

Dit klink moeilik, maar as jy 'n buisjie gaan sit en dink, dan is dit tog nie so moeilik nie!

Eerstens moet ons die data vir die graphic ontwerp en dit in 'n veilige plek stoor. Ons sal 60 000 as 'n gerieflike plek gebruik.

N.B. Indien hy 'n lang BASIC program gebruik, dan moet jy 'n CLEAR 59 999 gebruik om te sorg dat dit nie uitgewis word nie. (dis nou jou data vir die graphic!)

Die volgende program sal die nodige doen:-

```
10 FOR n=60000 TO 60007
20 READ d
30 POKE n,d
40 NEXT n
100 DATA 24, 126, 255, 255, 219, 255, 255, 85
```

Die program hierbo sal 'n PAC-MAN karakter in die geheue stoor. So as jy GKA-A print dan behoort dit op die skerm te verskyn, maar waar's dit?!

Die geheim lê in 2 geheue - blokkies - 23675 en 23676.
Hulle moet met 2 waardes gestoor word.

```
POKE 23675, n-256*INT(n/256)
POKE 23676, INT(n/256)
```

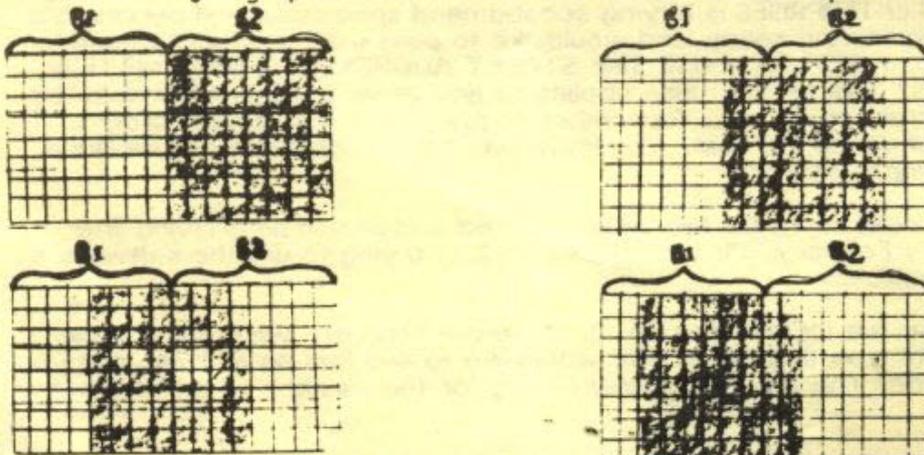
Waar "n" die waarde is waar hou graphics gestoor is. In hierdie geval is dit 60000. Probeer om nou weer hou graphic te print.

Uiteindelik het ons 'n graphic om mee te werk!

Die eerste probleem is dat 'n mens nie BASIC suksesvol kan gebruik nie. Dis geheel en al te stadig! Jy moet 'n vinniger taal aanleer soos Masjien-kode. Die artikels oor Masjien-kode deur D. Koux vind ek baie nuttig en ek glo julle sal nog baie baat daarby vind as hy met die reeks volhou. Mark Berkowits se artikels is ook goed, maar ek vind dat dit meer op die professionele programmeerder gemik is.

Keg, om terug te kom by die graphics. Ons graphic bestaan uit 'n blok van 8x8 blokkies. Ek het besluit dat ons die graphic 2 blokkies op 'n slag sal beweeg, want dit vereis minder dinkwerk! Om in BASIC hou graphic links of regs te beweeg is baie maklik, maar jy sal opmerk dat dit nie baie glad beweeg nie en ook onvoldoende is.

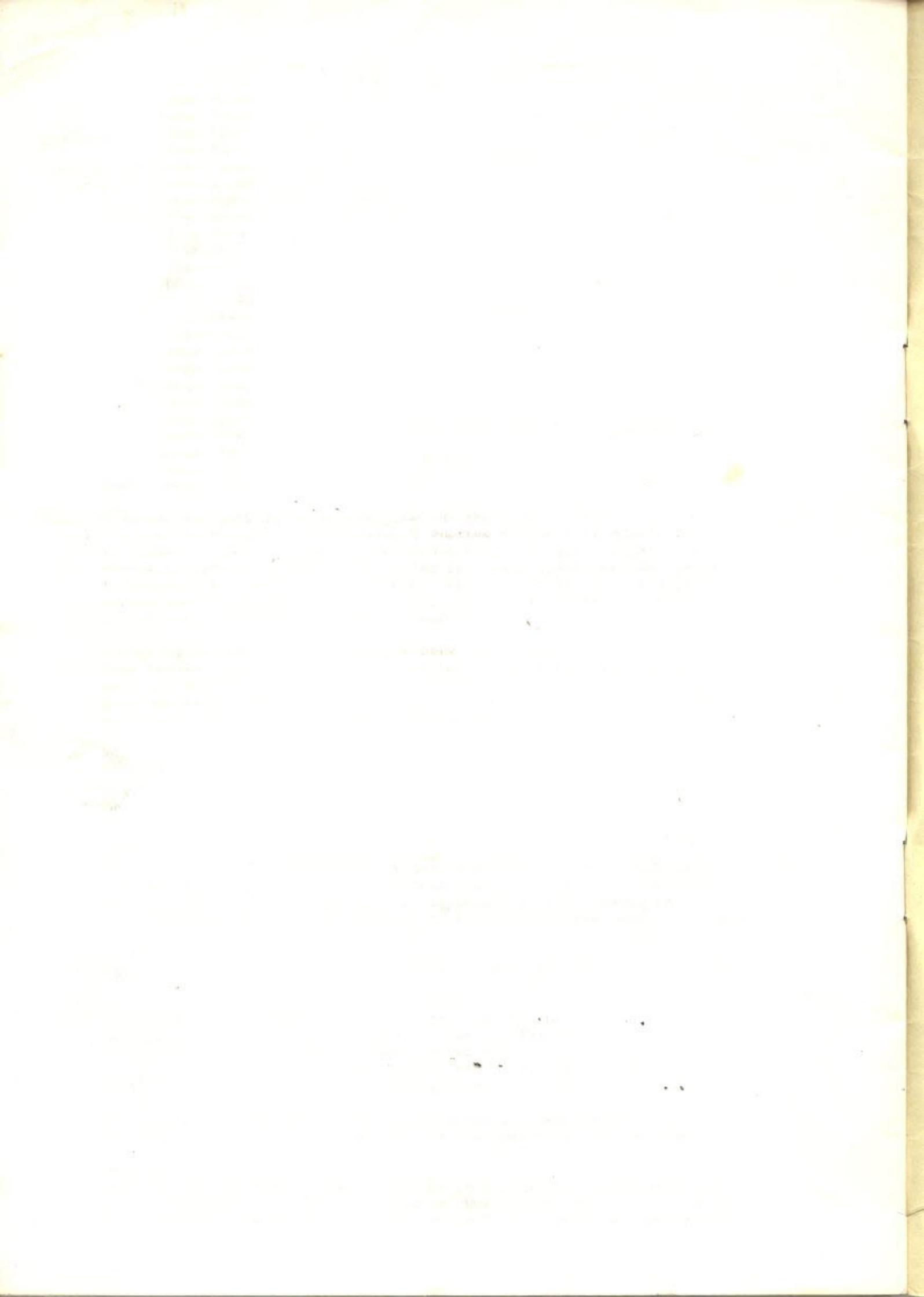
'n Maklike metode is om jou graphic in 2 blokke te stoor en dat dit op die skerm te PRINT:



m.a.w. - jy gaan 4 graphics nodig hê om die graphic gladweg links of regs te laat beweeg. Jy moet B1 en B2 langs mekaar PRINT. Daar is 'n eenvoudige formule om uit te werk hoeveel graphics jy nodig gaan hê:-

$$\frac{64}{x \cdot y} \quad (64/(X \times Y))$$

X = die hoeveelheid blokkies wat jou graphic op die X-as gaan beweeg
Y = die hoeveelheid blokkies wat jou graphic op die Y-as gaan beweeg



Next, to PRINT the character on the screen, load the A register with the character's ASCII value and use the ROM routine at 16. Instead of CALL 16, you can also instruct the CPU to RST 16. It functions in the same way.

To PRINT an "A" at the extreme top row, extreme right column, one would therefore use the ROM routines in the following way:

```
LD B,14      ;top row: equivalent of AT 0,x in Basic
LD C,2       ;right column: equivalent of AT x,31 in Basic
CALL 3545    ;calculate screen buffer address
LD A,65      ;ASCII value of "A" into A register
RST 16       ;PRINT "A" - equivalent of CALL 16
RET
```

This assembly program will function in the same way as PRINT AT 0,31;"A" in Basic.

Using the ROM routines are difficult, in this case, and require strange calculations for the row/column co-ordinates. It also cannot cope with graphics: when we write an arcade game, we definitely don't want to use a B to defend us against a deadly squadron of A's! Consider this piece of assembly program:

```
LD B,10
LD C,10
LD DE,CROSS
CALL PRINT
RET
```

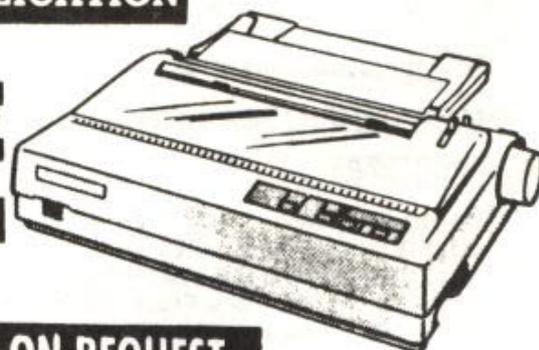
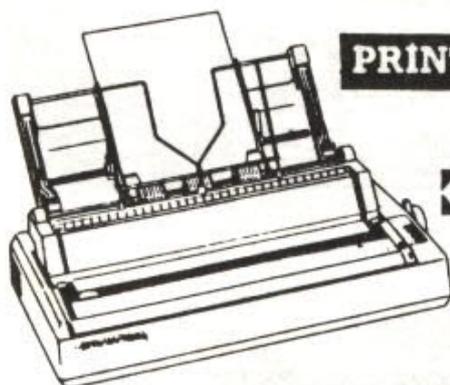
We have to read the row/column co-ordinates of a shape into B and C respectively, load a label called CROSS into DE and call a routine PRINT to actually print a cross on the screen at 10,10. This is much easier to use than the ROM routines - I will show you how to construct subroutines which will support this format.

To start off, I am going to use a look-up table to calculate the screen address of the row stored in B. The column value stored in C is then simply added to the address and the top of the character square is thus calculated. The top of the first character row starts at address 16384, the top of the second at 16416, etc. In fact, we can draw up a table in our assembly program and call it LOOK, for look-up, and list these values from the first to the 24th:

```
LOOK  DEFW 16384
      DEFW 16416
      DEFW 16448
      DEFW 16480
      DEFW 16512
      DEFW 16544
      DEFW 16576
      DEFW 16608
      DEFW 18432
      DEFW 18464
      DEFW 18496
      DEFW 18528
      DEFW 18560
      DEFW 18592
      DEFW 18624
      DEFW 18656
      DEFW 20480
      DEFW 20512
      DEFW 20544
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      DEFW 20608
      DEFW 20640
      DEFW 20672
      DEFW 20704
```

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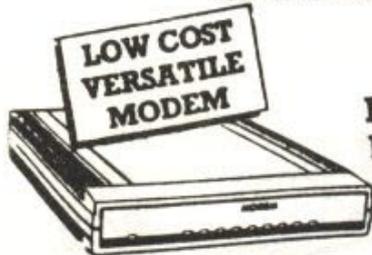
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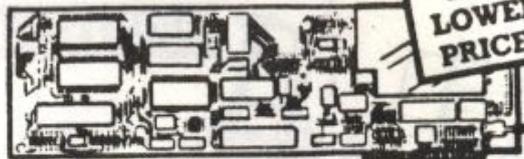
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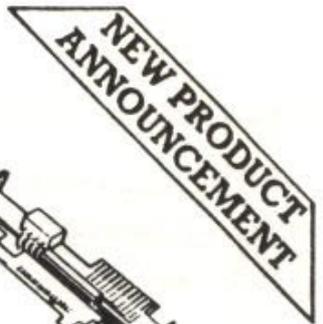
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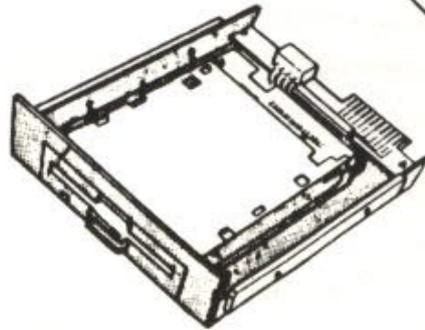


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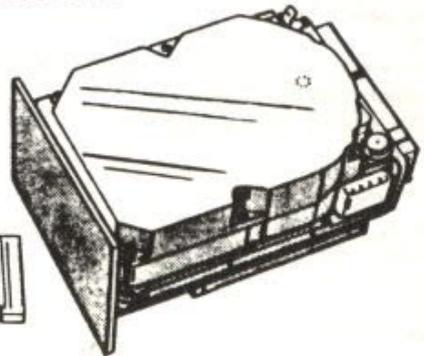
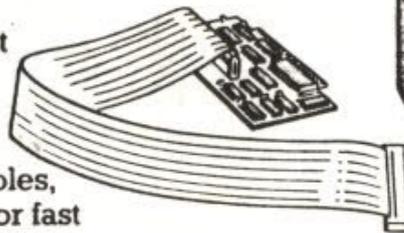


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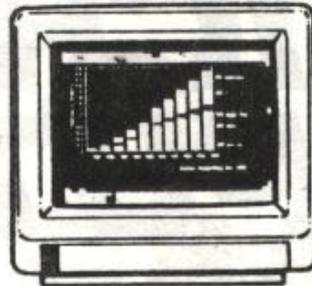
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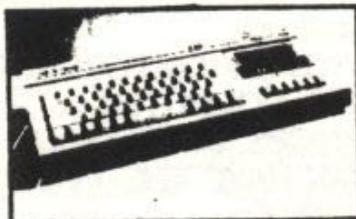
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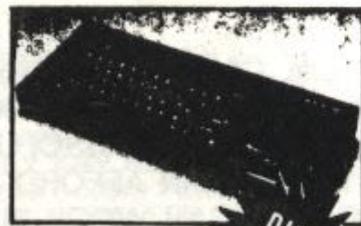
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8 colours background,
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Independently controllable border

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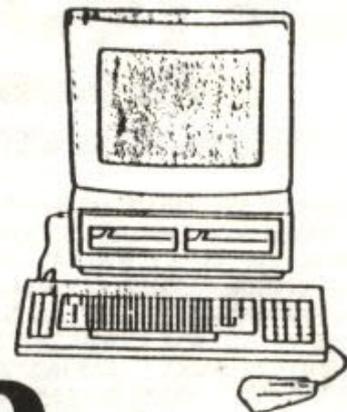
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HELP!! do you have any information on these two games - KENTILLA and MESSAGE FROM ANDROMEDA. Nicolas Vorster from Queenstown is having problems with them!

CAN YOU HELP? Mr Nel from Potch has the following system: Spectrum128K, Tasprint, The Style Writer, Phillips Monitor, Breakthrough Interface made by Arrow Research 1986, Seikosha SP1200. Have you been able to customise this program(s) for this system - for the Breakthrough Interface? Please Help.

GREMLIN INVASION! PLEASE HELP!! Michael Bishop from Kloof has the following problem- He scares the Gremlins into the vents with the camera and weld them all closed with the plates. But, they still keep coming! After Gizmo opened the locked door He sealed the last vent but he cannot block the broken window. How is this done and where do they come from? What use are the pipes and jointing tape, and how does he kill them? Any suggestions??

TASMAN TROUBLES!! Mr Janse v Rensburg from Kimberley has the following hitch - He uses Tasword PC 1.05 Word processing package. Do you know how to get rid of the space created by control K when printing mathematical and scientific symbols?

A very happy mushroomer sent us this letter. I think that we should share it with our other members in the Club.

I've been with the club for about 8 months now, and I must say, I'm impressed. For those of you who say that the club's prices are too high, or that it's a stupid idea for the club to ask members fees again, don't know what they are talking about! When I received the news that we must pay member fees again I didn't like the idea myself so I've done some enquiries about other clubs. There are a few, and I was surprised about their fees. One of the clubs asked R30.00 and the other two no less than R20.00. I say the Mushroom Club's fees are VERY reasonable and prices very low. So how is that for all you complaining members!?

This very encouraging note was received from Etienne Smith of Evander. Thank you Etienne.

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Here are some POKES for those of you who would like to get there more quickly:-

For all you Multifacial People!!

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Type in any access code!

RENEGADE

Infinite lives POKE 41048,195
no of lives x POKE 23343,x

WIZBALL

Infinite lives POKE 37052,0
Invincibility POKE 36831,0
POKE 36832,0
POKE 36833,0

Normal POKES

GUNFRIGHT

Stops bandit drawing in quickdraw mode
10 FOR a=1 TO
7: LOAD "" CODE:NEXT
a: POKE 47919,0: POKE
47920,0: RANDOMIZE USR
23424

TARGET KENEGADE

When entering your name use the J,K & L keys as you would in Decathlon, except using all 3 keys. The writing should go over your score, and when it does, push ENTER. You'll return to the game immediately, with infinite lives!

Now that the computer has these addresses stored and the assembler knows where they start, it is possible to write a routine which calculates where the top of a character square is using B and C as row/column pointers. I called this routine CALC for calculate.

```

CALC  LD H,0
      LD L,B           ;load HL with B (row)
      ADD HL,HL        ;multiply by 2
      PUSH DE          ;store value in DE
      LD DE,LOOK       ;DE=start of look-up table
      ADD HL,DE        ;Add row to start of look-up table
      LD E,(HL)
      INC HL
      LD D,(HL)        ;screen address stored at that address into DE
      EX DE,HL         ;put the result in DE in HL
      LD D,0
      LD E,C           ;DE loaded with C (column)
      ADD HL,DE        ;add row to column
      POP DE           ;retain initial value of DE
      LD B,8           ;is going to be used later
      RET

```

After CALC has calculated the top of the character square, a routine is needed to do the printing of the shape (e.g. the cross in the example). I decided to call the routine SHAPE.

```

SHAPE LD A,(DE)        ;A contains byte at DE
      LD (HL),A        ;load screen address with that byte
      INC DE           ;next byte of shape
      INC H            ;add 256 to screen address
      DJNZ SHAPE       ;repeat until B is 0
      RET

```

It may be worth the effort to include a routine which prints a blank so that the shape can be wiped. I called this routine WIPE.

```

WIPE  LD (HL),0        ;load screen address with 0
      INC H            ;add 256 to screen address
      DJNZ WIPE        ;repeat until B is 0
      RET

```

Finally, the PRINT routine which calls all these routines in sequence:

```

PRINT PUSH BC          ;to prevent it from being corrupted
      CALL CALC
      CALL SHAPE
      POP BC
      RET

```

And a routine to print a blank:

```

BLANK PUSH BC
      CALL CALC
      CALL WIPE
      POP BC
      RET

```

Even if you understood nothing of these routines, you can still use them by loading E and C with row/column and calling PRINT or BLANK. If PRINT is called, DE will need the label value of the graphic data.

In the example case, you will need to define the data for the cross and label it CROSS somewhere in the assembly program:

```
CROSS DEFB 24,24,24,255,255,24,24,24
```

If you want to print your shape by the pixel, and not by the character, you will need to define a look-up table of your own with the screen address values from 0-175 for row. It will be necessary to call the routine which calculates the screen address before each byte which is poked into the screen memory.

Faint, illegible text at the top of the page, possibly a header or title.

Several lines of faint, illegible text in the upper middle section.

Another block of faint, illegible text in the middle section.

A section of faint, illegible text in the lower middle section.

A section of faint, illegible text in the lower section.

Faint, illegible text at the bottom of the page, possibly a footer.

TEST YOUR KNOWLEDGE - WHAT IS:-

1. Special circuits which convert the signals from a computer into a form other electronic equipment can deal with, and vice versa.	(9)
2. Character at CODE 85 (Print CHR\$ 85).	(1)
3. A system of computers, sometimes with other computer peripherals, linked together to share information.	(7)
4. A high-level programming language used mainly by scientists and mathematicians.	(7)
5. Character at CODE 78.	(1)
6. Any information the computer gives you.	(6)
7. This function gives the natural logarithm of a value.	(2)
8. At the end of a subroutine, tells the computer to go back to the instruction after the one where it left.	(6)
9. Character at CODE 90.	(1)
10. A code consisting of abbreviated instructions used as an aid to low-level programming.	(9)
11. This function checks the status of the keyboard and other input and output devices. It reads a byte from a given port address that indicates the status of the device connected to the port.	(2)
12. Moving pictures on the screen.	(10)
13. Character at CODE 65.	(1)
14. An electronic component which stops or sends the pulses in the circuits of a computer, depending on the pulses it receives.	(10)
15. This command may be used in an INPUT statement. -- 0,0 displays at the start of the line above the bottom line and the display scrolls up if more than two lines are displayed.	(2)
16. A special part of the computer's permanent memory (ROM) where instructions in a programming language are converted into machine code.	(11)
17. Is the second part of a statement/command which makes the computer loop back through the program and repeat any instructions inside the loop a fixed number of times.	(4)
18. Allows you to alter a line in a program without typing in the whole line again.	(4)
19. Character at code 70.	(1)
20. Wipes the program from the computer's memory to clear it for the next program.	(3)
21. The first part compares pieces of data (e.g. numbers or words or the contents of variables) and does different things depending on the results.	(2)
22. The second part mentioned in 21 above.	(4)
23. Character at CODE 75.	(1)
24. When this message is flashed up on the screen by the computer it is telling you that there is a bug in the program.	(5)
25. The computer ignores lines starting with this statement.	(3)
26. First word of the Mushroom Club.	(2)
27. Short for picture elements.	(6)
28. The memory inside the computer where the program and data are stored.	(3)
29. Is a way of getting the computer to ask you for data while program is running.	(5)
30. A series of characters for storing in a variable.	(6)
31. One of the two digits (0 and 1) that make up the binary code.	(3)
32. Another word for ESCAPE from a routine (not available on the ZX).	(4)
33. An alternative to a Monitor.	(2)
34. In a computer, this is a pulse single or a no-pulse single.	(3)
35. This command specifies the foreground colour in which characters are displayed.	(3)
36. This function calls a user-defined function.	(2)
37. Puts a variable label on a memory space and puts some information in it.	(3)
38. Character at CODE 84.	(1)
39. Acts as a logical operator to test the truth of a combination of conditions.	(2)

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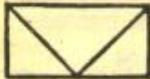
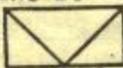
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