

You know, a lot of people ask me why I write under such a silly name. This is a jolly good question, and I for one would certainly like to know the answer.

In the meantime however, we have reached an interesting point in our great quest to understand machine code. We have covered enough of the ground rules to start thinking about writing our own programs. A great day indeed!

Before we continue we'll need one or two little extras. I know many months ago I said you could probably do without an Assembler, but the time has now come to rush out and buy one. To be honest, if you have read this far in the series you are either interested, my mother or my editor.

If you are interested, then the time has come. Open that piggy-bank. Search behind the sofa for loose change. Tell your parents that you're going on hunger strike until they give you a raise in pocket money. Write thank-you letters to all your relatives for last year's Christmas presents and explain that you have a deep and important need for something to improve your education.

And once you have the dosh, here is what you do. Send it to me, care of the editor. Well no, I suppose you'd better not. I'd only spend it. What you should do is start reading your local paper.

You'd be surprised how many people are selling CPC equipment for one reason or another. It's the perfect opportunity to expand your own system for minimum cost.

Failing the second hand market, you'll have to buy a brand spanking new Assembler. Several advertisers in recent copies of your favourite mag (that's this one, by the way) will be happy to exchange your cash for a disc, tape or ROM with an Assembler such as MAXAM on it.

You will also need some reference books. The first can usually be obtained from your local library, and is called something like "Learn Z80 machine code". Ask the librarian to order you one if it's not currently in stock, it shouldn't cost you anything.

You'll need it to list all the possible Z80 instructions that you can use in your programs. There just isn't time or space to list them all here, so such a book will come in very handy.

The second reference guide is something you will need if you want to become rich and famous like me. It's called "The CPC Firmware Guide" and without it, you'll be forever in the dark. This one is quite expensive, so ask around at computer clubs to see if

someone will lend you a copy. Eventually of course, you'll really need one of your own. The Amstrad User Club will help you out here.

Ok, so we have all the books and an assembler. Where do we go from here? First off, let's look at an enquiry I received from a would-be machine code programmer. The programmer in question was worried that by POKEing around in memory, he could accidentally break something.

Let me put your mind at rest: there is nothing you can type from the keyboard that will damage your computer in any way. Even if your program suffers an amazingly awful crash, just switching it off and then on again will enable you to start all over again. The

**Your favourite
relative explains what
an Operating System
is, and how you can
use it.**

The Wizard Of OS

only delicate parts of the CPC set-up are the discs and tapes. Remember to remove them from the computer before switching off or you may corrupt the data stored on them.

Now, let's have a little POKE around in memory and see what happens. Try this little program-ette:

```
10 MODE 1
20 POKE &C020,255
RUN
```

See what happens? A tiny line has appeared at the top of the screen. The reason for this is that the area of memory we POKEd just happens to be that used by the video display. We didn't break anything, or damage anything. We just POKEd some memory that wasn't expecting it. Remember that the "&" symbol just means that the number following it is in hexadecimal. Try this program for some more fun. Instead of just one little byte of screen

memory being changed, it will write to the entire screen. You can learn a lot about how the screen display works just by watching this program in action.

```
10 MODE 0
20 A = &C000
30 FOR B = 1 TO &4000
40 POKE A,INT (RND*256)
50 A = A + 1
60 NEXT B
70 CLS
```

If we POKE somewhere lower down in memory, say between &4000 and &8000, we won't see anything. When you switch on your CPC this memory is empty, just waiting for something to come along and use it. It's a darn good place to store machine code programs.

However, if you start to POKE around in lower or higher memory addresses, you may get yourself in trouble. Although you might not believe it, your CPC is always running a machine code program. Even when you think it's not





doing anything, there is still a program running all the time.

This program is called the Operating System or OS, and it takes care of all the mundane bits and pieces like keypresses and updating the screen. If you accidentally POKE into these areas, the OS will get very confused. So confused that it will crash. Now you'll have to switch off and start again.

Problem time again. How do you think we can put a letter "A" on the screen? Come to think of it, how does the CPC normally write letters and numbers to the screen?

We saw from the example listings above how we could write to the screen memory directly. In theory, we could therefore POKE the correct patterns of pixels onto the screen to make the shape of a letter.

Thankfully, there is a better way. It's our old friend the Operating System. The engineers who designed the CPCs knew that sooner or later, machine code programmers would want to write characters onto the screen. They knew also that they needed to do it them-

selves. So they designed a machine code routine to do it. Then they placed it in a ROM and built it into every CPC you can buy.

The routine is at address &BB5A, and it works by being supplied with an ASCII code in the A register.

What's that? You don't know what an ASCII code is? Sigh. Look up the back of your CPC guide. There will be a list of all the letters, plus the digits and punctuation marks. Each one will have a special number. These are the ASCII codes.

The letter "A" has the ASCII code of (decimal) 65. So here is a machine code program to write a letter A on the screen.

```
LD A,65
CALL &BB5A
RET
```

Incredibly simple, n'est pas? The Operating System can come in useful after all!

Next month we'll look at some other wonderful things the OS can do for us, so until then, keep POKEing!

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