

5.3 Important PC Concepts To Understand

The world of computers has many concepts that may be foreign to you. For example, what is PCI and ISA? What is SATA and IDE? Or what's PCI Express and AGP? What is 802.11g and 802.11n? All these bits of computer jargon can confound the best of us, so I'm going to try to explain some of these concepts here to help you out.

5.3.1 Software

First up, I'd like to talk about software in a computer. The physical components in a computer, i.e. the CPU, motherboard, RAM, etc. are known as hardware. Software can be thought of as any set of "instructions" that the CPU uses to execute tasks. These instructions are usually organized into packages called software - they could be your applications or your games.

The most important piece of software (and often the largest) in your computer is the operating system, (e.g. Windows Vista or Windows XP). There is another category of software, called drivers, which determine how your hardware interacts with the operating system and other hardware in your computer.

This is why when you buy and install a new piece of computer hardware, you usually need to install a "driver" - it is to tell the rest of the computer "Ok, I've got a new piece of hardware and this is how you're going to talk to it".

5.3.2 Circuits

Next up, we look at circuits. When we speak of computers, we often hear of the word "circuit". What is a circuit? Well, a circuit is simply a path something follows to get somewhere, eventually leading back where it started from. In the world of computers, electricity travels along those circuits.

Now, circuits are usually organized together into special designs on a "printed circuit board" or PCB. A PCB is a piece of fibreglass with many circuits laid out on it. Some components on a PCB include "integrated circuits" or ICs. ICs are simply little chips of silicon that have built-in logic to perform specific instructions on their own (this is where the term "Silicon Valley" comes from).

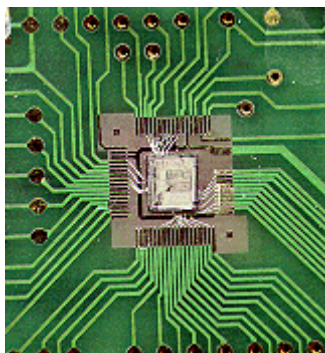


Figure 47: A picture of integrated circuit on a PCB

These ICs are connected to the PCB by little wires so that information can be passed from the chip to the board and vice versa. Your motherboard, incidentally, is one huge and gigantic PCB. You can imagine the millions of little chips and circuits contained in that motherboard.

5.3.3 The Bus

Ok, another term that might keep coming up when folks talk about computers is the "bus". No, not the bus that brings you to school or the vet. It's the computer bus. What is this bus? The computer bus can be thought of as traces that connect pins of one component to another.

The bus used in computer systems these days is the PCI bus, with the older ISA bus almost obsolete. The key difference between PCI and ISA is that PCI supports "Plug-and-Play" - which means that you can hook up a new piece of hardware into the system and the computer automatically configures itself to use it (without requiring a shutdown and reboot).

5.3.4 Resources

A personal computer also works using the concept of "resources". Resources help to determine whose turn it is to exchange data in the system. In particular, an Interrupt Request Queue (IRQ) port is considered a resource. Each component or device in your PC is assigned an IRQ port (which can be 0 to 15).

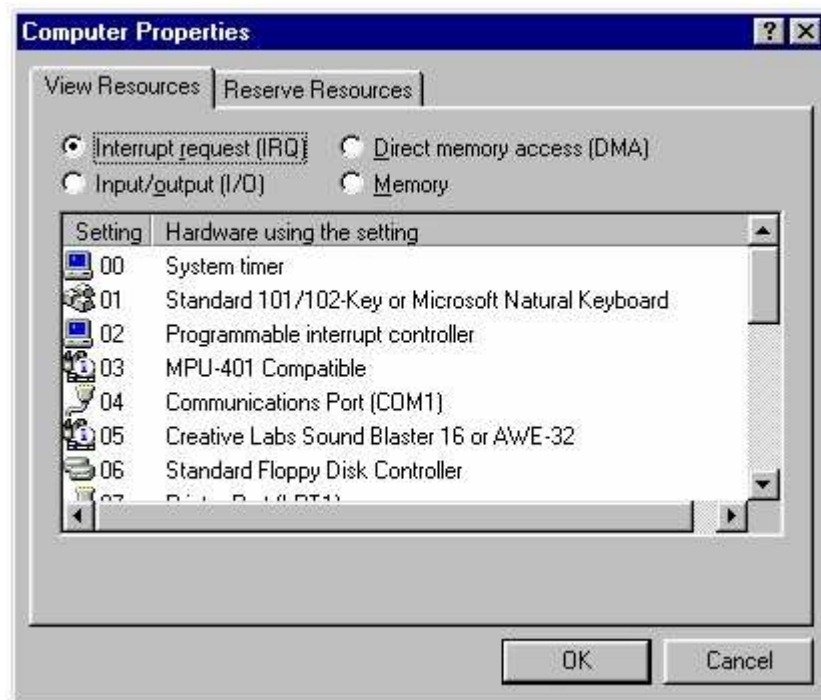


Figure 48: Computer properties listed by IRQ

When a component or device wants to pass some data or transmit a message to another component or device, it will "tug" on the IRQ line. The CPU will get alerted of this and depending on how urgent that request is, the CPU will entertain it. Once the CPU gives the ok, the component or device will be able to transmit information via the system bus. Another type of resource is the I/O port (Input Output port) - which is used by the PC to transmit information to and from devices like the display monitor, mouse or keyboard.