

Lifestyle

Computer components explained

For the next few weeks, we'll be taking a look at the main components of computer systems, both hardware, and software.

The distinction between hardware and software is difficult to grasp at first, but the easiest definition is that hardware is something tangible. Hardware is solid, it has volume; you can go up and touch it. Software is not tangible; it's there, but you can't see it or feel it. A few weeks ago we talked about an analogy between computers and a stereo system. Using that analogy, the stereo system itself would be the hardware, and the software would be the music we want to be listening to.

At the heart of a computer's hardware is the Central Processing Unit, or CPU. The CPU is usually a single micro-chip - a square wafer of silicon that is packed in a small black plastic housing about an inch square. Amazingly, out of all the computer suppliers in the world, the vast majority of them have CPU chips made by one of only two companies: either Intel or Motorola. Intel CPU chips are used in all PC's and PC compatibles. Motorola chips are best known for their use in mini-computer systems, but they are also used in the Apple Macintosh.

When selecting a computer, the two things to look at concerning the CPU are the model number of the chip, and the speed. The most common Intel chips are the 8088, the 80286 and the 80386. The 8088 is the oldest of the three, and is not powerful enough to run much of the currently popular software. The 80386 is the most powerful of the three, and is best



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for all power-hungry applications. The 80286 is in between; powerful enough for most applications, yet still reasonably priced. Because the 80386 was quite expensive, and the 80286 not always powerful enough, Intel introduced a chip called the 80386-SX. This chip has most of the features of the '386, but is quite a bit less expensive. It is a good compromise, and computers based on this chip are becoming extremely popular.

Another recent product from Intel is the 80486, which as you can guess is a still more advanced member of the same product line. The 80486 has enough power to allow PC's to seriously challenge the computer power of mini-computers - machines that can be used to run small to medium-sized companies, or whole departments of large companies. The 80486 is available now

in several machines, but has yet to reach any degree of popularity.

The speed of a CPU chip is called the clock rate, and is measured in mega-hertz, or MHz. At the slow end of the spectrum, we have the 8088's, running at 4.77 or 8 MHz. At the other end, we have 80386's running at up to 33 MHz. Just remember that you must take into account both the clock rate and the model number of the chip: for example, a 16 MHz '386 will do a lot more work than a 20 MHz '286.

In the Motorola camp we see a very similar scenario, just with different model numbers. The main CPU chip family from Motorola is the 68000 family, with models numbered 68000, 68020, 68030, and 68040. There was a 68010 as well at one point, but is no longer common. The 68000, the oldest member of the family, is still used in many systems, including some members of the Apple Macintosh line. The other chips, ranging up to the 68040, are used in increasingly powerful computers from Apple, and from many other vendors. The 68040 can power a computer large enough to handle many dozens of users.

The next most significant element in the computer's hardware is memory, and we'll be taking a look at that next week.

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