

## How Much Smaller Can PCs Get? As It Turns Out, a Lot

We've all seen photos from the 1970s of the giant computers that filled an entire room. And usually, those photos are met with astonishment as we look at the computers we use today, from the desktop at work to the smartphone in our hand. How is it possible that computers have gotten so small, yet so much more powerful — and so much less expensive?

As much as we believe that the computers are today are about as small as they can get, there's a good chance that our great-grandchildren are going to look back at the computers of 2016 and think "Wow, those things were huge!" As computer components get smaller and we develop new ways of building more powerful machines on a smaller scale, it's possible that at some point, your desktop computer could be smaller than a deck of cards.



### The Desktop Revolution

Any discussion of the size of computers should begin with the desktop, still one of the most ubiquitous types of computers in the world. While laptop and tablet sales have outpaced desktops in recent years — and those have gotten thinner and lighter in their own right — desktop computers have arguably come the farthest in terms of size.

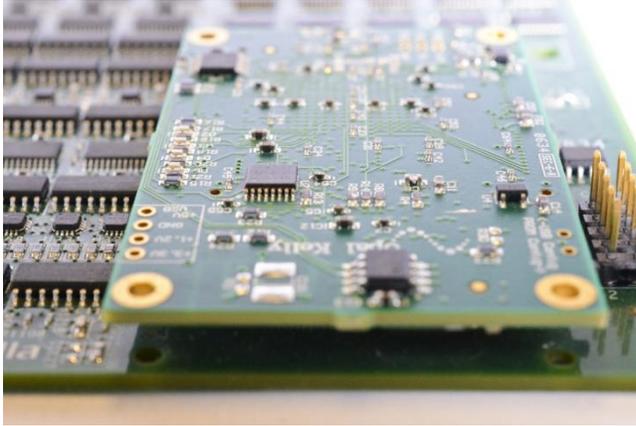
The earliest desktops consisted of a CPU tower and a monitor, with the first CPUs not much smaller than a piece of furniture. These towers needed to be that size, since in the early days, every one of the computer's functions required a different module; the CPU was filled with cards for graphics, video, sound, networking, even to run a printer, as well as various drives. All of these physical modules also required space for cooling and a fan, meaning that the tower needed to be large enough to hold everything.

These days, though, developers have figured out how to combine the various functions into a single device, adding [efficient and inexpensive 16-bit microcontrollers](#) to the motherboard for networking and communications as well as other processors and chips for various functions — and anything that isn't built into the motherboard can be operated via USB. In addition, modern components need less cooling than older ones, so there is less need to include all of the extra space and fans.

The result is computers that are significantly smaller than what we are used to, with more computing power. How small? Well, there are some CPUs that are as small as a typical candy bar, and can actually connect to the back of a standard LCD monitor. While there are some limitations to smaller machines,

such as challenges in working within the machines due to their small size and the potential for them to create more heat, the overall trend is toward smaller machines.

The question remains, though, can computers get even smaller?



### **Chips Are Getting Smaller**

According to most experts, smaller computers are going to be the name of the game in the future — and it's not just within the realm of desktops either. [Chips are getting smaller](#), thinner and more powerful as well, paving the way for even smaller computing devices. Currently, Intel is working on a chip that is 10 nanometers thick (a human hair is about 75,000 nanometers), their smallest chip yet. The chip will have full functionality, but it's only the

beginning of the story.

Until now, most chip designers have looked at the technology in the same way, putting all of the hardware and functionality into the same general box shape, and powering the chips the same way. As chips are designed to be ever smaller, though, developers are pushing the boundaries of creativity. It's possible, then, that within the next decade we could see ultra-low-power chips powered by everything from radio waves to human sweat. And thanks to the cloud, the need for greater computational power on the chip disappears, with chips being able to be controlled from a central system within the cloud. This technology will pave the way for more powerful wearable, devices, for example, with stronger sensors and a wider range of analytical abilities.

So while the idea of a computer the size of a stick of gum or a paperclip may seem like something from a science fiction movie, the reality is that it's actually not too far off in the future . . . and it's entirely likely that in the distant future, computers will be even smaller.