# How to find the best storage, memory, and processor to build the best computer possible

https://www.crucial.com/articles/pc-builders/how-to-build-a-computer

There has never been a better time to build your own PC, but where’s the best place to start? Determining what you want to get out of your new computer is the first step and it guides the rest of the process. When you know what you want from your computer, you’ll know what you need from your hardware, which is the source of your computer’s performance. Get the most performance for less by investing in the right components from the start. That’s when you can begin to build.

## What do you want to build?

It’s easy to get overwhelmed with all the possible variables in a PC build. Do you want to build a PC to save money? Or do you want to reach the highest levels of performance? The common thread with each of these scenarios is the hardware – the motherboard, processor (CPU), storage (hard drive or SSD), and memory (RAM). The “guts” of the computer have the most impact on your system’s performance, while the other components like the case, operating system (OS), monitor, mouse, power supply, and keyboard have a much smaller impact on how the computer runs, though they’re still important.

## The key components you’ll need

Once you’ve decided what kind of PC you want to build, you can begin to research and purchase the hardware you need to fulfil your plan. Here are the essential parts:

### Motherboard

A motherboard is the first component you’ll want to choose. The motherboard dictates the physical form factor and size of your PC build, but it also determines what other pieces of hardware the computer can use. For example, the motherboard establishes the power of the processor it can handle, the memory technology (DDR4, DDR3, DDR2, etc.) and number of modules that can be installed, and the storage form factor (2.5-inch, mSATA, or m.2) and storage interface (SATA or PCIe). While you will want to choose your motherboard based on other compatible components, the motherboard should be your starting point.

### Processor/Central Processing Unit (CPU)

The CPU is the engine of your computer and sets the performance expectations for the entire build. Memory and storage fuel the processor, which controls every data transaction within the PC. When you’re determining which CPU to install, pay attention to the gigahertz (GHz) – the higher the GHz, the faster the processor. However, more GHz also means the CPU consumes more energy, which could lead to higher system temperatures that require better airflow or heat dissipation within the computer.

### Memory (RAM)

Adding memory (RAM) is one of the fastest, easiest, and most affordable ways to amplify the performance of the computer you’re building because it gives your system more available space to temporarily store data that’s being used. Nearly every computer operation relies on memory – that includes having several tabs open while surfing the Web, typing and composing an email, multitasking between applications, and even moving your mouse cursor. Even background services and processes, like system updates, can draw from your RAM and that’s why it’s important to have as much memory as possible. The more things you’re doing, the more memory you need.

Choosing the best RAM for your system involves two things: compatibility and how much RAM your system can support. First, for compatibility, identify the kind of module your system uses by identifying the form factor (the physical form of the module – generally, desktops use UDIMMs, laptops use SODIMMs), then figure out the memory technology (DDR4, DDR3, DDR2, etc.) your system supports. Second, your system can only handle so many GB of memory, and that depends on your system. If you buy 64GB of RAM and your computer can only handle 16GB, that’s 48GB of wasted memory you can’t take advantage of.

## Storage

Your files and data are saved long-term on your storage drive. This data is held on either a hard disk drive (HDD) or solid state drive (SSD). Although hard drives generally give you more storage space (in GB), SSDs have essentially made them outdated – SSDs are on average 6x faster and 90x more energy-efficient than hard drives.

The speed discrepancy comes from how the two storage devices read and write data – read and write speeds measure how fast data loads (reads) and saves/transfers (writes). Hard drives use small mechanical moving parts and spinning platters to do this, and SSDs use NAND flash technology. The difference results in better speed, efficiency, and durability because small mechanical parts and spinning platters are much more susceptible to physical damage than NAND. Your data is accessed faster and preserved longer on SSDs because of this difference.

## Case, fans, and power supply

Depending on the kind of PC you’re building, you’ll also need to adjust what you’re looking for with a case and power supply. If you’re creating a high-powered performance workhorse, you’ll need a robust power supply to make it all run, and a case with optimal internal airflow and fans to expel hot air that could potentially damage the system. Zip ties are a massive help with managing all the cables inside your rig, and consolidating the cables helps improves airflow.

## PC building on your budget

The amount of money you spend on the parts of a computer will vary. If you’re building a PC to save money, you’ll probably want to at least match the performance of a store-bought desktop or laptop while spending less. If you’re going for the best possible performance in all of your PC components, expect to pay more. Faster processors cost more than slower ones, and memory and SSDs with more GB cost more than those with fewer GB.

Since memory and storage are a large part of the cost within a new computer, building your own PC gives you a chance to save on these components by adding your own. While RAM and SSD costs rise with the amount of GB they offer, they are less expensive than buying pre-installed (and often inadequate) components that you’ll likely need to upgrade quickly.

## How to build your PC

When you put all the parts together, make sure you have plenty of room to keep your build organized. Be aware of static electricity as you build – it’s one of the few ways the hardware can be damaged but it’s easy to avoid. Frequently ground yourself by touching an unpainted metal surface or wear an electrostatic discharge (ESD) wrist strap to protect your system’s components from the static electricity that’s naturally present in your body. It’s also helpful to keep a can of compressed air to remove any dust or fine debris from the interface as you’re installing the processor, memory, and SSD.

## Adding the hardware

For instructions on installing the processor, power supply, and putting the motherboard in the case, consult each component’s owner’s manual. The act of installation or assembling parts isn’t complicated, but there is the potential for errors to occur. That’s why it’s best to follow the more detailed step-by-step instructions for each specific part.

### Installing the memory

RAM is the easiest hardware to install when you’re building a PC. Locate the memory slots on the motherboard. Hold your memory modules on the side to avoid touching the chips and gold pins. Align the notches on the module with the ridge in the slot then firmly press the module in until it clicks. As you’re pressing, note that it takes about 30 pounds of pressure to fully install a module.

### Installing the HDD or SSD

Depending on the form factor of the SSD you’ve purchased (2.5-inch, mSATA, or M.2), installation requires attaching the drive to the storage interface, then fitting it into the drive bay (if it’s a 2.5-inch SSD). If you’re looking for the largest capacity possible and have an extremely tight budget, a hard drive may be an attractive option.

## Time to boot up your new computer!

Once your system is assembled, it’s time for the big moment – hit the power button! Make sure your monitor and keyboard are connected to the PC, and if everything worked correctly, a screen will appear where you can enter the system BIOS. If you have a disc or flash drive with an OS, put it into the appropriate drive, boot up, and you can install the OS. At this point, the assembly is over – congratulations, you’ve now built your own PC! Way to go!