How to Build a Computer

Introduction

Building a gaming PC from scratch is a rewarding task that uses technical and problem-solving skills.

Audience

The audience for these instructions is computer science students who are interested in assembling a PC. Whether you're a gamer looking for the satisfaction of playing on a machine you've built yourself or it is just a hobby, and you are looking to customize your setup, this guide is for you.

Benefit

The benefit of someone following this set of directions is the ability to select components that fit your specific needs and budget. Creating your own PC is a lot cheaper than buying one that is already built. Building your own PC also provides a deeper understanding of the hardware, which can be important for troubleshooting and upgrading certain parts in the future.

Before You Begin

Ensure you have a stable internet connection to be able to use the PC after competition of the build, a power source to run the PC, and the patience to wait for parts to arrive. It's also important to have a clean workspace with all the necessary tools and components laid out and ready to assemble.

Safety Measures

Safety measures are also important to think about when building a computer. Static electricity can damage components, so consider using an anti-static wrist strap. Also, make sure your workspace doesn't have any food and liquids to avoid spills on sensitive electronics.

Tools

The tools and items you may need include a Phillips head screwdriver, flathead screwdriver, scissors, tweezers, zip ties for cable management, and a clean cloth for wiping down parts. Optionally, an anti-static mat can provide an extra layer of protection for your parts.

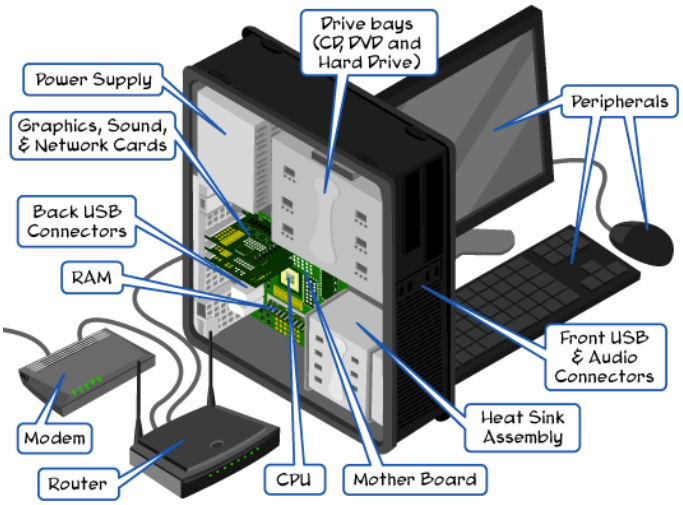
Step 1: Doing Research and Ordering Parts

Here are the components you need to build a gaming PC:

- Computer Case
- Central Processing Unit (CPU)
- Graphics Processing Unit (GPU)
- Motherboard
- Memory (RAM)
- Storage
- Power Supply Unit (PSU)
- System cooling (Fans)
- Gaming peripherals

Make sure all the parts are compatible. For example, the case must be large enough to fit all of the parts and all of the software must be able to work together.

After doing research you will need to order all of the parts to the location where you will be building the computer.



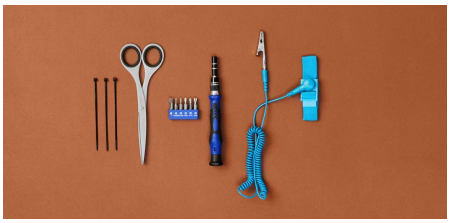
The diagram above has labeled all of the different components to make a computer.

Step 2: Organizing Parts and Tools

Once all of the components arrive, you will need to locate the following tools:

- flathead screwdriver
- scissors
- zip ties

Each of these tools will be necessary while building the computer.



Next, you will take all of the parts out of their packaging and lay them out as seen to the right.

Step 3: Setting up the Case

You can set up the case by following the directions on the manual that comes with it upon purchase.

Directions will probably touch upon:

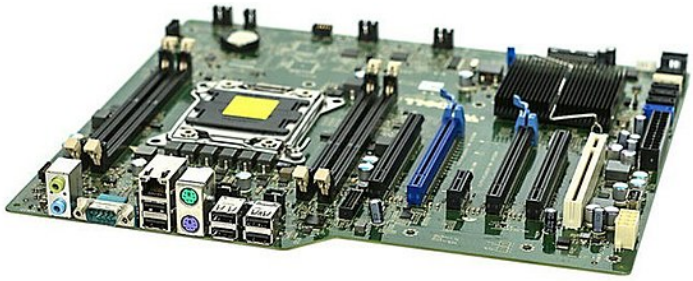
- Collecting screws and clips that come with case
- Clean out the case of any dust or debris
- Take a note of any existing cords in the case
- Install fans that would be hard to install after the rest of the parts are put in.

You can notice the pre installed cords in the figure to the right.

Step 4: Installing the Motherboard

When installing the motherboard, you will need the screws that you gathered from the case.

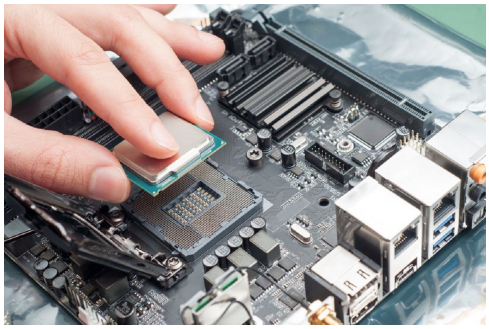
a. Put the studs onto the chase where you wish to put the motherboard
b. Place motherboard with the cord plugins facing the outside of the case
c. Carefully screw in the motherboard, using at least 5 screws to and ensure that it is secure and will not shift.

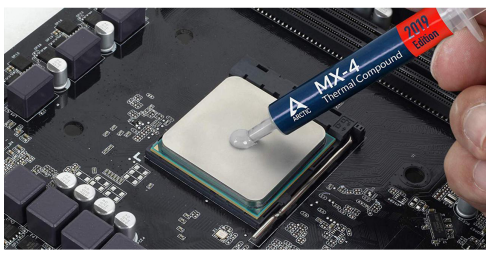


Above is a motherboard before being put into a case, missing a cpu and ram.

Step 5: Installing CPU

This Step is the step that requires you to be most careful/delicate.



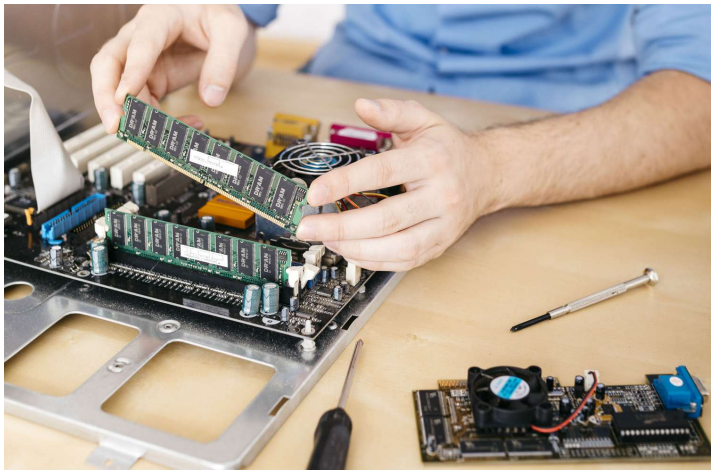


a. Socket Lever: Lift the retention lever on the side of the CPU socket to open it
b. Align the CPU: Match the CPU's corner with a triangle mark to the triangle on the socket(gentle)
c. Install the CPU: Gently place the CPU into the socket without force; it should sit flat and slide right into place.
d. Secure the CPU: Lower the retention lever back into place to lock the CPU.
e. Apply Thermal Paste: If the CPU doesn't have pre-applied thermal paste, apply a penny-sized amount to the center of the CPU.
f. Install CPU Cooler: Align the cooler with the mounting brackets and secure it according to the cooler's instructions; plug the cooler's power cable directly into the motherboard.

Step 6: Installing Ram

You install the GPU into the railroad looking section of the motherboard.
This part is very strait forward, you just have to align the triangle side of the ram with the triangle opening of the motherboard and then press until you hear a click.

You may have to apply a decent amount of pressure to hear the click so don't worry, these are very hard to break.



Step 7: Installing the memory

When installing the memory, you go to the SSD section of the motherboard and simply insert the chip side of the card into the motherboard, press down and then screw it down using the predrilled hole.

Step 8: Power!

Steps to installing Power Supply:

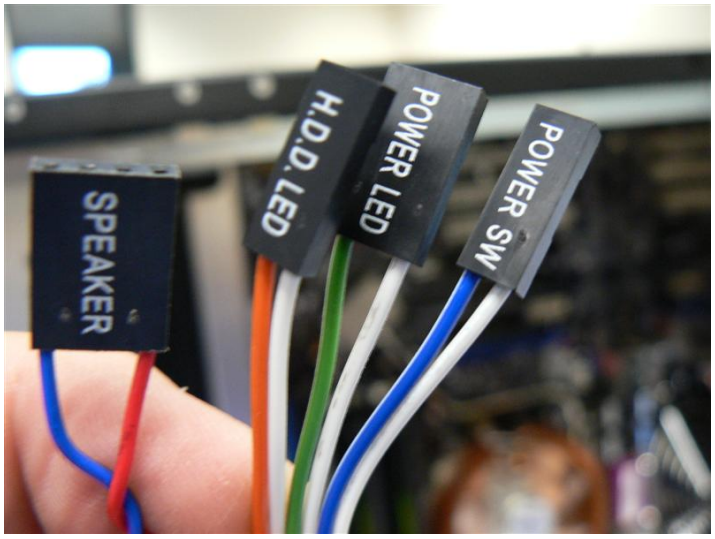
a. Slide the power supply into its bay
b. Use screws to attach the power supply to the case
c. Attach the main power connector (24-pin) (the big one) to the motherboard and the CPU power connector
d. Plug in power connectors to other components such as video cards, hard drives, SSDs, and optical drives as needed
e. Cable Management

Step 9: Plug Case into Motherboard

The following couple cables can be very confusing, but it is one of the last steps before having a working computer.

Every computer/motherboard/case is different so for this step you will have to consult the owner's manual for the motherboard and case to see where each of the cords belongs.

If these are placed in the wrong way the computer will not turn on.



Sept 10: Final steps

When putting the finishing touches on the PC you need to do the following:

a. Do final cable management
b. Add LED lights if desired
c. Install extra fans to increase cooling
d. Wipe down inside and outside of case
e. Screw in the case to close it up
f. Put the case at your desk
g. Plug in all of the wires for power and PC accessories

Conclusion

For future maintenance, you will need to check your pc every 6 months and clean out dust. If you ever wish to update your computer with a better part, all you need to do is verify that the new part is compatible and install it. Now that you have completed all of the steps you can enjoy your new computer!

Citations:

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