



Building a Computer

Component by Component

By Simon Rouswell

Table of Contents

Introduction.....	1
Step 1: Gather Materials.....	2
Step 2: Mount the Processor.....	3
Step 3: Mount RAM and GPU	4
Step 4: The Motherboard	5
Step 5: Mount the Drives.....	6
Step 6: Install the Power Supply	7
Step 7: Finalize.....	8

Introduction

This manual will serve as a guide for building a computer at home. Although it doesn't go into depth concerning the purchase of parts and other specifics, it does cover where to find that information. Technology evolves at a rate where including such information in specific terms would only confuse readers who may be using more advanced, or even less advanced, components than the ones covered. Therefore, the manual aims to equip the reader with enough knowledge to work out the building of a computer.

Information outside this manual can be found on the Internet. I personally learned how to build computers years ago by watching videos. The advent of YouTube makes this particularly easy. If you find yourself needing any extra help with any of the steps, a myriad of videos can be found online which show installation of each component in excruciating detail. Often times you can even find videos which show installation with the exact hardware components you might be using.

Step 1:

Gather Materials

- ✓ Gather components.
- ✓ Gather needed tools.
- ✓ Prepare your workspace.

Components and Tools

Choosing components for a new computer build can be a daunting task. With the speed at which technology and computers advance, new components in every sector of computing are sold on the market regularly. For this reason, it is best to research the components you will choose online. Make sure to keep in mind what will work for you without going overkill. The average consumer can do anything from Internet, games, office work, and media, all on a budget of less than \$800. Remember you'll need to have a monitor and a copy of Windows or Linux.

You will need:

- Case
- Power Supply (PSU)
- Motherboard
- Processor (CPU)
- Graphics card (GPU) [Either integrated onto the motherboard, or a standalone]
- RAM
- Media (DVD, Blu-ray drives)
- Hard Drive (HDD)/Solid State Drive (SSD)

On the tool front, you'll need a Phillips head screwdriver, an anti-static mat (or an area that is static free), a power socket, and a computer monitor.

Prepare your area by making sure it is clean, free of dust, and most importantly, free of static. Lay your components out on top of their boxes with a layer of anti-static plastic (each component should come in an anti-static bag that works for this) underneath, between the box and the component.

Step 2: Mount the Processor

- ✓ Mount the processor.
- ✓ Install the heat sink.

Mounting the Processor and Heat Sink

The first step is actually one of the trickiest to perform. If you've never mounted a processor and heat sink before, you won't like how much force you actually have to use on such a fragile and expensive piece of hardware. It's important to remember for this step and for all the steps proceeding after this one, to be firm but gentle. If you feel like something is going to snap or break, relax and come back to it after a few minutes. Double check to make sure nothing is in the way and all holes are matched up.

With the motherboard on a firm, anti-static surface, be sure to open the lever and hatch that's covering the processor slot. Take your processor and look at the pins on the bottom. One corner should be void of pins in a triangle shape. On the motherboard processor slot, there should be a corner that is identical. Lining those corners up, gently drop (with zero force) the processor into the slot so that the pins are in the holes. Close the lever and hatch back on top of the processor. This may take quite a bit of force, but as long as the pins are lined up in the holes properly, no damage will occur.



Once the processor is secured, follow the manual that came with it to install the heat sink. Normally this involves lining up push pins with holes on the motherboard and snapping it into place over the processor. Every processor and heat sink is different.

Finally, plug the fan from the heat sink into the HSF (heat sink fan) power port near the processor slot.

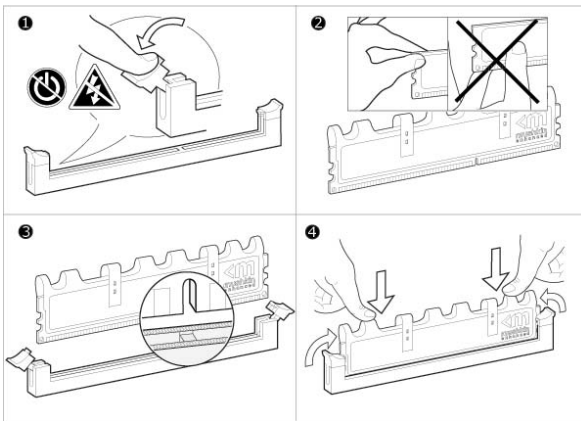
Step 3:

Mount RAM and GPU

- ✓ Mount the RAM (Memory).
- ✓ Mount the GPU (Graphics card).

Mounting the RAM

Once again looking at your motherboard, locate the RAM slots. Refer to your motherboard manual to find them. You may have dual channel RAM (two sticks), which is the most common configuration. If not, never fear, the installation for all RAM is the same. You may just have more or less to install than this manual.



Make sure the levers for the RAM slots are in the open position and ready to accept the RAM. Take the first DIMM (dual in-line memory module, a stick of RAM) and line it up over the first slot. With each hand on one end of the DIMM, firmly place down until it clicks into place. The force should cause a snap sound when the levers lock into place. Press on the levers to make sure they are firmly holding onto the DIMM. Repeat for the second DIMM.

Next, locate the PCI-Express slot on your motherboard, typically a long differently-colored slot from the rest of the board. It will be labeled. Using the same principles as with the RAM, firmly insert your graphics card into the slot until you hear an assuring snap.

Step 4:

The Motherboard

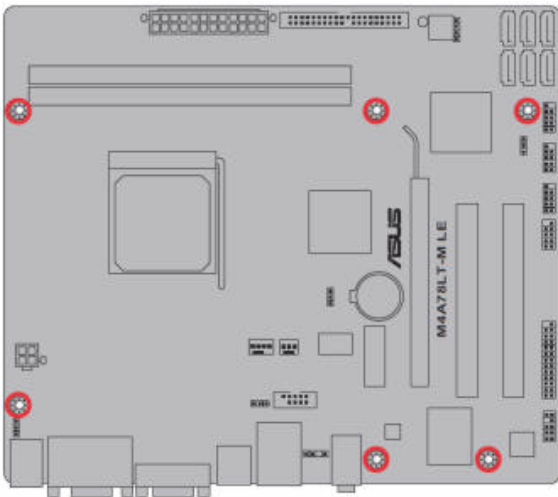
- ✓ Mount the motherboard to the case.

Mounting the Motherboard

Now that most of the essential components are on the motherboard, it's time to put it into the computer case.

Start by opening the side of the case, normally just by unscrewing a few thumbscrews, and lay the case on its side, opening upwards. Line the holes in the motherboard up with the standoffs in the case. They are tiny brass nubs which keep the motherboard from being in direct contact with the case (which could cause a short) and also serve to screw the motherboard into.

Once lined up, screw the motherboard into the standoffs with the screws provided by the motherboard manufacturer.



Make sure to screw the GPU into the back of the case as well. If you installed the motherboard properly, there should be a screw hole on your GPU lined up with a screw on the case already.

Step 5: Mount the Drives

- ✓ Mount hard drive or solid state drive.
- ✓ Mount DVD or CD-ROM drive.

Mounting a Drive



Locate the hard drive bay on your computer case and pull it out. Sometimes you must unscrew it from the case, other times it snaps in and out without the use of tools. Slide your hard drive into the bay and secure it with the provided screws, lining the holes on the sides of the hard drive up with the holes in the bay. Once in and secured, slide the bay back into the computer and make sure to reattach it.

Next, mount the media drive (DVD, CD-ROM, etc) in a similar manner, with the front of the drive facing out the front of the case.

Both types of drives (hard drive and DVD/CD-ROM) should come with a SATA cable. This is a red cable that plugs directly into the motherboard onto its



SATA ports. Refer to your motherboard manual to find out where it is on your particular motherboard.

Step 6: Install the Power Supply

- ✓ Install the power supply.
- ✓ Plug in power cables.

Power Supply and Cables

Next, take the power supply and place it in the computer with the exhaust fan pointed out of the appropriately sized exhaust hole on the case. Some cases have this at the top, above the motherboard, and others have it below. The sprawl of cables coming from the power supply should be towards the inside of the case. Secure it to the case with the provided screws.



Perhaps one of the more difficult steps is plugging in all the appropriate cables. Each cable should be labeled, which makes things easier. Remember as you do this to try and keep the inside of the case clean, tucking in wires and keeping them out of view.

First, plug the PCI-Express cable from the motherboard into your graphics card. This is a 6-pin cable that should be a simple plug in.

Next, for all the fans in your case, plug them into a 4-pin connector. You can chain these, as they have both female and male connectors on each plug.

The largest connector plugs directly into the motherboard and should be very simple to find and connect.

Step 7:

Finalize

- ✓ Put side back on the case.
- ✓ Plug into the wall.
- ✓ Plug in peripherals.
- ✓ Install operating system.

Powering and Playing

At the end of our build we will start by reattaching the side of the case, and standing the computer up-right. Ta-da! If you've followed this manual, and the specific instructions for each component that came with your hardware, you should have a fully functioning computer. However, it still lacks a few things.

Power! Plug the computer into the wall with the power cable that came with the power supply. Make sure the power supply is set to ON, which is a switch on the power supply, but accessible from outside the case.

Plug in your peripherals such as keyboard, mouse, speakers if you have them, and a monitor. You'll need to plug the monitor into the back of your graphics card, on the back of the computer, as well as power from the wall.

At this point, you should be able to power the computer on. To install your operating system, place the disk into the drive and then boot. It will boot into the installation wizard.