



**UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

**SCHOOL OF COMPUTING**  
Faculty of Engineering

### Semester I 2020/2021

Subject : Technology and Information Systems  
(SECP1513) Section : Section 8  
Assignment : Step by step PC Assembly

#### GROUP NAME: Group iX

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## Part A

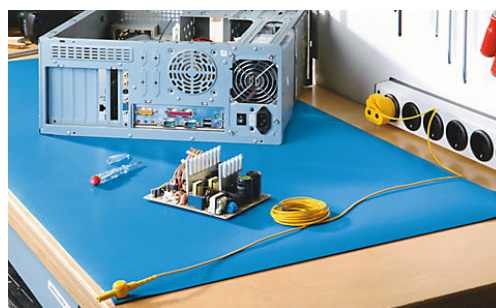
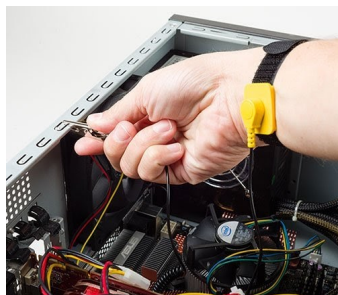
### Tool 1: Screwdrivers



**Function:** To tighten and untighten the screws on your components to hold them securely in place. For a modern PC build, a Phillips-head screwdriver is usually the ideal size to use.

**Importance:** Able to install and remove the components easily. A long shaft screwdriver is also important in keeping the handle out of the way when working in tight spaces around the components and a short shaft as well. A screwdriver that has a magnetic tip is also very helpful to avoid dropping small screws during installation in PC assembly.

### Tool 2: Anti-Static

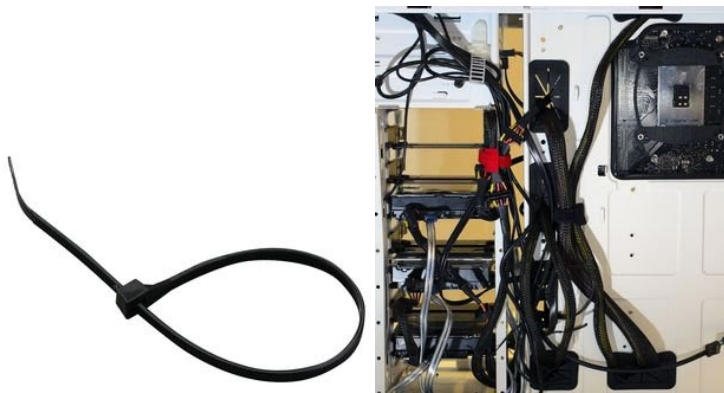


### Equipment

**Function:** Device that reduces or discharge of static electricity. In other words, it is to avoid static sparks to your body when building your PC. This anti-static equipment can be in the form of a wrist strap that clips to a grounded object or plugs into the ground socket of any plug outlet. Another form of equipment is an anti-static mat can be placed on the floor of the workspace, allowing unrestricted movement.

Importance: To prevent the damage and risk of electrical components such as computer hard drives and flammable liquid gases.

### **Tool 3: Cable Ties**



Function: To tie up any loose cables and categories the wire to make it neat and tidy.

Importance: Makes the finished PC build look neater, nicer, better cable management, and promotes better airflow within the PC case.

### **Tool 4: Pliers**



Functions: Typically used as a wire cutter, which can be used to snip the excess off the cable ties.

Importance: for loosening up screws or bolts that are super-tight, picking up hard to reach screws that you may drop within your case, removing chipped/broken screws, removing motherboard standoffs, and cutting zip ties.

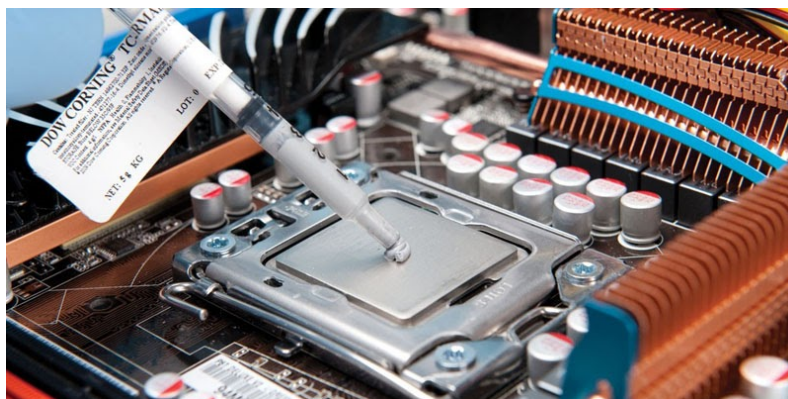
### **Tool 5: Trays/Containers**



Functions: Acts as a container for the screws of the PC case/parts.

Importance: Ensures that the screws do not get lost or missing during the PC build and also keeps the screws organized as some parts have different types of screws. A magnetic tray is even more useful as the screws will not go missing if you accidentally knock over the tray when PC building.

### **Tool 6: Thermal Paste**

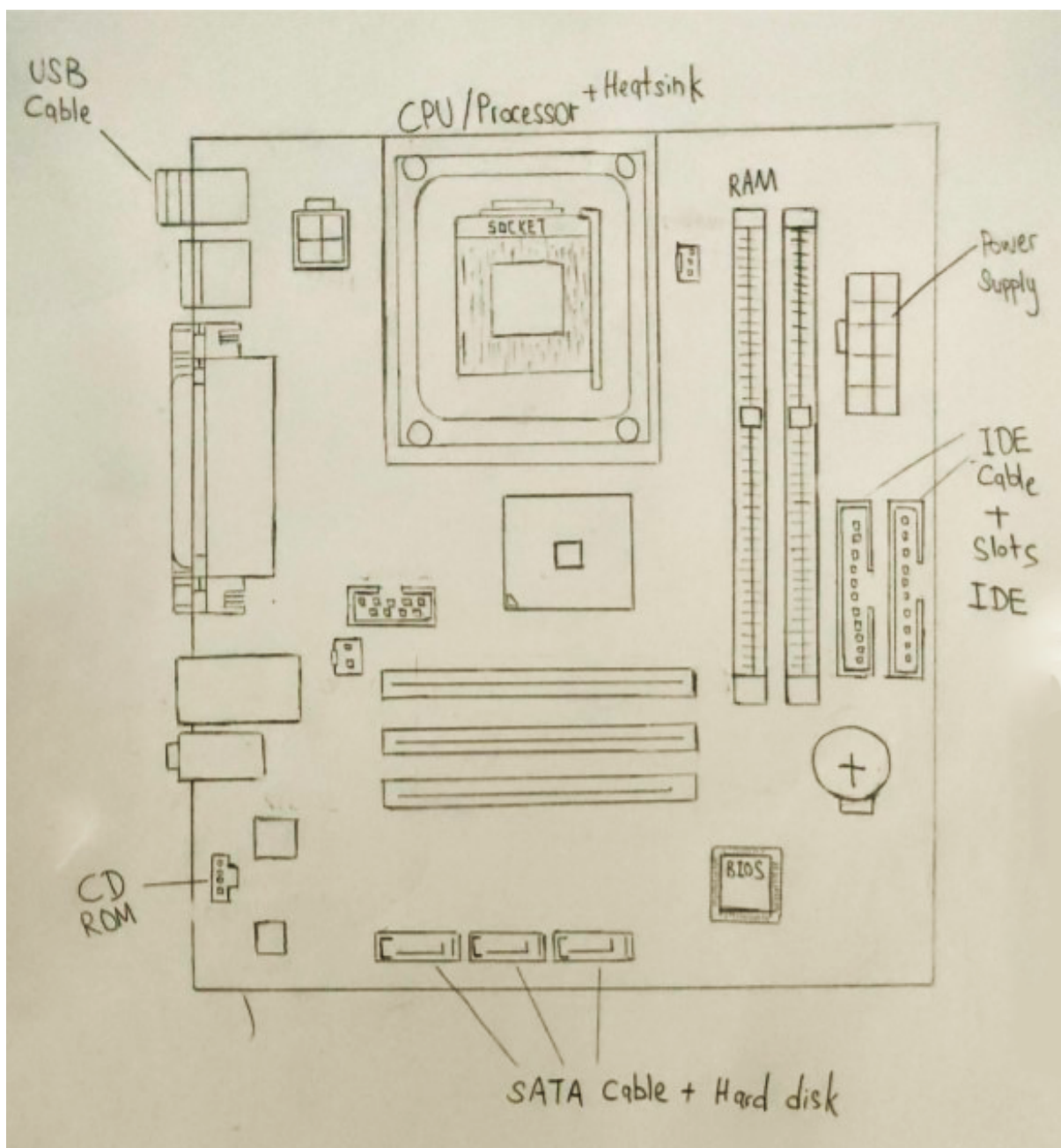


Function: A silvery-grey substance that you apply to a processor before installing a heatsink cooling solution. It allows for an efficient transfer of heat from the IHS of the processor to the base plate or water block of the CPU cooler that is designed to dissipate that heat.

Importance: to make sure the processor is in cooling conditions. To avoid the processor from being damaged easily when heat dissipates.

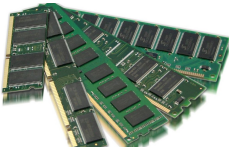
## PART B

### 1.0 Sketch of Motherboard



**2.0**

| Parts                                                                                                      | Functions                                                                                                                                                                                                                                                                                                                                                                                           | Examples of models                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Graphic Card</p>       | <p>A piece of computer hardware that produces the image you see on a monitor.</p> <p>The Graphics Card is responsible for rendering an image to your monitor, it does this by converting data into a signal your monitor can understand.</p> <p>The better your graphics card the better, and smoother an image can be produced. This is naturally very important for gamers and video editors.</p> | <ul style="list-style-type: none"> <li>- Nvidia RTX 3090</li> <li>- Nvidia GTX 1080</li> <li>- AMD Radeon RX 6800 XT</li> </ul>                                        |
| <p>USB Cable</p>        | <p>Connect computer to other devices such as mouse and keyboard</p>                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>- USB Type-A</li> <li>- USB Type-B</li> <li>- USB Type-C</li> </ul>                                                             |
| <p>IDE Cable</p>        | <ul style="list-style-type: none"> <li>- Connection for storage drives and optical drives in a computer</li> </ul>                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>- 34-Pin Cable</li> <li>- 40-Pin Cable</li> </ul>                                                                               |
| <p>CPU / Processor</p>  | <ul style="list-style-type: none"> <li>- Performs basic arithmetic, logic, controlling, and input/output operations specified by the instructions in the program</li> </ul>                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>- AMD Ryzen 5 3600</li> <li>- AMD Ryzen 9 5900X</li> <li>- Intel® Core™ i9-10980XE</li> <li>- Intel® Core™ i5-10400T</li> </ul> |
| <p>Slots (IDE)</p>                                                                                         | <ul style="list-style-type: none"> <li>- Connecting a motherboard to storage devices such as hard drives and CD-ROM/DVD drives</li> </ul>                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>- IDE and ATA-1</li> <li>- EIDE and ATA-2</li> </ul>                                                                            |

|                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                 |
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|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                 |
| <p><b>Power Supply</b></p>  | <p>A <u>hardware</u> component of a computer that supplies all other components with power. It converts mains AC to low-voltage regulated DC power for the internal components of a computer</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>- Corsair CX450</li> <li>- Seasonic SSR-750PX</li> </ul>                 |
| <p><b>Heat Sink</b></p>   | <p>A device that incorporates a <u>fan</u> or another mechanism to reduce the temperature of a hardware component (e.g., <u>processor</u>). There are two heat sink types: active and passive. The picture is an example of a heat sink that has both active and passive cooling mechanisms.</p> <p>The components that generate the most heat in your computer are the <u>CPU</u> (central processing unit), <u>video card</u> (if your computer has one), and the <u>power supply</u>. They always have some cooling, usually a fan. Other components that may have a heat sink include the <u>north bridge</u>, <u>south bridge</u>, and <u>memory</u>. It is also not uncommon to find heat sinks on other <u>expansion cards</u> and <u>hard drives</u>.</p> | <ul style="list-style-type: none"> <li>- Noctua NH-D15</li> <li>- Cooler Master Hyper 212 EVO.</li> </ul>       |
| <p><b>RAM</b></p>         | <ul style="list-style-type: none"> <li>- Volatile memory</li> <li>- Gives applications a place to store and access data on a short-term basis</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>- Corsair Vengeance LED</li> <li>- Kingston HyperX Fury</li> </ul>       |
| <p><b>Hard Disk</b><br/>(jumper setting either</p>                                                           | <ul style="list-style-type: none"> <li>- Store computer data permanently</li> <li>- Master and slave settings on IDE hard drives are designed so you can put two drives on a single IDE cable. One acts as the</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>- WD My Book Duo</li> <li>- Seagate Backup Plus Desktop Drive</li> </ul> |

|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                         |  |                |  |                                      |  |              |  |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|--|----------------|--|--------------------------------------|--|--------------|--|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <div><p>Options jumper block</p><table><tr><td></td><td>Master or single drive</td></tr><tr><td></td><td>Drive is slave</td></tr><tr><td></td><td>Master with non ATA-compatible slave</td></tr><tr><td></td><td>Cable select</td></tr><tr><td></td><td>Limit drive capacity<br/>40 Gbytes = 32 GB<br/>&lt;40 Gbytes = 2.1 Gbytes</td></tr></table><p>7 5 3 1<br/>8 6 4 2</p><p>Circuit Board</p></div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Master or single drive                                                  |  | Drive is slave |  | Master with non ATA-compatible slave |  | Cable select |  | Limit drive capacity<br>40 Gbytes = 32 GB<br><40 Gbytes = 2.1 Gbytes | <p>master or main drive and the other is the slave. A hard drive's master or slave role is determined by the position of a jumper which is placed on a series of pins on the back of the drive, usually located beside the power plug.</p> <p>When you look at the jumper, it looks like a small rectangular piece of plastic. Beneath this plastic is a metal connector that fits over two pins, creating a circuit between them. When you compare the jumper's position with the pinout diagram for the hard drive, you can tell if the drive is a master or a slave.</p> |  |
|                                                                                                                                                                                                                                                                                                                                                                                                         | Master or single drive                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                         |  |                |  |                                      |  |              |  |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
|                                                                                                                                                                                                                                                                                                                                                                                                         | Drive is slave                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                         |  |                |  |                                      |  |              |  |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
|                                                                                                                                                                                                                                                                                                                                                                                                         | Master with non ATA-compatible slave                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                         |  |                |  |                                      |  |              |  |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
|                                                                                                                                                                                                                                                                                                                                                                                                         | Cable select                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                         |  |                |  |                                      |  |              |  |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
|                                                                                                                                                                                                                                                                                                                                                                                                         | Limit drive capacity<br>40 Gbytes = 32 GB<br><40 Gbytes = 2.1 Gbytes                                                                                                                                                                                                                                                                                                                                                                             |                                                                         |  |                |  |                                      |  |              |  |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| <div><h2>CD ROM</h2><p>Compact Disc (CD)</p><p>ComputerHope.com</p></div>                                                                                                                                                         | <ul style="list-style-type: none"><li>- Pre-pressed optical compact disc that contains data</li><li>- Stands for "Compact Disc Read-Only Memory." A CD-ROM is a CD that can be read by a computer with an optical drive. The "ROM" part of the term means the data on the disc is "read-only," or cannot be altered or erased. Because of this feature and their large capacity, CD-ROMs are a great media format for retail software.</li></ul> | <ul style="list-style-type: none"><li>- CD-Rs</li><li>- CD-RW</li></ul> |  |                |  |                                      |  |              |  |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |

## SATA Cable



-Stands for "Serial Advanced Technology Attachment," or "Serial ATA." It is an interface used to connect ATA hard drives to a computer's motherboard

- Micro SATA
- SATA Power
- SATA Bridge
- e-SATA

## PART C - “Step by Step PC Assembly”

### Step 1: Open Case

1. Remove the screws that are screwed in the case.
2. Take off the side cover/side panel.



### Step 2: Mount Motherboard

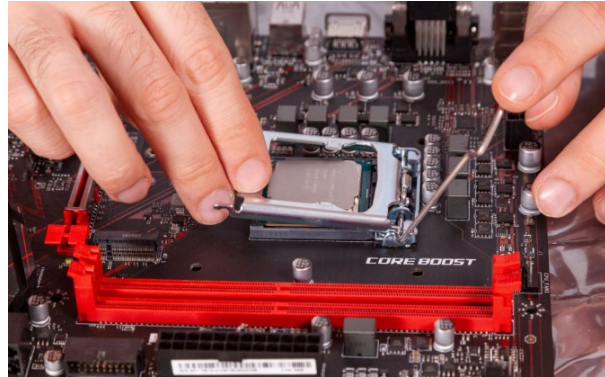
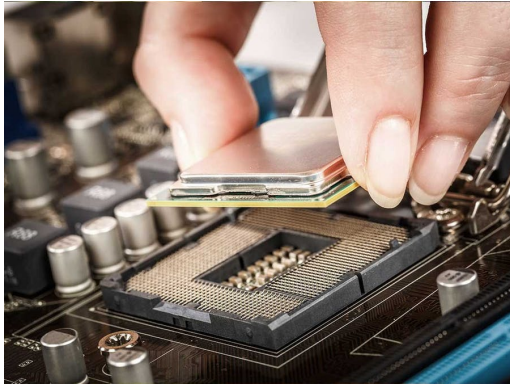
1. Screw in the motherboard standoffs into the case. This ensures that there is a slight clearance between the back of the motherboard and the surface of the case and prevents the motherboard from being damaged.
2. Install the motherboard I/O shield/plate into the case.
3. Mount the motherboard onto the standoffs in the case. Make sure the I/O ports of the motherboard are aligned with the I/O shield in the case and is installed properly.



### Step 3: Mount Processor (CPU)

1. Lift up the latch lever at the CPU socket on the motherboard to open the CPU socket cover.
2. Hold the CPU by its sides. Usually there is a triangle or mark at one of the corners at the CPU socket on the motherboard and a mark on the corner of the CPU. These marks must be aligned before the CPU is being placed into the socket.
3. Gently place it down into the CPU socket.

4. Lower the CPU socket cover over the CPU and closed it to secure the CPU from moving.

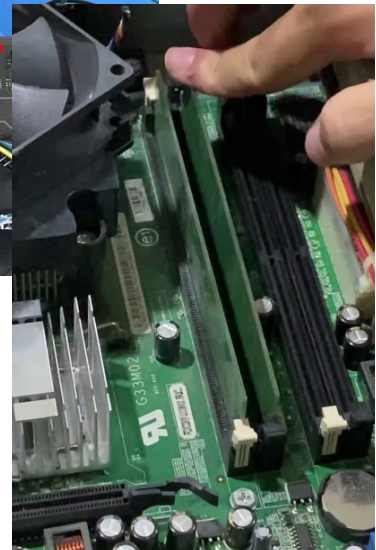
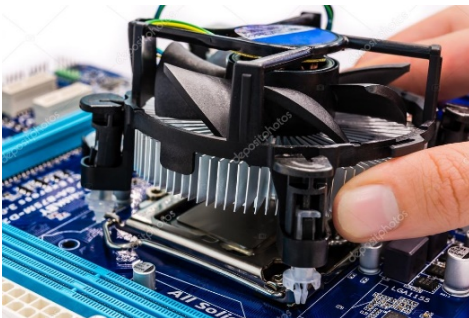


Caution: Avoid touching the back of the CPU, as any marks or smudges from your hands can eliminate heat transfer surface for the heat sink itself.

#### Step 4: Install CPU Cooler/Heat sink

Most stock CPU coolers and heat sinks come with thermal paste pre applied but if required, apply thermal paste onto the CPU before installing the heat sink.

1. Install the cooler in position and screw it in place if needed.
2. Plug in the CPU fan connector to the CPU fan header on the motherboard.



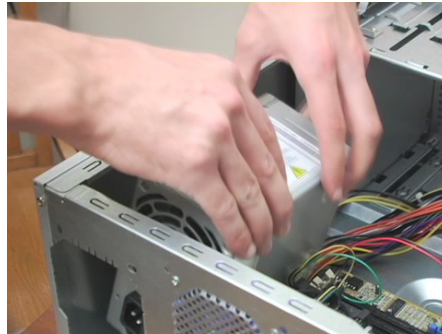
#### Step 5: Mount Memory (RAM)

1. The RAM slots have clips at both ends and is opened by pressing on them.
2. Line up the notch on the RAM stick with the mounting slot.
3. Press the RAM firmly down into the slot. The tabs of the slot should let the RAM be secured in place with a click sound.
4. Repeat the steps if you have more RAM to be installed.

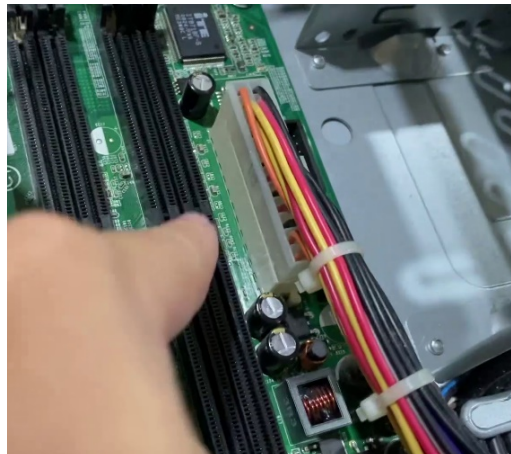
Tip: When pressing the RAM into the mounting slots, more than a good amount of pressure is used to make sure that it is installed properly. Be very careful not to flex the motherboard too much when putting pressure onto it.

## Step 6: Install Power Supply Unit (PSU)

1. Mount the PSU into its dedicated slot in the case and screw in place.



2. Plug the largest cabling connector from the PSU which is usually a 20-pin or 24-pin ATX cable into the motherboard power connector.



3. Plug the 8-pin or 4-pin connector from the power supply cabling into the CPU power connector on the motherboard.



## Step 7: Install Graphics Card

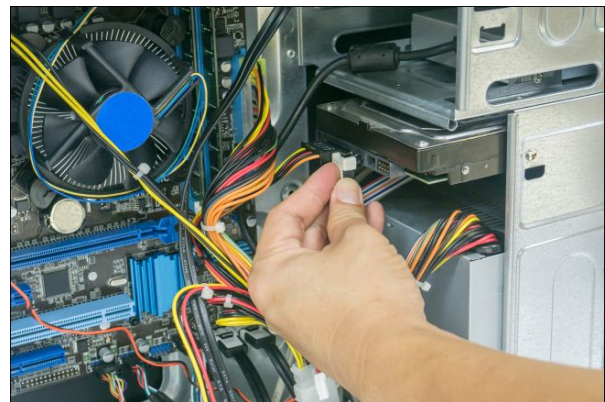
A graphics card is optional to install if the CPU has onboard graphics. Therefore, you can skip this step. But often times people would want to install a dedicated graphics card anyways for maximum performance.

1. The graphics card is slotted and pushed in firmly into the PCI Express x16 expansion slot.
2. Screw in the graphics card into place with the case.
3. If needed, plug in the 8 pin or 6 pin connectors from the PSU into the graphics card power connector.



## Step 8: Mount Storage Drives

1. Mount and install the storage drives such as hard disk drives (HDD) in the drive bays provided in the case.
2. Screw the drives through the case mounting holes till it is secured.
3. Connect the SATA cable or IDE from the motherboard to the drive.
4. Plug in power connector for the storage drive from the PSU.
5. Repeat the steps if there are more storage devices to be installed.
6. The HDD can be either a master or slave if mounted correctly.



Information: There are two cables connected to the drive which are the power cable and SATA/IDE cable. This is because one cable is to power the drive and another cable is to send the data between the drive and the motherboard.

## Step 9: Mount Optical Drive

Optical drives such as CD-ROM are optional as most users these days do not use optical drives. For those who still need to read or write disks, the steps are:

1. Remove any front panel covers at the pc case to install the optical drive.
2. Mount the optical drive in the case and screw it through the case mounting frame holes.
3. Connect the optical drive to IDE connector on the motherboard using an IDE cable.
4. Plug in the power connecting cable from your PSU to the optical drive

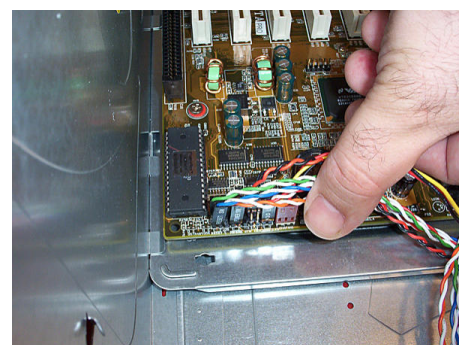


Information: Just like for storage devices, there are two cables connected to the optical drive which are the power cable and SATA/IDE cable. This is because one cable is to power the optical drive and another cable is to send the data between the optical drive and the motherboard.

### Step 10: Connect case fans and front panel connectors

Most PC cases and chassis have case fans pre - installed but some choose to add more case fans for better airflow. Other than that, different computer cases might have slightly different front panel connections and I/O but usually they have the same connectors with all PC cases.

1. Mount any case fans in the case using the clips or screws provided.
2. Connect the case fans to the fan headers found on the motherboard.
3. Find the front panel connectors from your case and check the labelling on them.
4. Connect the front panel audio connectors to the front audio header on the motherboard.
5. Connect the front panel USB connectors on the USB headers on the motherboard.
6. Connect the front panel case connectors on the front panel I/O headers on the motherboard.



### Step 11: Close the side panels and connect peripherals

Do some cable management before closing the case. Use zip ties or cable ties to secure the cables and tie them up neatly so your PC has a better aesthetic as well. After that, proceed with

the following steps:



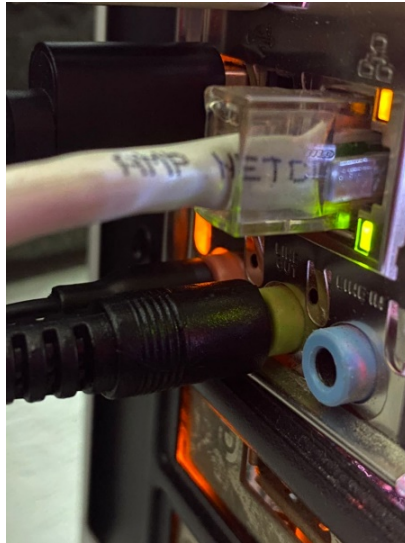
1. Place the side panels back on and secure the side panels tightly with the screws.
2. Connect peripheral devices include plugging in the mouse, keyboard, webcams, and printer by plugging into the USB port.



3. Plug Local area network (LAN) cables into the ethernet port for wired internet connection. You can also plug in a wireless network dongle into the USB port for wireless internet connection.



4. Then, connect speakers and microphone into 2.5 mm sockets.



5. Finally connect the CPU with monitor by plugging into display ports. Make sure to use display ports of the graphics card if you have it installed and not the display ports of the motherboard. This makes sure that the graphics card is being used and not the display ports on the motherboard. If you do not have a graphics card, then plug into the motherboard's display output ports.



## PC ASSEMBLY COMPLETE!

