



UTM
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REPORT :

STEP BY STEP BASIC PC ASSEMBLY

SUBJECT :

TECHNOLOGY AND INFORMATION SYSTEMS (SECP1513-02)

GROUP :

GROUP 8

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PART A – TOOLS NEEDED TO ASSEMBLE A PC

List at least 4 tools needed to assemble a PC. For each tool, provide picture(s), explanations of its functions and its importance.

1.0 Phillips head Screwdrivers



Figure 1: Phillips head screwdriver

The Phillips-head screwdrivers is the first most important tool that is needed when assembling a PC. The function of this screwdrivers in assembling PCs are screwing and unscrewing screws since most compartments and accessories computers are held together securely by the screws. Screwdrivers with long shaft and have a magnetic tip is not necessary, but it can ease the overall process. This is because, long shaft Phillips-head screwdrivers can handle screws when working in tight spaces and magnetic tip can help screws remain attached to the screwdriver without requiring external force. Phillips-head screwdrivers are important as it can be used to secure the motherboard inside a case, install case fan, tighten up PCIe brackets, and of course to mount the hard drives.

2.0 Precision Screwdrivers



Figure 2: Precision Screwdriver

Precision screwdrivers is a small-sized screwdriver which works similar as other screwdrivers but it is slightly smaller. The function of this precision screwdrivers is to tighten and loosen screws when in situation that may need small tip of screwdrivers to unscrew screws. For example, if the screw head is quite small, to use the normal screwdrivers may need a little hustle, thus situation can be handled by precision screwdrivers. The importance of this tool is that it provides the best function when you need a sharp and precise fit into the screw so that it does not require you to grasp the handle to apply force.

3.0 Needle-nose Pliers



Figure 3: Needle-nose Pliers

Pliers are a hand tool used to hold objects firmly and there are three types of pliers. The one that is used for assembling a PC is Needle-nose pliers. There are a lot of functions for Needle-nose pliers since most of the pliers include a wire cutter to trim or snip off extra zip ties. Besides, it can also help in bending back broken parts of steel hardware. This tool is important to ease the process of insertion or removal for accessories and parts that are very small and tiny on the hard disk of a PC. It is also a useful tool whenever the heads of screws get stripped which happen most of the time. When facing this, this plier can help to pluck out the screws.

4.0 Zip or Twist ties



Figure 4: Zip Ties

Zip or Twist ties are a type of plastic fastener used for holding items together especially electrical cables or wires. The functions of this ties are to keep cables in place in order to create clearance for the hardware. These plastic zip ties are also great at stitching down cables and wires tightly and securely. These ties are an essential for proper cable management to keep dust accumulation low and also to help us get the lower air temperature through better obstructed air flow. In addition, Zip and Twist ties also manages the overall system look tidier and cleaner.

5.0 Anti-static Kit



Figure 5: Anti-static Kit

Anti- static equipment should be utilized for any PC assembly exercise. Contacting a grounded case or another grounded, metal item sometimes will wipe out most danger of electrostatic release, yet best to be as careful as possible. An anti-static mat can be placed on the floor of the workspace, allowing unrestricted movement. This is normally cultivated by connecting to the grounded line in an electrical source. It is essential to release at a moderate rate, consequently a resistor should be utilized in establishing the tangle. The resistor, just as permitting high-voltage charges to spill through to ground, additionally forestalls a stun danger when working with low-voltage parts.

6.0 Thermal Paste



Figure 6: Thermal Paste

Thermal paste is a silvery grey substance that you apply to a processor prior to introducing a cooling arrangement. It takes into account a proficient exchange of warmth from the IHS of the processor to the base plate or water square of the CPU cooler that is intended to disperse that heat. Most CPU coolers come with a patch of thermal paste already applied. However, no assurance it's high-calibre or new. Cleaning off the given thermal paste and applying another layer guarantees that the paste is delicate and that the right sum is utilized. A little container of thermal paste should go an amazingly long route for the easy-going manufacturer, so there's no compelling reason to purchase multiple.

PART B – SKETCH OF A MOTHER BOARD LAYOUT

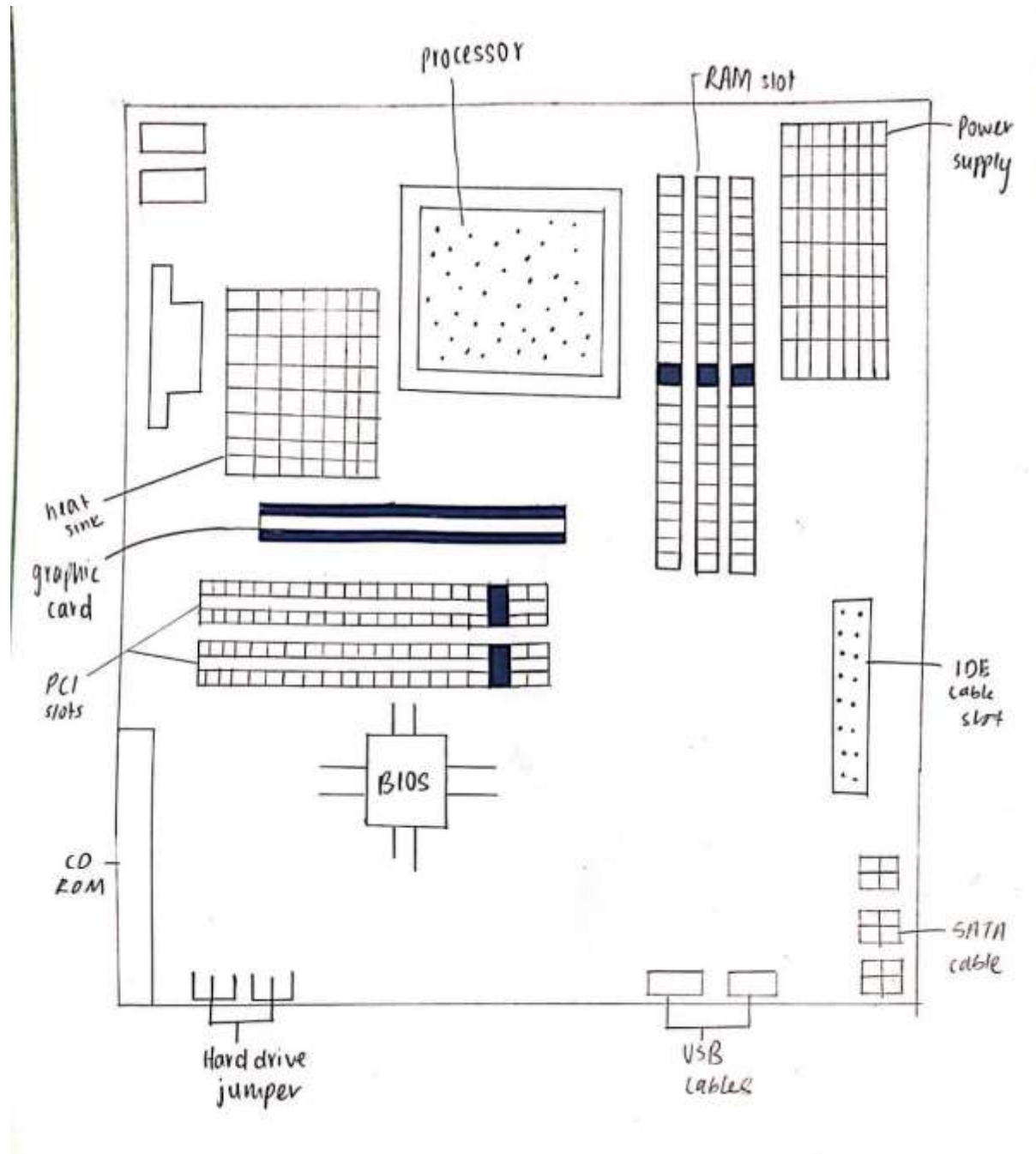
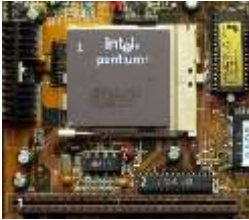
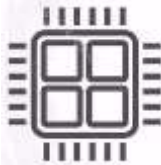
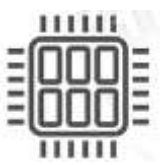
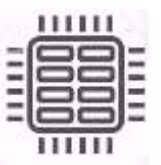
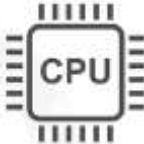
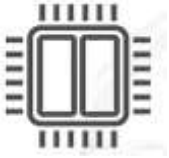
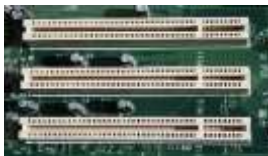


Figure 7: Sketch of Motherboard

COMPONENTS	FUNCTIONS		
GRAPHIC CARD  <i>Figure 8: Graphic Card</i>	Graphic cards permit PCs to deliver designs and pictures more rapidly. Graphic card interfaces with the motherboard and the monitor. This permits the card to acknowledge data from the CPU (central processing unit) and transmit output to the screen. (Ebuyer, 2015), (Bastounis, 2020)		
	 <i>Figure 9: Nvidia GeForce GTX 1660 Ti</i>	 <i>Figure 10: AMD Radeon Pro WX8200</i>	 <i>Figure 11: Nvidia Quadro RTX 5000</i>
	 <i>Figure 12: Nvidia GeForce RTX 2080 Ti</i>		 <i>Figure 13: AMD Radeon VII</i>
USB CABLE  <i>Figure 14: USB Cable</i>	USB cable can interface and disengage the cables with the PC running and unafraid of freezing the PC. USB cable are quick, transmitting up to 480Mbps. USB cable convey power and signs. This allows recharging of batteries in cameras and other USB peripherals. (Infinite Electronics International)		
	 <i>Figure 15: Mini-USB</i>	 <i>Figure 16: Micro-USB</i>	 <i>Figure 17: USB-C</i>
	 <i>Figure 18: USB Type-A</i>		 <i>Figure 19: USB Type-B</i>

IDE CABLE  Figure 20: IDE Cable	IDE (Integrated Drive Electronics) cable is utilized as a regulator on motherboard, so it will be associated with the Disk Drive. IDE cable transmit information with speed at 100mbps IDE cable is very durable which can last for a significant long time. (Rizky, 2019)		
	 Figure 21: 34-pin floppy drive cable	 Figure 22: 40-pin ribbon cable	
CPU/ PROCESSOR  Figure 23: CPU/ Processor	CPU (central processing unit) execute a wide range of information processing tasks. CPU stores information, intermediate outcomes, guidelines and instruction of a program. CPU controls the activity of all parts in the computer. (Tutorials Point)		
	 Figure 24: Quad- Core processors	 Figure 25: Hexa- Core processors	 Figure 26: Octa-core processors
	 Figure 27: Single-Core CPU		 Figure 28: Dual-core CPU

SLOTS  Figure 29: Slots	Slots is port inside a PC on the motherboard which gives an installation point for components to be connected. There are usually several slots on a motherboard to install memory or storage. (McDonnel)  Figure 30: IDE Slot  Figure 31: PCI Slot  Figure 32: RAM Slot  Figure 33: CPU Slot
POWER SUPPLY  Figure 34: Power Supply	Power supply convert AC to DC so the PC has enough power to run. It distributes appropriate DC voltage to every component such as motherboard and adapters. Power supply provides cooling and ease air flow through the case. (Schmidt, 2013)  Figure 35: ATX  Figure 36: ATX12  Figure 37: EPS12v

	Heat sink transfer the heat from the source to the heat sink to prevent overheating of device. Heat distributes naturally throughout the heat sink. (Arrow, 2019), (Celsia)		
HEAT SINK  Figure 38: Heat Sink	 Figure 39: Passive heat sink	 Figure 40: Active heat sink	 Figure 41: Solid metal heat sink
	 Figure 42: Pumped liquid heat sink	 Figure 43: Two phase heat sink	
RAM  Figure 44: RAM	RAM (random access memory) gives temporary storage for information and program. RAM is used as “RAM disk” which is as a virtual hard disk. RAM is used as "shadow RAM" where some contents stored in ROM is duplicated into RAM. (Rubens, 2019)		
	 Figure 45: Static random-access memory (SRAM)		 Figure 46: Dynamic random-access memory (DRAM)

HARD DISK  <i>Figure 47: Hard Disk</i>	Hard drive is a part that stores the entire digital content such as images, music, recordings, programs, application and systems. The storage size of hard drives is measured in gigabytes and terabytes. (Seagate)
	<i>Figure 48: Parallel Advanced Technology Attachment (PATA)</i> <i>Figure 49: Small computer System Interface (SCSI)</i>
	<i>Figure 50: Serial ATA (SATA)</i> <i>Figure 51: Solid State Drives</i>
CD ROM  <i>Figure 52: CD ROM</i>	CD ROM (compact disc read only memory) could be used to access information on CDs, such as recorded music, images, word documents and many more. CD ROM are widely used as installation disc for software installation. (Casima, 2016)
	<i>Figure 54: CD-ROM</i> <i>Figure 53: CD-R</i> <i>Figure 55: CD-RW</i>

SATA CABLE



Figure 56: SATA Cable

SATA cable (serial advanced technology attachment or Serial ATA) is used to make connections between compartments and motherboard:

- Hard drive to motherboard
- Hard drive to hard drive
- ATA and ATAPI devices

SATA cable could transfer data at 1.5 to 6 gigabytes per second.
(Roberts)

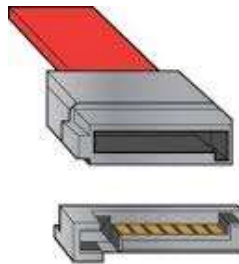


Figure 57: SATA

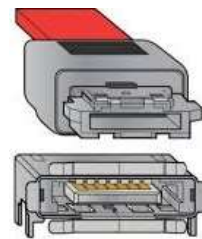


Figure 58: eSATA

PART C – STEP BY STEP PC ASSEMBLY

STEP 1 – PLACING PROCESSOR UNIT ON MOTHERBOARD

- Place the CPU socket holder on the motherboard.
- Insert CPU in the motherboard socket.
- Make sure the CPU placed correctly and neat.
- Secure CPU by closing the socket holder and lower the latch beside it to prevent it from moving.

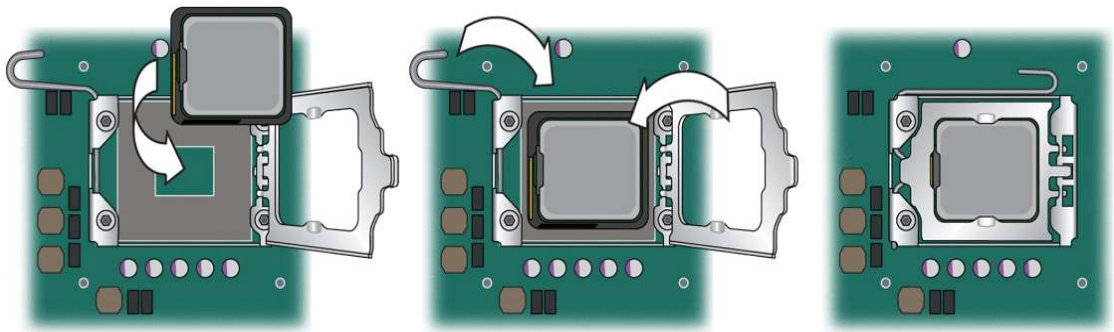


Figure 59: Steps to place processor unit on motherboard

STEP 2 – INSTALLING HEAT SINK

- After placing the CPU correctly, place some thermal paste on top of it.
- Place heat sink and cooler fan on top of the CPU and fix the position.
- Take the power cable from cooler fan and connect it to motherboard.

Quick tip : some heat sink comes with its own thermal pad. In this case, thermal paste is not required.

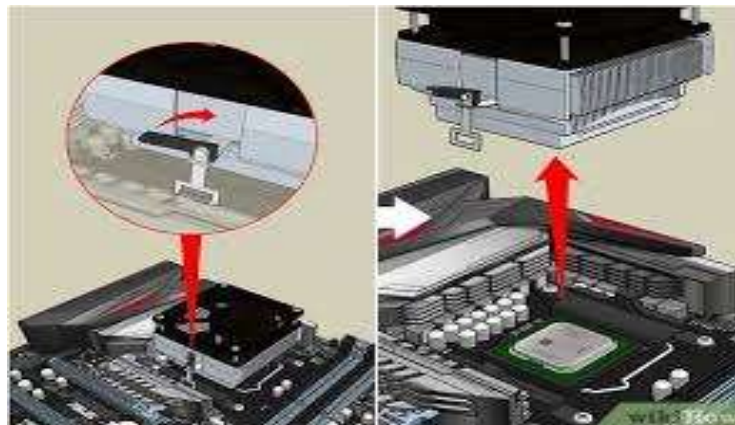


Figure 60: Step to install heat sink

STEP 3 – INSTALL RAM (RANDOM-ACCESS MEMORY)

- Take the RAM stick and place it on the right slot.
- Press down RAM stick slowly until it automatically clip on the slot to secure it from moving.

Quick tip : do not force the RAM stick to clip as it may lead to damaging the slot and clip as well.

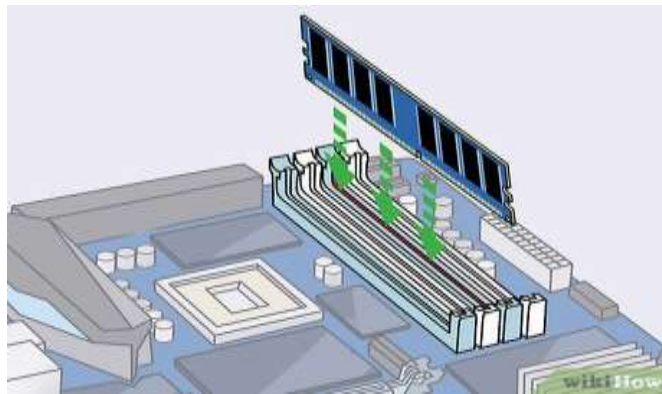


Figure 61: How to install RAM

STEP 4 – INSTALL POWER SUPPLY

- Place power supply on the right place at the case.
- Install it and make sure all screws are fasten on the case.
- Connect all cable from power supply to motherboard and CPU power connector.

Quick tip : make sure all screws are fasten, if not it will cause problem and do not forget to connect cable to the right place.

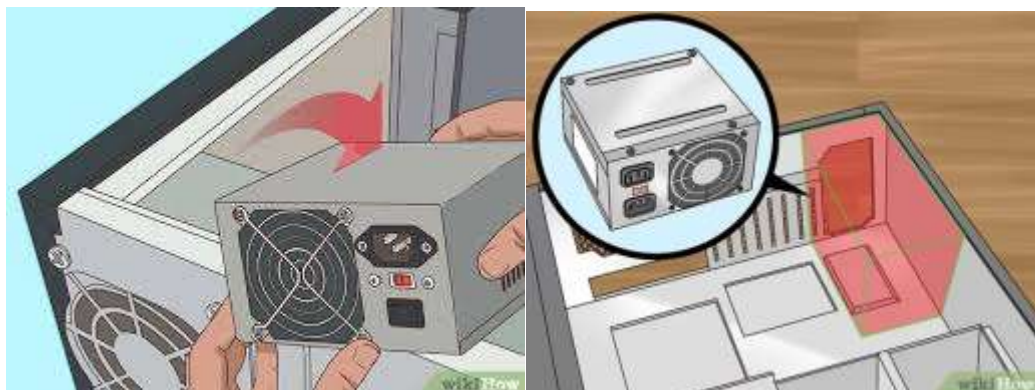


Figure 62: Installing power supply

STEP 5 – MOUNT MOTHERBOARD

- Place motherboard in the case carefully according to its place.
- Fasten all screw tightly to secure its place from moving.

Quick tip : Do not forget to fasten all screw into the right hole. It is very important.



Figure 63: Mounting motherboard

STEP 6 – MOUNTING GRAPHIC CARD

- Take your graphic card of interest and place it in PCIE slot.
- Press it down slowly to place the card. Do not put extra force.
- Fasten every screw on the graphic card holder to secure.
- Plug in cable connector from power supply into graphic card power connector.

Quick tip : not all graphic card requires external power so the step is not necessary.

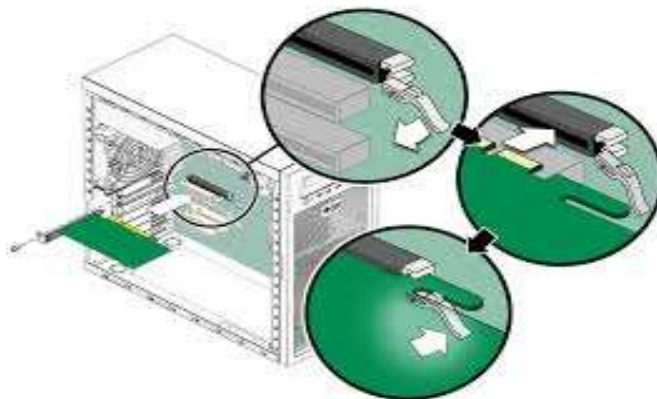


Figure 64: Mounting graphic card

STEP 7 - INSTALLING CD-ROM

- Install CD-ROM drive in the case.
- Secure it with screws from case frame to the case mounting hole.
- Connect the CD-ROM drive to motherboard using SATA cable.

Quick tip : Please ensure that the drive is not moving to prevent it from damaging in a short term.



Figure 65 Installing CD-ROM

STEP 8 – INSTALLING HARD DISK

- Place hard disk in the case.
- Secure it with screws from case frame to case mounting hole.
- Use IDE or SATA cable to connect hard disk with motherboard.
- Set up your jumpers whether you want it to be slave or master. The drive will tell you how to set it up.

Quick tip : The screw must be fastened tightly to prevent it from moving.

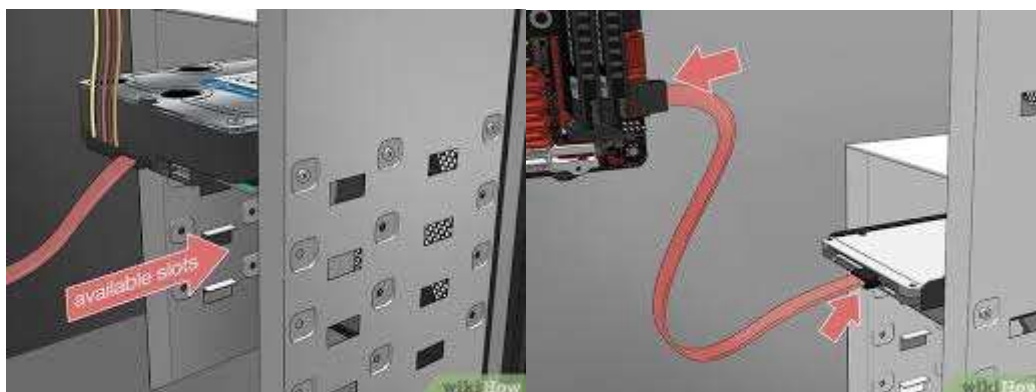


Figure 66 Installing hard disk

STEP 9 - USB CABLE

- Install the switch cable and USB cable to the motherboard.
- Make sure all cables including IDE and SATA are place neatly to save space and lessen the heat.

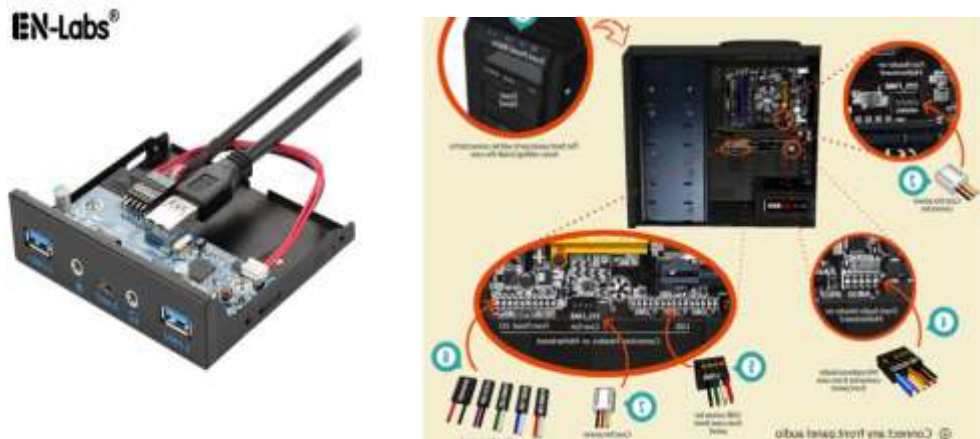


Figure 67 Installing USB cable

STEP 10 - CLOSING THE CASE AND CONNECTING THE PERIPHERALS

- Place the side cover back on and secure the side panels with case screws.
- Connect peripheral devices which include keyboard, mouse, wireless network dongle, printer and webcams with your CPU by plugging into USB port.
- Then, connect speakers and microphone into 2.5 mm sockets.
- Finally connect the CPU with monitor by plugging into display ports

Quick tip : side case must be screw tightly to prevent dust from entering.

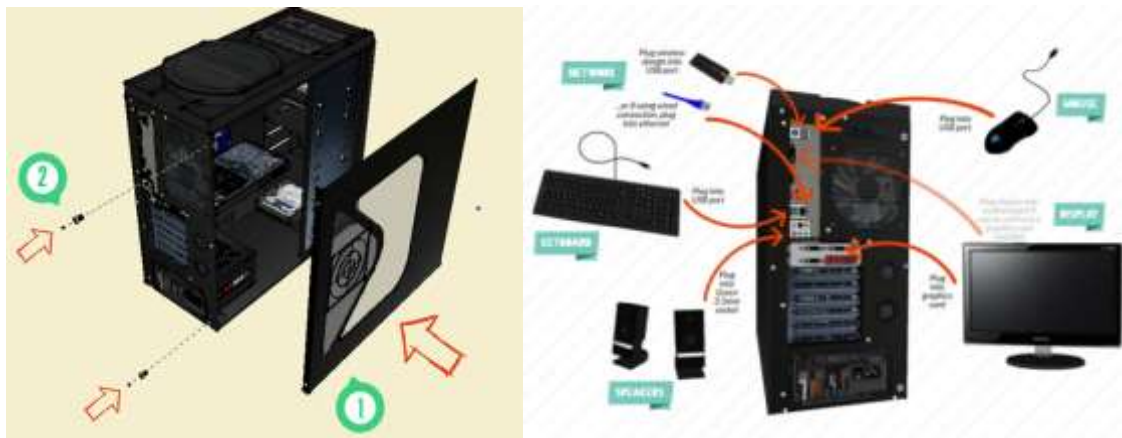


Figure 68 Closing the case

REFERENCES

1. Arrow. (2019, October 31). Understanding Heat Sinks: Functions, Types, & More. Retrieved from Arrow: <https://www.arrow.com/en/research-and-events/articles/understanding-heat-sinks-functions-types-and-more#:~:text=A%20heat%20sink%20is%20a,across%20its%20enlarged%20surface%20area.>
2. Bastounis, O. (2020, July 14). The best graphics cards in 2020 . Retrieved from Creative Bloq: <https://www.creativebloq.com/features/best-graphics-cards>
3. Casima, R. (2016, December 20). What Are the Functions of CD-ROM Drive? Retrieved from Techwalla: https://www.techwalla.com/articles/functions-cd_rom-drive_
4. Celsia. (n.d.). Heat Sink Types. Retrieved from Celsia: <https://celsiainc.com/technology/heat-sink/>
5. Ebuyer. (2015, April 7). What is a graphics card? Retrieved from e Media Hub: <https://www.ebuyer.com/blog/2015/04/what-is-a-graphics-card#:~:text=A%20Graphics%20Card%20is%20a,signal%20your%20monitor%20can%20understand.>
6. Infinite Electronics International. (n.d.). What is a USB Cable? Retrieved from Infinite Electronics International: <https://www.l-com.com/frequently-asked-questions/what-is-a-usb-cable#:~:text=The%20term%20USB%20stands%20for,printers%2C%20scanners%2C%20and%20more.>
7. McDonnell, S. (n.d.). Types of Slots On a Motherboard. Retrieved from Techwalla: <https://www.techwalla.com/articles/types-of-slots-on-a-motherboard>
8. Rizky, T. M. (2019, September 11). 5 IDE Cable Functions on a Computer. Retrieved from PCSOLIT: <https://ilkufaat.blogspot.com/2019/09/5-ide-cable-functions-on-computer.html>
9. Roberts, B. (n.d.). Uses for a SATA Cable. Retrieved from Techwalla: <https://www.techwalla.com/articles/types-of-hard-drive-cables>
10. Rubens, P. (2019, May 24). Random Access Memory: Fast, Short Term Memory. Retrieved from Enterprisestorageforum: <https://www.enterprisestorageforum.com/storage-hardware/random-access-memory-ram.html#:~:text=A%20vital%20part%20of%20every,for%20data%20and%20program%20code.&text=Random%20access%20memory%2C%20RAM%2C%20provides,it%20expects%20to%20use%20imminently>
11. Rutnik, M. (2020, October 19). Understanding different types of USB cables. Retrieved from ANDROID AUTHORITY: <https://www.androidauthority.com/different-types-of-usb-cables-804432/>

12. Schmidt, C. (2013, May 24). Complete CompTIA A+ Guide to PCs: Disassembly and Power. Retrieved from Pearson IT Certification:
<https://www.pearsonitcertification.com/articles/article.aspx?p=2024310&seqNum=17>
13. Seagate. (n.d.). Everything You Want to Know About Hard Drives. Retrieved from Seagate:
<https://www.seagate.com/as/en/do-more/everything-you-wanted-to-know-about-hard-drives-master-dm/>
14. Tutorials Point. (n.d.). Computer - CPU(Central Processing Unit). Retrieved from Tutorials Point:
https://www.tutorialspoint.com/computer_fundamentals/computer_cpu.htm#:~:text=CPU%20is%20considered%20as%20the,all%20parts%20of%20the%20computer.
15. Build-gaming-computers. April 2020. How to Assemble a PC (2020 Guide).[online]. Available from: <https://www.build-gaming-computers.com/how-to-assemble-a-pc.html>
16. EaseUS. September 2020. Install IDE Hard Drive. [online]. Available from :
<https://www.easeus.com/resource/install-ide-hard-drive.htm>
17. PC Build Advisor. June 2018. How to Build A Computer. [online]. Available from:
<https://www.pcbuildadvisor.com/how-to-build-a-computer-step-by-step-infographic/>
18. Technology Guide. December 2017. How to make or assemble desktop CPU step by step.[youtube]. Available from: https://www.youtube.com/watch?v=m_-G9Cacx2U
19. Arujuna CelikIT. October 2014. Asas Pemasangan Sistem Komputer. [youtube]. Available from: <https://www.youtube.com/watch?v=ctK58A71DTs>
20. How to Apply Thermal Paste. (n.d.). Retrieved November 24, 2020, from
<https://www.intel.com/content/www/us/en/gaming/resources/how-to-apply-thermal-paste.html>
21. Lathan, P., & G. (2016, December 23). 5 Tools You Need to Build a PC. Retrieved November 24, 2020, from <https://blog.nzxt.com/tools-need-build-pc/>