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THE ASSEMBLING OF A BASIC DESKTOP COMPUTER (CENTRAL PROCESSING UNIT)

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ABSTRACT: *The central processing unit is the brain of the computer unit. If you have purchased all the necessary hardware's, you have already gone through the first stage of assembling of your computer. You are advised to put on your anti-static wrist strap that will enable you discharge yourself before unpacking your components from its original anti-static bags. It is necessary to discharge yourself to avoid the danger of damaging your components by anti-static shock while making contact with the components. If you don't have an anti-static wrist strap, you can discharge yourself by touching the metal edges of the casing. Most of these parts can be bought together in what is known as a "barebones kit". In this instance, most of these components were bought together from percenttechnology.com as a barebones kit for around #35,000. There is financial advantage when we buy parts bundled together. Have all the mounting screws that come with the motherboard and a Philips screw driver handy as we will need them through all the stages. This is far cheaper when assembled than when purchased the assembled one. After securing the needed parts and materials, it will likely take between 2 and 4 hours to assemble your personal computer.*

Keywords: *Desktop Computer, Motherboard, Central Processing Unit, Assembling, hardwares*

INTRODUCTION

To build your PC from the scratch, one will purchase all the necessary hardware. The first thing that should be considered before one can start shopping around for the PC hardware noting its specification. You should think of the purpose of assembling that PC before buying the expensive hardwares. Otherwise, one can end up buying hardware's that offers advanced features that may not be necessary for your needs and also too expensive for the purpose. Recently, modern computers are more affordable when users supplement their monetary investment with a few hours of commitment. You will need to be able to use simple hand tools, such as a screwdriver and a pair of pliers.

METHODOLOGY

The assembling of a desktop computer is presented in steps for an elaborate explanation. This was done by procuring the necessary hardware's.



Fig 1: Computer Hardwares

These are the devices that will be needed to build the computer;

1. Processor (CPU)
2. Computer Case
3. Optical Drive (DVD RW and SATA capable)
4. Memory (RAM)
5. Power Supply
6. SATA Cables
7. Motherboard (SATA Capable)
8. Processor Fan
9. Case Fan
10. Hard Drive (SATA Capable)
11. Assortment of case and drive screws (Not Pictured)
12. Flowers

Step 1: Gather Tools and Supplies

The first thing is to assemble the tools that will be needed for this work. Every single one of these tools must not be used in every installation, though it is good to have them for obvious reasons. Using inappropriate tools for a task can cause damages on the equipments and injury on human.



Fig 2: Tools and Supplies

- Wire cutters and stripper
- Adjustable wrench
- Needle-nosed pliers
- Screwdriver
- Heat sink compound

- Grounding Strap
- Small container to hold screws
- Utility knife
- Small flashlight

Step 2: Open the Case

To open the computer case, the side panels must be removed. Unscrew the screws that hold the side panels. You must slide the side panels back to remove it then lift it away from the case (fig 3).



Fig 3: Open the Case

Step 3: Prepare the Case for Assembly

Three things need to be done before assembly commences:

- Removal of any packaging materials or item that may have come with the case.
- The cover for the optical drive will be removed. On our case, we will be removing the cover on the highest drive bay to mount our DVD or CD drive. This will be done by pushing in the retaining tabs.
- Take note of the pre-installed cables that came with the case. These are the connections for the front panel features. They are as follows; the audio jacks, power switch and USB ports. If these cables are not labeled are not labeled, the manufacturer's documentation should be consulted and they should be labeled before the installation of other parts in the case (fig 4).



Fig 4: Prepare the Case for Assembly

Step 4: Ground Yourself

The grounding strap should be put on your wrist and the other end connected to the computer case. If your strap doesn't have a clip to hook to the case, get a place to wedge against the metal as shown in fig 5. This will help avoid any buildup of static electricity on your body which might destroy the computer components. Static electricity have the tendency of destroying computer components.

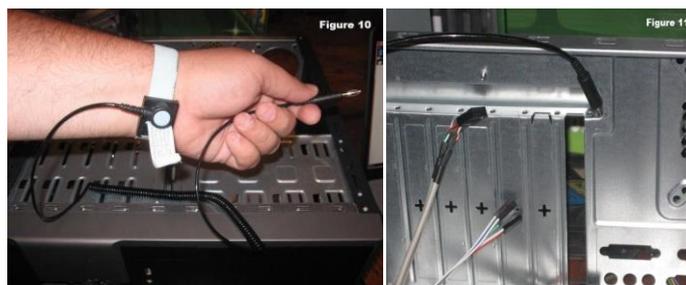


Fig 5: Ground Yourself

Step 5: Install Motherboard

- I/O Bezel is a trim panel installed in the back of the case which work is to surround the interface ports on the motherboard. It comes with the motherboard.
- There are standoffs which are installed in the case screw holes. This is installed to create a riser that demarcates the case and motherboard. The screws are installed into the standoffs as shown in fig 6. The screws and standoffs come uninstalled with the case, but it is necessary to order some of these screws and standoffs, just in case they aren't included.

Steps taken for motherboard installation in the case:

1. The I/O bezel plate is installed into the opening in the back of the case. It is pushed in from the inside of the case.
2. Screw the standoffs to the case. The standoffs should be screwed into the motherboard mounting holes.
3. Place the motherboard into the case and make sure that it matches the I/O bezel.
4. Install the screws to hold the motherboard firmly to the case.
5. The motherboard is already mounted to the case securely. The power connector will now be placed to the motherboard.

Figure 6 shows the motherboard installed in the case. It is better to keep the screws loose until all the connections on the board is done and the board is aligned with the bezel. To avoid damaging the motherboard, it must contact only the standoffs and screws. All of the standoffs and screws on the case must be installed to maintain balance.



Fig 6: Install Motherboard

Step 6: Install Hard Drive

The hard drive is a storage device of the computer that stores all your data. It is 3.5" wide and should be mounted to gain access to the cable connections on the back (fig 7). You may need to connect cables before you install the drive, if that is not feasible.



Fig 7: Install Hard Drive

1. Find a 3.5" drive bay to enable you install the drive in. If you find it difficult to get a place to mount the drive, kindly consult the documentation manual on your case for suggestions.
2. The drive will be slide into the proper hole until the screw holes on the sides are in line with the holes in the case.
3. Afterwards, screw it.

Step 7: Install Optical Drive



Fig 8: Install Optical Drive

The optical drive is 5.25" wide. It is installed in the drive bay on the case where the cover from was removed in a previous step. There will be considerations on the cable access while installing this drive. To install the drive:

1. The drive will be moved into the drive bay until the holes for the screws are lined up and the front of the drive is flush with the front of the case (fig 8). Make sure that it is orientated correctly.
2. Drive the screws to secure it.

Step 8: Install the Processor

The Processor is the brain of the computer. It is installed on the motherboard in the socket. To install the Processor

1. Identify the side with mark that shows pin 1 of the Processor as shown in fig 9. On the AMD brand processor, the marking is done as an arrow. Consult the manufacturer's documentation for specific information about your processor.
2. Lift the lever metal rod next to the socket.
3. Identify the corresponding marking on the Processor socket which on the motherboard to aid you inserts the Processor properly.
4. Push the lever rod down again to lock the processor in place.
5. Then close the small metal rod which will securely hold the CPU in place

6. Make sure that the fan or heat sink which will be installed afterwards is correct for the speed of your CPU; otherwise your CPU will overheat and behave abnormally or could be damaged.

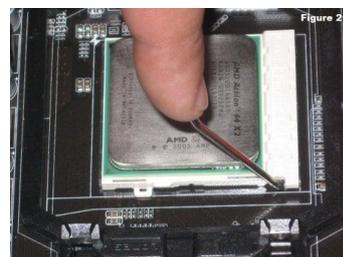
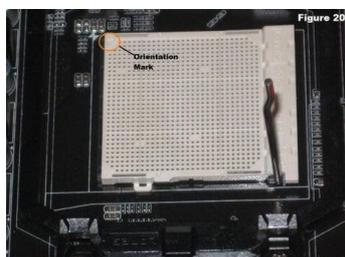


Fig 9: Install the Processor

Step 9: Install RAM

The Random Access Memory is the temporary memory location where the processor starts works. The data stored permanently is pulled from disks and the storage happens in the RAM while the processor will work with it. The memory can be installed install:

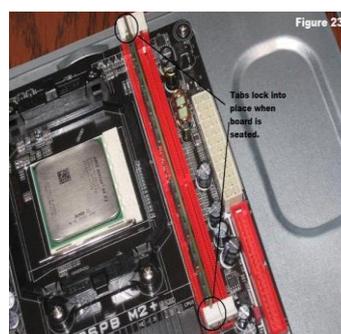
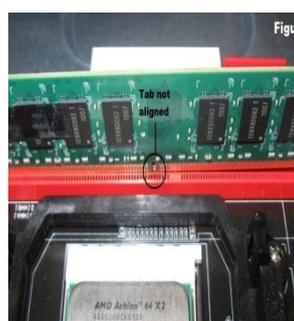


Fig 10: Install RAM

1. The RAM board is set in the socket as shown above. There should be confirmation that the notch in the board is in the right location. If it is not, turn the RAM around 180°.
2. Press it down firmly to fit it into the socket. Be sure that the tabs locks into place. When you press the tab and it is not aligned with the port, this can destroy the RAM board or the motherboard.

Step 10: Install the CPU Fan

The CPU fan consists of a heat sink and fan. The CPU fan sucks heat out from the CPU. On the installation of the fan:



Fig 11: Install the CPU Fan

1. You will drop thermal compound to the CPU based on the directives on the instruction manual provided with the compound.
2. Fix the fan assembly on the motherboard with mounting tabs aligned.
3. Move the locking rod down on the fan assembly with the purpose of locking it into place.
4. The fan assembly's power connector will be connected to the motherboard. The manual can be consulted to determine proper placement.

Caution: Thermal compound will be applied to avoid insufficient cooling and will cause damage to the CPU and/or motherboard.

Step 11: Install Case Fan

The case fan is often mounted on the back panel of the case. If the mount is not clear, consult the case manual. To mount the fan:

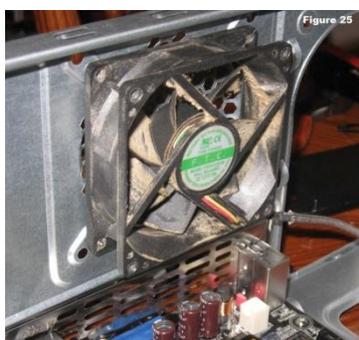


Fig 12: Install Case Fan

1. Align the mounting holes by holding the fan to the mounting pad on the inside of the case as shown in figure 25. The mounting of the fan is necessary because it blows air out of the case.
2. The screws are inserted from the outside of the case and also tighten.

Step 12: Install Power Supply

The case manual is consulted for details which will then be followed to install the power supply:



Fig 13: Install Power Supply

1. Align the mounting holes and power supply in the case as shown above.
2. Insert and tighten the screws.

Step 13: Connect Cables

Looking at all the components installed in the case, the jungle of wires can be daunting. It is very necessary to consult the motherboard manual at this stage for proper connections. We have power and data connections.



Fig 14: Connect Cables

Every device that has been installed needs power. In fig 14, the power supply connectors are shown. The motherboard is consisting of two power connections, and there are two connectors specifically for SATA devices (drives). The other connectors will operate the fans and other non-SATA devices.

- Data cables can be used to link drives and the front panel devices to our motherboard. Please consult the motherboard manual to confirm the exact placement of connectors. Wrong connections during cable connections can damage the components and cause bodily harm.

CONCLUSION

Since the components have all being installed completely, the next and probably the last step to take is to reinstall the side panels which was earlier removed on the case. At this point, the computer is ready to be switched on before the loading of the necessary software on it. If the computer fails to start up, check all connections and mounting to confirm that everything is correctly linked. Consultation on individual component manuals for specific troubleshooting information if the problem continues.



Fig 15: Basic Desktop Computer

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