ECE401 – Perspectives in Electrical and Computer Engineering

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Anatomy of a Personal Computer

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LAB Section: 05

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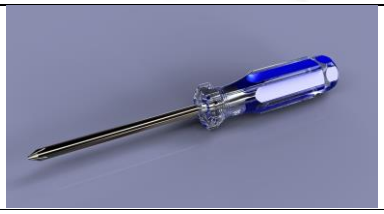
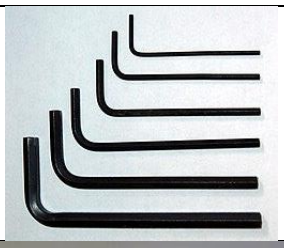
Submission Date: September 25, 2020

Introduction:

Lab 1 is titled “the anatomy of a personal computer”. For this lab, I took apart a Dell Studio XPS 8100. The purpose of this lab is to identify and use some of the tools necessary for the assembly and disassembly of electronic equipment and to identify the different components inside of a computer. The skills of working with these tools apply to electrical engineering tools. Being able to identify the components of a PC helps to give a picture to the physical side of components that will be covered in depth in later courses.

Equipment List:

Equipment	Image	Description
Flat Head Screwdriver		Flat-edged shaft attached to a handle. Primarily used to screw flat head screws. Sometimes can be used for other applications
Philips Head Screwdriver		Cross-edged shaft attached to a handle. Used for screw other Philips head screws
Needle Nose Pliers		Opposing long and narrow with a pointed tip attached to hinge and handle. Used to hold small objects or reach hard to reach places
Diagonal Cutters		Snub-nosed scissors-like tool used to cut thick wires
Nut Drivers		Socket attached to a shaft with a handle. Used to tighten/loosen low-torque bolts
Adjustable Wrenches		Open-ended wrench with adjustable jaw to fit many bolt sizes

Allen Wrenches		L-Shaped, hexagonal steel rod used to tighten/loosen bolts and screws
Torx Wrenches		Shaft attached to handle with edge of a six-pointed star. Used to tighten/loosen bolts and screws found in both automotive and computers
Tweezers		2 small, third-class levers connected at one end. Used for picking up small screws and computer components.
Soldering Iron		Metal tip attached to and insulated handle with power connection. Used to join wires and electronic components using the practice of soldering

Procedure:

1. The first step is to remove the side panel of the computer. This may require removing a single screw holding the cover in place. Removing the panel will grant you access to all the desktop's components including the motherboard.
2. What to do next is to detach all the cords and connectors attached to the motherboard, graphics card, hard drives, optical drives, I/O panel, and power supply. Many of these cords will be difficult to detach so be mindful as to press down the clips on some of the connectors before separating them.
3. This step will be the removal of most of the large components
    a. Remove the hard drive. This will require the removal of a screw and may need some force to remove or slide out of case.
    b. Next, remove any graphics, sound, or network cards in the PCI or PCIE slots. These may be screwed to case and the screw can often be found around the I/O port of the device on the backside of the case.

    c. Remove the power supply. This is the large heavy box located next to the motherboard. The screws that are holding it in will need to be removed. Many computer cases will have an additional clip or tab that needs to be pushed down to remove the power supply.
    d. The optical drive can be removed now that the power supply is out of the way. The removal process will be like the hard drive.
    e. Lastly, remove the fan that is usually mounted to the back side or side panel of the case. Removing this will make it much easier to reach the screws mounting the motherboard to the case that will be removed in the next step.
4. Unscrew all the screws mounting the mother board to the case. This will grant you greater access to the RAM and the CPU.
5. Once the motherboard is removed, unclip both ends of each RAM card. There may be more than one RAM card, all will need to be removed.
6. This step will detail the removal of the CPU fan and later the CPU. Many CPU fan configurations are different and will require a unique method of separating it from the CPU and motherboard.
    a. For this specific model of computer, removing the CPU requires twisting each of the four pegs counterclockwise. This is easiest with a flat-head screwdriver.
    b. The next step is to lift out the CPU fan. The fan will not be attached to the motherboard but will be adhered to the CPU, so lifting straight up may not be feasible.
7. The last step will be to remove the CPU from the motherboard. The CPU is usually secured to the motherboard by a clip mechanism. To release the clip, press down arm to separate from metal housing, then swing arm out and around from the metal housing.

Results/Discussion:

One of my pre-lab questions was does the computer have anything in its PCI and PCI/E slots. After I opened this computer, I found both a network card and a NVIDIA graphics card. I would guess from those components and 8 GB of RAM I had found that this computer was used as a kind of computer lab computer. I would guess that this was designed to be an all-around well-running machine that could run some computer programs. Because this lab had so many possibilities for components to take apart, I ran out of time to fully disassemble either the hard drive or optical drive. I would have especially liked to see the neodymium magnets inside the hard drive.

Conclusion:

Overall, I think that this lab was successful. The purpose of this lab is to identify and use some of the tools necessary for the assembly and disassembly of electronic equipment and to identify the different components inside of a computer. While completing this lab, I was able to do both objectives. Even though I did not use all the equipment during the lab, I still had access to all of the tools in the equipment list. This lab also strengthened the knowledge I already have when it comes to common tools and computer components. This is because I had previously taken apart computers both in high school and at home in my free time.