Lab 3.2 – Take a Computer Apart and Put it Back Together

Objectives:
The goal of this lab is to help you get comfortable working inside a computer case. After completing this lab, you will be able to:

- Take a computer apart
- Recognize components
- Reassemble the computer

Materials required:
This lab requires the following:

- A computer designated for disassembly
- A PC toolkit with an antistatic ground strap and mat
- A marker and masking tape
- Small containers, such as paper cups, to hold screws as you work
- A workgroup of 2 students or as individuals

Lab Preparation
Before the lab begins, the instructor or lab assistant needs to do the following:

- Verify that a computer designated for disassembly is available to each student or workgroup.

Activity Background
If you follow directions and take your time, there’s no reason to be intimidated by working inside a computer case. This lab takes you step by step through the process of disassembling and reassembling a PC. Follow your computer lab’s posted safety procedures when disassembling and reassembling a PC, and remember to always wear your antistatic ground strap. Also, never force a component to fit into its slot.

You begin this lab by removing the cover of your PC and then removing the components inside. Next, you reassemble the components and replace the cover. This lab includes steps for working with a desktop PC and a Tower PC. Follow the steps that apply to your computer.

Also, in this lab, you’re instructed to disassemble your PC in this order: expansion cards, interior cables and cords, power supply, case fans, motherboard, and drives. Because some systems are designed so that the disassembly order is different from this one, your instructor might change the order. For example, you might not be able to get to the power supply to remove it until drives or the motherboard
are out of the way. Be sure to follow any specific directions from your instructor. As you work, when you remove a screw, place it in a paper cup or on a piece of paper so that you can keep different size screws separated. Later, when you reassemble, organizing the screws in this way makes it easier to match the right size screw to the hole.

**Activity:**

Follow the procedure outlined in the following steps to remove the case cover and expansion cards. (If you are working on a tower case, lay it on its side so that the motherboard is on the bottom.)

1. Remove the cover from your PC.
2. To make reassembly easier, take notes or make a sketch of the current placement of boards and cables and identify each board and cable. You can mark the location of a cable on an expansion card with a marker, if you like. Note the orientation of the cable on the card. Each cable for the floppy disk drive, parallel ATA hard drive, or CD-ROM drive has a colored marking on one side of the cable called the “edge color”. This color marks pin 1 of the cable. On the board, pin 1 is marked with the number 1 or 2 beside the pin or with a square soldering pad on the back side of the board, as shown in figure 3-1. You might not be able to see this soldering pad now.
3. Remove the cables from the expansion cards. There’s no need to remove the other end of the cable from its component (floppy disk drive, hard drive, or CD-ROM drive). Lay the cable over the top of the component or case.

4. Remove the screw holding the card to the back of the case. If you aren’t wearing an antistatic ground strap, touch the case before you touch the card.

5. Grasp the card with both hands and remove it by lifting straight up and rocking the card from end to end (not side to side). Rocking the card from side to side might spread the slot opening and weaken the connection. When you remove the card, be sure you don’t touch the edge connectors on the card to avoid causing ESD damage.

6. If the card had a cable attached, examine the card connector for the cable. Can you identify pin 1? Lay the card aside on a flat surface.

7. Remove any other expansion cards in the same way.

8. In some proprietary systems, an expansion card assembly attaches to the motherboard, with each card attached to the assembly. If your system has this arrangement, remove it now. It’s probably held in place by screws or clips and may or may not have a rail guide you can use to locate the assembly in the case.

9. To remove the power supply, first remove the power cables to the motherboard, case fans, other remaining components, and the power switch, if necessary. Make notes about which cable attaches to what hardware. After the cables are removed, support the power supply with one hand, and remove the screws attaching it to the case.

10. Remove any case fans.

In some systems, it’s easier to remove the drives first and then the motherboard. In other systems, it’s easier to remove the motherboard first. In these instructions, to make sure you don’t risk dropping a drive on the motherboard when removing the drive, you’re directed to remove the motherboard first and then the drives. Your instructor however, might prefer that you remove the drives first and then the motherboard.

1. Begin removing the motherboard by removing any power cables connected to any case or component fans. Be sure to make notes or label the cables so that you can reinstall them correctly.

2. Finish removing the motherboard by removing the screws holding the board to the stand-offs. Usually six to nine screws attach the motherboard to the case. Be careful not to gouge the board or damage components with the screwdriver. Because the screws on the motherboard are often located between components, they can be hard to reach. Be very careful not to damage the motherboard.

3. To remove drives, remove the ribbon cable if it’s still attached. Many cases have a removable drive bay. The drives are attached to this bay and the bay can be removed with all the drives attached. This arrangement gives you easier access to drive-mounting screws than from inside the case. If your case has a removable drive bay, this removal method is preferred. Otherwise, remove each drive separately. Be careful not to jar the drive as you remove it from the case.
4. If your system has a removable drive bay, the floppy drive likely came out with the removable bay. If the floppy drive is still in the system, remove the screws holding the drive in place, and slide the drive out of the case.

5. Remove any CD-ROM, DVD, or tape drives from the case. These drives are usually in the 5 ¼" drive bays and are normally held in place by four to eight screws. After the screws are removed, the drive slides out the front of the case.

6. Remove any other components.

Now that you have removed all the components, you’re ready to reassemble the PC. Replace each component carefully. Take care to install each component firmly without over tightening the screws. Don’t force components to fit. If a component won’t fit easily the way it should, look for some obstruction preventing it from falling into place. Look carefully for the reason the component won’t fit correctly, and make any small adjustments as necessary. The following steps outline the required procedure, which is essentially the reverse of the disassembly procedures:

1. Install the power supply and replace the screws holding it in position.

2. Install the drives in their bays and then install the motherboard, unless your instructor prefers that you install the motherboard first.

3. Connect the power cables from the power supply to the drives and the motherboard. Double check to make sure the power supply connectors to the motherboard are connected correctly, especially the relative positions of the P8 and P9 connectors on older motherboards (remember the black to black rule) if you are dealing with an older AT power supply.

4. Place each card in its slot (it doesn’t have to be the same slot, just the same bus type) and replace the screw. Don’t place a PCI or an ISA video card near the power supply; otherwise, electromagnetic interference (EMI) from the power supply might affect the video picture.

5. Replace the cables, being sure to align the colored with pin 1. (In some cases, it might work better to connect the cable to the card before you put the card in the expansion slot.)

6. Check to make sure no cables are interfering with any fan’s ability to turn. A common cause of an overheated system is a fan that can’t move air because a cable is preventing it from spinning.

7. When all components are installed, you should have refitted all the screws you removed earlier. If some screws are missing, it’s important to turn the case upside down and gently shake the case to dislodge any wayward screws. Any screw lying on the board has the potential to short out the board when power is applied. Don’t use a magnet to try to find missing screws in the case because you might damage data on hard drives and floppy disks left in the floppy drives.

8. Plug in the keyboard, monitor and mouse.

9. In a classroom environment, have the instructor check your work before you power up.

10. Plug in the power cord to the PC and to the power outlet or surge protector. Verify that any power switches on the rear of the case are set correctly. Some cases have a power switch to close the AC voltage, and others have an on/off switch.

11. Using the power button on the front of the case, turn on the power and check that the PC is working properly before you replace the cover. Don’t touch the inside of the case while the power is on.
12. If all is well, turn off the PC and replace the cover and its screws. If the PC doesn’t work, don’t panic. Turn off the power, and then go back and check each cable connection and each expansion card. You probably haven’t seated a card solidly in the slot. After you have double checked everything, try again.

**Review Questions**

1. When removing the cover, why should you take care to remove only the screws that hold the cover on?
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   ____________________________________________________________

2. How should you rock a card to remove it from its slot? Why is it important to know how to rock a card correctly?
   ____________________________________________________________
   ____________________________________________________________

3. What should you do to help you remember which components connect to which cables?
   ____________________________________________________________
   ____________________________________________________________

4. What marking on the ribbon cable identifies pin 1
   ____________________________________________________________

5. What component(s) defines the system’s form factor?
   ____________________________________________________________
   ____________________________________________________________

6. What form factor does your PC use?
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7. Why would a PC technician ever have to change out a computer’s motherboard?
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