MIS 431 Project 8 Building Cat 5 Cables

For this project you are to use the crimp tool to create a 6 foot straight-through 2-pair Ethernet cable. Materials are found in the network lab, and you should test your cable with a working computer in the lab, near the hub. Please make one cable per team and before you squeeze the crimp tool, have your partners check the wire pattern. There is a color-coded diagram on the white board in the lab to help you insert the wires in the proper channels. You will be using 2-pair Cat 5 wire (easier to build than the 4-pair Cat 5 wire) and a male RJ-45 connector. Please attach your server’s name to the cable using transparent tape in the red toolbox.

Some hints:
- Examine the crimp tool cutter blades so you know which cuts all the way through and which produces the nick in the outer insulation. Use the crimp tool to cut off the wire cleanly; this is the cutter farthest from the pivot point.
- Insert the wire against the stop and squeeze again - it puts a small nick in the outer insulation that allows the outer insulation to be pulled off the proper distance from the ends of the wires.
- Untwist the wires so you have the pattern Blue, Blue/White, Orange, Orange/White and put them in this order, left to right, as shown on the white board in the lab.
- Make sure you orient the connector’s release tab to be on the bottom of the plug as you insert the wires from the bottom. Push the wires all the way into the channels so that you can see the copper ends of the wire from the end of the RJ-45 connector and so that the outer insulation is inside the connector (so that it can be crimped by the strain relief).
- The wires go into channels 1, 2, 3, and 6, counting from the left with the tab down. Fan them out so 1, 2, and 3 are next to each other. Leave a little space between the Orange and the Orange/White wire so to skip the two channels (4 and 5). They should look like 1 2 3 6
- As you start to squeeze the crimp tool, make sure that you continue to push in on the wires so they remain at the very end of the channels; that way they will make a good connection when crimped. Make sure you squeeze it pretty hard to assure a good connection.
- The crimp tool is on a ratchet and will not release until you have squeezed it in all the way. Well, that was the case for the one that has disappeared from the lab. This one just squeezes.
- Repeat the process on the other end of the cable, again using the same pattern of the wires and channels. Switch partners on the other cable end so both people get the experience of working the crimp tool.
- If the cable does not work (I will test it in the lab) then carefully examine both ends of the cable to see if you have wired it wrong, and cut off that end and repeat these steps. If you cannot see anything wrong then you might not have made a proper crimp in the conductor wires and need to guess which end should be replaced. Before you cut off the end, have someone else check it – remember that the connectors cost about $1 each retail.
Also, there are a number of other twisted pair cable standards out there. Write a paragraph on each of these: Cat 5, Cat 5e, Cat 6. When would each be used, and why? What is the cost difference? If you need resources, look at “Blackbox Explains” at www.blackbox.com.

Good luck! Your write up for this should describe the process you used and should give the number of connectors you used. Additional connectors will be available from my office but be prepared to give your name when you pick them up.

**Background on Unshielded Twisted Pair Cables**

You are building a so called Cat 5 2-pair patch cable using stranded UTP (unshielded twisted pair) wiring. The cable has a similar male connector on each end and plugs into a matching RJ-45 female wall connector or into a hub or switch female connector. These are available widely already built, and are fairly inexpensive. Check out Staples, for example – they come in various lengths and also different colors (wires and hoods).

It is usual that where several wires are plugged in at one place (a wall patch panel or a multi-port hub/switch) each cable is identified by a number inscribed on a tiny “donut” that encircles the cable, next to the connector. You can look up the number in a book and thus know which cable flows to which office connector, etc. For example, which port in the hub in the corner of the room (near the white board) is connected to your server? Unless you had a partner and were plugging and unplugging wires to see which link lights go out, you might not know without tracing the flow of your wire back. And most offices have the wiring in the walls so this would be impossible. Needless to say, it makes sense to mark the wires as they are installed. The donuts are usually installed by testing them from both ends to identify the necessary wire. Also, some firms use different wire colors to identify the cable run.

**Testing** a cable must be done before it is put into use. Professional installers use a fancy testing device that resembles a very large remote control box with an LCD window. The cable plugs into a port and a remote piece of the tester is plugged into the other end of the cable, often in another room and out of site. The remote unit “injects” a signal into the cable and the tester evaluates that signal in a variety of ways before indicating that the cable run is OK. Rarely is the cable itself bad initially – usually it is the connections. However, over time stuff happens and the cable could develop faults – mice chewing (really!), nails driven into a wall (been there, too), movement of the wall, and so forth.

When you wish to plug two computers together directly (without a hub/switch in the middle) then you must build a **crossover cable**. This reverses the Send/Receive pair orientation so that they can communicate. (The hub or switch does this for you in the middle if you use one.) So, one end of the crossover cable will have the Blue, Blue/White, Orange, Orange/White wires in the 1-2-3-6 channels. The other end will have the same wire colors but in the 3-6-1-2 channels. It is customary to use a special wire color or attach a colored hood on top of the regular connector to indicate it is a crossover cable. Most modern switches auto-sense and can accommodate a crossover cable used to connect a computer to the switch instead of a straight cable.