

## Lab 4.5.4 Terminating UTP Cables

### Objectives

- Use a punch down tool to terminate an RJ-45 wall jack.
- Install an RJ-45 jack in a wall plate.
- Use a punch down tool to terminate a UTP cable at a patch panel.

### Background / Preparation

In this lab you will wire an RJ-45 data jack for installation in a wall plate using a punch-down tool. This is done frequently when installing cabling in an office environment. The punch tool is also used to terminate the other end of the cable at a patch panel punch-down block. The punch tool uses spring-loaded action to push wires between metal pins, while at the same time skinning the sheath away from the wire. This ensures that the wire makes a good electrical connection with the pins inside the jack. The punch tool also cuts off any extra wire.

A Category 5/5e straight-through patch cable with an RJ-45 connector normally plugs into a data jack or outlet to connect a PC to the network. It is important to use Category 5 or 5e rated jacks and patch panels with Category 5 or 5e cabling in order to support Fast Ethernet (100 Mbps) and Gigabit Ethernet (1000 Mbps). The process of punching down wires into a data jack in an office area is the same as punching them down at a patch panel in a wiring closet. This lab can be performed individually, in pairs, or in groups.

The following resources are required:

- 60-90 cm (2-3 feet) length of cable, either Category 5 or 5e.
- RJ-45 data jack—If RJ-45 data jacks are installed on both ends of the cable, two jacks will be needed and the installation can be tested by inserting cable with RJ-45 connectors and a simple cable continuity tester. More jacks may also be needed if errors are made.
- Category 5/5e wall plate.
- Patch panel.
- Punch tool, type 110.
- UTP cable stripper.
- Wire cutters.
- Two known good straight-through patch cables for testing (optional).

### Step 1: Strip the sheath

- a. Remove the cable sheath 2.54 cm (1 inch) from the end of the cable.

**Step 2: Position wires in data jack**

- a. Position wires in the proper channels on the RJ-45 jack maintaining the twists as close to the jack as possible. The diagram that follows shows an example of how to place the wires with one type of jack.

**8-pin receptacle**

<b>White Green</b>	<b>White Blue</b>
<b>Green</b>	<b>Blue</b>
<b>White Brown</b>	<b>White Orange</b>
<b>Brown</b>	<b>Orange</b>

- b. Most jacks have the channels color-coded to indicate where the wires go. The following photo of the jack shows one model. Jacks are typically stamped to indicate whether they are T568A or T568B.



**Step 3: Punch down the data jack**

- a. Use the punch tool to push conductors into the channels. Make sure to position the cutting side of the punch tool so that it faces the outside of the jack. If this is not done, it will cut the wire being punched. Try tilting the handle of the punch tool a little to the outside, so it will cut better.



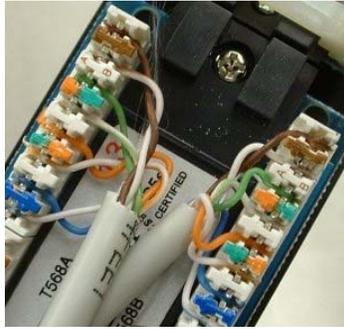
- b. If any wire remains attached after using the punch tool, simply twist the ends gently to remove them. Then place the clips on the jack, and tighten them. Make sure that no more than 1.27 cm (one half inch) of untwisted wire is between the end of the cable jacket and the channels on the jack.

**Step 4. Attach the faceplate.**

- a. Snap the jack into the faceplate by pushing it from the back side. Make sure when this is done, that the jack is right-side up so the clip faces down when the wall plate is mounted.
- b. Use the screws to attach the faceplate to either the box or to the bracket. If there is a surface-mounted box, keep in mind that it might hold 30-60 cm (1-2 feet) of excess cable. Then it will be necessary to either slide the cable through the tie-wraps, or pull back the raceway that covers it, in order to push the excess cable back into the wall. If there is a flush-mounted jack, all that is needed is to push the excess cable back into the wall.

**Step 5: Punch down the patch panel**

- a. On the opposite end of the cabling, remove the jacket 2.54 cm (1 inch) from the cable.
- b. Lay the wires down in the patch panel so that the colors of the wires correspond exactly to the colors indicated on the pin locations in the same manner as the data jack was punched down.
- c. Keep the sheath within .64 cm (¼ inch) of where the wires begin branching out to their pin locations.
- d. Do not untwist the wires more than necessary to lay them down at the pin locations. A good way to keep from untwisting too much is to hold down the wires next to the patch panel with one finger while using the other hand to pull apart each end as you lay it across the connector.



e. The following figure shows a large punch down patch panel with carefully routed cabling.



**Step 6: Test the data jack and patch panel terminations with a basic cable tester (optional)**

- a. Obtain two straight-through Ethernet patch cables and verify they both function properly using a simple cable tester.
- b. Connect one end of one of the straight-through Ethernet patch cables to the data jack outlet and one end of the other straight-through cable to the jack at the patch panel.
- c. Insert the opposite ends of the two cables into a simple cable tester and check for continuity from end to end through both patch cables, the data jack, and the patch panel. Did the cable run test good from end to end?

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**Step 7: Reflection (optional)**

- a. Take a tour of a wiring closet that contains patch panels and punch-down blocks. Was there any other type of devices that might use similar techniques to attach wires? What do you think attaches to these cables? \_\_\_\_\_
- b. What do you think are some of the drawbacks and advantages of having a job installing network cabling? \_\_\_\_\_