Lab 3.1.9d Rollover Cable Construction

Objective

- Build a Category 5 or Category 5e Unshielded Twisted Pair (UTP) console rollover cable.
- Test the cable for continuity and correct pin-outs, the correct wire on the right pin.

Background

This will be a 4-pair "rollover" cable. This type of cable is typically 3.05 m (10 ft) long but can be as long as 7.62 m (25 ft). A rollover cable can be used to connect a workstation or dumb terminal to the console port on the back of a Cisco router or switch. Both ends of the cable built will have RJ-45 connectors on them. One end plugs directly into the RJ-45 console management port on the back of the router or switch. Plug the other end into an RJ-45-to-DB9 terminal adapter. This adapter converts the RJ-45 to a 9-pin female D connector for attachment to the PC or dumb terminal serial (COM) port. A DB25 terminal adapter is also available to connect with a PC or dumb terminal. This adapter uses a 25 pin connector. The following picture shows a rollover console cable kit that ships with most Cisco devices.

This cable is called a rollover because the pins on one end are all reversed on the other end as though one end of the cable was rotated or rolled over. In the last lab when building the straight-through cable, putting the second RJ-45 on upside down would have made a rollover cable instead of the straight through cable.

Prior to starting the lab, the teacher or lab assistant should have a spool of Category 5 or Category 5e UTP cable, RJ-45 (8-pin) connectors, an RJ-45 crimping tool and a continuity tester available. Work individually or in teams. The following resources will be required:

- One 3.05 to 6.1 m (10 to 20 ft) length of Category 5 cabling per person or per team

- Four RJ-45 connectors, two are extra for spares
- RJ-45 crimping tools to attach the RJ-45 connectors to the cable ends
- An RJ-45 to DB-9 female terminal adapter, available from Cisco
- Cabling continuity tester
- Wire cutters

Step 1

Use the table as a reference to help create a rollover console cable.

Router or switch Console port (DTE)	RJ-45 to RJ-45 Rollover Cable (left end)	RJ-45 to RJ-45 Rollover Cable (right end)	RJ-45 to DB9 Adapter	Console Device (PC workstation serial port)
Signal	From RJ-45 Pin No.	To RJ-45 Pin No.	DB9 Pin No.	Signal
RTS	1	8	8	CTS
DTR	2	7	6	DSR
TxD	3	6	2	RxD
GND	4	5	5	GND
GND	5	4	5	GND
RxD	6	3	3	TxD
DSR	7	2	4	DTR
CTS	8	1	7	RTS

Signal Legend: RTS = Request To Send, DTR = Data Terminal Ready, TxD = Transmit Data, GND = Ground (One for TxD and one for RxD), RxD = Receive Data, DSR = Data Set Ready, CTS = Clear To Send.

Step 2

Determine the distance between devices, then add at least 30.48 cm (12 in.) to the distance. Make the cable about 3.05 m (10 ft), unless connecting to router or switch from a greater distance. The maximum length for this cable is about 8m (approx 25 ft).

Step 3

Strip 5.08 cm (2 in.) of jacket off of one end of the cable.

Step 4

Hold the 4 pairs of twisted cables tightly where jacket was cut away. Reorganize the cable pairs and wires into the order of the T568B wiring standard. They can be ordered in any sequence, but use the T568B sequence to become more familiar with it.

Step 5

Flatten, straighten, and line up the wires, then trim them in a straight line to within 1.25 to 1.9 cm (1/2 to ¾ in.) from the edge of the jacket. Be sure not to let go of the jacket and the wires, which are now in order.

Step 6

Place an RJ-45 plug on the end of the cable, with the prong on the underside and the orange pair to the left side of the connector.

Step 7

Gently push the plug onto wires until the copper ends of the wires can be seen through the end of the plug. Make sure the end of the jacket is inside the plug and all wires are in the correct order. If the jacket is not inside the plug, the plug will not be properly gripped and will eventually cause problems.

Step 8

If everything is correct, crimp the plug hard enough to force the contacts through the insulation on the wires, thus completing the conducting path.

Step 9

Repeat steps 2 through 8 to terminate the other end of the cable, but reversing every wire as indicated in the table above. Pin 1 to pin 8, pin 2 to pin 7, pin 3 to pin 6 and so on.

a. **Alternate Method** – Arrange the wires into the order of the T568B wiring standard. Place a RJ-45 plug on the end with the prong on the top side of the connector. This method will achieve the proper reversing of every pair of wires.

Step 10

Test the finished cable. Have the instructor check it. How is it possible to tell if the cable is functioning properly?

There is a simple method to check if the cable is functioning that does not require any specialized testing hardware. Find an existing connection that uses a rollover cable, for example between a router and a PC, and replace the existing cable with the new cable. Use HyperTerminal or other terminal software to ensure that communication is still occurring between the router and the PC.

If you have a Fluke 620, the wiring can be tested for connectivity, mapped for correct placement of wires, and confirmed for length. If you have a more basic cable tester, it may simply tell you whether the wire passes a connectivity test or not. Be careful, some cable testers only give a passing grade if the cable is straight through or crossover, so the rollover cable may work, but the cable may fail the test.

At times, a simple visual inspection can lead to the discovery of an incorrect wiring color pattern or wiring that is incorrectly fit into the connector.

