

Lab 1: STUDY AND DEMONSTRATION OF ETHERNET CABLING: STRAIGHT THROUGH AND CROSSOVER.

OBJECTIVES:

- To study ethernet cable structure and wiring standards.
- To prepare and terminate a straight-through ethernet cable using RJ45 connectors.
- To test and verify the connectivity of the cable tester.

MATERIALS REQUIRED:

- Ethernet cable (Cat5e or Cat6)
- RJ45 connectors
- Crimping tool
- Wire stripper
- Cable tester

THEORY:

Ethernet cables are widely used in computer networks to connect devices such as computers, switches, and routers. RJ45 connectors are attached to Ethernet cables to enable these connections. There are two common types of Ethernet cables:

- Straight-through cable: Used to connect different network devices (e.g., computer to switch).
- Crossover cable: Used to connect similar devices directly (e.g., computer to computer).

The wiring standards T568A and T568B define the order of colored wires inside the RJ45 connector. Correct wiring and proper crimping are essential for reliable data transmission.

PROCEDURE:

Type 1: Straight-through Cable

1. Cut the Ethernet cable to the desired length.
2. Strip about 1 inch of the outer jacket from both ends of the cable using the wire stripper.
3. Untwist the pairs of wires and arrange them according to the T568B wiring standard:
 - Pin 1: White/Orange
 - Pin 2: Orange
 - Pin 3: White/Green
 - Pin 4: Blue
 - Pin 5: White/Blue
 - Pin 6: Green
 - Pin 7: White/Brown
 - Pin 8: Brown
4. Trim the wires to ensure they are all the same length.
5. Insert the wires into the RJ45 connector, ensuring each wire goes into its respective slot.
6. Use the crimping tool to secure the RJ45 connector onto the cable.
7. Repeat steps 2-6 for the other end of the cable.
8. Test the cable using a cable tester to ensure proper connectivity.

Type 2: Crossover Cable

1. Follow steps 1-4 from the straight-through cable procedure.
2. For one end of the cable, arrange the wires according to the T568A wiring standard:
 - Pin 1: White/Green
 - Pin 2: Green
 - Pin 3: White/Orange
 - Pin 4: Blue
 - Pin 5: White/Blue
 - Pin 6: Orange
 - Pin 7: White/Brown

- Pin 8: Brown
3. For the other end of the cable, arrange the wires according to the T568B wiring standard:
 - Pin 1: White/Orange
 - Pin 2: Orange
 - Pin 3: White/Green
 - Pin 4: Blue
 - Pin 5: White/Blue
 - Pin 6: Green
 - Pin 7: White/Brown
 - Pin 8: Brown
 4. Trim the wires to ensure they are all the same length.
 5. Insert the wires into the RJ45 connectors, ensuring each wire goes into its respective slot.
 6. Use the crimping tool to secure the RJ45 connectors onto the cable.
 7. Test the cable using a cable tester to ensure proper connectivity.

Connection Testing Using Cable Tester

1. Connect one end of the cable to the transmitter unit of the cable tester.
2. Connect the other end of the cable to the receiver unit of the cable tester.
3. Turn on the cable tester and observe the results.
 - For a straight-through cable, all pairs should show continuity in the same order.
 - For a crossover cable, the transmit and receive pairs should be crossed.
 - Orders : 1-8 for straight-through and 1-3, 2-6, 3-1, 6-2 for crossover.

OUTPUT:

Straight cable:



Crossover cable:



RESULT:

The Ethernet straight-through and crossover cables were successfully prepared using RJ45 connectors. Cable testing confirmed that all wire connections were correct and there were no faults in the cables.

CONCLUSION:

In this lab, we learned how to prepare Ethernet cables using RJ45 connectors and understood the wiring standards T568A and T568B. We also learned the practical difference between straight-through and crossover cables. Proper crimping and correct wire arrangement are essential for reliable network communication. The cable tester helped verify the correctness of the connections.