



**BUBT | BANGLADESH UNIVERSITY OF
BUSINESS AND TECHNOLOGY**

COMPUTER SCIENCE AND ENGINEERING

LAB REPORT

NETWORK CABLING - MAKING CONNECTIONS WITH CAT6
STRAIGHT THROUGH AND CROSSOVER CABLE CONNECTION

COMPUTER NETWORKS (CSE-320)

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1 Introduction

Network cabling is a fundamental part of building reliable wired networks. In Ethernet-based LANs, Category 6 (CAT6) Unshielded Twisted Pair (UTP) cable is commonly used because it supports high-speed data transmission, reduces interference through twisting of wire pairs, and provides better performance than older categories such as Cat5/5e. To connect CAT6 cables to network devices (such as PCs, switches, routers, and hubs), the cable ends must be properly terminated using an RJ45 modular connector and arranged according to standard wiring schemes.

This lab experiment focuses on creating two common Ethernet patch cables: straight-through and crossover cables. A straight-through cable uses the same wiring standard on both ends (typically T-568A–T-568A or T-568B–T-568B) and is widely used to connect different types of devices, such as a computer to a switch.

A crossover cable uses different wiring standards on each end (T-568A on one end and T-568B on the other) and is traditionally used to connect similar devices directly, such as a computer to a computer or switch to switch. Correct pin arrangement and secure crimping are essential for ensuring proper connectivity and minimizing transmission errors.

2 Instruments

The tools needed for this experiment:

1. Unshielded twisted pair (UTP) patch cable (Cat5/Cat6)
2. Modular connector (RJ45)
3. Crimping tool
4. Cable tester

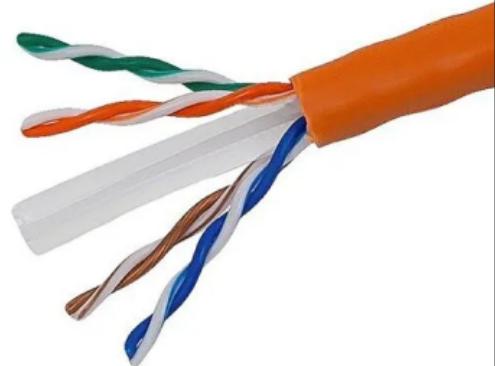


Fig: UTP Cable



Fig: RJ45



Fig: Crimping Tool



Fig: Network Cable Tester

Figure 1: Instruments

3 Color Code Sequence

Pin	T-568A	T-568B
1	White/Green	White/Orange
2	Green	Orange
3	White/Orange	White/Green
4	Blue	Blue
5	White/Blue	White/Blue
6	Orange	Green
7	White/Brown	White/Brown
8	Brown	Brown

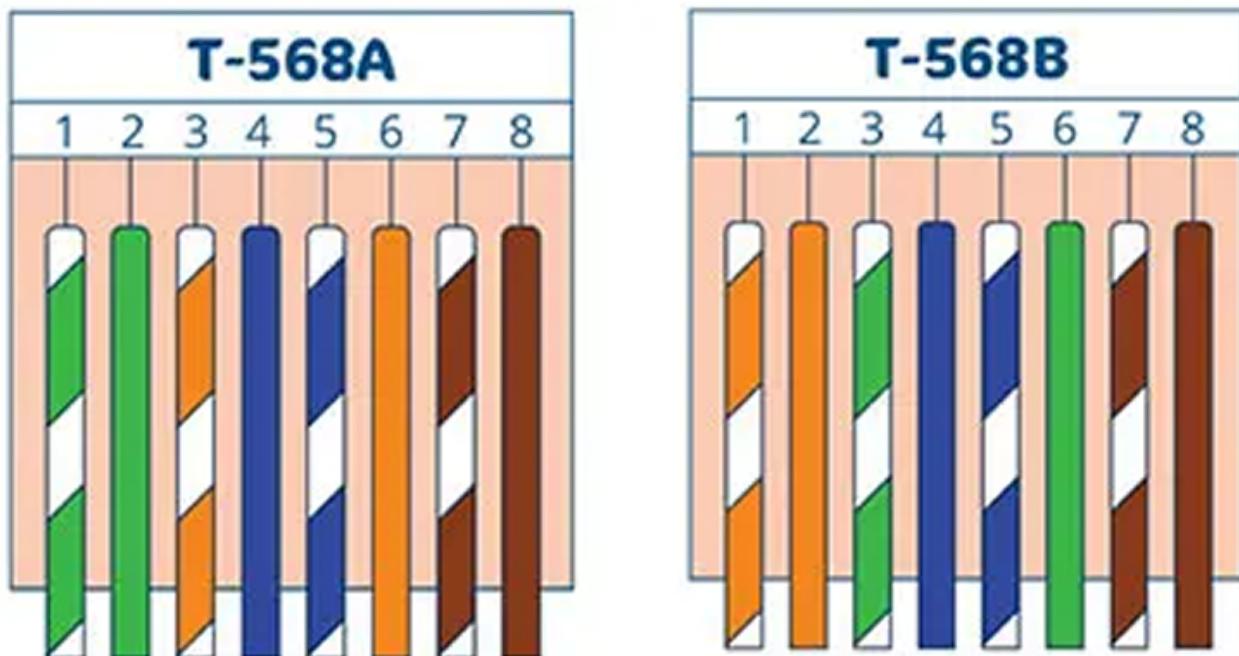


Figure 2: Color Code Sequence

Straight-through cable: Use the same wiring standard on both ends (T-568A–T-568A or T-568B–T-568B).

Crossover cable: Use T-568A on one end and T-568B on the other.

4 Procedure

Here's a step by step guide followed for

4.1 Cable Preparation

1. Measure the required CAT6 UTP cable length and cut it.
2. Strip about 2–3 cm of the outer jacket from one end.
3. Separate the twisted pairs and untwist them slightly.
4. Straighten all 8 wires properly.

4.2 Wire Arrangement

1. Choose the wiring standard:
 - **Straight-through cable:** same standard on both ends (T-568A–T-568A or T-568B–T-568B).
 - **Crossover cable:** different standards on each end (T-568A on one end and T-568B on the other).

2. Arrange wires in the correct sequence:

T-568A : White/Green, Green, White/Orange, Blue, White/Blue, Orange, White/Brown, Brown.

T-568B : White/Orange, Orange, White/Green, Blue, White/Blue, Green, White/Brown, Brown.

4.3 Termination (Crimping)

1. Hold the arranged wires tightly and trim the ends evenly (about 1–1.5 cm).
2. Insert the wires fully into the RJ45 connector (ensure all wires reach the end).
3. Make sure the cable jacket goes slightly inside the RJ45 connector for a firm grip.
4. Place the RJ45 connector into the crimping tool and crimp firmly.
5. Repeat the same steps for the other end:
 - Straight-through: use the same wire sequence on both ends.
 - Crossover: use T-568A on one end and T-568B on the other end.

4.4 Testing and Verification

1. Connect both ends of the cable to the cable tester (main unit and remote).
2. Turn on the tester and observe the LED sequence.
3. Verify the pin mapping:
 - **Straight-through:** $1 \rightarrow 1, 2 \rightarrow 2, \dots, 8 \rightarrow 8$.
 - **Crossover:** $1 \rightarrow 3, 2 \rightarrow 6, 3 \rightarrow 1, 6 \rightarrow 2$, and $4 \rightarrow 4, 5 \rightarrow 5, 7 \rightarrow 7, 8 \rightarrow 8$.
4. If any mismatch occurs, re-check wire order and re-crimp the incorrect end, then test again.

5 Conclusion

This lab experiment was done to make CAT6 network cables and learn how to connect RJ45 connectors correctly. We made two types of cables: **straight-through** and **crossover**, using the **T-568A** and **T-568B** color codes. After crimping the connectors, we tested the cables with a cable tester to check whether all pins were connected properly. The results showed that the straight-through cable followed the same order on both ends, and the crossover cable correctly crossed the required pins. From this experiment, we learned the correct wire arrangement, proper crimping technique, and the importance of testing to ensure a working network cable.