

Ex. Nos. 11

STUDY OF DIFFERENT TYPES OF NETWORK CABLES AND CRIMPING OF CABLE WITH RJ45 CONNECTOR

Aim:

To study different types of network cables and to prepare (crimp) a network cable using RJ45 connectors for establishing LAN connections between network devices.

Apparatus Required:

S.No	Equipment / Component	Quantity
1.	CAT5e / CAT6 UTP Cable	1 roll
2.	RJ45 connectors (8P8C)	2 Nos
3.	Crimping tool 1	1
4.	Cable stripper / Cutter 1	1
5.	LAN tester (optional)	1
6	Computer systems/ As required	As required

A network cable is a medium through which data is transmitted between computers and other network devices.

Different types of network cables are used based on speed, distance, and network environment.

1. Types of Network Cables

1. Twisted Pair Cable

- Most commonly used for LAN (Local Area Network).
- Consists of pairs of insulated copper wires twisted together.
- Types:
 - UTP (Unshielded Twisted Pair) → No metallic shielding; used in LAN.
 - STP (Shielded Twisted Pair) → Shielded to reduce interference.

Categories (CAT):

Category	Speed	Frequency
CAT5	Up to 100 Mbps	100 MHz
CAT5e	Up to 1 Gbps	100 MHz
CAT6	Up to 10 Gbps	250 MHz
CAT7	Up to 10 Gbps	600 MHz

2. Coaxial Cable

- Has a central copper conductor, dielectric insulator, and braided shield.

- Used in cable TV and early Ethernet.

- Types:

ThinNet (10Base2)

ThickNet (10Base5)

3. Fiber Optic Cable

- Uses light signals instead of electrical signals.
- Offers very high bandwidth and long-distance communication.
- Types:

Single Mode Fiber (SMF)-long distance, thin core (8-10 μm).

Multi Mode Fiber (MMF)-short distance, thick core (50-62.5 μm).

2. Types of Ethernet Cables (Based on Connection Type)

Type	Use
<p>Straight-Through Cable</p> <p>Both ends . code (T568B-T568B).</p>	<p>Connects PC</p> <p>Switch/Router</p> <p>follow same color</p>
<p>Crossover Cable</p> <p>Switch</p>	<p>Connects PC PC or Switch One end T568A, other end T568B.</p>

3. RJ45 Connector:

- RJ = Registered Jack.
- RJ45 is an 8-pin modular connector (8P8C) used for Ethernet cables.
- Each pin carries a specific signal in the network.

4. Color Coding Standards

(A) T568A Color Code

Pin	Wire Color	Function
1	White/Green	Transmit +
2	Green	Transmit-
3	White/Orange	Receive +

Step-by-Step Procedure:

1. Cut the UTP Cable:

- Take required length (1–2 meters) of CAT5e/CAT6 UTP cable.

2. Strip the Cable:

- Use wire stripper to remove about 1 inch of insulation from both ends.

3. Untwist and Arrange Pairs:

- Separate the 4 twisted pairs and arrange them according to the color code standard (T568A or T568B).

4. Trim the Ends:

- Cut all 8 wires evenly to the same length (about 1/2 inch from jacket).

5. Insert Wires into RJ45 Connector:

- Carefully insert the wires into RJ45 ensuring correct order and full contact with pins.

6. Crimp the Connector:

- Place RJ45 into crimping tool and firmly press until the connector is properly crimped.

7. Repeat for Other End:

- For **Straight Cable**: Use the same color code on both ends.
- For **Crossover Cable**: Use T568A on one end and T568B on the other.

Result: Thus, the Experiment done successfully.