## Objectives:

1. To get knowledge about types of data transmission medium.
2. To receive basic information about Network Interface Card (NIC).
3. To get knowledge about types of cables used in wired medium.
4. To become familiar with various cabling standards.
5. To build a workable cat 5/6 cable with RJ 45 connectors which is capable of transmitting data packets between two computers.

## Introduction:

Data transmission medium can be broadly divided into 2 types

1. Wired Medium
2. Wireless Medium

Regardless of medium, network interface card (NIC) provides the physical connection between network & computer workstation. It is also known as LAN adapter.

The conceptual classification of transmission medium is

## Copper

a) Coaxial Cable
b) Unshielded Twisted Pair Cable

## Optical Fibre:

a) Multimode - multiple rays.
b) Singlemode - a single ray

## Wireless

a) Short Range
b) Medium Range
c) satellite

## Co-axial Cable:

It is copper-cored cable surrounded by heavy shielding and is used to connect computers in a network it has high bandwidth & repeater is used to amplify signal as it has lossy channels.

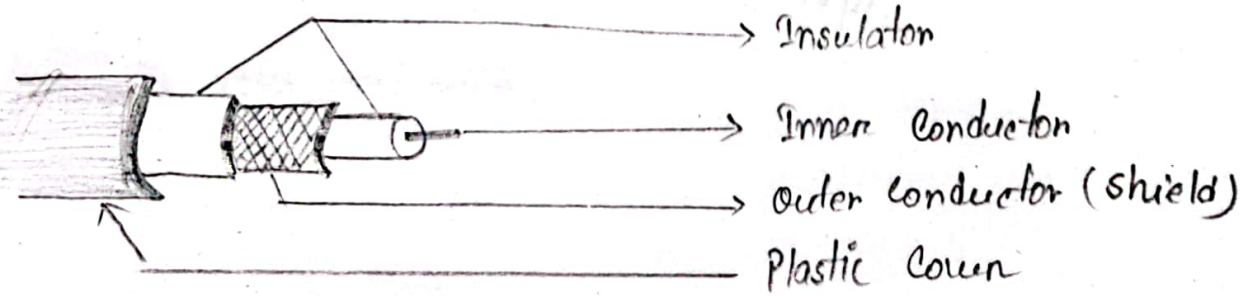



Fig: 1.1 Co-axial Cable

## Twisted Pair:

Twisted pair is a type of cabling that is used for telephone communications and most modern networks. The pairs are twisted to provide protection against crosstalk

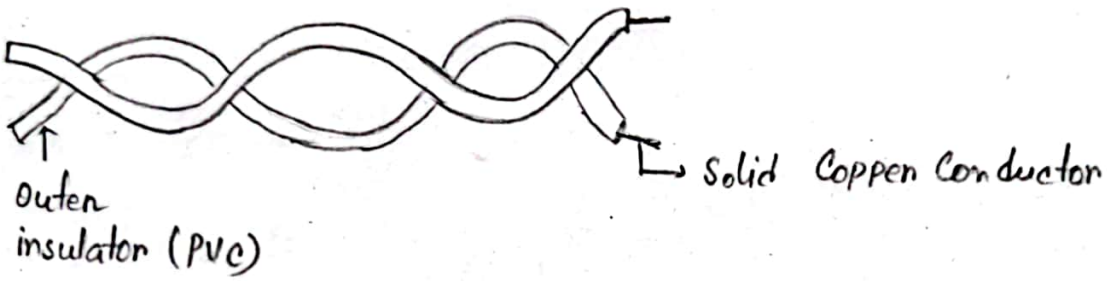



Fig: 1.2 Twisted Pair Cable

Twisted pair
- Shielded Pair (STP)
- Unshielded pair (UTP)

## Categories of UTP

### Cat 3

a) Bandwidth 16 MHz
b) Contains 4 pairs & carry up to 10 Mbps.
c) used in voice applications.

CAT 4

a) 20MHz Bandwidth

b) 4 pairs & can carry upto 16 Mbps.

c) Used in 10baseT ethernet

CAT 5

a) 100 MHz Bandwidth

b) 4 pairs & can carry upto 100 Mbps

c) Used in 10Base T & Fast Ethernet.

CAT 5e

a) 150 MHz Bandwidth

b) A higher grade of CAT5 that contains high quality copper

c) Used in Fast Ethernet (1000 Mbps) & 10 Gig Ethernet (10000) Mbps.

CAT 6

a) 250 MHz Bandwidth

b) A twisted pair cable contains 4 wire pairs each

in foil insulation.

c) Transmits high-speed data.

d) Used in Gigabit Ethernet (1000 Mbps) & 10 Gig Ethernet.

## Optical Fibre:

Optical Fibers use light to send information through the social optical medium. It uses the principle of total internal reflection. Modulated light transmission are used to transmit the signal.

## Cabling Standards

When installing cable, it is important to follow cabling standards, which have been developed to ensure data networks operate to agreed levels of performance.

## Standards in twisted pair cables:

The TIA/EIA organization defines two different patterns or wiring schemes called T568A & T568B

## Networking Cable Configuration:

| Pin | T568A | T568B |
|---|---|---|
| 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 |

## Data Installations Cable Type:

### Straight-through Cable

It is most common cable type. It maps a wire to the same pins on the both ends of the cable. If T568A is on one end of the cable T568A is also on the other. If T568B is on one end of the cable, T568B is on the other.

### Cross-over Cable

A crossover cables uses both wiring schemes. T568A is on one end of the cable and T568B on the other end of the same cable. This means the order of connections on one end of the cable does not match the order of connections on the other.

## Like & Unlike devices:

Two devices directly connected and using different pins to transmit & receive are known as unlike devices. They require straight through cable to exchange data

Device that are directly connected & use the same pins to transmit & receive. are known as like devices. They require the use of a crossover cable to exchange data

## Rollover Cable:

Rollover cable (also known as cisco control cable) is a type of null modem cable that is mostly commonly used to connect a computer terminal to a router's console point. This cable is typically flat and the colon is also different to help distinguish it from other types of network cabling.

## RJ 45 Connector:

An RJ45 connector is a standardized physical connector commonly used for Ethernet networking. It is the most prevalent type of connector for connecting networking devices like computers, routers etc. RJ45 stands for Register Jack 45.

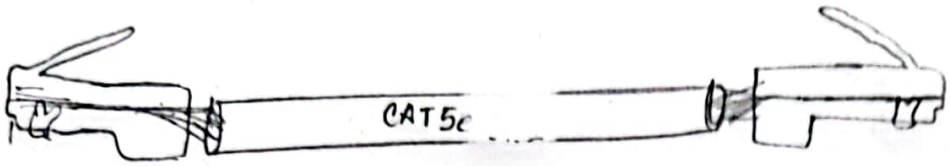
## Instruments:

1. CAT 6e Cable
2. RJ 45 Connectors
3. Cable Stripper
4. Scissors
5. Crimping tool.

## Procedure:

1. First, the ends of the cables were stripped.
2. The wire ends were untwisted.
3. The wires were then arranged.
4. Next, the wires were trimmed to size.
5. The RJ45 connector was attached.
6. The connectors were checked then.
7. Finally, the both connectors were crimped.

8. It was time for testing then.




## Result:

After building up the cable, the cable was connected between two computers. After testing by pinging a data packet from one computer to another, it was found that the packet loss is 0%.

## Discussion:

After performing the experiment we learnt wired transmissi on media