

EXPERIMENT-3

Aim: Installation of UTP, Co-axial cable, Cross cable, parallel cable NIC and LAN card.

UTP

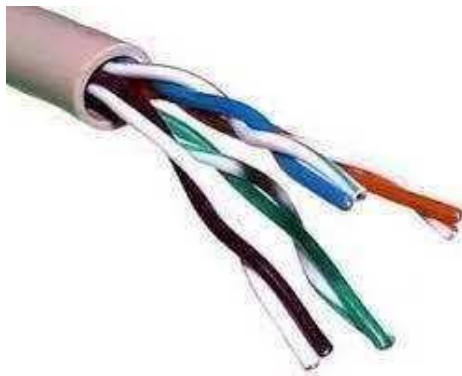
- UTP stands for Unshielded Twisted Pair cable. It is basically a 100 ohm copper cable that consists of 2 to 1800 unshielded twisted pairs surrounded by an outer jacket.
- It is called as unshielded as it has no metallic shield.
- It is small in diameter (because of the lack of shield) but is also unprotected against electrical interference.
- The twisted cables improve its immunity to electrical noise and EMI.

Categories of UTP:

Category	Speed	Use
1	1 Mbps	Voice only
2	4 Mbps	LocalTalk and Telephone
3	16 Mbps	10BaseT Ethernet
4	20 Mbps	Token Ring
5	100 Mbps (2 pair)	100BaseT Ethernet
	1000 Mbps (4 pair)	Gigabit Ethernet
5e	1,000 Mbps	Gigabit ethernet
6	10,000 Mbps	Gigabit Ethernet

UTP cable connectors: RJ-45

- RJ-45 (Registered Jack-45) is an eight wire connector used to connect computers to a LAN and mostly with Ethernet cables.
- It is a standard connector which features eight pins to which the wire strands of cable interface electrically.
- RJ-11 closely resemble it and is slightly narrower, used for telephone cables.



Coaxial Cable:

They are commonly called as coax, are copper cables with metal shielding that provide immunity against noise and a greater bandwidth. It can transmit signals over a large distance at a higher speed if compared to the twisted pair cable.

Structure of coaxial cable:

It has a central core of copper which transmits the signals. It is covered by an insulating material. This insulator is again woven into a outer metal conductor that acts as a shield for noise, which is then coated with a insulating cover.

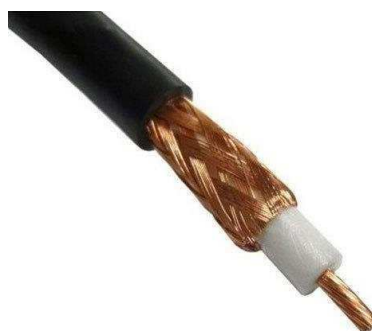
Categories of coaxial cables:

The cables are categorixed into three categoriesas per radio Government (RG) readings:

- 1) RG-59; It has impedance of 75 W and used in cable TV.
- 2) RG-58; It has impedance of 50 W and used in thin Ethernet cables.
- 3) RG-11: It has impedance of 50 W and used in thick ethernet cables.

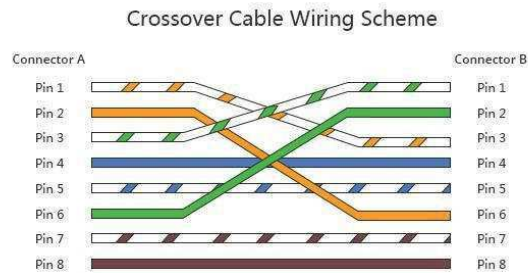
Applications of coaxial cables:

- They are used in analog telephone networks and can carry upto 10,000 voice signals.
- They can be used in digital telephone networks with a speed upto 600 Mbps.
- These cables can be used in traditional Ethernet LANs and MANs.
- They can be used in cable TV networks.

**Ethernet cross-over cables:**

- It is used for connecting two Ethernet network devices directly without a switch or router in between by connecting the transmitting pins of one side by receiving pins of other side.
- They can send and receive data by enabling complex data transfers,
- They have a crisscross pair of wires; which reverses the incoming and outgoing signals.
- It can be used for connecting:
 - Two computers
 - Two hubs
 - A hub to a switch
 - A cable modem and a router

■ Two router interfaces



NIC:

NIC stands for Network Interface Card is a hardware component that is a prerequisite for the computer to be connected to the internet. It is basically a circuit board installed in a computer that provides dedicated network connection to the computer. It is also called as Network Interface controller/Network Adapter/LAN Adapter/LAN Card.

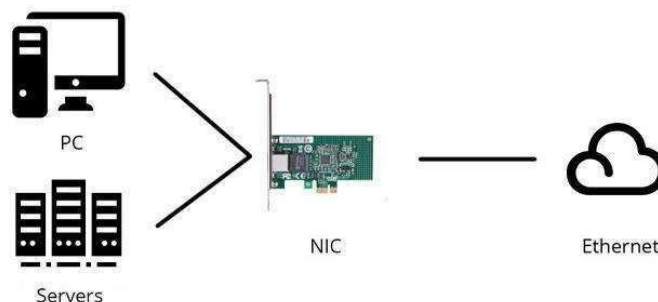
It is of two types:

Internal network cards: They are inserted in a predefined slot of motherboard and requires network cables.

External network cards: If there is no internal NIC in desktops or laptops, then it is used and can be wither wireless or USB type.

Purpose of NIC:

- It allows both wired and wireless communication.
- It is in both physical and data link layer.
- It allows communications between computer connected through LANs as well as communications over large-scale network through Internet Protocol (IP).



Procedure:

The following steps discuss the procedure to make your own Ethernet cable:

Materials Required:

- Unshielded Twisted Pair (UTP) Patch cable
- Modular connector (8P8C plug, aka RJ45)
- Crimping tool
- Cable tester (optimal, but recommended)

Steps:

- 1) Strip the jacket of cable up to about 1.5 inches down from the end.
 - 2) Spread the four pairs of twisted wire apart, for category 5e pull string can be used.
 - 3) Untwist the wire pairs and neatly align them in the T568B orientation.
 - 4) Cut the wires now (as straight as possible) about 0.5 inches above the end of the jacket.
 - 5) Insert the wires all the way into the modular connector carefully and make sure that each wire passes through the appropriate guides inside the connector.
 - 6) Push the connector inside the crimping tool and squeeze it all the way down.
 - 7) Repeat the steps 1-6 for the other end of the cable too.
 - 8) Use a cable tester for each pin to make sure that you have terminated each end of the cable successfully.
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