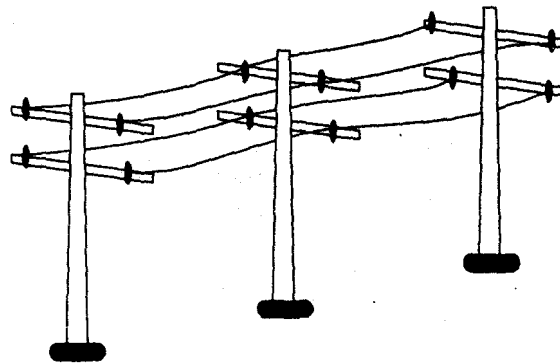


# GUIDED MEDIUM Transmission

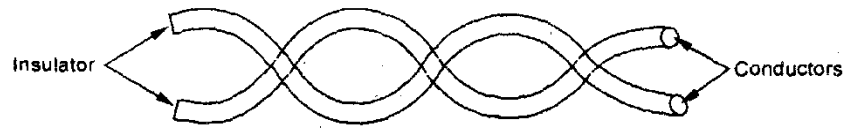
Data transmitted using guided medium needs some means to transmit it from Transmitter and Receiver. However there are many types of guided transmission types , but in general they can be divided in to four basic types of Guided media

- (i) Open wire
- (ii) Twisted pair
- (iii) Coaxial cable
- (iv) Optical fiber

**Open wire:** This is single wire strung between poles. No shielding or protection from noise interference is provided. Thus media is susceptible to a large degree of noise and interference and consequently not acceptable for data transmission except for short distances under 20 ft.



**Twisted pair:** The wires is twisted pair cabling are twisted together in pairs. Each pair would consist of wire used for the +ve data signal and a wire used for the -ve data signal.



## Types of Twisted Pairs Cables

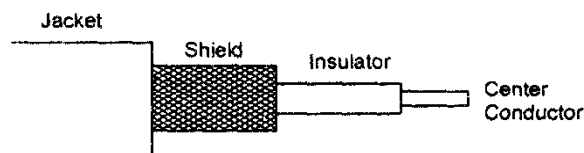
Cables with the shield are called **shielded twisted pair** and commonly abbreviated STP. Cables without a shield are called unshielded twisted pair or UTP.

### Noise Factor and Twisted Pair

The degree of reduction in noise interference is determined specially by the number of turns per foot increasing the number of turns per foot reduces the noise interference.

To further improve noise rejection, a foil or wire braid shield is wound around the twisted pair. This shield can be moves around individual pairs or around a multi pair conductor.

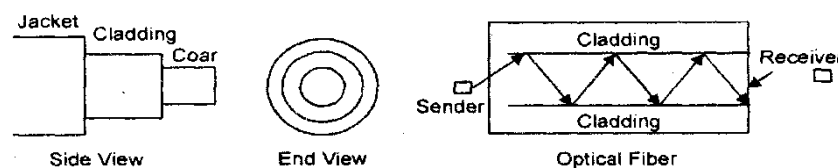
**Coaxial cable:** Coaxial cable consists of 2 conductors. The inner conductor is held inside the insulator with the other conductor waves around it providing a shield, An insulating protective coating called a jacket covers the outer conductor.



The outer shield protects the inner conductor from outside electrical signals. The distance between the outer conductor (Shield) and inner conductor plus the type of material used for insulating the inner conductor determine the cable properties or impedance.

Typical impedance for coaxial cables is 75 ohm for cable TV, 50 ohm for Ethernet thermite and thicknet.

**Optical Fiber:** Optical fiber consists of thin glass fiber that can carry information at frequencies in the visible light spectrum. The typical optical fiber consists of a very narrow strand of glass called the cladding. A typical core diameter is 62.5 microns. Typically cladding has a diameter of 125 minors. Coating the cladding is a protective coating consisting of plastic, it is called the jacket.



## What are the advantages and disadvantages of optical fibers?

### Advantages:

**(i) Small size and light weight:** The size of the optical fibers is very small. Therefore a large number of optical fibers can fit into a cable of small diameter.

**(ii) Easy availability and low cost:** [material used for the manufacturing of optical fibers is "Silica glass". this material is easily available. So the optical fibers cost lower than the cables with metallic conductors.

**(iii) No electrical or electromagnetic interference:** Since the transmission takes place in the form of light rays the signal is not affected due to any electrical or electromagnetic Interference.

**(iv) Large Bandwidth:** As the light rays have a very high frequency in GHz range, the bandwidth of the optical fiber is extremely large.

(v) Other advantages: - No cross talk inside the optical fiber cable.

- Signal can be sent up to 100 times faster.



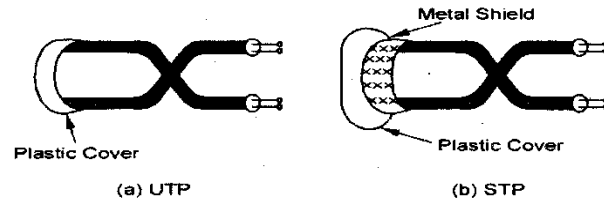
Hey Pal...Have you ever noticed that , cables are twisted around each other ?

A twisted cable is made by intertwining two separate insulated wires together. There are two twisted pair types: shielded and unshielded.

**Shielded Twisted Pair (STP)** has a fine wire mesh surrounding the wires to protect the transmission

**Unshielded Twisted Pair (UTP)** does not have wire mesh surrounding the wires

Shielded cable is used in older telephone networks, network, and data communications to reduce outside interference The use of two wires twisted together helps to reduce crosstalk and electromagnetic induction. While twisted-pair cable is used by older telephone networks and is the least expensive type of local-area network (LAN) cable.



Twisted pair cable	Co-axial cable	Optical fiber
1. Transmission of signals takes place in the electrical form over the metallic conducting wires.	1. Transmission of signals takes place in the electrical form over the inner conductor of the cable.	1. Signal transmission takes place in an optical form over a glass fiber.
2. In this medium the noise immunity is low.	2. Coaxial having higher noise immunity than twisted pair cable.	2. Optical fiber has highest noise immunity as the light rays are unaffected by the electrical noise.
3. Twisted pair cable can be affected due to external magnetic field.	3. Coaxial cable is less affected due to external magnetic field.	3. Not affected by the external magnetic field.
4. Cheapest medium.	4. Moderate Expensive.	4. Expensive
5. Low Bandwidth.	5. Moderately high bandwidth.	5. Very high bandwidth
6. Attenuation is very high.	6. Attenuation is low.	6. Attenuation is very low.
7. Installation is easy.	7. Installation is fairly easy.	7. Installation is difficult.

# Connectors for Guided Medium



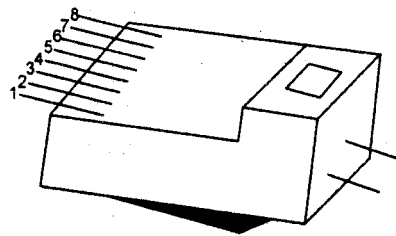
How Guided Medium  
are connected to  
Receivers and  
Transmitter

These devices are connected via Connectors. You may have seen some connectors at your home for example - a USB connector for connecting your Devices to computer or Connecting Cable to TV

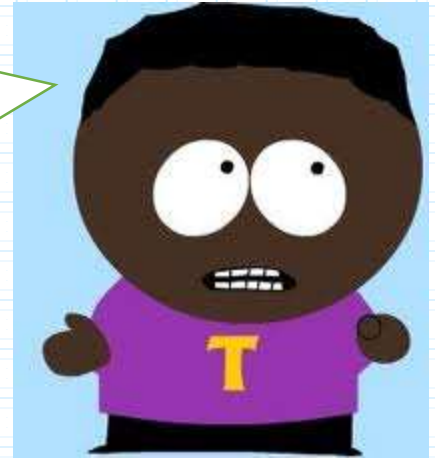
Some of the important Connectors and their brief discussion is given below

- (i) Twisted pair cable
- (ii) Co-axial cable
- (iii) Fiber optics cable.

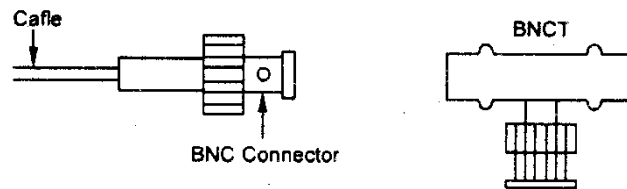
**Twisted Pair** : The most common UTP connector is RJ-45 (Registered Jack). The RJ-45 is keyed connector, meaning the connector can be inserted in only one way.



Do you know Ethernet cable can be connected to different equipment via RJ 45 in two configurations called straight and Cross. Do you know the purpose and Reason



(ii) To connect co-axial cable to devices, we need coaxial connectors. The most common type of connector used today is the Bayonet-Neill-Concelman, or BNC, connectors.



### Fiber-optics cable connectors

Fiber-optic cables use there different types of connectors.

The subscriber-channel. (SC) connector is used in cable TV.

The straight-tip (ST) connector is used for connecting cable to networking devices. It uses a bayonet locking system and is more reliable this SC MT-RJ is a new connector with the same size as RJ 45.

