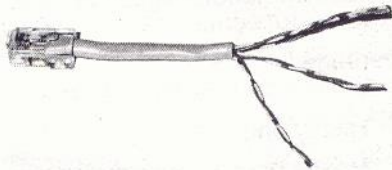


## Transmission Media/Medium

**Transmission media (Communication media)** refers to the physical material along which data travels from one point to another. The media you use is dependent on the distance of the data to be transmitted. For computers that are linked by cable media, there are three choices: **twisted pairs, coaxial cables and fiber optics**. For communication over wireless media examples are: **microwave, satellites and infra-red**. For wireless network technology are: **Bluetooth and Wireless Fidelity (Wi-Fi)**.

Twisted Pairs



A telephone line consists of a twisted pair of copper wires and is the medium used by telephones to transmit data.

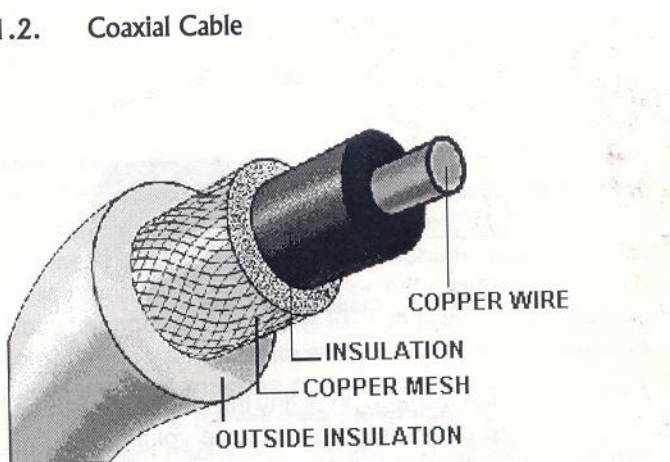
Advantages:

- The telephone network links the entire world; therefore, data can be transmitted to virtually any place in the world.
- Cheaper to setup

Disadvantage:

- Subject to interference

### 1.2. Coaxial Cable



Coaxial cable consists of a conductive cylindrical shield with a central wire or solid core held together by an insulating material. These are the cables that connect your television set to the cable television provider and one medium used to connect computers in a local area network.

Advantages:

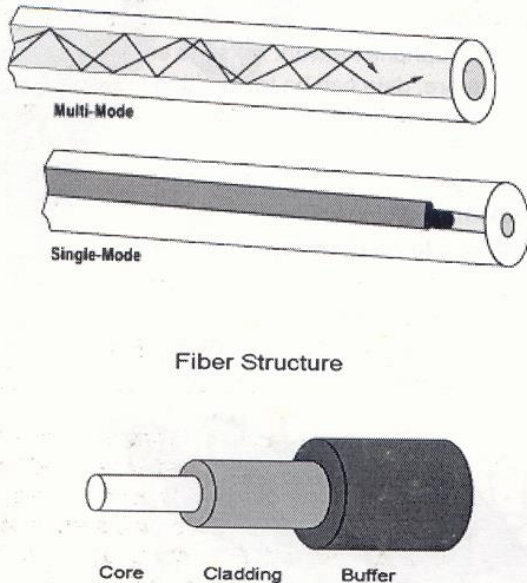
- Not susceptible to interference
- Transmits faster than twisted pairs

- Can accommodate digital and analog signals

Disadvantages:

- Heavy and bulky
- Needs booster over distance

### 1.3. Fiber Optic Cable



A fiber optic line is made up of tiny threads of glass tubes about the size of a human hair. Large volumes of data can be transmitted at the speed of light through these glass tubes. A single glass fiber can transmit the entire Bible in a single second. It would take over 20 hours to send the bible over the telephone line. As the production cost of fiber optic cables decreases, it will become the communication medium of choice replacing coaxial cables and telephone lines and possibly even satellite and microwave transmissions.

Advantages:

- Smaller and lighter
- Faster (match the speed of light)
- No interference
- Abundance of raw material to manufacture medium
- Able to bend right around a corner

Disadvantages:

- Expensive to setup
- Hard to install and modify

## Microwave Transmission Media



The term “microwave” is the name given to a small portion on the entire electromagnetic spectrum. The electromagnetic spectrum is arranged by frequency or wave length. In order of increasing frequency, the electromagnetic spectrum contains radio waves, infrared radiation, higher frequencies, the more energetic forms of radiation like, x-rays and cosmic radiation. The microwave region lies in the upper part of what is generally known as the radio frequency portion of the spectrum and below the infrared region. These radio waves are not unique. The only difference between them and infrared radiation or light, etc., is the frequency or wavelength.

Microwave is a good medium for sending data between buildings in a city or on a large college campus. For longer distances the waves must be relayed by means of “dishes” or antennas.

### Advantages:

- Travels at the speed of light
- Transmit both analog and digital data

### Disadvantages:

- Cannot travel around bends (line-of-sight only)
- The signal cannot penetrate buildings or mountains
- The relay stations must be placed no more than 30 miles apart.

## 2. Satellite



A communication satellite acts as a relay station in outer space. It is placed in orbit over 23,000 miles above the earth surface. It receives data beamed at it from a ground station and sends that data to other ground stations. A single satellite in orbit at 22,300 miles can easily cover 40% of

the earth's surface. A network of three satellites can cover the entire earth. It is possible to relate data from satellite to satellite and then beam it to any ground station on earth.

Advantages:

- Always in sight
- No distance limitation

Disadvantages:

- Very expensive to set up
- Not suitable for rapid exchange of data, because delays occur when data are sent thousands of miles up into space and back down again.