**Lab Practical #02:**

Study of different types of network cables & connectors and crimping a LAN.

**Practical Assignment #02:**

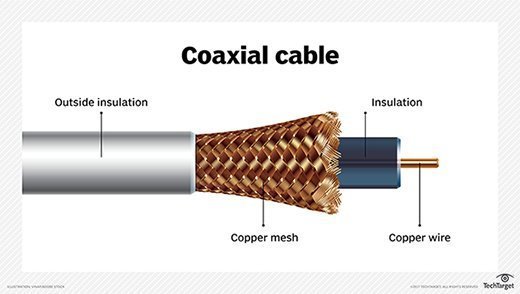
1. List various networks cable. Also, write short description.
2. Difference between guided and unguided media.
3. Give cross-wired cable and straight through cable diagram (Color Code wise).

## List various networks cable and connectors. Also, write short description.

### Cables:

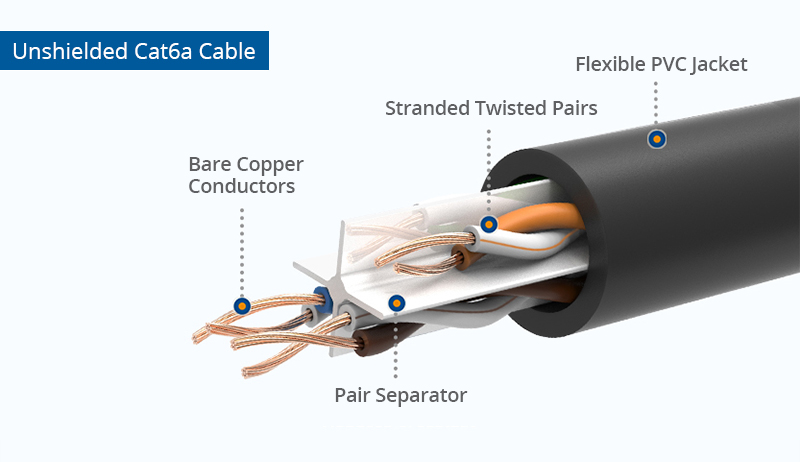
1. **Coaxial Cable**

* Coaxial cables consist of a central copper conductor, surrounded by a plastic insulating layer, a metallic shield, and an outer insulating layer. They are commonly used for cable television, internet connections, and older Ethernet networks.



1. **Unshielded Twisted Pair (UTP)**

* UTP cables have pairs of twisted copper wires without additional shielding. They are widely used in Ethernet networks for both residential and commercial applications due to their flexibility and ease of installation.



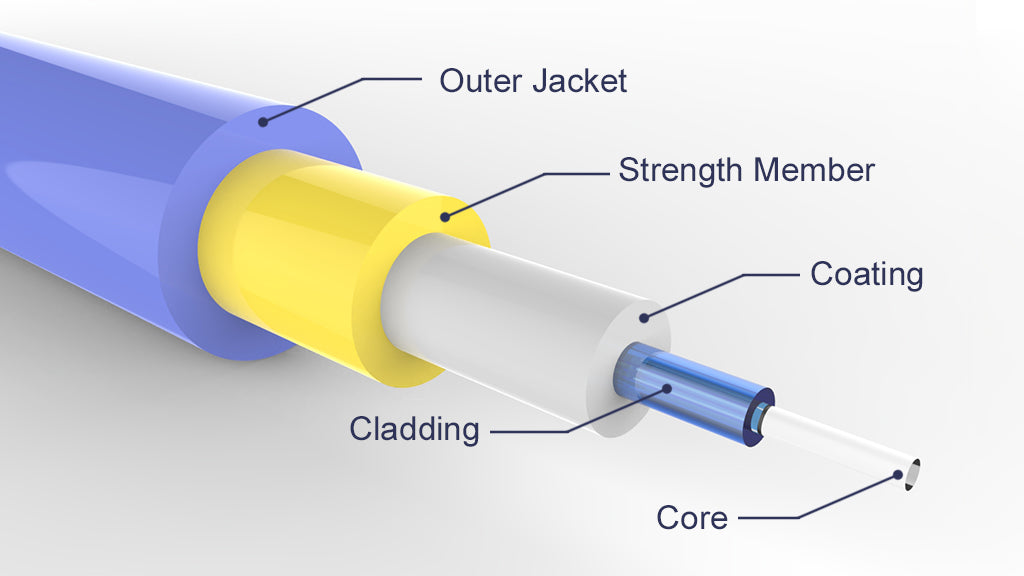
1. **Shielded Twisted Pair (STP)**

* STP cables are similar to UTP but have an additional shielding to protect against electromagnetic interference (EMI) and radio frequency interference (RFI). They are used in environments with high interference.

![STP [ Shielded Twisted Pair ](id:894890) Product details - View STP [ Shielded  Twisted Pair ] from Continental Electric Wire Co., Ltd. - EC21 Mobile](data:image/gif;base64,)

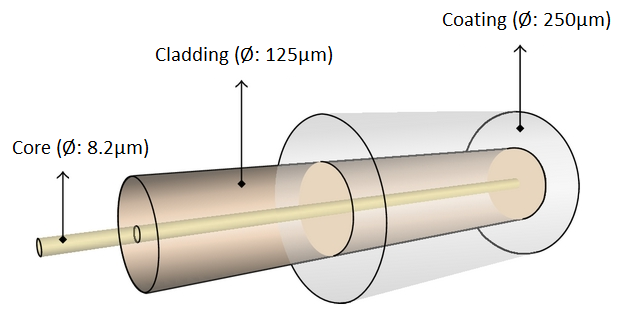
1. **Fiber Optic Cable**

* Fiber optic cables use light to transmit data, offering high bandwidth and long-distance capabilities. They consist of strands of glass fibers surrounded by protective layers.



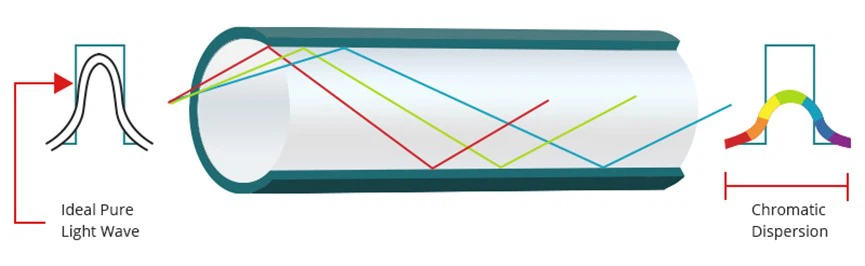
1. **Single-mode Fiber (SMF)**

* SMF cables use a single strand of glass fiber and are used for long-distance data transmission with higher bandwidth capabilities.



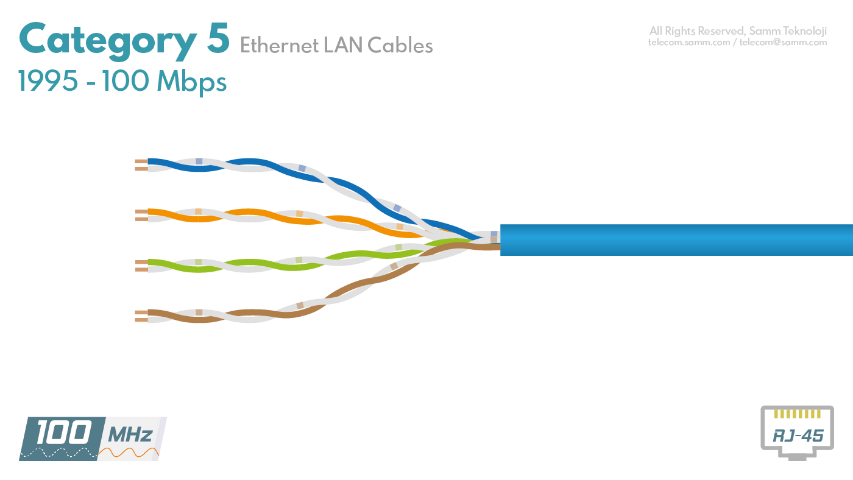
1. **Multi-mode Fiber (MMF)**

* MMF cables use multiple strands of glass fiber and are used for shorter distance data transmission with moderate bandwidth capabilities.



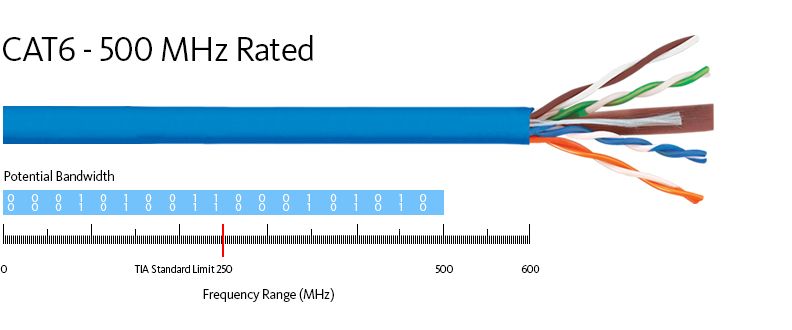
1. **Category 5 (Cat 5)**

* Cat 5 cables are used for Ethernet networks and support speeds up to 100 Mbps. They consist of four twisted pairs of copper wire.



1. **Category 6 (Cat 6)**

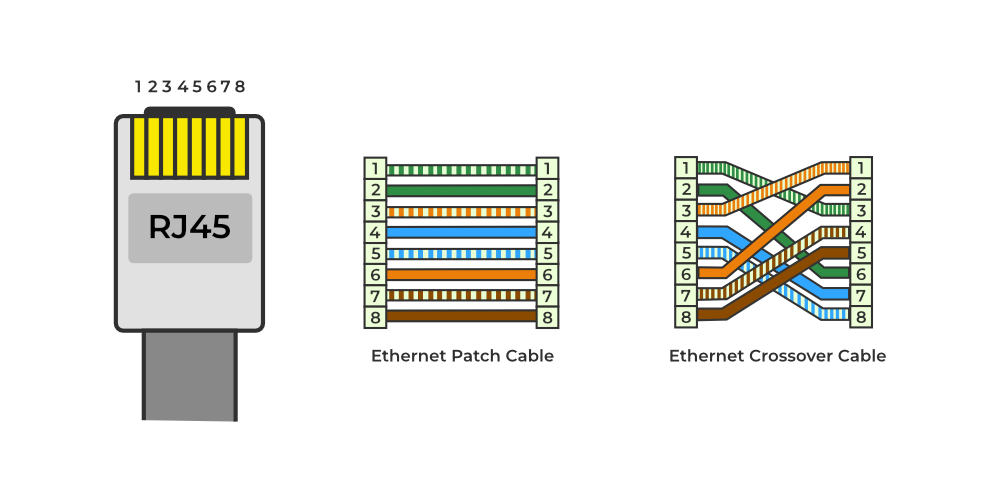
* Cat 6 cables support speeds up to 10 Gbps over short distances and are used in Ethernet networks. They offer better performance and reduced crosstalk compared to Cat 5e.



### Connectors:

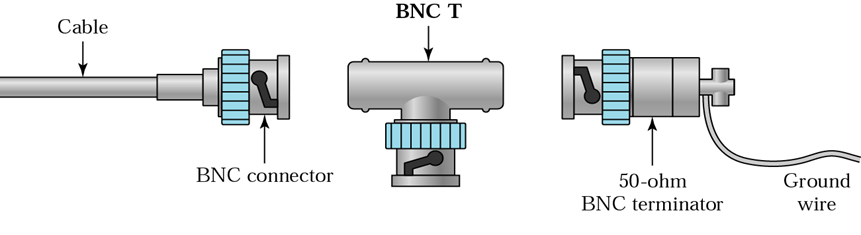
1. **RJ45**

* The RJ45 connector is an 8-pin modular plug commonly used for Ethernet networking. It connects twisted pair cables to networking devices like routers, switches, and computers.



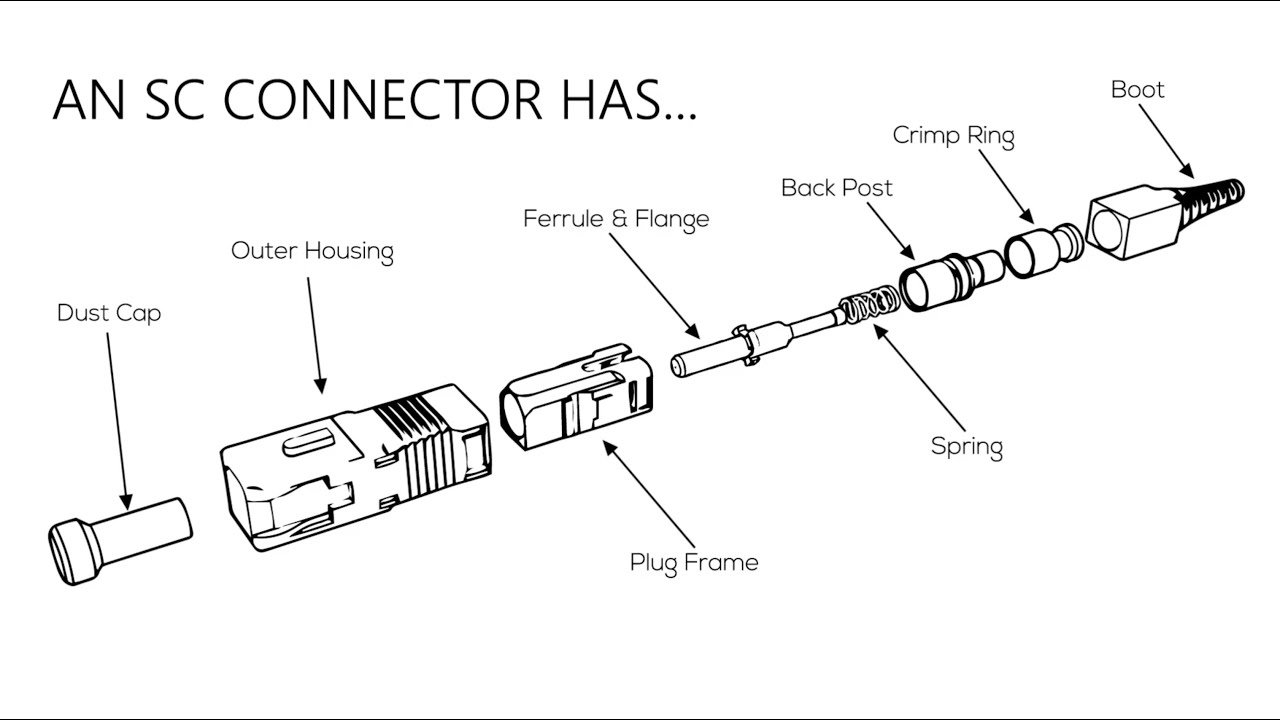
1. **BNC (Bayonet Neill-Concelman)**

* BNC connectors are quick connect/disconnect RF connectors used with coaxial cables. They are widely used in television, radio, and other radio-frequency applications.



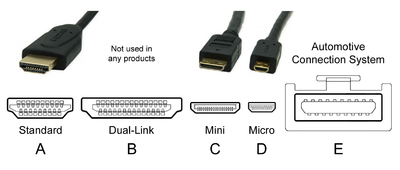
1. **SC (Subscriber Connector)**

* SC connectors are used for fiber optic cables. They are push-pull connectors that provide excellent performance for single-mode and multi-mode fiber applications.



1. **HDMI (High-Definition Multimedia Interface)**

* HDMI connectors transmit high-definition video and audio signals between devices such as TVs, monitors, and gaming consoles. They support both standard and high-definition formats.



1. **Difference between guided and unguided media.**

* Guided and unguided media are two primary categories of transmission media used in networking and telecommunications. Here's a breakdown of their differences:

### Guided Media

1. **Definition**:
   * Guided media refers to transmission media where signals are guided along a physical path.
2. **Types**:
   * **Twisted Pair Cables**: Pairs of insulated copper wires twisted together. Examples include Unshielded Twisted Pair (UTP) and Shielded Twisted Pair (STP).
   * **Coaxial Cables**: Consists of a central conductor, insulating layer, metallic shield, and outer insulating layer.
   * **Fiber Optic Cables**: Use light to transmit data through strands of glass or plastic fibers.
3. **Characteristics**:
   * **Physical Confinement**: Signals are confined to the physical pathway.
   * **High Bandwidth**: Can support high data rates, especially fiber optic cables.
   * **Less Interference**: Protected from external electromagnetic interference, especially with shielded cables.
   * **Distance**: Generally suitable for shorter to medium distances, except for fiber optics which can handle long distances effectively.
4. **Use Cases**:
   * Local Area Networks (LANs)
   * Telephony
   * Cable TV
   * Internet Backbone (Fiber Optics)

### Unguided Media

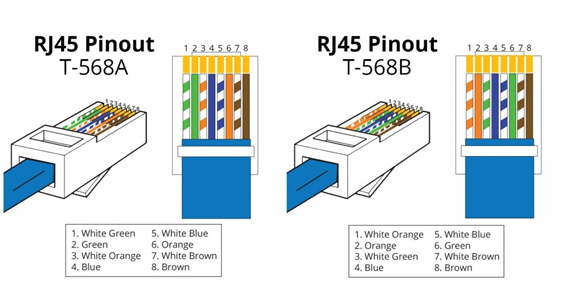
1. **Definition**:
   * Unguided media refers to transmission media where signals are transmitted without a physical path, typically through the air or vacuum.
2. **Types**:
   * **Radio Waves**: Used for radio broadcasting, TV, and wireless networking.
   * **Microwaves**: Used for satellite communications and long-distance wireless transmission.
   * **Infrared**: Used for short-range communication like remote controls and some wireless devices.
3. **Characteristics**:
   * **No Physical Confinement**: Signals are not confined to a physical path and can travel freely through space.
   * **Variable Bandwidth**: Bandwidth can vary based on frequency and technology used.
   * **More Interference**: Susceptible to external interference from other signals and environmental factors.
   * **Distance**: Suitable for various distances, from short-range (infrared) to long-range (microwave and satellite).
4. **Use Cases**:
   * Wireless Local Area Networks (WLANs)
   * Satellite Communications
   * Bluetooth and Infrared Devices
   * Mobile Telephony

### Key Differences

|  |  |  |
| --- | --- | --- |
| Feature | Guided Media | Unguided Media |
| **Physical Path** | Uses physical pathways (cables) | No physical pathways, uses air or vacuum |
| **Examples** | Twisted Pair, Coaxial, Fiber Optic | Radio Waves, Microwaves, Infrared |
| **Interference** | Less susceptible (shielded cables) | More susceptible to environmental interference |
| **Bandwidth** | Typically, higher (especially fiber optics) | Variable, dependent on technology and frequency |
| **Distance** | Short to long (fiber optics for long distances) | Short to very long (depending on type) |
| **Cost** | Generally higher due to physical infrastructure | Generally lower, no physical infrastructure |
| **Installation** | More complex due to laying cables | Easier, involves setting up antennas or transmitters |

## Give cross-wired cable and straight through cable diagram (Color Code wise).

1. Cross-wired Cable Diagram (Color Code)



1. Straight Through Cable Diagram (Color Code)

