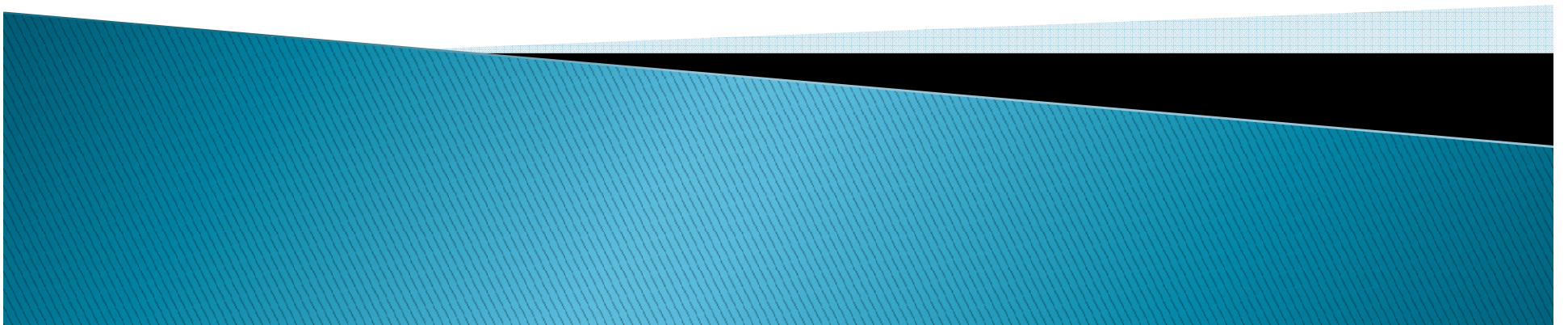


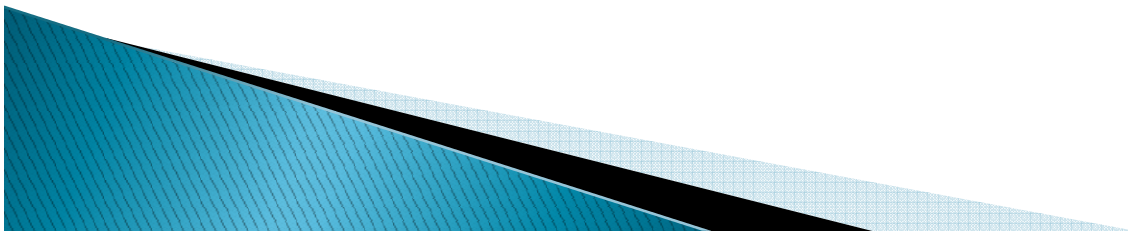
GUIDED MEDIA

SAVIYA VARGHESE

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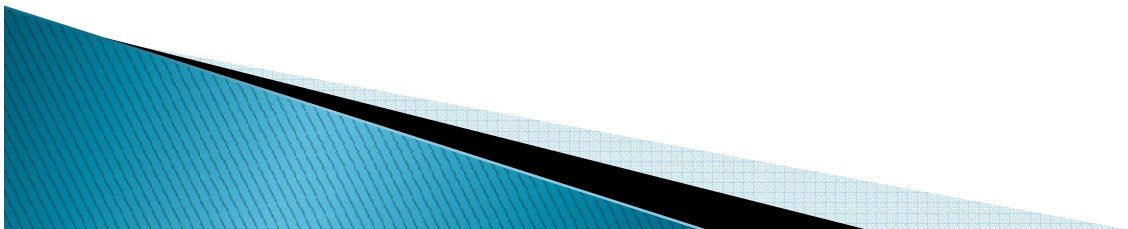


Guided media, which are those that provide a conduit from one device to another, include twisted-pair cable, coaxial cable, and fiber-optic cable.



Twisted-Pair Cable A twisted pair consists of two conductors (normally copper), each with its own plastic insulation, twisted together.

One of the wires is used to carry signals to the receiver, and the other is used only as a ground reference. The receiver uses the difference between the two. In addition to the signal sent by the sender on one of the wires, interference (noise) and crosstalk may affect both wires and create unwanted signals.



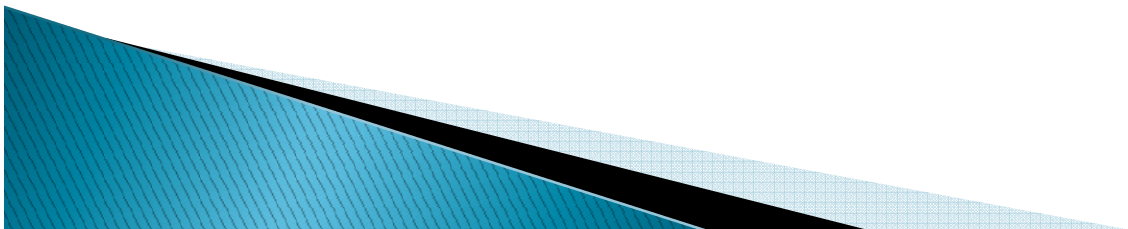
Unshielded Versus Shielded Twisted-Pair Cable

The most common twisted-pair cable used in communications is referred to as unshielded twisted-pair (UTP).

IBM has also produced a version of twisted-pair cable for its use called shielded twisted-pair (STP).

STP cable has a metal foil or braided mesh covering that encases each pair of insulated conductors.

Although metal casing improves the quality of cable by preventing the penetration of noise or crosstalk, it is bulkier and more expensive

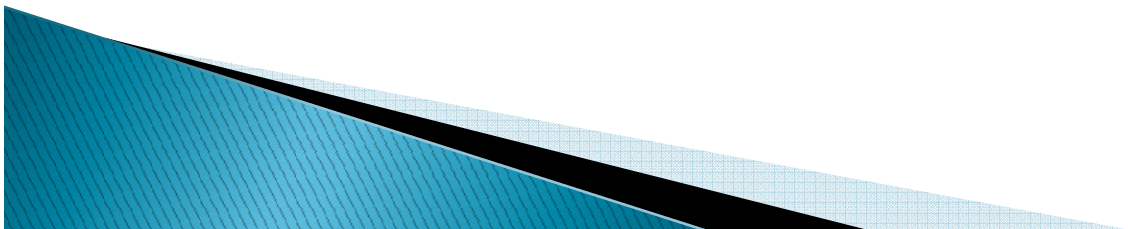


Categories

The Electronic Industries Association (EIA) has developed standards to classify unshielded twisted-pair cable into seven categories.

Categories are determined by cable quality, with 1 as the lowest and 7 as the highest.

Each EIA category is suitable for specific uses.



Connectors The most common UTP connector is RJ45 (RJ stands for registered jack).

The RJ45 is a keyed connector, meaning the connector can be inserted in only one way.

Applications

Twisted-pair cables are used in telephone lines to provide voice and data channels.

The local loop-the line that connects subscribers to the central telephone office---commonly consists of unshielded twisted-pair cables.

.The DSL lines that are used by the telephone companies to provide high-data-rate connections also use the high-bandwidth capability of unshielded twisted-pair cables.

. Local-area networks, such as 10Base-T and 100Base-T, also use twisted-pair cables.



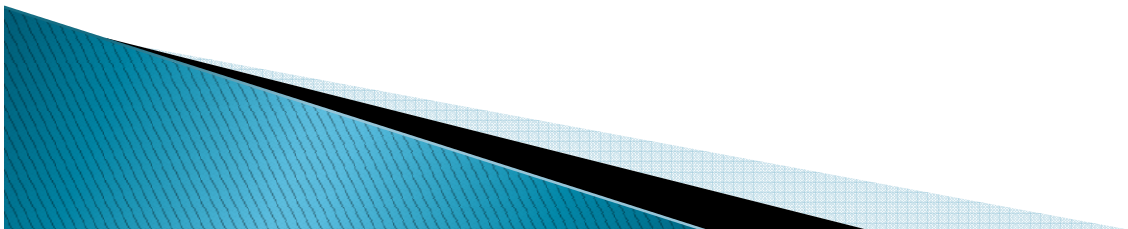
Coaxial Cable

Coaxial cable (or coax) carries signals of higher frequency ranges than those in twisted pair cable, in part because the two media are constructed quite differently.

Instead of having two wires, coax has a central core conductor of solid or stranded wire (usually copper) enclosed in an insulating sheath, which is, in turn, encased in an outer conductor of metal foil, braid, or a combination of the two.

The outer metallic wrapping serves both as a shield against noise and as the second conductor, which completes the circuit.

This outer conductor is also enclosed in an insulating sheath, and the whole cable is protected by a plastic cover



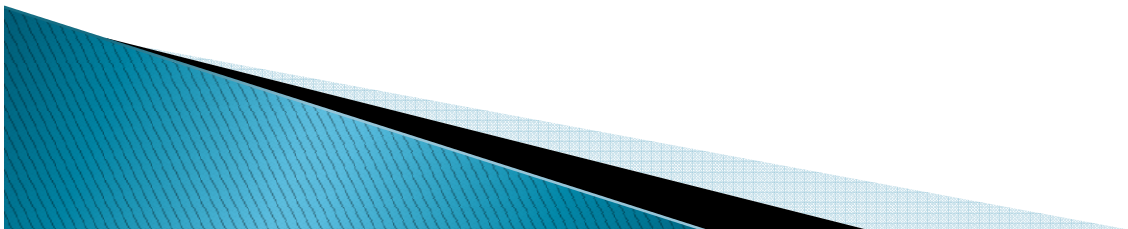
Coaxial Cable Standards

Coaxial cables are categorized by their radio government (RG) ratings.

Each RG number denotes a unique set of physical specifications, including the wire gauge of the inner conductor, the thickness and type of the inner insulator, the construction of the shield, and the size and type of the outer casing.

Each cable defined by an RG rating is adapted for a specialized function,

Category	Impedance	Use
RG-59	75 Ω	Cable TV
RG-58	50 Ω	Thin Ethernet
RG-11	50 Ω	Thick Ethernet



Coaxial Cable Connectors

To connect coaxial cable to devices, we need coaxial connectors.

The most common type of connector used today is the Bayonet-Neill-Concelman (BNC), connector.

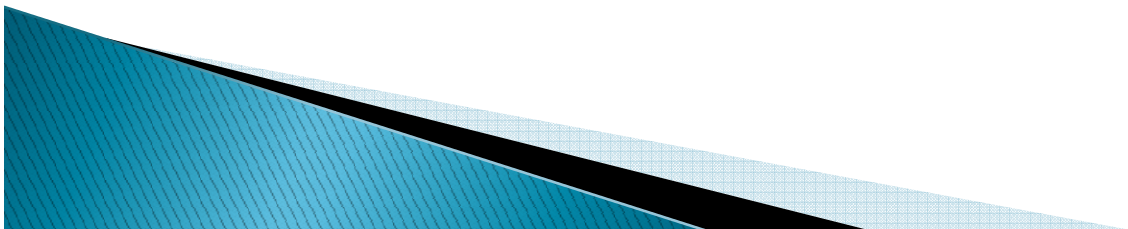
Three popular types of these connectors:

the BNC connector, the BNC T connector, and the BNC terminator.

The BNC connector is used to connect the end of the cable to a device, such as a TV set.

The BNC T connector is used in Ethernet networks to branch out to a connection to a computer or other device.

The BNC terminator is used at the end of the cable to prevent the reflection of the signal.



Performance

As we did with twisted-pair cables, we can measure the performance of a coaxial cable.

The attenuation is much higher in coaxial cables than in twisted-pair cable.

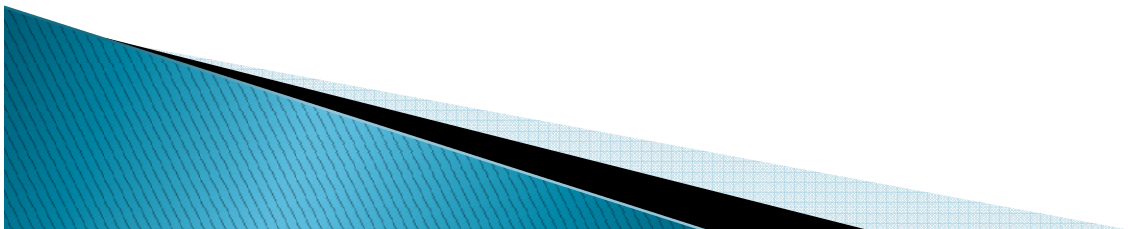
In other words, although coaxial cable has a much higher bandwidth, the signal weakens rapidly and requires the frequent use of repeaters.

Applications

Coaxial cable was widely used in analog telephone networks where a single coaxial network could carry 10,000 voice signals. Later it was used in digital telephone networks where a single coaxial cable could carry digital data up to 600 Mbps.

Cable TV networks (see Chapter 9) also use coaxial cables. In the traditional cable TV network, the entire network used coaxial cable..

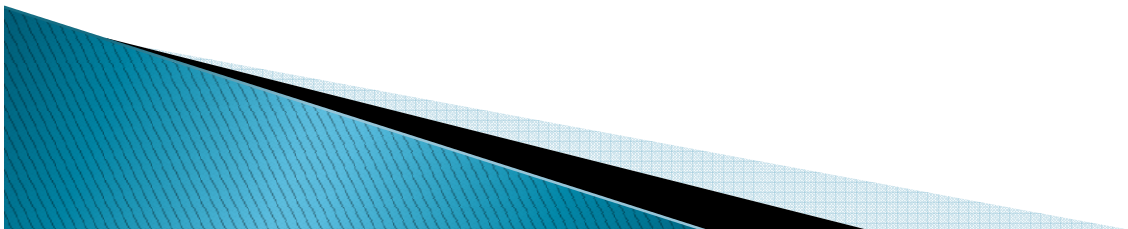
Cable TV uses RG-59 coaxial cable.



Another common application of coaxial cable is in traditional Ethernet LANs .Because of its high bandwidth, and consequently high data rate, coaxial cable was chosen for digital transmission in early Ethernet LANs.

The 10Base-2, or Thin Ethernet, uses RG-58 coaxial cable with BNC connectors to transmit data at 10 Mbps with a range of 185 m.

The 10Base5, or Thick Ethernet, uses RG-11 (thick coaxial cable) to transmit 10 Mbps with a range of 5000 m. Thick Ethernet has specialized connectors.





Thank
You