COAXIAL CABLE

SUBJECT:DATA COMMUNICATION & OPTICAL FIBERS

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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.

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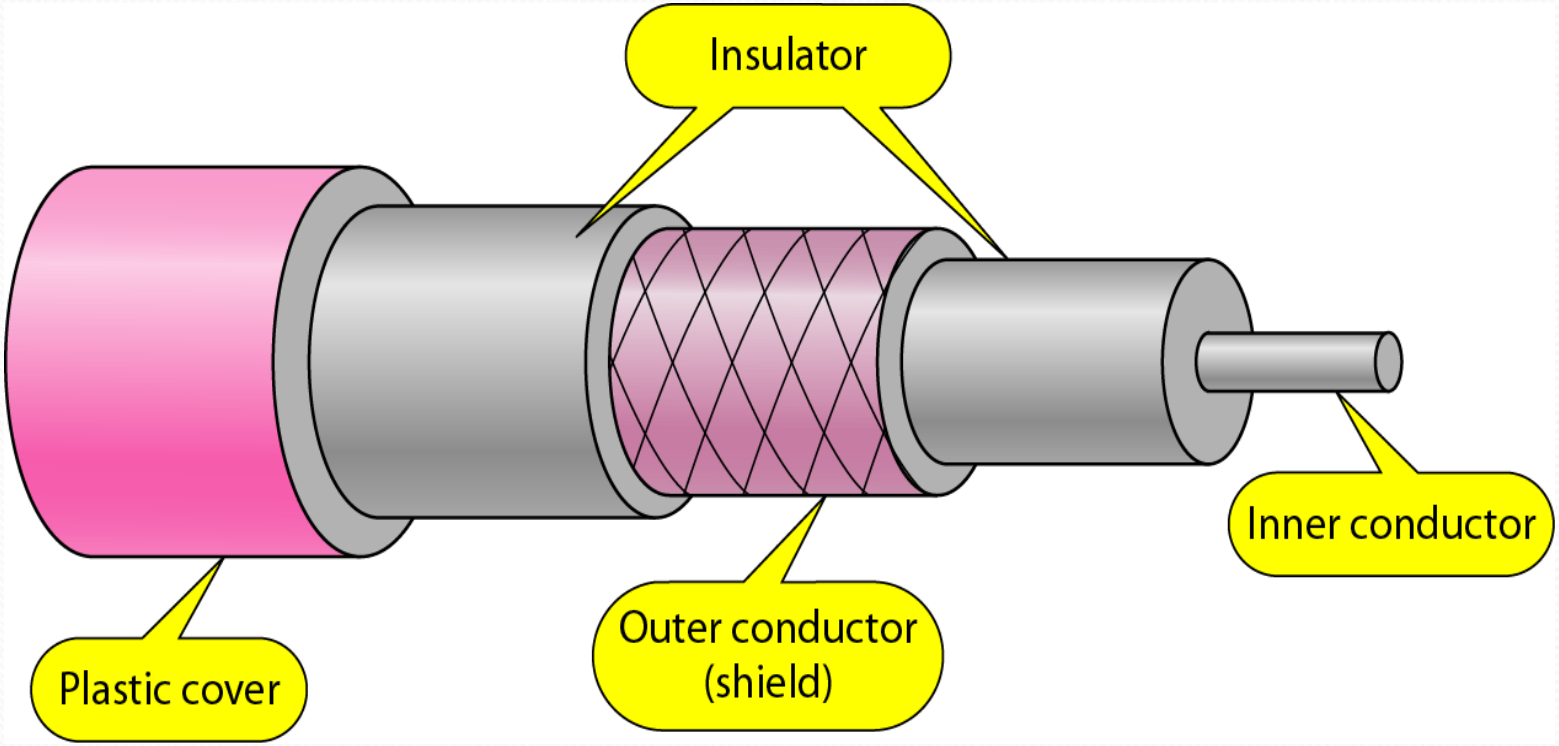
Figure 7.7 *Coaxial cable*



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, as shown in Table 7.2.

Table 7.2 *Categories of coaxial cables*

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 Bayone-Neill-Concelman (BNe), connector.

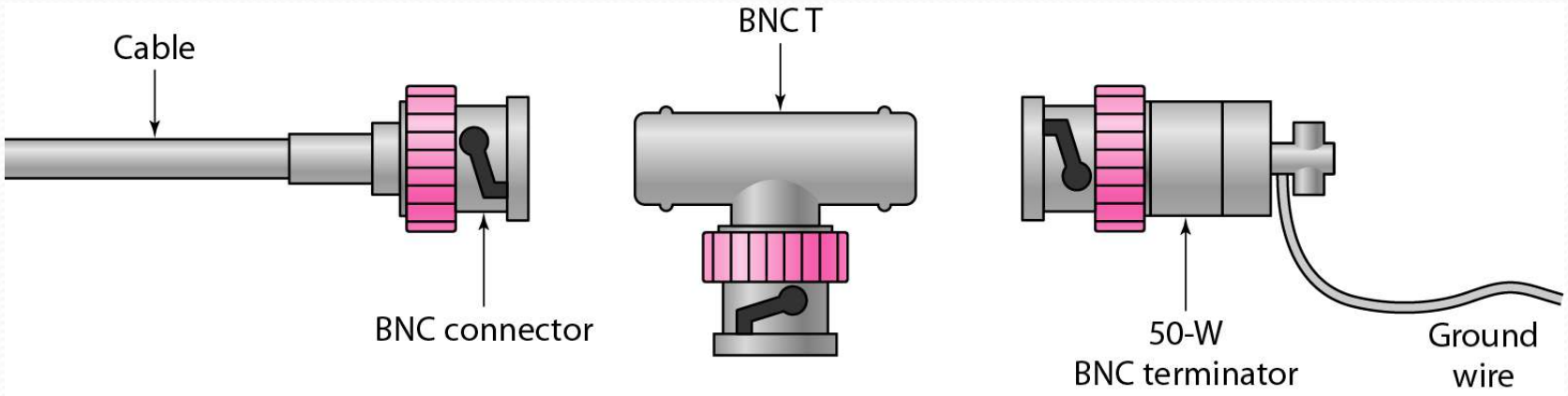
- Figure 7.8 shows three popular types of these connectors: the BNC connector, the BNC T connector, and the BNC terminator.

- 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

Figure 7.8 *BNC connectors*



performance

- 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.
- However, coaxial cable in telephone networks has largely been replaced today with fiber-optic cable.
- Cable TV networks also use coaxial cables. In the traditional cable TV network, the entire network used coaxial cable.
- Later, however, cable TV providers replaced most of the media with fiber-optic cable; hybrid networks use coaxial cable only at the network boundaries, near the consumer premises. 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 BNe connectors to transmit data at 10 Mbps with a range of 185 m. The lOBase5, or Thick Ethernet, uses RG-11 (thick coaxial cable) to transmit 10 Mbps with a range of 5000 m.
- Thick Ethernet has specialized connectors