

Technical Description: Ethernet Cable

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History of the Ethernet Cable

An Ethernet cable is a type of network cable that is commonly used for wired networks, such as the internet. They are typically used to connect devices that are located on local area networks (LANs), like routers, PCs, and switches. The first version of Ethernet was released in 1983 after the project was commissioned in 1980 (Fluke, 2022, 3). It was standardized by the IEEE (Electrical and Electronic Engineers). The standard defines rules for configuring an Ethernet network and how elements in an Ethernet network interact with each other. Over time, ethernet technology has evolved to meet new bandwidth and market requirements.

Ethernet cables are wired in a specific way and conform to an Ethernet cable color code. Cables are constructed with 8 wires twisted into four pairs with a pair usually consisting of a solidly colored wire and another that is white with a colored stripe. Two different color codes exist for Ethernet cables. The T568B scheme is the standard for most Ethernet use in the United States, especially for business purposes (Ellis, 1970, 5). T568A is followed by most European and Pacific nations as well as the United States government.

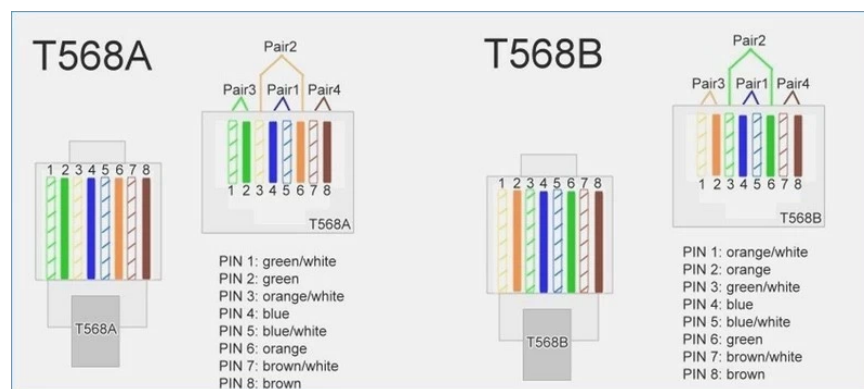


Figure #1: T568A and T568B scheme ethernet.

Technical Description of the Ethernet Cable

Ethernet cables look like a cable that has a connector that can clip along with gold-plated pins for contact. Figure 2 shows an RJ45 connector on an ethernet cable, however, ethernet cables can come with varying connectors (Weis, 2020, 4).

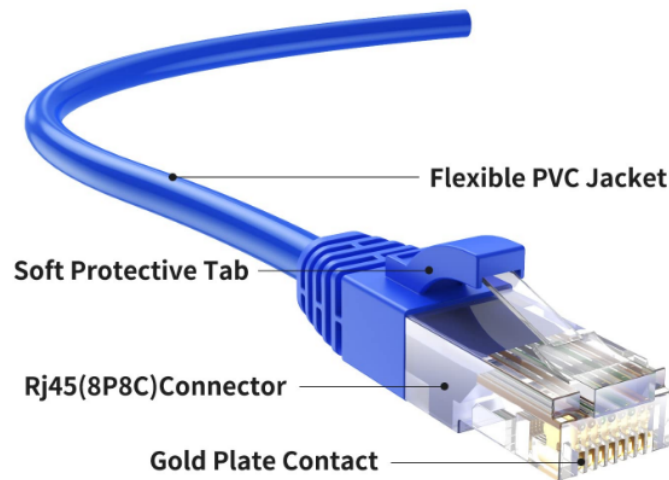


Figure #2: Outer components of an ethernet cable

Flexible PVC Jacket

The cable itself is covered with a flexible A PVC jacket is a type of insulation that is used to protect wires and cables. PVC is a durable and flexible material that can withstand high temperatures and is resistant to abrasion.

Connector

There are many types of Ethernet connectors, but the two most common are the RJ-45 and the BNC. The RJ-45 is a plastic connector that has eight metal pins that are used to connect the Ethernet cable to the network card. The BNC is a metal connector that has two prongs that are used to connect the Ethernet cable to the network card.

Gold Plate Contact

The gold plate contact on ethernet cables is used to help prevent interference from other electronic devices. It is a conductive layer that results in lesser interference.

Inside of an ethernet cable, you can typically find four twisted pairs of copper wire, along with a ground wire, and sometimes a metal shield, in Figure #3, the shield is aluminum foil.

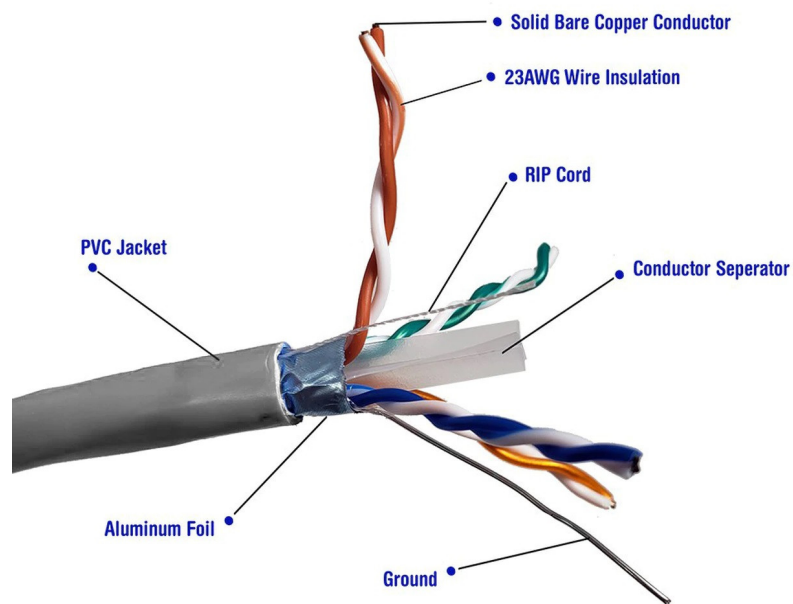


Figure #3: Inside components of an ethernet cable.

Twisted Wires

Ethernet cables are typically made out of twisted copper wire, though they can also be made out of optical fiber.

Ground Wire

A ground wire in an ethernet cable is a wire that helps to reduce interference by providing a path for electrical current to flow to the ground.

Ethernet Cable Functions

An ethernet cable is used to connect two devices together, such as a computer and a router. The cable transfers data between the two devices, and to the network. Ethernet cables transfer data using a technique called carrier sense multiple access with collision detection (CSMA/CD). This technique allows multiple devices to share a single cable by taking turns transmitting data (Irei, 2019, 5). When two devices transmit data at the same time, a collision occurs and both devices must retransmit their dates (Irei, 2019, 5). Ethernet cables are typically connected to devices that are located on local area networks (LANs), like routers, PCs, and switches.

Conclusion

An Ethernet cable is a type of network cable that is commonly used for wired networks, and connecting devices such as PCs, routers, and switches. Ethernet cables look like a cable that has a connector that can clip along with gold-plated pins for contact. Ethernet cables contain twisted pairs of copper wire, along with a ground wire, and a metal shield. Ethernet cables transfer data using CSMA/CD, which allows for devices to take turns transferring data.

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