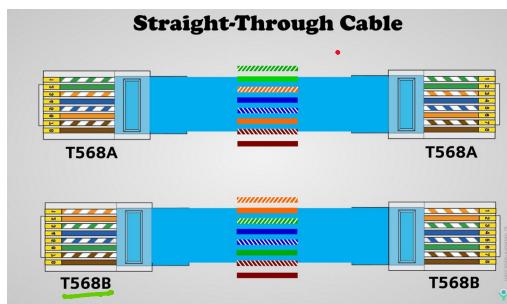


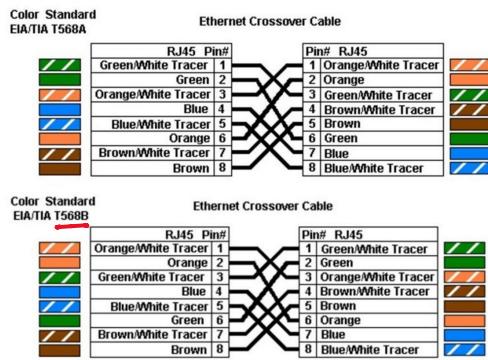
1. Ethernet Cables (Twisted Pair)

Used for LAN connections (Local Area Network), primarily in office and enterprise networks.
(a) Straight-through Cable



- Used to connect different types of devices (e.g., PC → Switch, Router → Switch).
- Wiring standard: Same on both ends (T568A-T568A or T568B-T568B).
- Example: Connecting a laptop to a network switch.

(b) Crossover Cable



- Used to connect similar devices (e.g., PC → PC, Switch → Switch, Router → Router).
- Wiring standard: One end follows T568A, the other follows T568B.
- Example: Connecting two switches without a hub.

(c) Rollover (Console) Cable



Router
 ↓
~~Access Console~~





- Used for configuring Cisco routers and switches.
- Wiring standard: Completely reversed (Pin 1 ↔ Pin 8, Pin 2 ↔ Pin 7, etc.).
- Example: Connecting a PC's COM/USB port to a router's console port for configuration.

2. Fiber Optic Cables

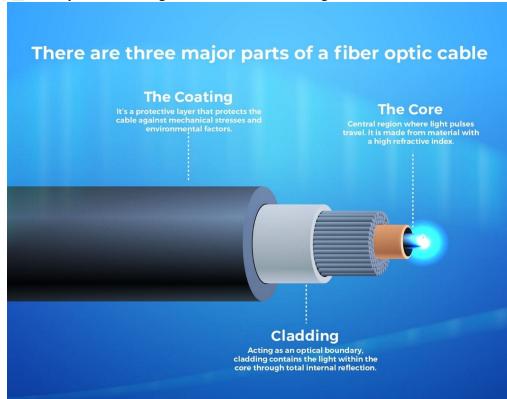
Used for high-speed, long-distance connections in large networks.

(a) Single-mode Fiber (SMF)

- Long-distance transmission (up to 100 km).
- Uses laser light for high-speed data transfer.
- Example: Connecting two data centers across a city.

(b) Multi-mode Fiber (MMF)

- Shorter distances (up to 2 km).
- Uses LED light instead of a laser.
- Example: Connecting switches inside a building or data center.



3. Coaxial Cable

Used in older Ethernet networks and broadband internet connections.

- Thicker shielding reduces interference (compared to twisted pair cables).
- Mostly used for Cable TV and Internet (DOCSIS technology).
- Example: Cable modem connection in home internet service.



4. Serial Cables



Used for **WAN (Wide Area Network) connections** between routers.

- Used in point-to-point connections (Frame Relay, PPP).
- Common connectors: DB60, Smart Serial, V.35.
- Example: Connecting two routers in a CCNA lab for WAN simulation.



Comparison Table of Network Cables

Cable Type	Speed & Distance	Use Case	Example
Straight-through (Ethernet)	1 Gbps – 100 m	Different devices	PC → Switch, Router → Switch
Crossover (Ethernet)	1 Gbps – 100 m	Similar devices	PC → PC, Switch → Switch
Rollover (Console Cable)	N/A	Device configuration	Laptop → Router (Console Port)
Single-mode Fiber	Up to 100 Gbps – 100 km	Long-distance, High-speed	Data centers, ISP backbone
Multi-mode Fiber	Up to 40 Gbps – 2 km	Short-distance, High-speed	Switches in data centers
Coaxial Cable	Up to 1 Gbps – 500 m	Cable TV, Broadband Internet	Home modem connections
Serial Cable	Low-speed – 10 km	WAN connections	Router → Router (WAN Lab)

Key Differences in Simple Terms

1. Ethernet cables (Straight-through, Crossover, Rollover) are **used in local networks (LAN)**.
2. Fiber optic cables are **used for high-speed, long-distance communication**.
3. Coaxial cables are mainly **used for broadband internet and older networks**.
4. Serial cables are **used for WAN connections between routers**.