Cable Types & Speeds Reference

Copper, Fiber, and Standards

■ Twisted Pair Copper Cables

Category	Max Speed	Max Distance	Use Case	Frequency
Cat 5e	1 Gbps	100m	Most common for Gigabit	100 MHz
Cat 6	1 Gbps (10 Gbps @ 55m)	100m	Better performance	250 MHz
Cat 6a	10 Gbps	100m	10 Gigabit standard	500 MHz
Cat 7	10 Gbps	100m	Shielded, data centers	600 MHz
Cat 8	40 Gbps	30m	Short high-speed runs	2000 MHz

■■ Shielded vs Unshielded

Type	Description	Use Case	Cost
UTP	Unshielded Twisted Pair	Most common, office environments	Low
STP	Shielded Twisted Pair	High EMI areas, factories	Medium
ScTP	Screened Twisted Pair	Moderate protection	Medium
SFTP	Shielded Foiled TP	Maximum protection	High

■ T568A vs T568B Wiring Standards

Pin	T568A	T568B
1	White/Green	White/Orange
2	Green	Orange
3	White/Orange	White/Green
4	Blue	Blue
5	White/Blue	White/Blue
6	Orange	Green
7	White/Brown	White/Brown
8	Brown	Brown

- **Straight-through:** Both ends same standard (T568B most common)
- **Crossover:** One end T568A, other T568B (legacy - Auto-MDIX replaced this)
- **Rollover:** Pin 1→8, 2→7, etc. (Cisco console cables)

■ Fiber Optic Cables

Type	Core Size	Distance	Speed	Use Case	Cost
Single-Mode	9 μm	Up to 100km+	Up to 100 Gbps	Long distance, ISP	High
Multi-Mode	50/62.5 μm	Up to 2km	Up to 100 Gbps	Campus, data center	Medium

■ Fiber Optic Connectors

Connector	Description	Common Use
LC	Lucent Connector (small, square)	Most common modern connector
SC	Subscriber Connector (square, push-pull)	Common in data centers
ST	Straight Tip (round, bayonet twist)	Legacy, older installations
MTRJ	Mechanical Transfer RJ (duplex)	Compact duplex connector

■ Ethernet Standards (IEEE 802.3)

Standard	Speed	Cable Type	Max Distance
10BASE-T	10 Mbps	Cat 3 or higher	100m
100BASE-TX	100 Mbps	Cat 5 or higher	100m
1000BASE-T	1 Gbps	Cat 5e or higher	100m
1000BASE-SX	1 Gbps	Multi-mode fiber	550m
1000BASE-LX	1 Gbps	Single-mode fiber	5km
10GBASE-T	10 Gbps	Cat 6a or higher	100m
10GBASE-SR	10 Gbps	Multi-mode fiber	400m
10GBASE-LR	10 Gbps	Single-mode fiber	10km
40GBASE-T	40 Gbps	Cat 8	30m

■ Exam Tips

- Know the maximum distance for copper: **100 meters (328 feet)**
- Cat 5e is minimum for Gigabit Ethernet
- Cat 6a is standard for 10 Gigabit over full 100m
- Single-mode = long distance, Multi-mode = shorter distance
- Fiber is immune to EMI (electromagnetic interference)
- T568B is the most common wiring standard in US
- Plenum-rated cable required in air handling spaces (fire code)
- Remember: 10BASE means 10 Mbps, 100BASE means 100 Mbps, etc.