Copper Cables

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Copper Connectors

RJ11
Registered Jack Type 11
6 positions 2 conductors (6P2C)
Used mostly in telephone & DSL connection

RJ14 uses 6P4C for dual-line use

RJ45
Registered Jack Type 45
8 Positions, 8 Conductors (8P8C)
Modular connector
Mostly used in ethernet

F-Connectors
Used mostly for cable modem
Follows Data Over Service Interface
Specification (DOCSIS)

Copper Cables

Twisted Pair Operation

- Two wires with equal and opposite signals (Transmit+,Transmit- or Receive+,Receive-)
- 4 Pairs
- The twisting is done to prevent noise
- The opposite signals are compared at the end and missing/damaged data might be reconstructed
- Different pairs have different twist rates

IEE 802.3 Standard

Ethernet Standard	Cable Category	Maximum Supported Distance
1000BASE-T	Category 5	100 meters
1000BASE-T	Category 5e (enhanced)	100 meters
10GBASE-T	Category 6	Unshielded: 55 meters Shielded: 100 meters
10GBASE-T	Category 6A (augmented)	100 meters
10GBASE-T	Category 7 (Shielded only)	100 meters
40GBASE-T	Category 8 (Shielded only)	30 meters

Coaxial Cables

- Two or more forms that share a common axis
- Usually used in television/cable modem connection

Twinaxial Cables

- Similar to Coaxial but instead has 2 cables instead of 1
- Commonly used on:
  10Gigabit Ethernet
  SFP+ Cables
- Properties:
  Full duplex
  5 Meters
  Low cost compared to fiber
  Low latency compared to twisted pari

Structured Cabling Standards

- International ISO/IEC 11801 cabling standards which defines classes of networking standards
- In north america there is the TIA which uses 2 standards (we are focusing on the pin and pair assignments of the eight conductor 100-ohm cables which are usually used for ethernet connection)
  - TIA-568A
  - TIA-568B (Used by many organizations)
- It's difficult to change after selecting a specific standard
- The same cable can't have one side 568A and the other 568B