INSTRUCTOR
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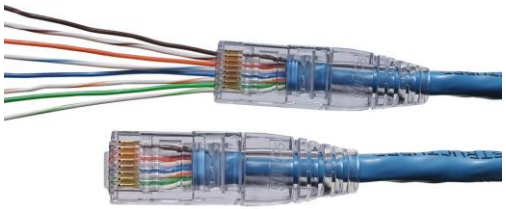
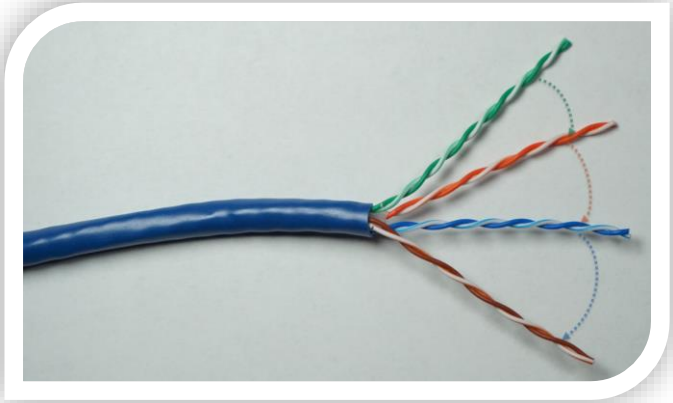
Twisted Pair Copper Cabling

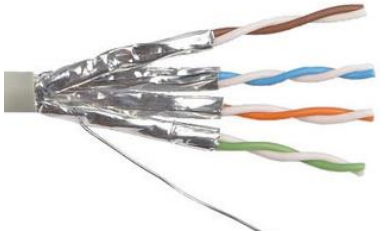
- 4 Twisted Pairs of Wires with RJ-45 Connector
- Balanced pair operation
  - + & - Signals
  - Equal & Opposite Signal
- Why are they twisted?
  - To Help Reduce Interference
    - Crosstalk
    - Noise (Electromagnetic Interference)
- Security concerns
  - Signal Emanations
- 100 Meters Maximum Distance
  - Signal Attenuation

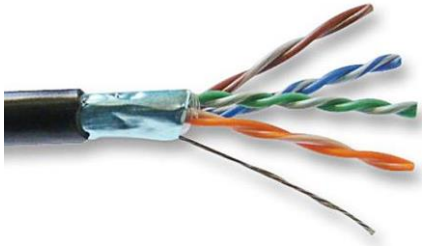


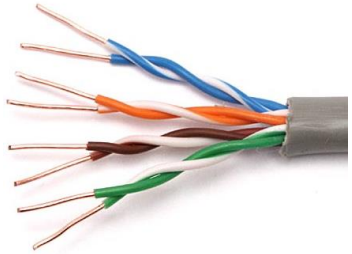


Shielded vs. Unshielded & EMI

- **Unshielded Twisted Pair (UTP)**
  - More susceptible to electromagnetic interference (EMI).
- **Shielded Twisted Pair (STP)**
  - Less susceptible to EMI & Crosstalk (if each pair shielded).
- **Electromagnetic Interference**
  - The disruption of an electronic device's operation when it's in the vicinity of an electromagnetic field caused by another electronic device (manufacturing equipment, microwave ovens, etc.).







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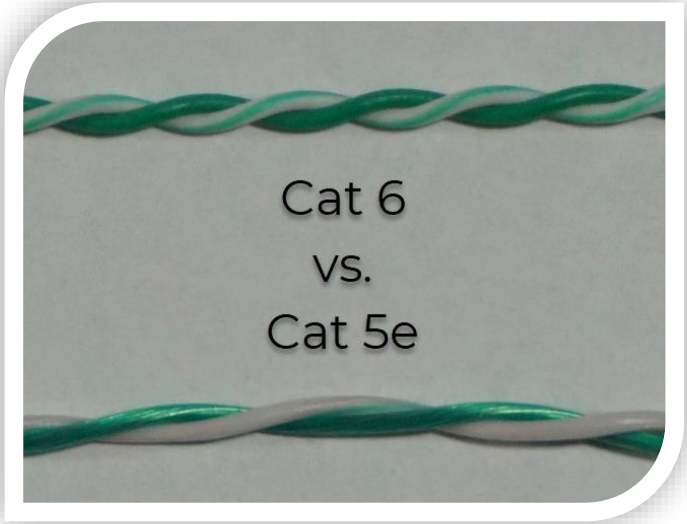
Roles of Twists

- Increased twists per inch:
  - Reduces Crosstalk
  - Increases Signals
  - Supports Faster Speeds



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Twisted Pair Standards

Cat	Network Type	Ethernet Standard	Speed	Max. Distance	Frequency
Cat 3	Ethernet	10Base-T	10Mbps	100 meters	16 MHz
Cat 5	Fast Ethernet	100Base-TX	100Mbps	100 meters	100 MHz
Cat 5e	Gigabit Ethernet	1000Base-T	1Gbps	100 meters	100 MHz
Cat 6	Gigabit Ethernet 10 Gigabit Ethernet	1000Base-T 10GBase-T	1Gbps 10Gbps	100 meters 55 meters	250 MHz
Cat 6a	10 Gigabit Ethernet	10GBase-T	10Gbps	100 meters	500 MHz
Cat 7	10 Gigabit Ethernet	10GBase-T	10Gbps	100 meters	600 MHz

Cat: Copper Cabling Standard.

Other Copper Cable Connectors

RJ-11

- 4-pin connection used for telephone connections.

DB-9

- 9-pin connection used for serial connections on networking devices

DB-25

- 25-pin connection previously commonly used for serial printer connections.