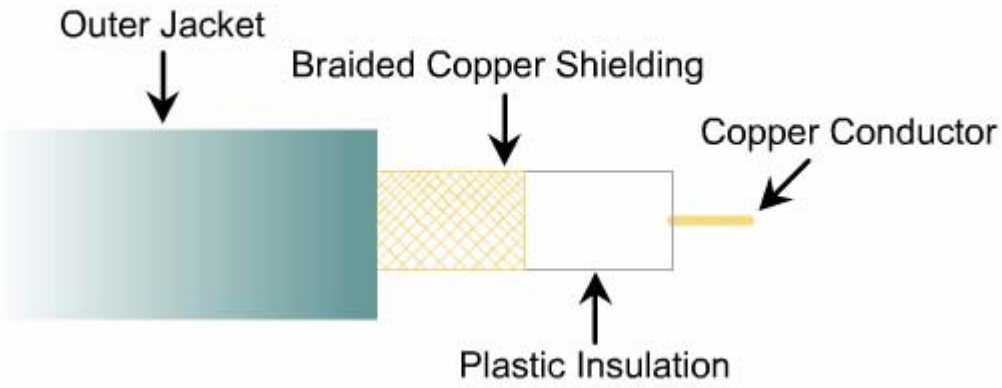
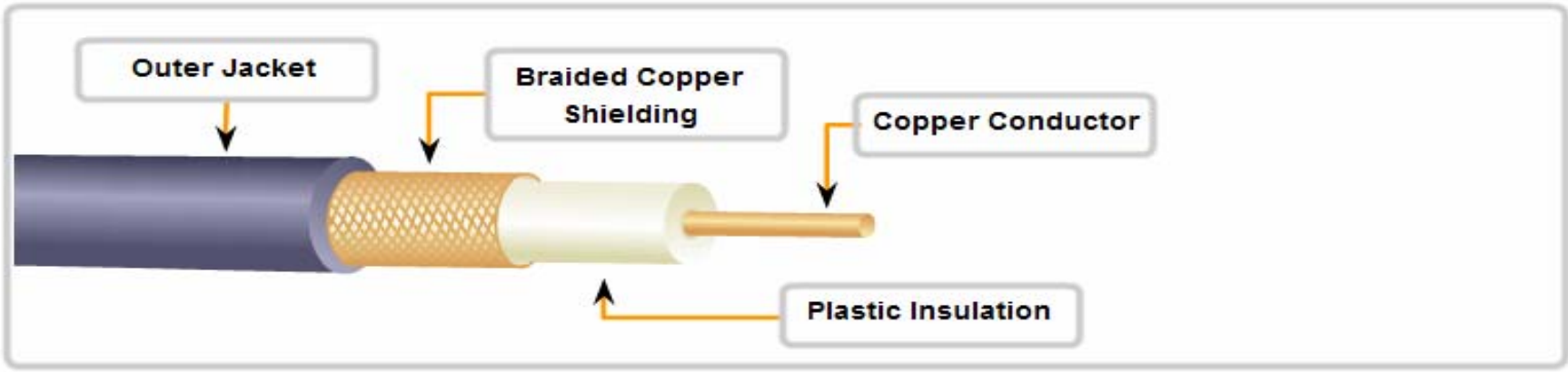
# Coaxial Cable

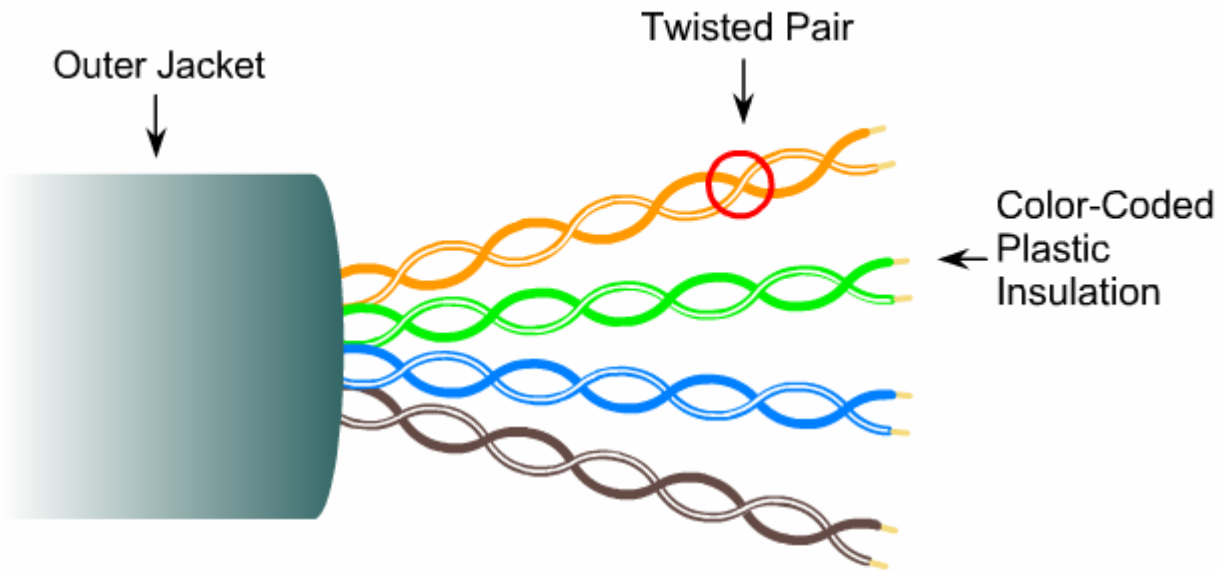


- Speed and throughput: 10 - 100 Mbps
- Cost: Inexpensive
- Media and connector size: Medium
- Maximum cable length: 500m

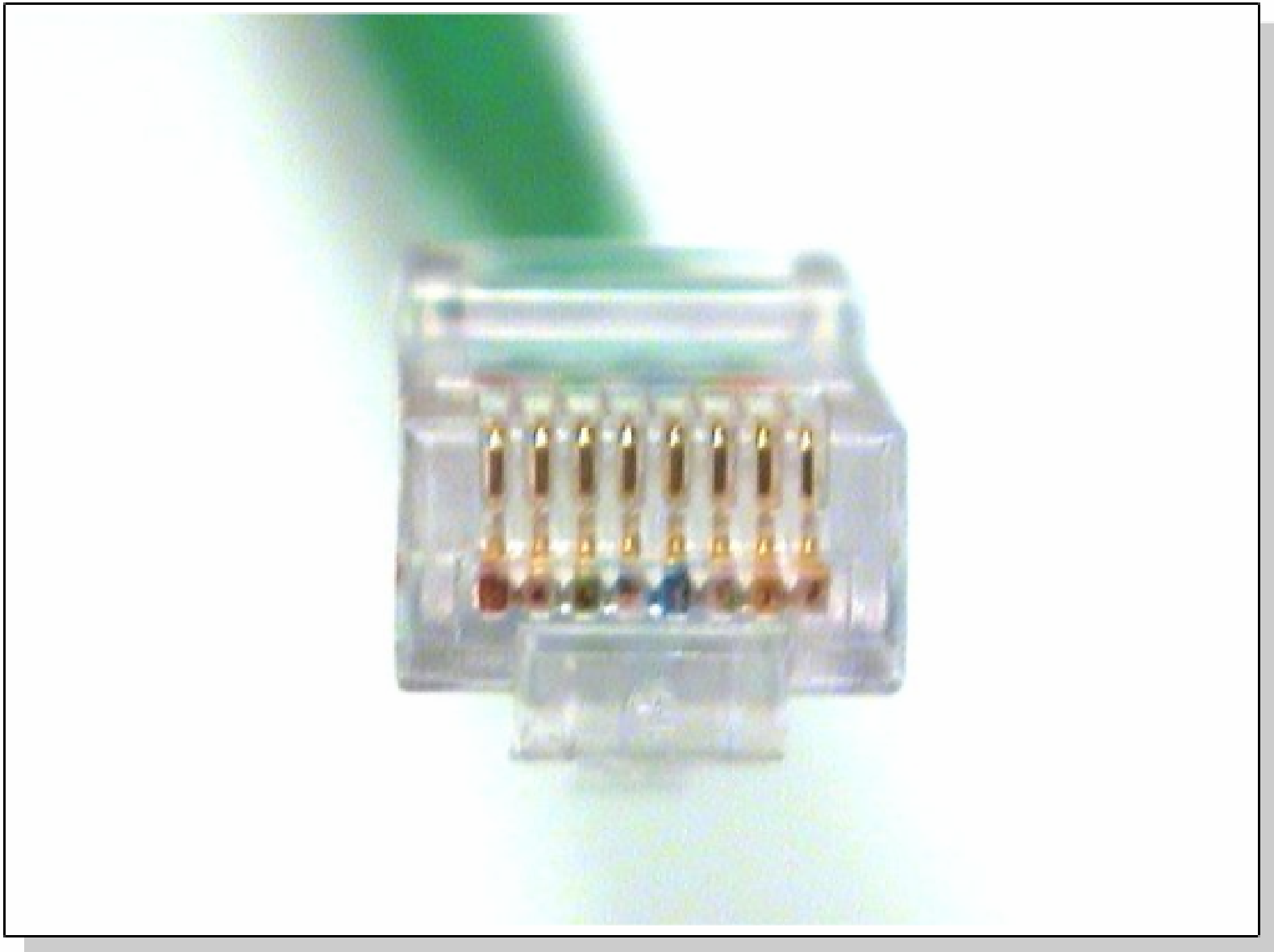
# Coaxial Cable Design

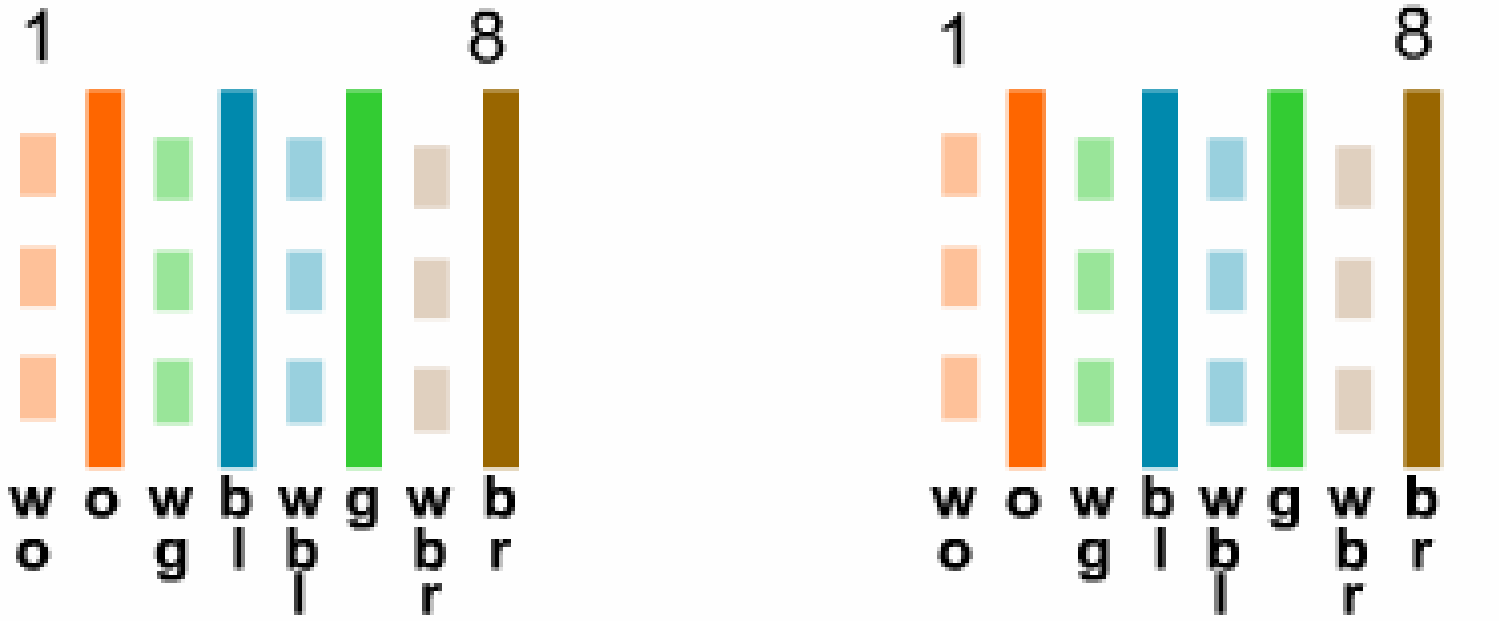


# Unshielded Twisted-Pair Cable




- Speed and throughput: 10 - 100 - 1000 Mbps (depending on the quality/category of cable)
- Cost: Least Expensive
- Media and connector size: Small
- Maximum cable length: 100m






Wires on cable ends are in same order.

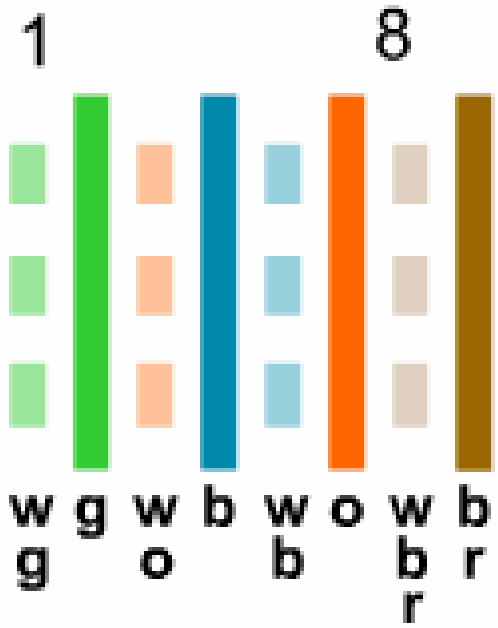
**Use straight-through cables for connecting:**

Switch to router

Computer to switch

Computer to hub

Hub to router

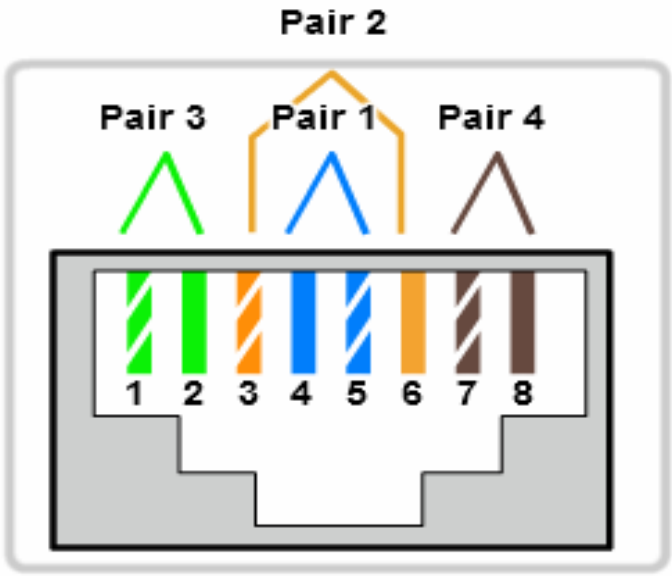


The orange wire pair and the green wire pair switch places on one end of the cable.

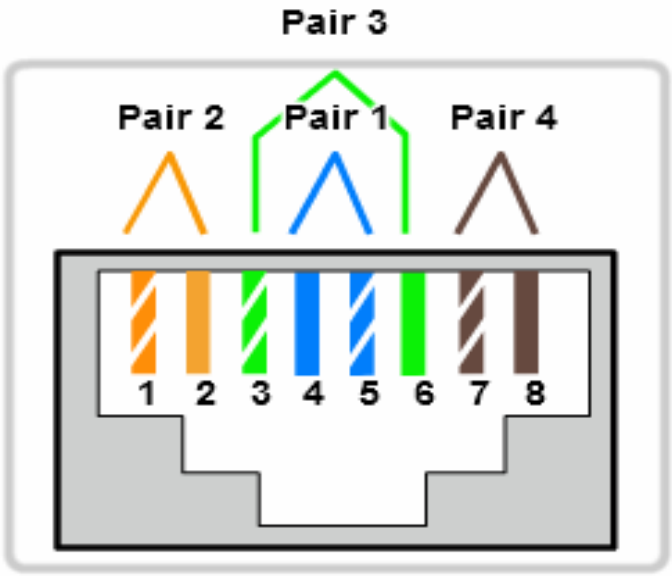
**Use crossover cables for connecting:**

Switch to switch
Switch to hub
Hub to hub
Router to router
Computer to computer
Computer to router

# RJ45 T568A & T568B Termination

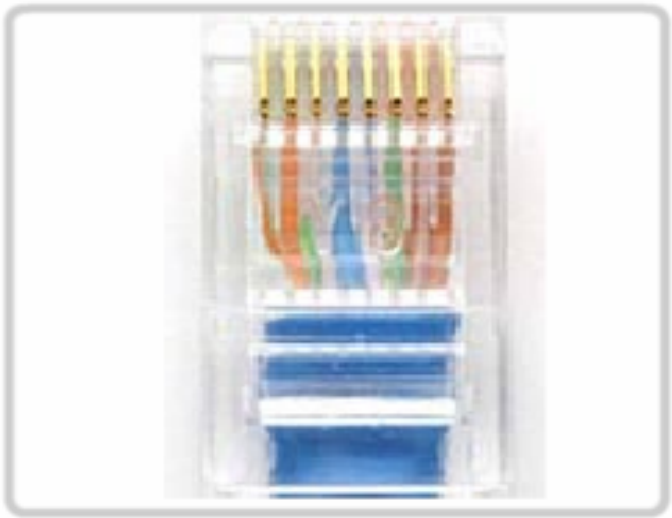



T568A



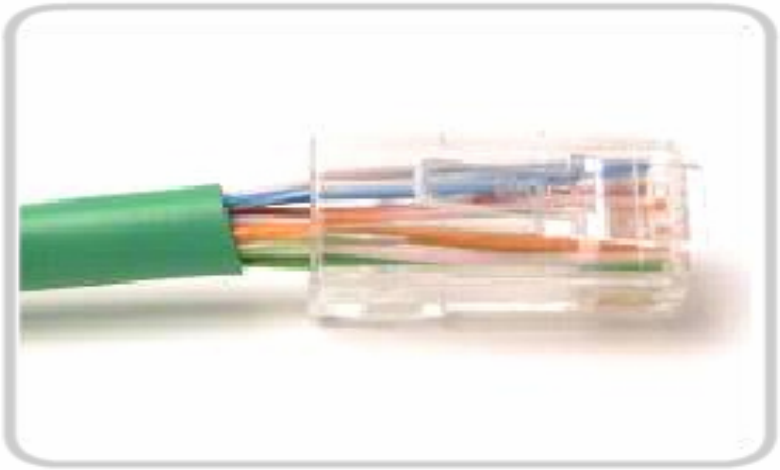

T568B

**T568A**
(Top View)

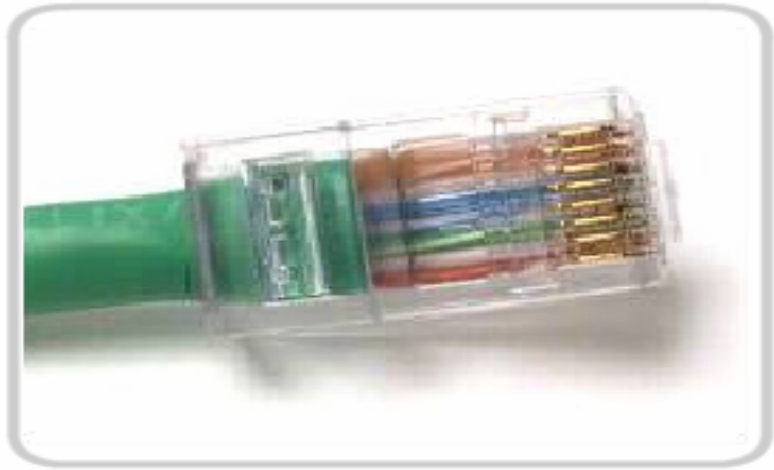


**T568B**
(Top View)

## Copper Media Connectors
## RJ45 Termination



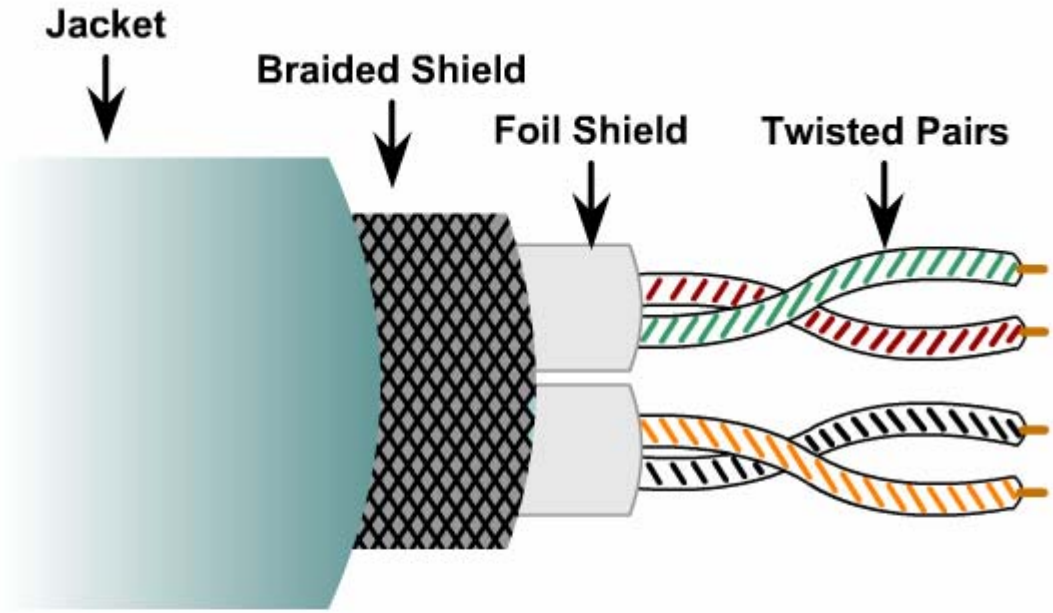
Bad connector - Wires are untwisted for too great a length.



Good connector - Wires are untwisted to the extent necessary to attach the connector.

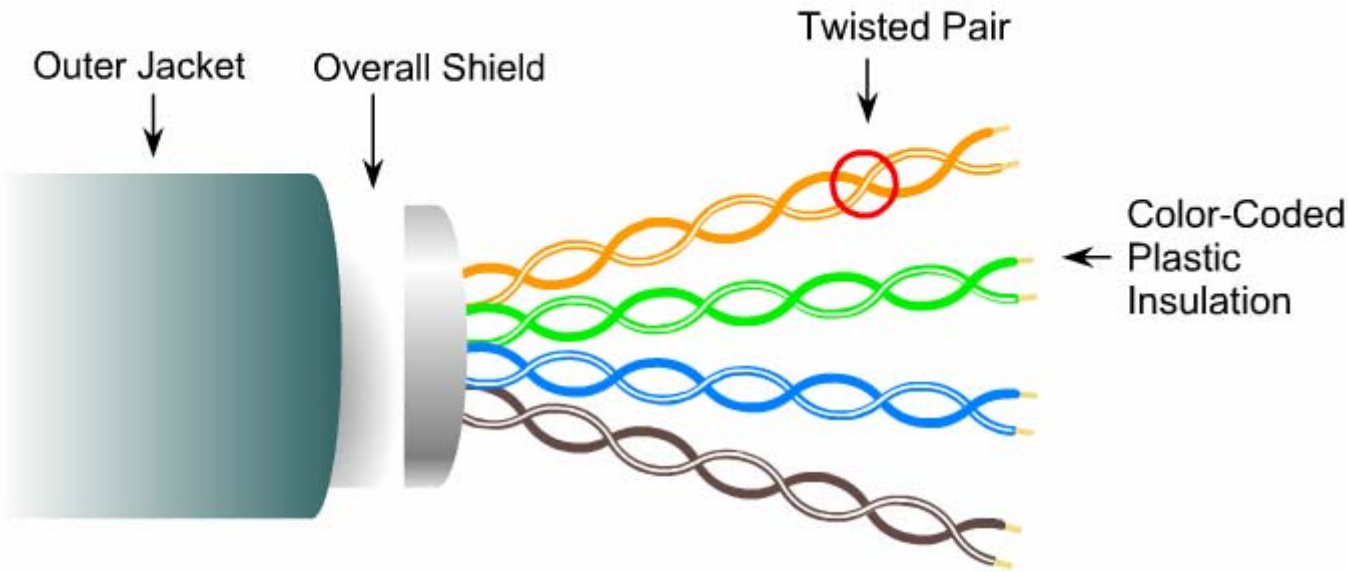
Improper cable termination can impact transmission performance.

# Shielded Twisted-Pair Cable



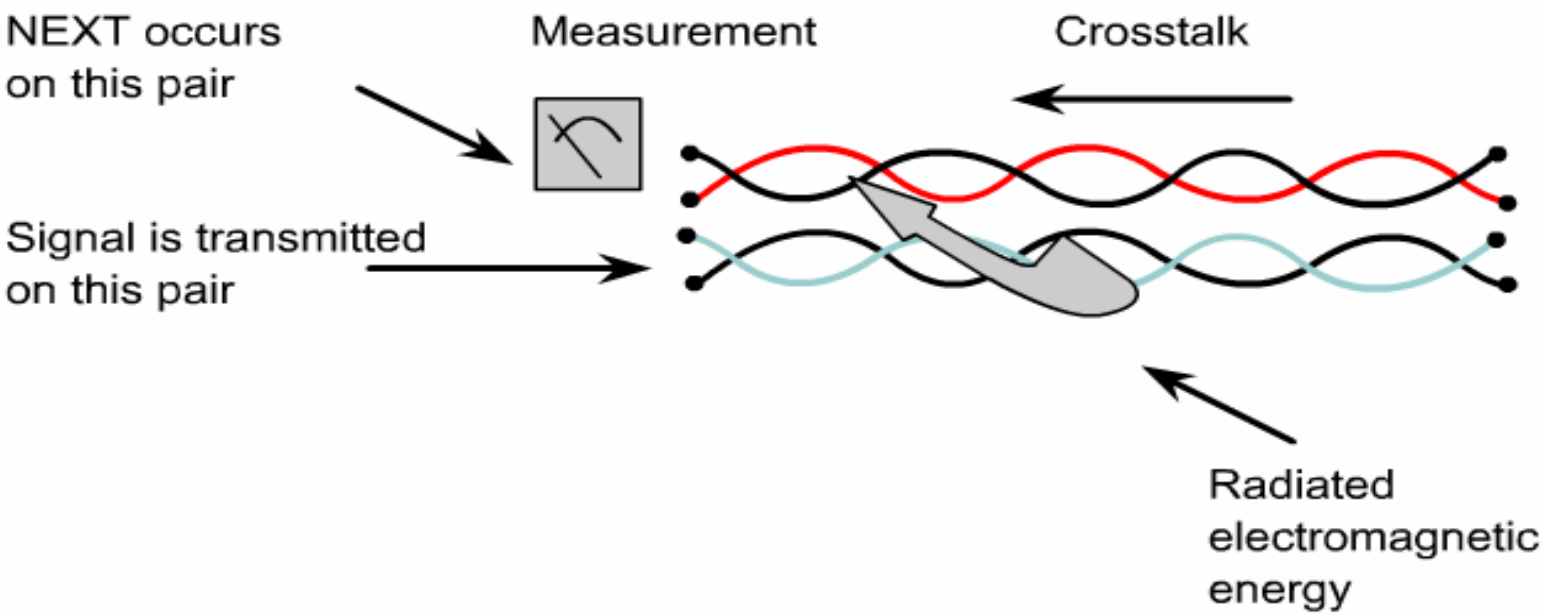

- Speed and throughput: 0 - 100 Mbps
- Cost: Moderate
- Media and connector size: Medium to Large
- Maximum cable length: 100m

# ScTP (Screened Twisted Pair)

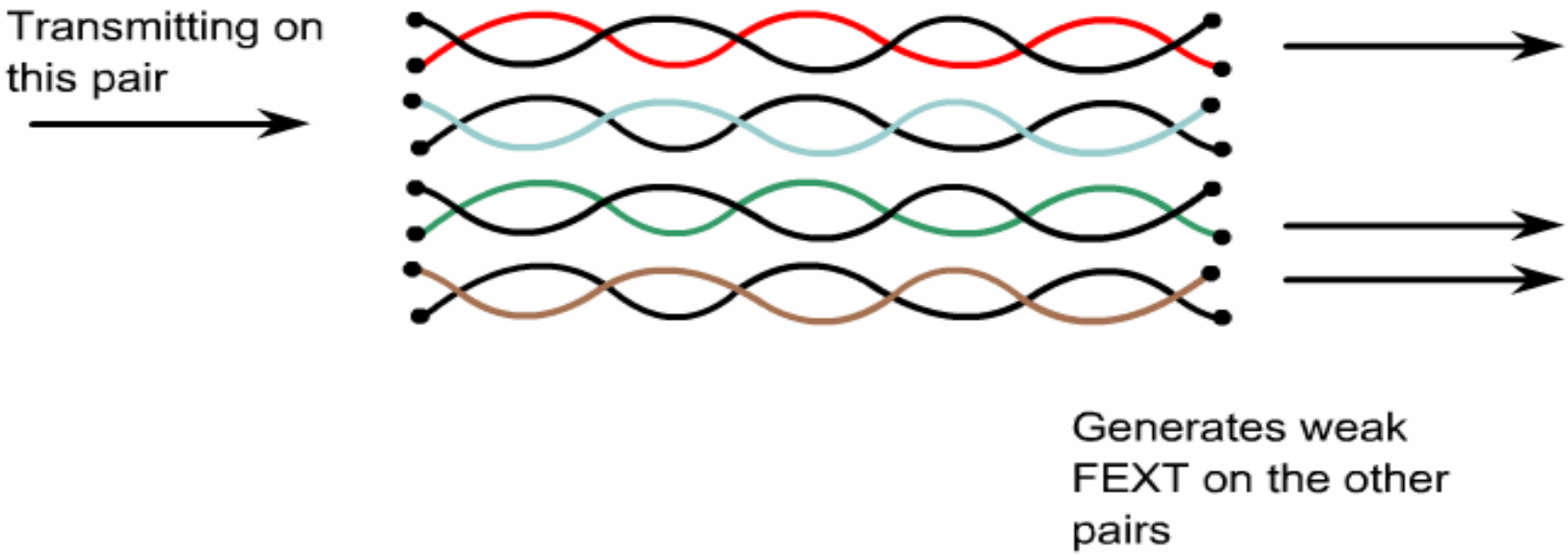



- Speed and throughput: 0 - 100 Mbps
- Cost: Moderately Expensive
- Media and connector size: Medium to Large
- Maximum cable length: 100m

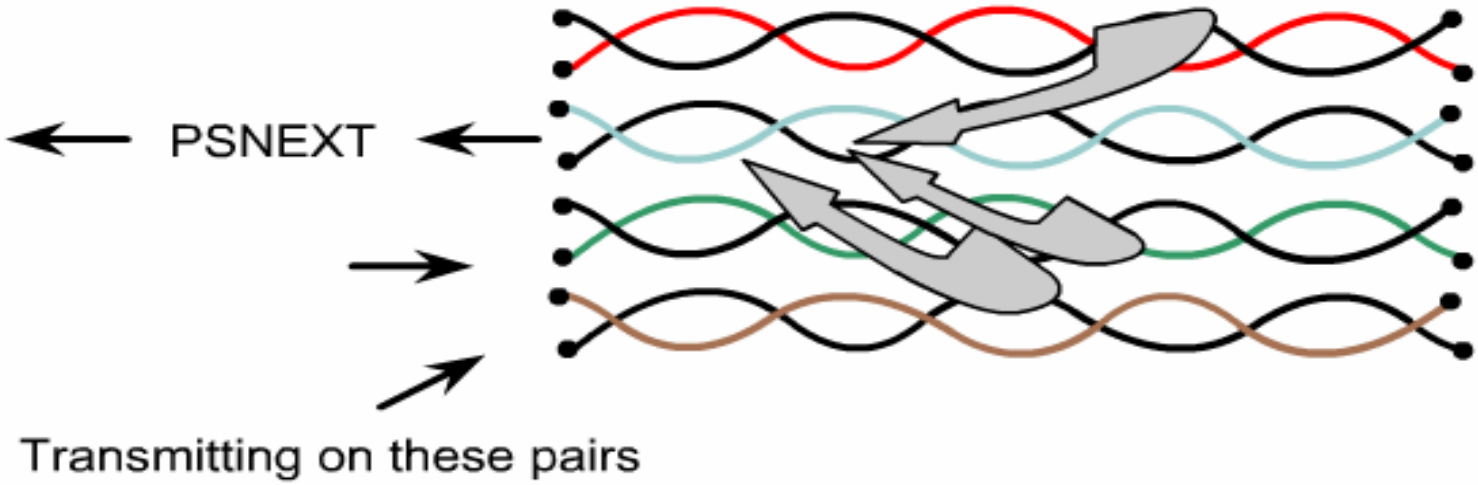
# Near-End Crosstalk (NEXT)



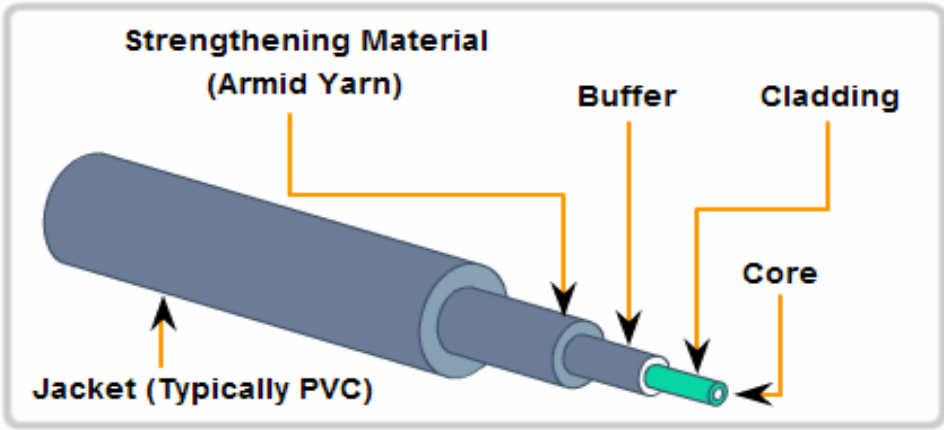
# Far-End Crosstalk (FEXT)

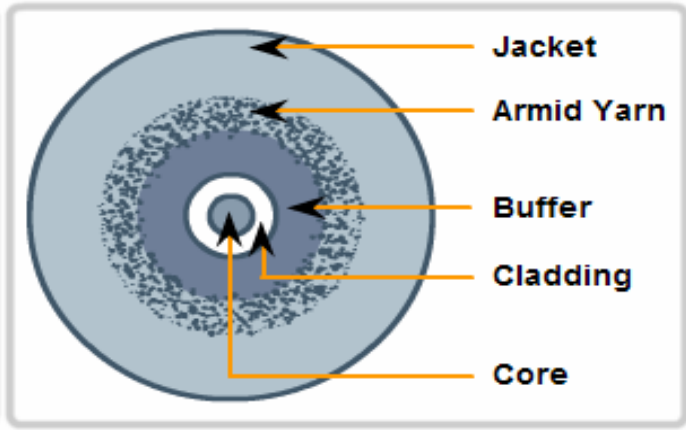


# Power Sum NEXT (PSNEXT)



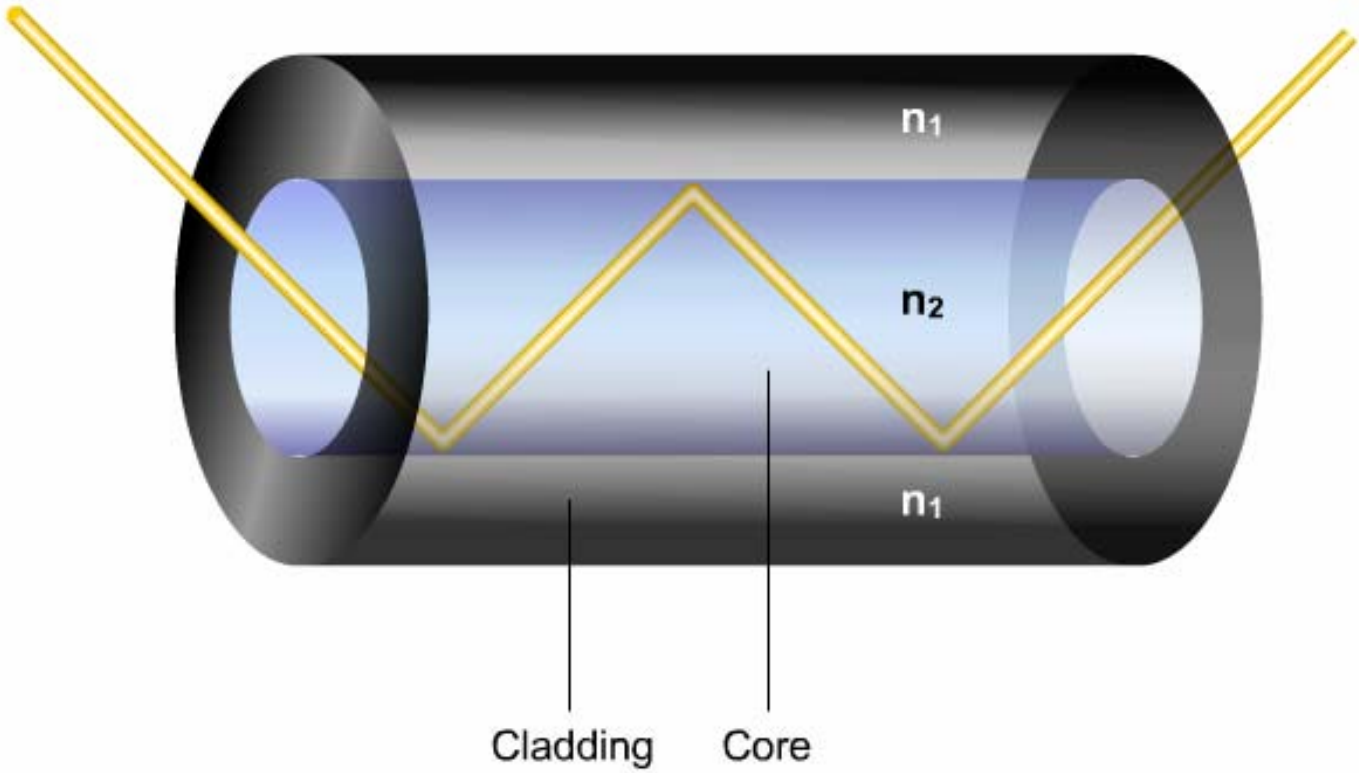
## Fiber Media Cable Design



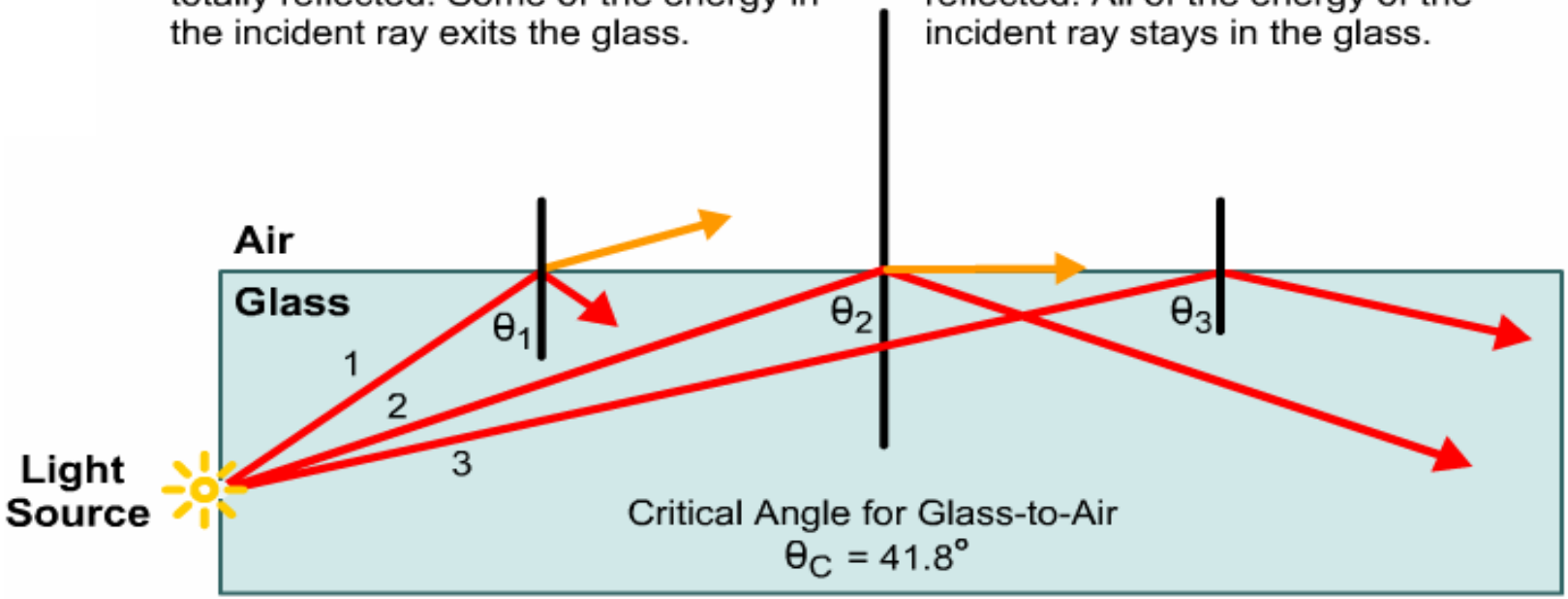

SECTION Rollover to change perspective.

Fiber Connectors


$n_1$
$n_2$
$n_1$
Cladding
Core

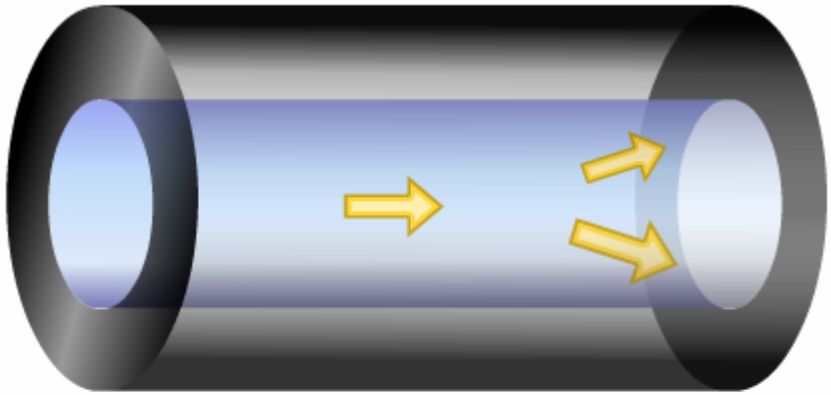
Light incident at any angle smaller than or equal to the critical angle is not totally reflected. Some of the energy in the incident ray exits the glass.

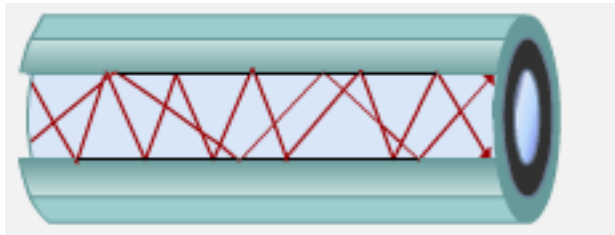
Light incident at any angle greater than the critical angle is totally reflected. All of the energy of the incident ray stays in the glass.



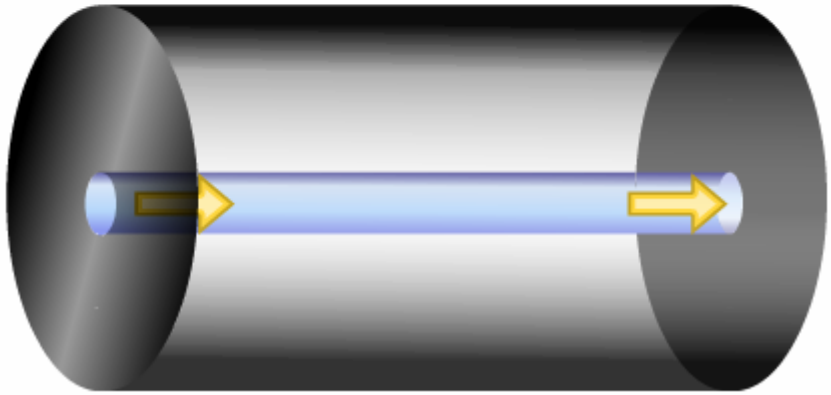

Ray 1: $\theta_1 < \theta_C$ , so ray reflects and refracts
Ray 2: $\theta_2 = \theta_C$ , so ray reflects and refracts
Ray 3: $\theta_3 > \theta_C$ , so ray is totally internally reflected

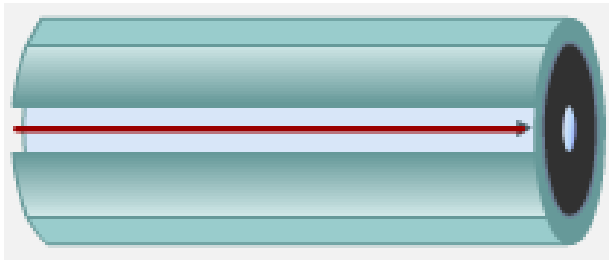
Multimode



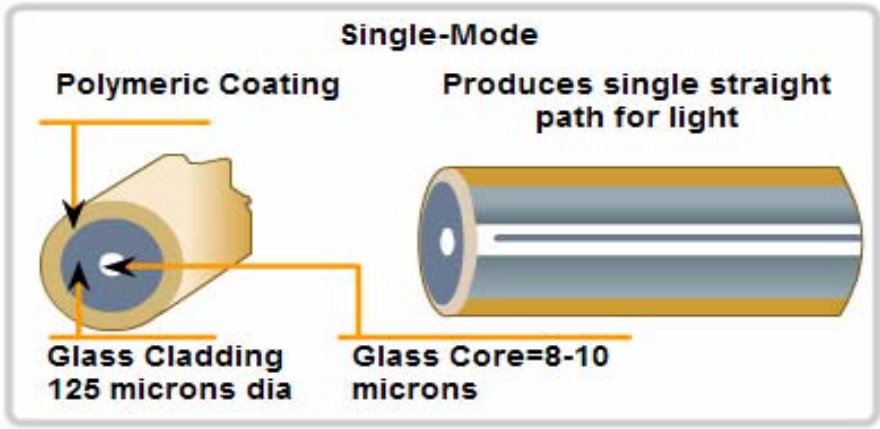


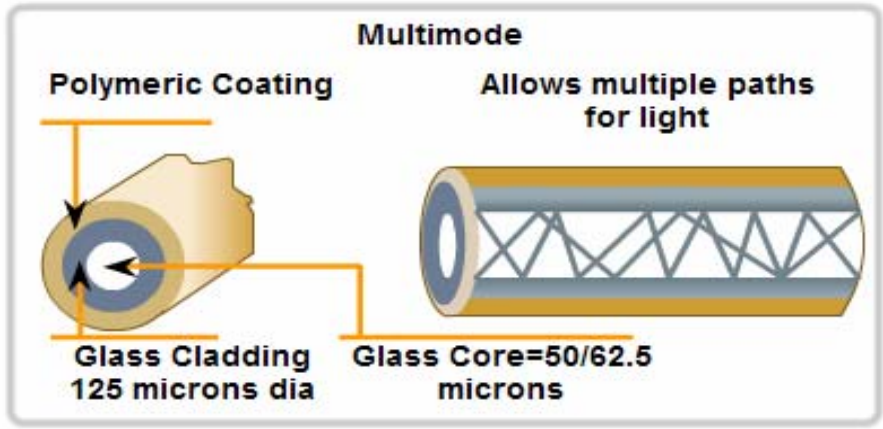
Single Mode





# Fiber Media Modes




- Small Core
- Less Despersion
- Suited for long distance applications (up to 100 km, 62,14 mi.)
- Uses lasers as the light source often within campus backbones for distance of several thousand meters

- Larger core than single-mode cable (50 microns or greater)
- Allows greater dipersion and therefore, loss of signal
- Used for long distance appllication, but shorter than single-mode (up to ~2km, 6560 ft)
- Uses LEDs as the light source often within LANs or distances of couple hundred meters within a campus network

## Fiber Media Connectors

### ST Connector

Straight Tip (ST) connector is used with single-mode fiber

### SC Connector

Subscriber Connector (SC) is used with multimode fiber

### Single-Mode (LC)

Single-Mode Lucent Connector (LC)

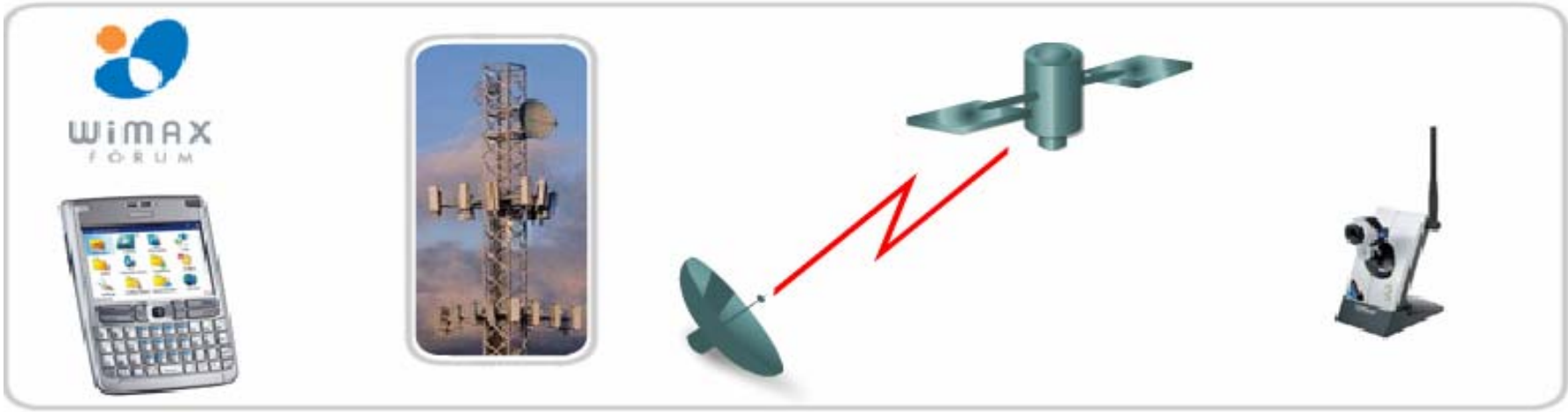
### Multimode (LC)

Multimode LC Connector

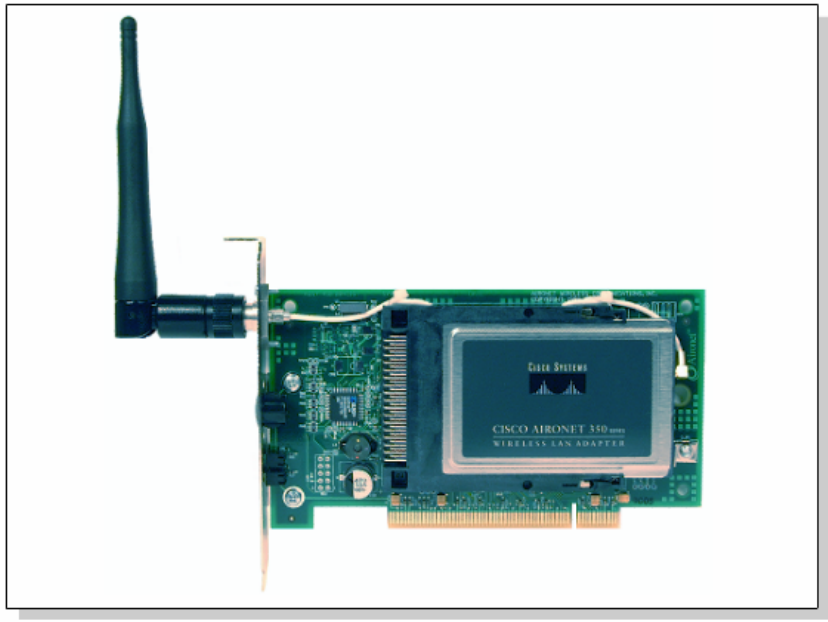
### Duplex Multimode (LC)

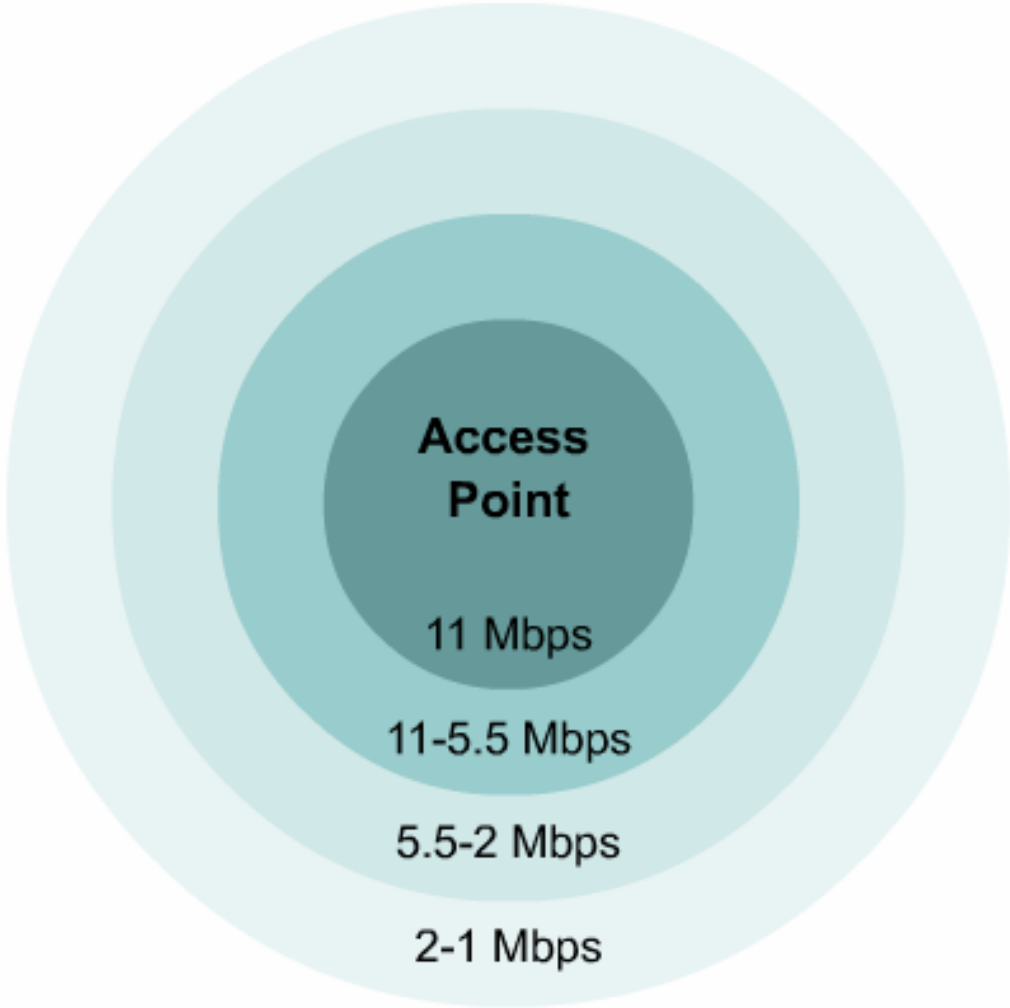
Duplex Multimode  LC Connector

## Wireless Media Standards and Types



- 802.11
- 802.11b
- 802.11a
- 802.11g


CISCO SYSTEMS
CISCO AIRONET 350
WIRELESS LAN ADAPTER


Access Point
11 Mbps
11-5.5 Mbps
5.5-2 Mbps
2-1 Mbps