

# Network Cabling: Media and Topologies

## Introduction to Network Cabling Questions

### 1. What is TIA/EIA 568?

The TIA/EIA 568 is a Telecommunications cabling standard for commercial buildings.

### 2. What is the difference between TIA 568A and TIA 568B?

The TIA 568 A and B are the commercial building wiring standards with the difference being the order in which the colored pairs are connected. I used to make cables, always the 568-B standard.

TIA 568-A uses the following color code terminations

Pin 1: White/Green

Pin 2: Green

Pin 3: White/Orange

Pin 4: Blue

Pin 5: White/Blue

Pin 6: Orange

Pin 7: White/Brown

Pin 8: Brown

TIA 568-B uses the following color code terminations

Pin 1: White/Orange

Pin 2: Orange

Pin 3: White/Green

Pin 4: Blue

Pin 5: White/Blue

Pin 6: Green

Pin 7: White/Brown

Pin 8: Brown

### 3. What is the function of a patch panel?

A patch panel is a panel of network ports that connects cabling in a LAN

### 4. Add these terms to your vocabulary list, Cat 5, Cat 6, and plenum.

1. Cat 5 – network cable that consists of four twisted pairs of copper wire terminated by RJ45 connectors. Supports frequencies up to 100 MHz and speeds up to 1000 Mbps.

2. Cat 6 – network cable used as the cabling infrastructure for 10BASE-T (Ethernet), 100BASE-TX (Fast Ethernet), 1000BASE-T (Gigabyte Ethernet) networks.

3. Plenum – space in a building that can facilitate air circulation for heating and A/C systems

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## Multimode and Singlemode Fiber

Historically, copper wire, either coaxial or twisted pair, has been a very popular networking media. At the same time, in certain contexts, fiber optics can offer some significant advantages.

Included in these advantages is the ability to run long distances, immunity to EMI and RFI, as well as relatively immunity from tapping.

#### Questions

1. For signaling, what type of technology does fiber optics employ?  
Light is transmitted for signaling. Single Mode- light travels down one strand of fiber, better for longer distances. Multimode signaling-signal bounces down fiber
  2. Is fiber optic cable easy to tap?  
No
  3. In what type of situation would you employ multimode fiber optic cable?  
Short distances, 2km or less
  4. What would be a conventional light source for multimode fiber optic cable?  
LED
  5. In what situation would you employ single mode fiber optic cabling?  
Long range, up to 100km
  6. What would be a conventional light source for single mode fiber optic cabling?  
Lasers
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#### UTP, STP and Coaxial Cabling

For local area networks, the historical dominant physical network media is unshielded twisted pair copper (UTP). Though, for a particular situation, you might also utilize shielded twisted pair (STP). Prior to UTP, coaxial cabling was the most common network media.

#### Questions

1. What type of cable do the terms 10base5, "Thicknet", RG-8, 10base2, and RG-58 describe?  
Older, coaxial cable
  2. What type of cabling uses conductor pairs that are twisted?  
Twisted pair copper cabling
  3. What differentiates UTP from STP?  
UTP (unshielded twisted pair) doesn't have an additional layer of metal shielding around each twisted pair, does not require an electrical ground, and is less expensive than STP.
  4. What is the most common form of Ethernet cabling for Local Area Networks?  
UTP
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#### Cable Categories

Here, you will learn about cable categories, the network topologies that they support, as well as the relevant standards associations.

1. What is the EIA?  
Electronic Industries Alliance, an alliance of trade associations that develops standards.
2. What is the TIA?

Telecommunications Industry Association, which is, deals with the telecommunications industry standards.

3. For what is Category 3 cable used?  
10Mbit/s Ethernet and 4Mbit/s Token Ring
  4. Compare and contrast Cat5 and Cat5e cable.  
Cat5e is updated Cat5 and supports 1 Gbit/s Ethernet. Cat5 supports 100Mbit/s Ethernet
  5. In what situation would you want to employ Cat6 cable?  
It is better long runs of 10 Gbit/s Ethernet
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## Crossover and Straight through Cables

Network cables come in both straight through and crossover configurations. Your specific use for the cable will dictate which configuration you should employ.

1. What is an Ethernet straight through cable? When would you use it?  
A patch cable, used to connect network devices
  2. What is the difference between a MDI and a MDIX interface?  
A Media Dependent Interface is a Network Interface Card. A Media Dependent Interface Crossover is an infrastructure device like a network switch The transmit and receive pins are opposites, pins 1 and 2, so use a straight through patch cable when connecting the two.
  3. What is an Ethernet crossover cable? When would you use one?  
An Ethernet crossover cable is used to connect similar devices, MDI to MDI or MDIX to MDIX
  4. If you were going to connect two CSU/DSUs, what type of cable would you use?  
A crossover cable
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## Plenum and Non-Plenum Cabling

1. What is the disadvantage of using regular TWP copper cable in a ceiling plenum?  
Regular TWP cable can give off toxic fumes when ignited.
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## Converting Media

When you are working in a network environment, you may have the need to convert a signal from one type of media to a different type of media. This tutorial will acquaint you with the options that you have in that situation.

1. Why do you always need to provide power to the device when you convert from fiber to copper?  
Power is required to operate the medial converter that converts electrical signals in the copper wire to the light waves in the fiber.

2. Can a network signal from almost any type of media be converted to any other type of media?  
Yes
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### Media Distance and Speed Limitations

Each cable has a unique set of attributes. Examples of these attributes include how far a signal can run and still be “in spec.” Another attribute is that each cable has a speed limitation. Often these attributes are expressed in a descriptive cable naming convention.

1. What type of cable does 10base5 networking use?  
RG-8U
2. How far can you run on a single run of 10baseT?  
328 feet (100m)
3. How far can you run on a single run of 100baseTx?  
328 feet (100m)
4. Complete Table 1 by adding the missing cable attributes.

TIA Category	Ethernet Standard	Cable (Fiber) Type	Speed	Distance
NA	10base5	RG-8U	10 Mbit/s	500m
NA	10base2	RG-58A/U	10 Mbit/s	185m
Cat 5	100base-TX	Cat 5	100 Mbit/s	100m
Cat 5e, Cat 6	1000base-T	Cat 5e, Cat 6	1000 Mbit/s	100m
NA	1000base-SX	Multimode	1000 Mbit/s	200-550m
NA	1000base-LX	Singlemode	1000 Mbit/s	2km

Table 1 Cable Attributes