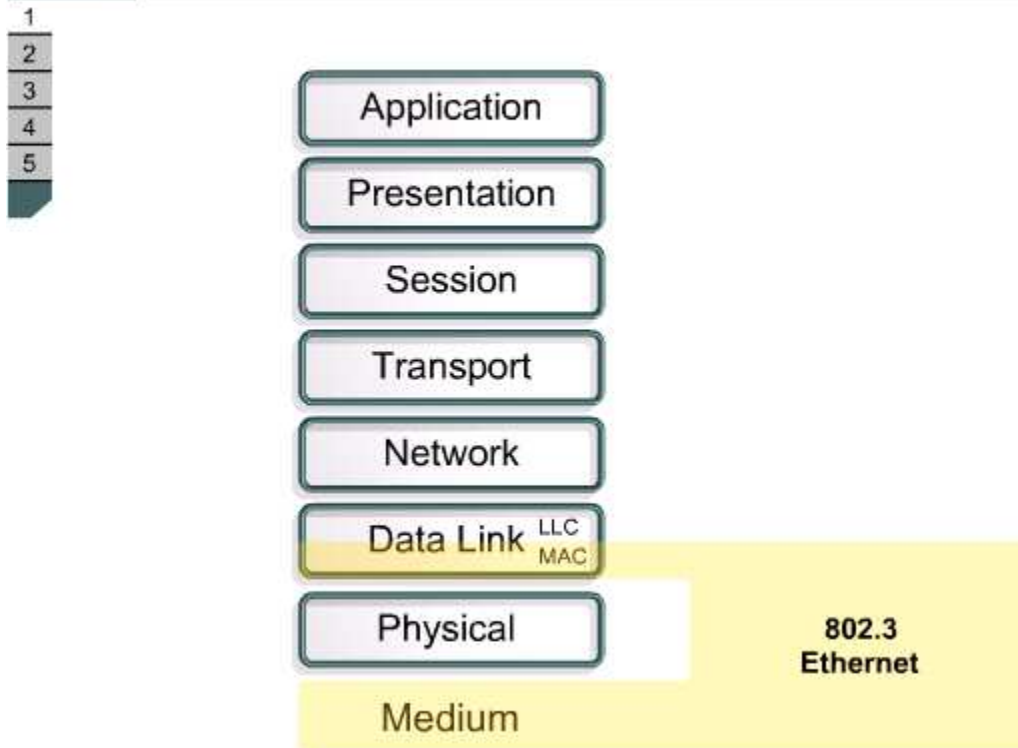


802.3 Ethernet in Relation to the OSI Model

FIGURES

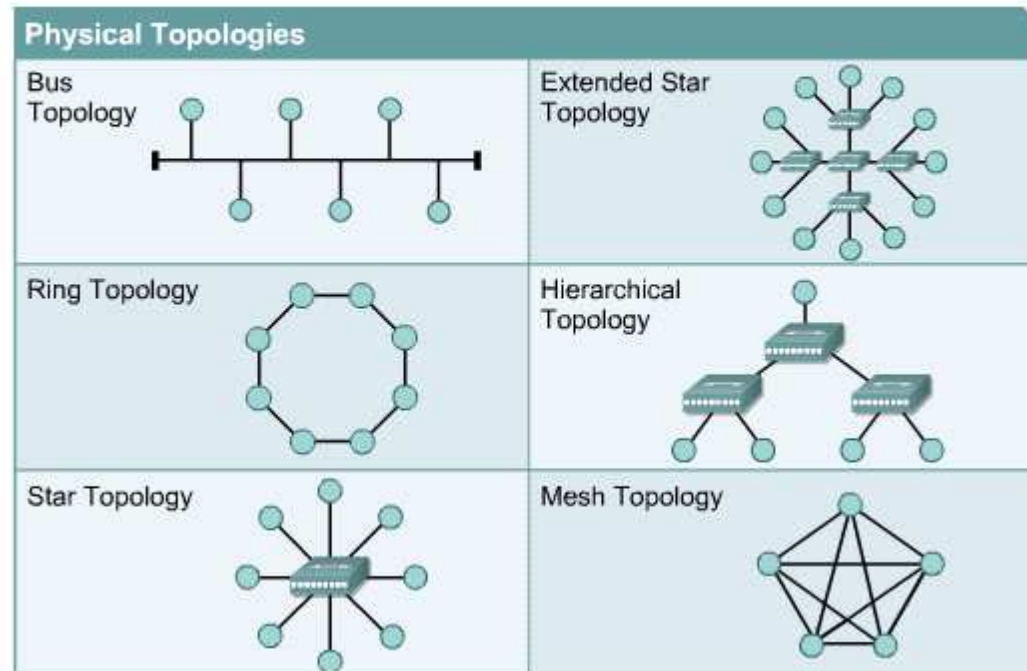


Physical Topology

FIGURES

1

2



Ethernet Media and Connector Requirements

FIGURE

1

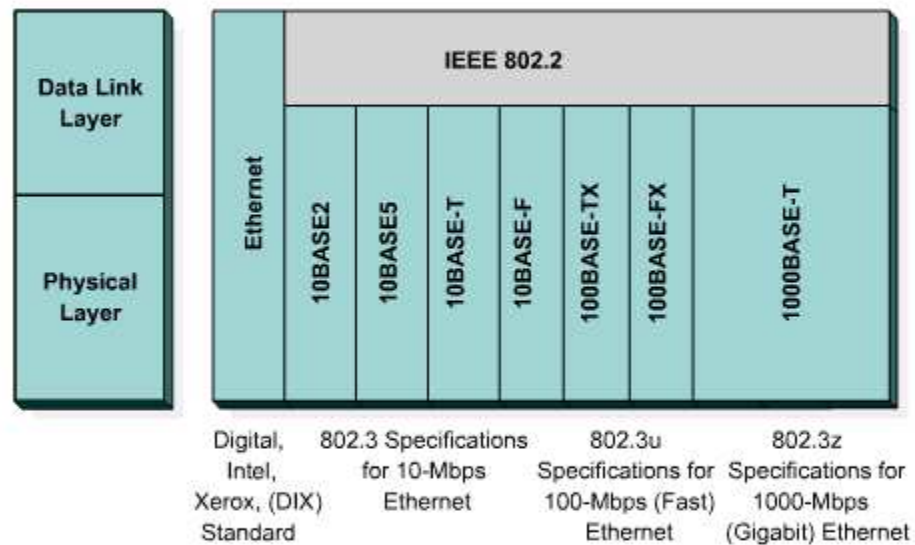
	10BASE2	10BASE5	10BASE-T	100BASE-TX	100BASE-FX
Media	50-ohm coaxial (Thinnet)	50-ohm coaxial (Thicknet)	EIA/TIA Category 3, 4, 5 UTP, two pair	EIA/TIA Category 5 UTP, two pair	62.5/125 multimode fiber
Maximum Segment Length	185 m (606.94 feet)	500 m (1640.4 feet)	100 m (328 feet)	100 m (328 feet)	400 m (1312.3 feet)
Topology	Bus	Bus	Star	Star	Star
Connector	BNC	Attachment unit interface (AUI)	ISO 8877 (RJ-45)	ISO 8877 (RJ-45)	

LAN Physical Layer Implementation

FIGURES

1

2



- Physical layer implementations vary.
- Some implementations support multiple physical media.

Ethernet II Frame Format

FIGURES

1

2

3

Preamble	Destination	Source	type	Data	Pad	FCS
8	6	6	2	46 to 1500		4

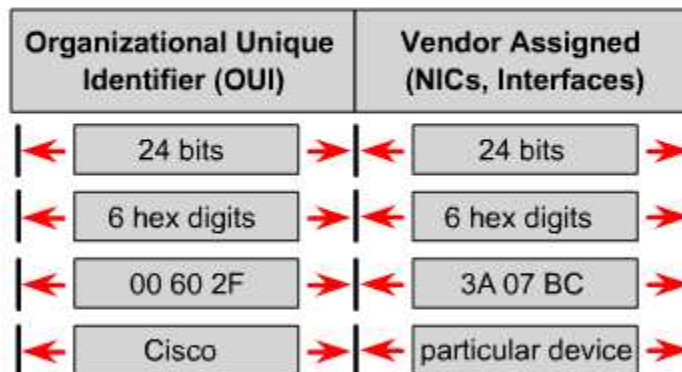
Octets	Description
• 8	Preamble (ending in pattern 10101011, the 802.3 SFD)
• 6	Destination MAC Address
• 6	Source MAC Address
• 46 to 1500	Data* (If less than 46 octets, then a pad must be added to the end)
• 2	Type Field
• 4	Frame Check Sequence (CRC Checksum)

MAC Address Format

FIGURES

1

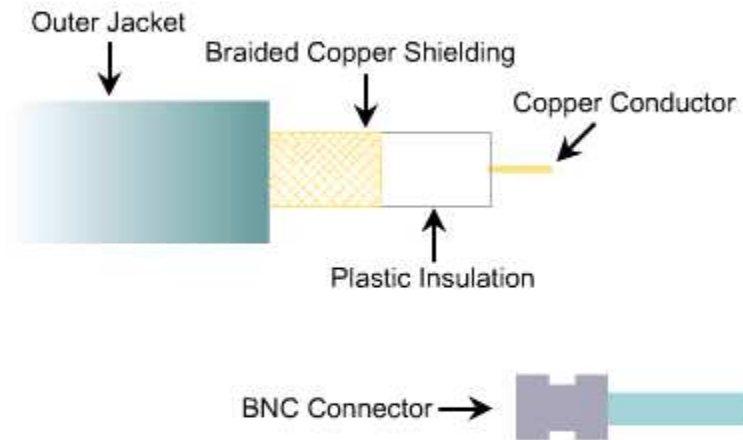
2



Coaxial Cable

FIGURE

1

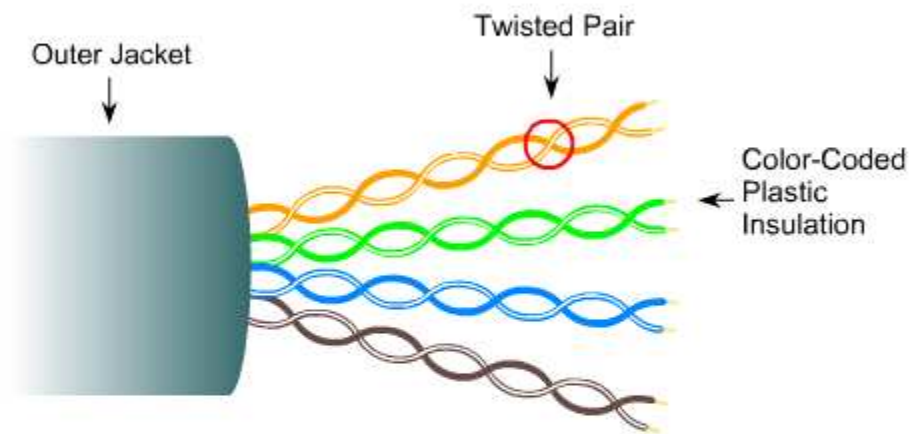


- Speed and throughput: 10 - 100 Mbps
- Cost: Inexpensive
- Media and connector size: Medium
- Maximum cable length: 500m

Unshielded Twisted-Pair Cable

FIGURES

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8



- 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

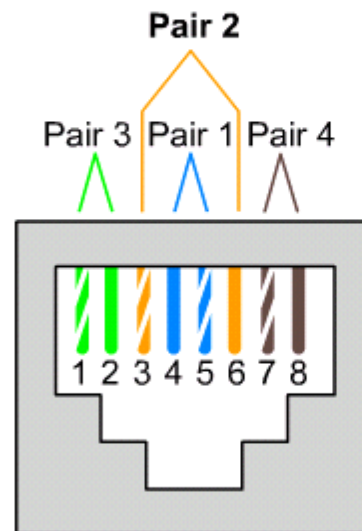
Ethernet Standards

FIGURES

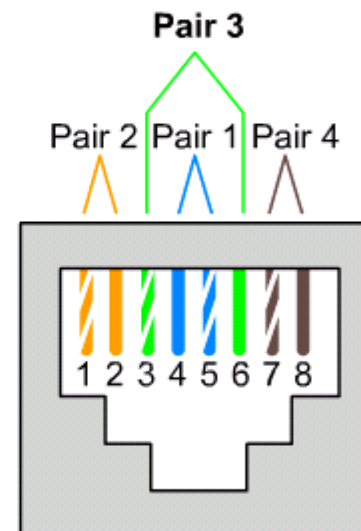
1

2

3



T568A



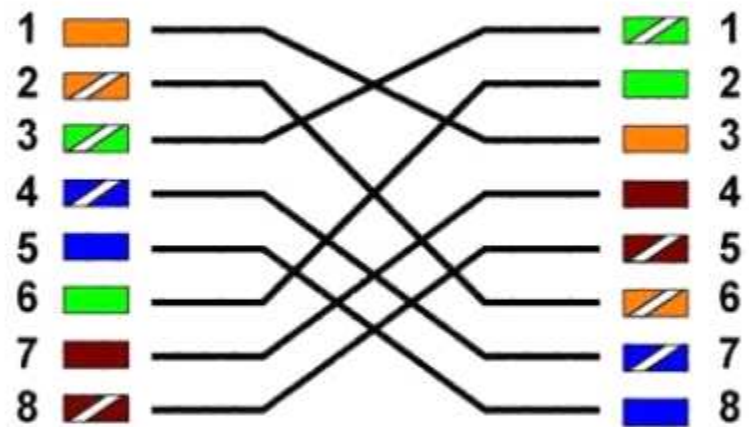
T568B

Crossover Cable

FIGURES

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

EIA/TIA T568B Crossover Diagram



An Ethernet (10Base-T and 100Base-TX) crossover cable has the transmit and receive pairs reversed

Fiber Optic Cable

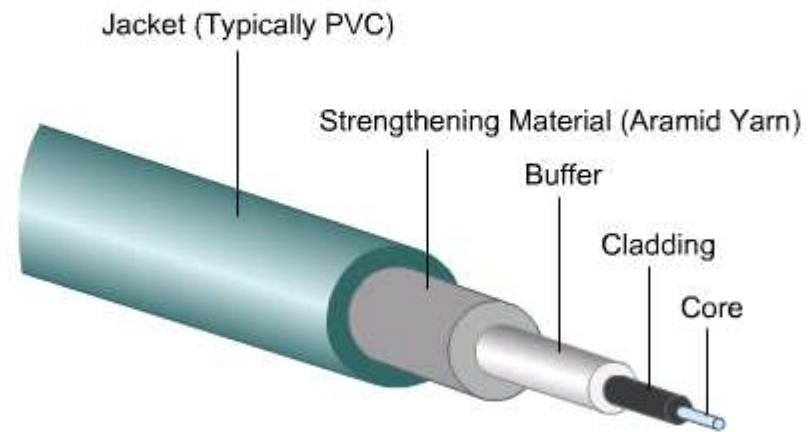
FIGURES

1

2

3

4

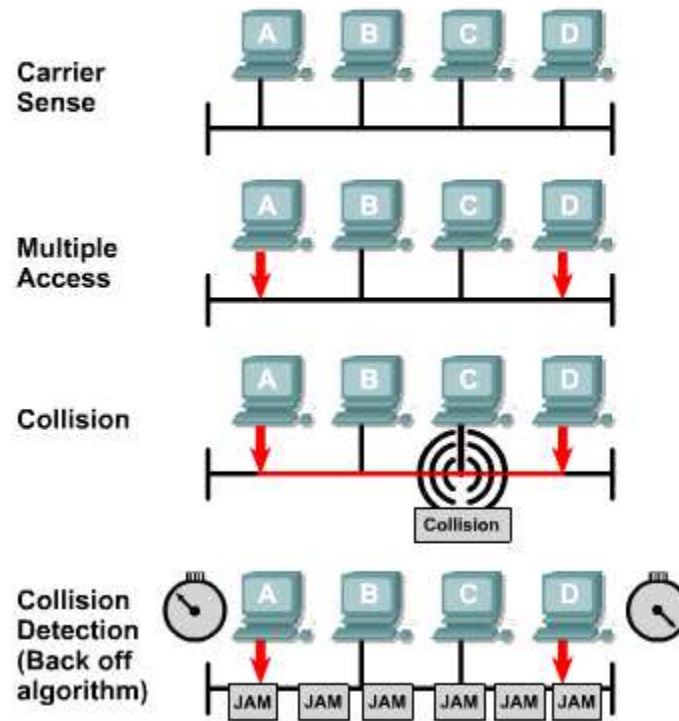


CSMA/CD

FIGURES

1

2

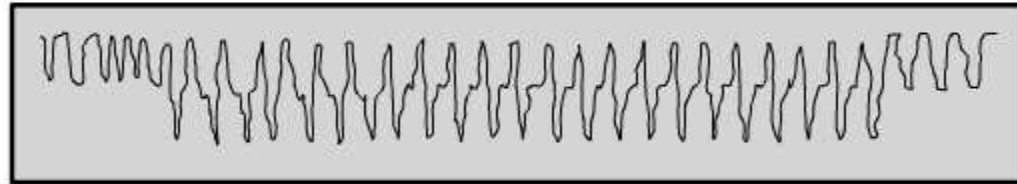


10BASE2/10BASE5 Local Collision

FIGURES

1

2



Midframe 10BASE2/10BASE5 collision captured by a digital storage oscilloscope.

Manchester Encoding Examples

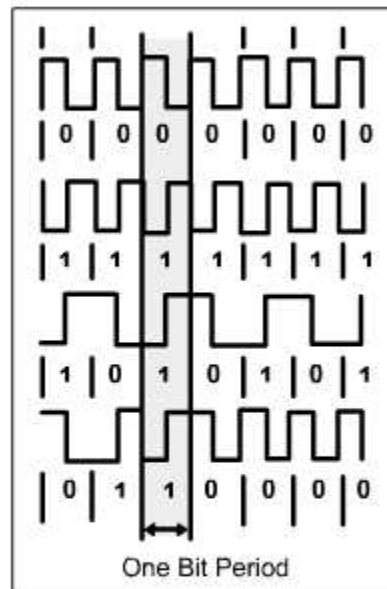
FIGURES

1

2

3

4



This is a Manchester encoding example. The Y-axis is voltage.
The X-axis is time.

Outbound (Tx) 1000BASE-T Signal

FIGURES

1

2

