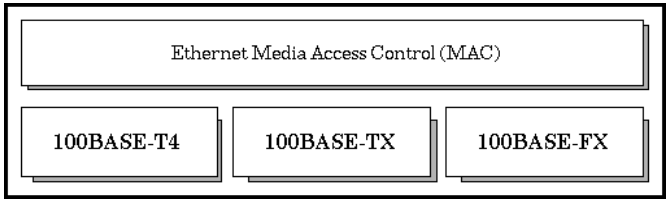
Fast & Gigabit Ethernet

Fast Ethernet (100Mbps)

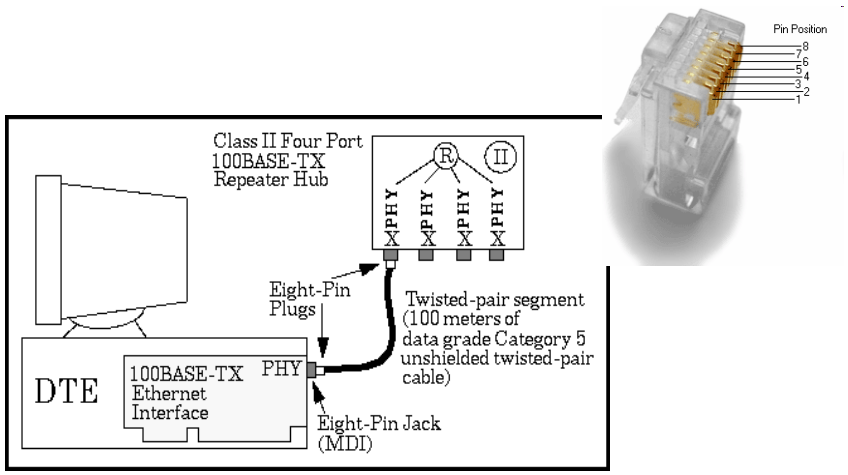
- Factor of 10 reduction in bit-time
- No changes to frame format, payload, MAC
- Ethernet card negotiates speed at interface



- 100Base-TX is the one used, all others obsolete
  - 100 is the speed,
  - Base is Baseband
  - T4 is twisted pair, 4 pair, TX is 2 twised pair, FX is fiber
- Hub reads in a packet and retransmits it on all outgoing lines, except one on which it arrived.
- Intelligent switches watch ports and know destination MAC addresses on each port.

- Physical Medium
  - 3 media types, fiber 2-pair UTP, 4 pair UTP
- Physical Layer device
  - PHY, transceiver, onboard or box with MII cable
- MII
  - Optional device to allow 10 or 100 Mbps
  - Provides flexibility
- Data Terminal Equipment DTE
  - The Network device itself, the card.

100-Mbps TX Media System



100-Mbps TX Media System

- 100BASE-TX system operates over two pairs of wires, one pair for receive data signals and the other pair for transmit data signals.
- Most popular wiring is unshielded twisted-pair.
  - The two wires in each pair of the cable must be twisted together for the entire length of the segment, and kept twisted to within approximately 1/2 inch of any connector or wire termination point

100BASE-TX Components

- - Network Medium
- - 100BASE-TX Repeaters
- - 100BASE-TX Crossover Wiring
- - 100BASE-TX Link Integrity Test

Network Medium

TABLE 0.1 100BASE-TX eight-pin connector

Pin Number	Signal
1	Transmit+
2	Transmit-
3	Receive+
4	Unused
5	Unused
6	Receive-
7	Unused
8	Unused

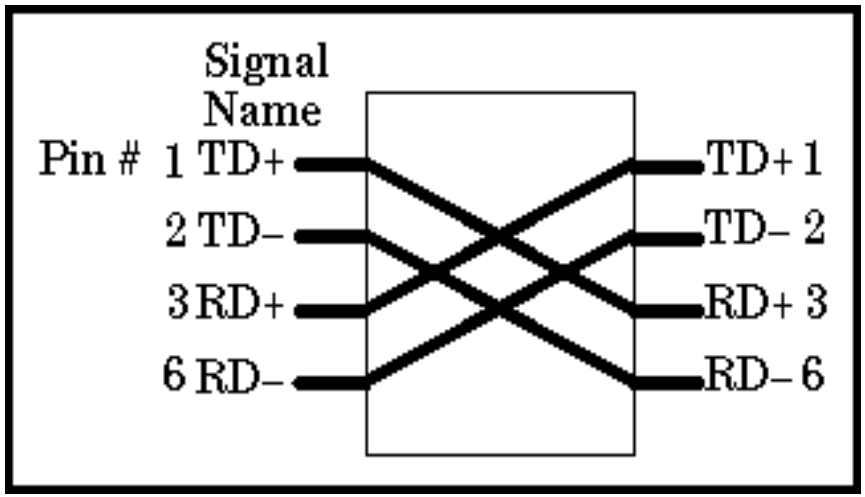
- Allows segments of up to 100 meters in length
- EIA/TIA standard recommends segment length 90 m between the wire termination equipment in the wiring closet, and the wall plate in the office
  - This provides 10 m of cable allowance to accommodate patch cables at each end of the link, signal losses in intermediate wire terminations on the link, etc.

100BASE-TX Repeaters

- Two types of repeater: Class I and Class II.
  - A Class I repeater allowed to have larger timing delays, and operates by translating line signals on an incoming port to digital form, and then retranslating them to line signals when sending them out on the other ports.
  - Possible to repeat signal between media segments that use different signaling techniques, such as 100BASE-TX/FX segments and 100BASE-T4 segments
  - Class II repeaters:- restricted to smaller timing delays, and immediately repeats the incoming signal to all other ports without a translation process ;connect only to segment types that use the same signaling technique

100BASE-TX Crossover Wiring

- Wiring multiple segments in a building.
  - Easier to wire cable connectors "straight through" do crossover wiring inside the repeater hub
- For single segment connecting 2 PCs, build special crossover cable
  - transmit pins on eight-pin plug at one end wired to receive data pins on eight-pin plug at other end of crossover cable.



100BASE-TX Configuration

- Connect the Ethernet interface in your computer to one end of the link segment, and the other end of the link segment is connected to the hub.
  - That way you can attach as many link segments with their associated computers as you have hub ports, and the computers all communicate via the hub.

100BASE-TX segment configuration guidelines

Maximum Segment Length		Maximum Number of MAUs	
100BASE-TX	100 m (328 ft.)[a]	Per Link Segment	2

a. 100BASE-TX segments are limited to a maximum of 100 m.