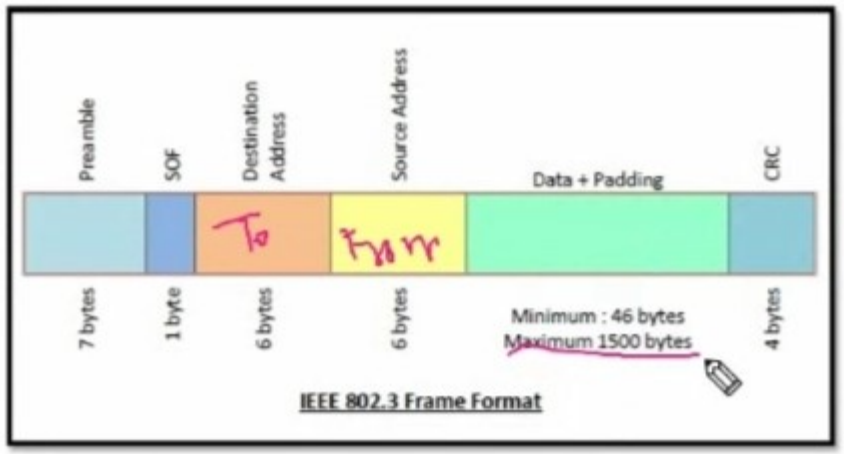
## ETHERNET CABLING

| Name | Cable | Max. seg. | Nodes/seg. | Advantages |
|---|---|---|---|---|
| 10Base5 | Thick coax | 500 m | 100 | Original cable; now obsolete |
| 10Base2 | Thin coax | 185 m | 30 | No hub needed |
| 10Base-T | Twisted pair | 100 m | 1024 | Cheapest system |
| 10Base-F | Fiber optics | 2000 m | 1024 | Best between buildings |

# ETHERNET (IEEE 802.3 ) Frame Format



## ETHERNET (IEEE 802.3 ) Frame Format

- ✓ **Preamble**: The preamble is responsible for providing the synchronization between the sending and receiving device. It is a series of 56 bits (7 bytes) of alternating 1s and 0s found at the beginning of the frame.
- ✓ **Start of Frame Delimiter**: The start frame delimiter follows the preamble. As its name implies, it indicates the start of the data frame. It is a 1 byte field in a IEEE 802.3 frame that contains an alternating pattern of ones and zeros ending with two ones. The start frame delimiter is 1 byte in length—made up of the following 8-bit sequence—10101011
- ✓ **Address Fields:**
  - ✓ **Destination Address:** It is a 6 byte field containing physical address of destination stations.
  - ✓ **Source Address**: It is a 6 byte field containing the physical address of the sending station.
- ✓ **Length**: This is a 2-byte field indicating the length of the data field that follows. It is needed to determine the length of the data field in those cases when a pad field is used

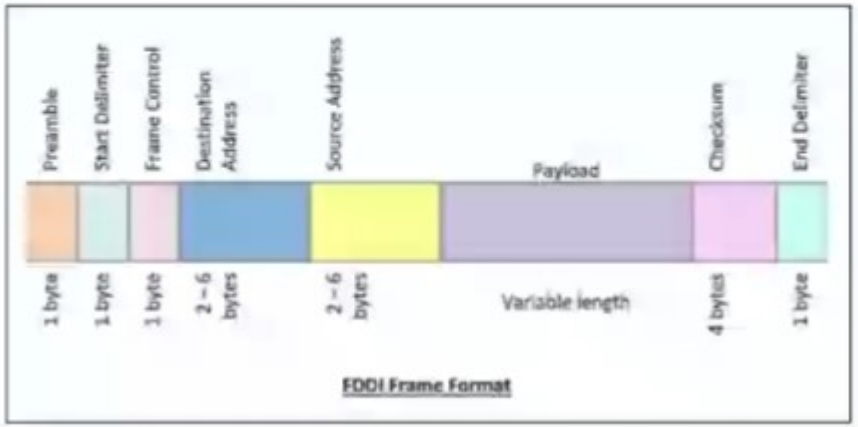
## ETHERNET (IEEE 802.3 ) Frame Format

- ✓ **Data**: This is a variable sized field carries the data from the upper layers. The maximum size of data field is 1500 bytes.
- ✓ **Padding**: This is added to the data to bring its length to the minimum requirement of 46 bytes.
- ✓ **Frame Check Sequence/CRC**: The frame check field is used as an error-control mechanism. When the transmitting device assembles a frame, it performs a calculation on the bits in the frame. The algorithm used to perform this calculation always results in a 4- byte value. The sending device stores this value in the frame check sequence field

## TOKEN BUS (IEEE 802.4)

- ✓ The IEEE 802.4 standard specifies the Token-bus media access control method. It is one of two token passing access methods. IEEE 802.4 is based on a physical bus or tree topology. The Token-bus approach requires a station to have possession of a token in order to transmit. The token is passed from station to station in a logical ring.
- ✓ Uses highly reliable cable television equipment's.
- ✓ It is more deterministic than 802.3, although repeated loss of token at critical times can introduce the uncertainness.
- ✓ Can easily handle shorter frames. (no limitation on frame size)
- ✓ It supports priorities and hence suitable for Real Time traffic.
- ✓ It also has excellent throughput and efficiency at high load.

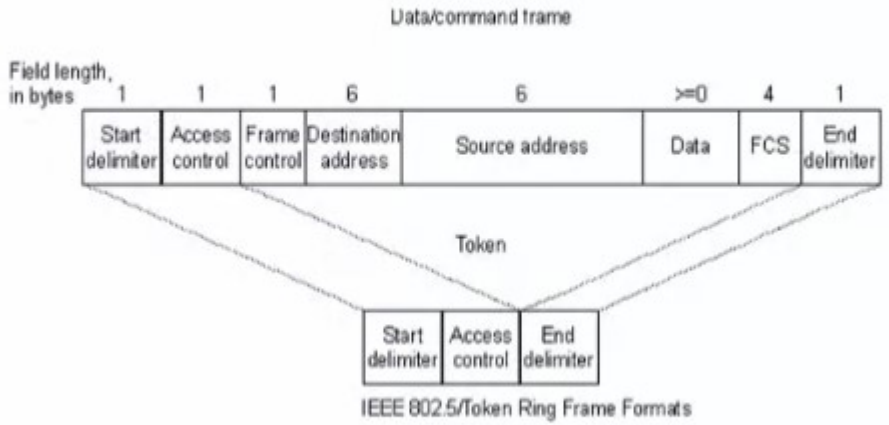
# TOKEN BUS (IEEE 802.4) Frame Format



## TOKEN BUS (IEEE 802.4) Frame Format

- ✓ **Preamble:** 1 byte for synchronization.
- ✓ **Start Delimiter:** 1 byte that marks the beginning of the frame.
- ✓ **Frame Control:** 1 byte that specifies whether this is a data frame or control frame.
- ✓ **Destination Address:** 2-6 bytes that specifies address of destination station.
- ✓ **Source Address:** 2-6 bytes that specifies address of source station.
- ✓ **Payload:** A variable length field that carries the data from the network layer.
- ✓ **Checksum:** 4 bytes frame check sequence for error detection.
- ✓ **End Delimiter:** 1 byte that marks the end of the frame.

# TOKEN RING (IEEE 802.5)Frame Format




IEEE 802.5/Token Ring Frame Formats

## TOKEN RING (IEEE 802.5)Frame Format

- ✓ **Start of frame:** The starting delimiter indicates the start of the data frame. It uses a unique signal pattern that does not correspond to either a 0 or 1 bit. These are known as non data values and ensure that no data sequence will ever be mistaken for a delimiter.
- ✓ **Access Control Field:** This field identifies whether the frame is a data frame or a token. It contains a bit used to identify a constantly busy token, a priority bit and reservations bits.
- ✓ **Frame Control Field:** This field identifies the frame type and for certain types of control frames, the function it is to perform.
- ✓ **Address Fields:** Each of the address fields—the destination address and the source address—can be either 2 bytes (16-bit addresses) or 6 bytes (48-bit addresses) in length. If universal addressing is used, the addresses must be 6 bytes each. But if local addressing is used they may be either 2 or 6 bytes long. Both destination and source addresses must be of the same length for all devices on a given network. The source address must be for an individual device. The destination address can be an individual address, a group address or a broadcast address.

## TOKEN RING (IEEE 802.5)Frame Format

- ✓ **Information Field:** The information field contains the actual data packet to be transmitted. This can be either a protocol data unit being passed from the logical link control sub layer or control information supplied by the media access control sub layer. Its length is variable anywhere from 0 to 17800 bytes in length.
- ✓ **Frame Check Sequence:** The frame check field is used as an error control mechanism. When the transmitting device assembles a frame, it performs a calculation on the bits in the frame. The algorithm used to perform this calculation always results in a 4 byte value. The sending device stores this value in the frame check sequence field. When the destination device receives the frame, it performs the same calculation and compares the result to that in the frame check sequence field. If the two values are the same, the transmission is assumed to be correct. If the two values are different, the destination station can request a retransmission of the frame.
- ✓ **Ending Delimiter:** This identifies the end of the frame by containing non data values. It also contains bits used to identify whether or not it is the last frame in a multi frame transmission and if an error has been detected by any station.
- ✓ **Frame Status Field:** The frame status field contains the address recognized and frame copied control bits.