

# HDLC

This scheme has two major advantages over the asynchronous format. First, no time is wasted on non-data bits (the start bit and stop bit, for example) which increases the utilization of the line. Second, less margin of error is required to ensure correct recovery of data which significantly increases the acceptable transmission speed.

Data are sent continuously and there is no start bit to indicate where a character begins, so this must be achieved by using special sequences of data known as protocols. One such protocol is the widely used HDLC (high-level data-link control) format whose basic structure is shown in Figure 2.17.

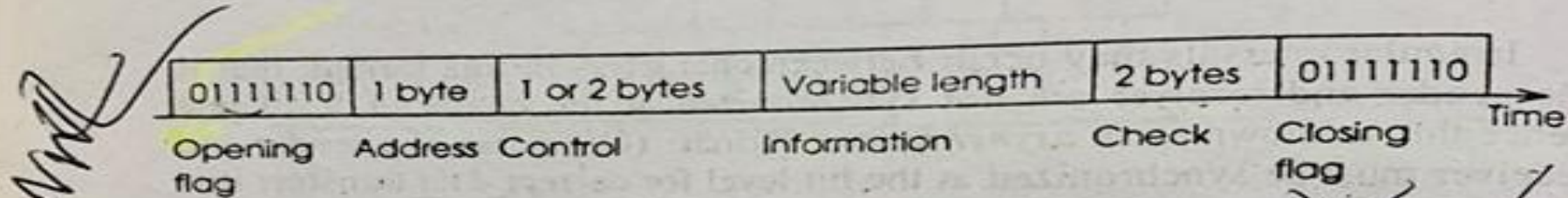


Figure 2.17 HDLC synchronous format

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HDLC is a bit - oriented protocol where each frame contains up to six fields. The structure varies according to the type of frame. The fields of a HDLC frame are –

- ▶ **Flag** – It is an 8-bit sequence that marks the beginning and the end of the frame. The bit pattern of the flag is 01111110.
- ▶ **Address** – It contains the address of the receiver. If the frame is sent by the primary station, it contains the address(es) of the secondary station(s). If it is sent by the secondary station, it contains the address of the primary station. The address field may be from 1 byte to several bytes.
- ▶ **Control** – It is 1 or 2 bytes containing flow and error control information.
- ▶ **Payload** – This carries the data from the network layer. Its length may vary from one network to another.
- ▶ **FCS** – It is a 2 byte or 4 bytes frame check sequence for error detection.

# Bit Stuffing

## ► Definition

**Bit stuffing** is the process of inserting **noninformation bits** into data to **break up bit patterns** to affect the **synchronous** transmission of information. It is widely used **in network** and **communication** protocols, in which **bit stuffing** is a required part of the **transmission** process.

# Bit Stuffing(Cont..)

- ▶ Each frame begins and ends with a special bit pattern called a flag byte [01111110]. {Note this is 7E in hex}.
- ▶ Whenever sender data link layer encounters five consecutive ones in the data stream, it automatically stuffs a 0 bit into the outgoing stream.
- ▶ When the receiver sees five consecutive incoming ones, it automatically destuffs the 0 bit before sending the data to the network layer.

# Bit Stuffing (Cont..)

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