3 HDLC

Thapar Institute of Engineering & Technology
(Deemed to be University)
Bhadson Road, Patiala, Punjab, Pin-147004
Contact No. : +91-175-2393201
Email : info@thapar.edu

THAPAR INSTITUTE
OF ENGINEERING & TECHNOLOGY
(Deemed to be University)

Course: Computer and Communication Networks

Topic: HDLC

Faculty Name

Dr. Amanpreet Kaur

Assistant Professor

Department of Electronics and Communication Engineering,

Thapar Institute of Engineering and Technology, Patiala.

www.thapar.edu

OUTLINE

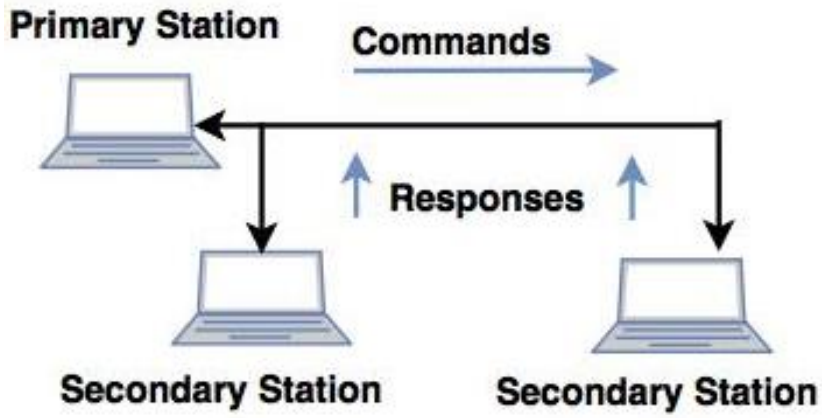
- High-Level Data Link Control
- Stations for HDLC Protocol
- Configurations and Transfer Modes
- HDLC Frame
- HDLC Frame Types

High-Level Data Link Control (HDLC)

- It is a synchronous data link layer protocol developed by the International Organization for Standardization (ISO).
- Provides both connection-oriented and connectionless service.
- It supports both half and full duplex communication.
- Flow control .
- Bit oriented protocol.

Reference: 1. Ferouzan, Behrouz A., Data Communications and Networking, 2. Stallings William, Data and Computer Communication

Stations for HDLC Protocol



Primary station

- It acts as a master and controls the operation.
- Handles error recovery.
- Frames issued by the primary station are called commands.

Secondary station

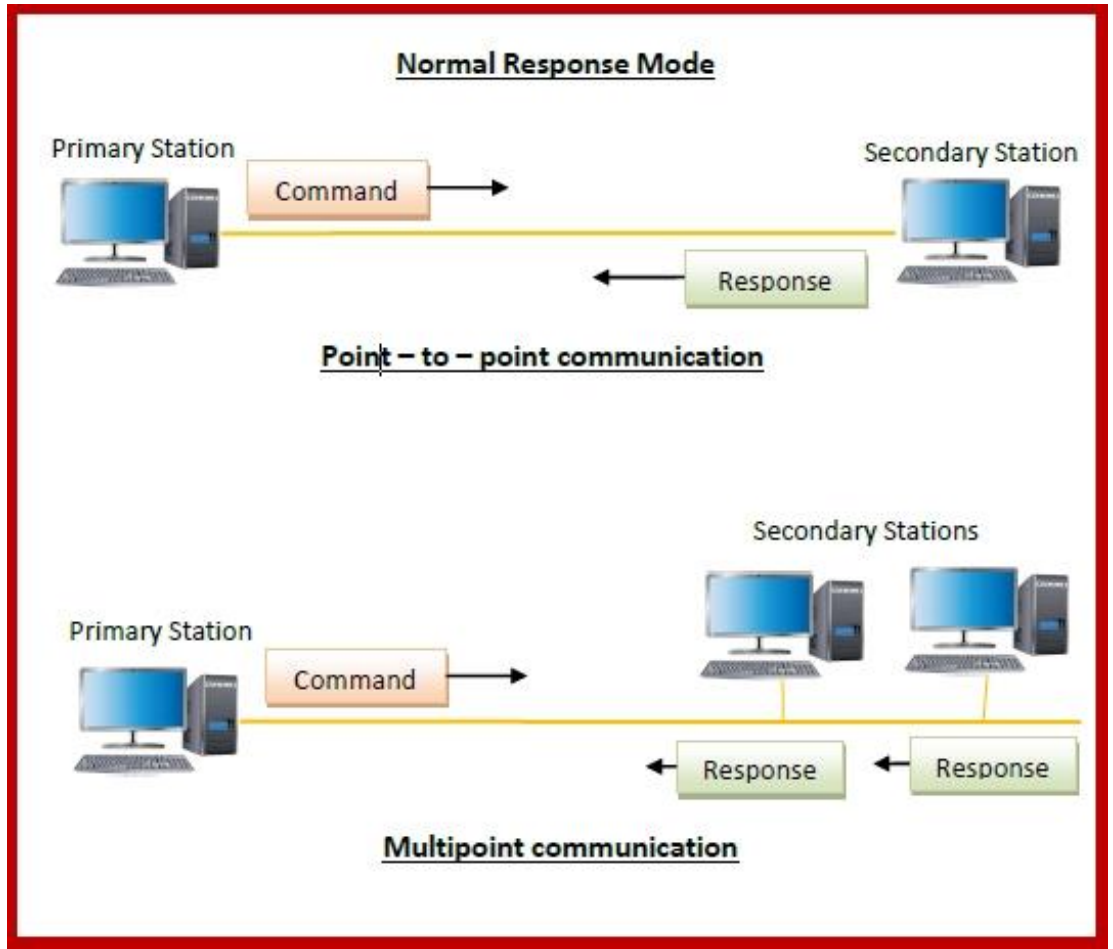
- It acts as a slave and operates under the control of the primary station.
- Frames issued by a secondary station are called responses.
- The primary station maintains a separate logical link with each secondary station.

Combined station

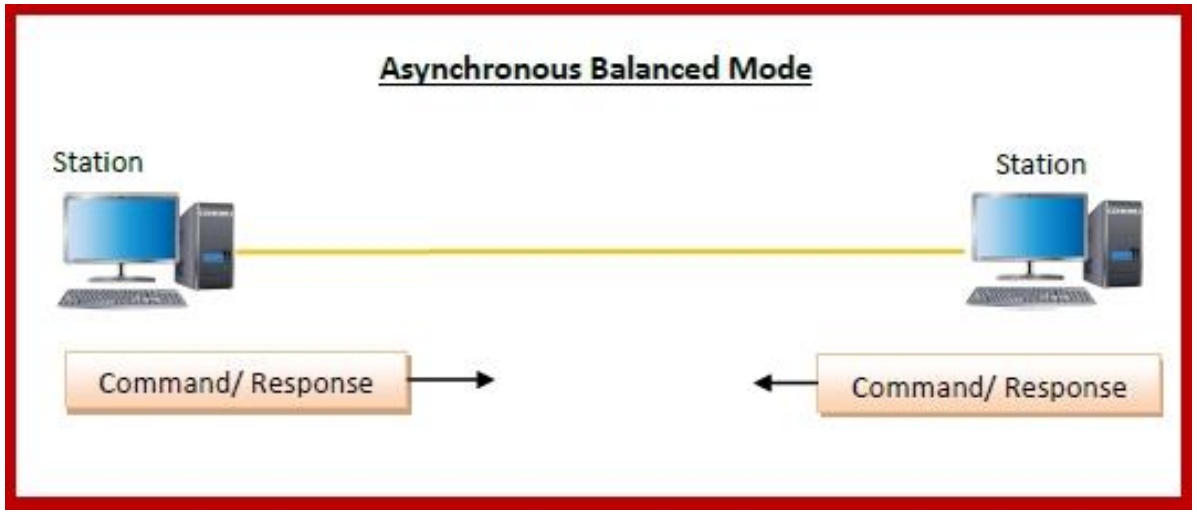
- Acts as both primary and secondary stations.
- It does not rely on others for sending data.

Configurations and Transfer Modes

Normal Response Mode (NRM)

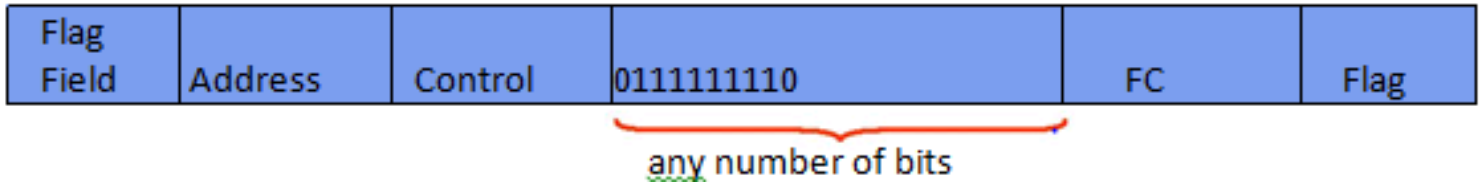


Asynchronous Balanced Mode (ABM)



HDLC Frame

- Each frame contains up to six fields.



•**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. The standard code used is CRC (cyclic redundancy code)

Reference: 1. Ferouzan, Behrouz A., Data Communications and Networking, 2. Stallings William, Data and Computer Communication

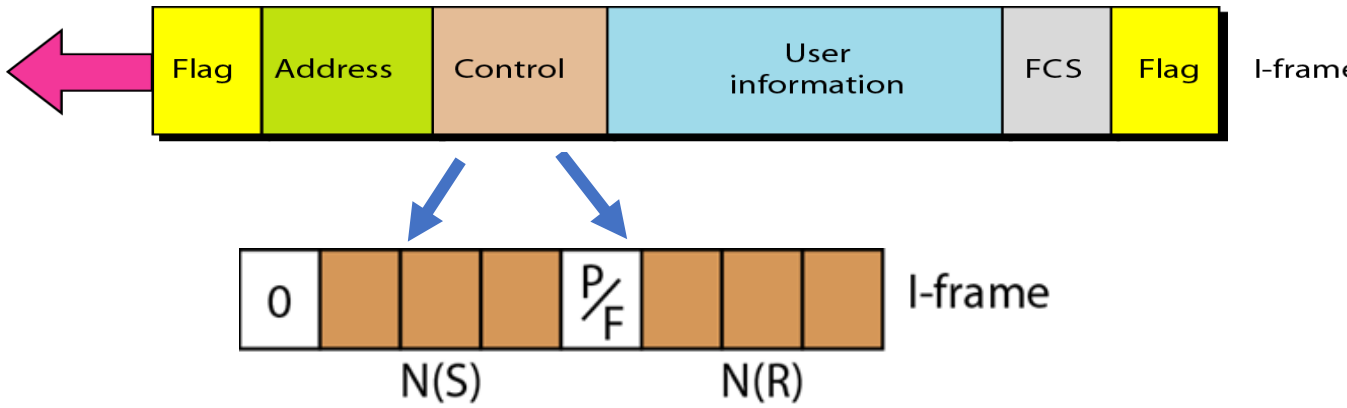
HDLC Frame types

- Information Frame(I-frame)
- Supervisory frames (S-frame)
- Unnumbered frames(U-frame)

Reference: 1. Ferouzan, Behrouz A., Data Communications and Networking, 2. Stallings William, Data and Computer Communication

Information Frame(I-frame)

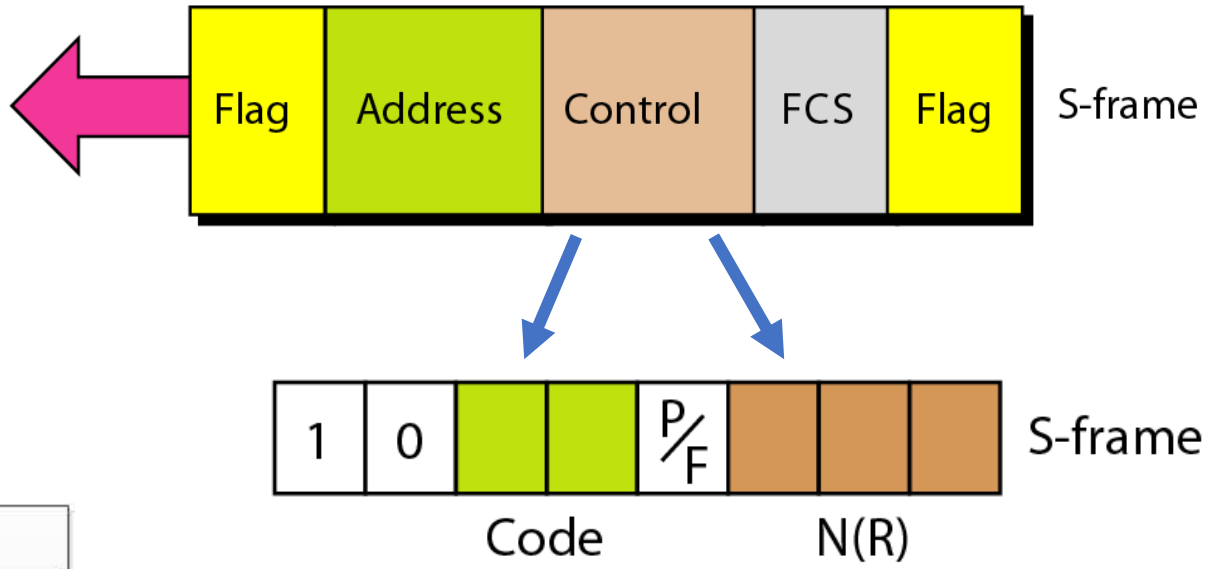
- I-frames or Information frames carry user data from the network layer. They also include flow and error control information that is piggybacked on user data. The first bit of control field of I-frame is 0.
- *N(S)* define the sequence number of the frame and *N(R)*, correspond to the acknowledgment number when piggybacking is used
- P/F has meaning only when it is set (bit = 1) and can mean poll or final.



Reference: 1. Ferouzan, Behrouz A., Data Communications and Networking, 2. Stallings William, Data and Computer Communication 3. ecomputernotes.co.in

Supervisory frames (S-frame)

- First 2 bits of the control field is 10.
- *N(R),* corresponds to the acknowledgment number (ACK) or negative acknowledgment number (NAK) depending on the type of S-frame.



Four types of S-frames

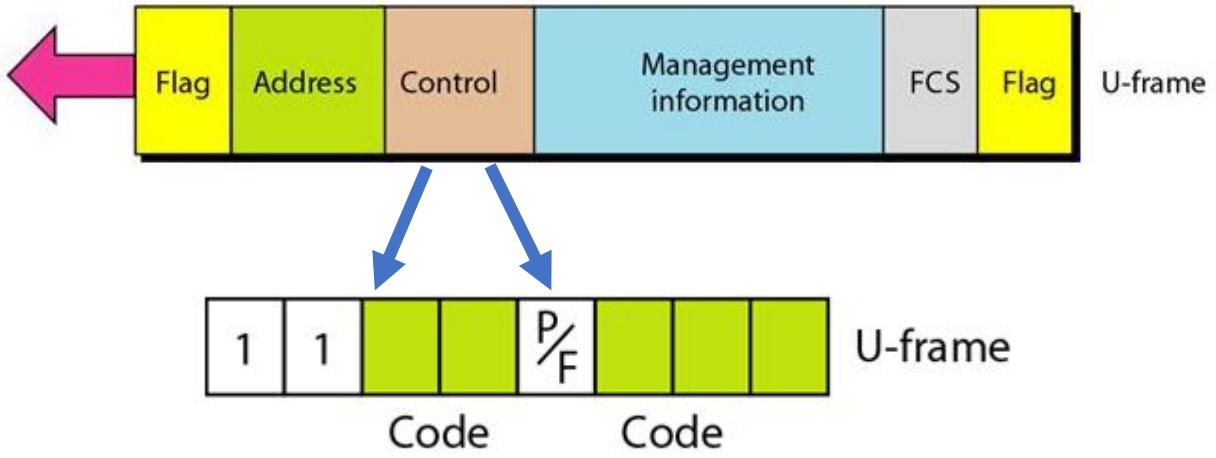
Table: Types of S-frame

Code	Command
00	RR Receive Ready
01	REJ Reject
10	RNR Receive Not Ready
11	SREJ Selective Reject

Reference: 1. Ferouzan, Behrouz A., Data Communications and Networking, 2. Stallings William, Data and Computer Communication 3. ecomputernotes.co.in

Unnumbered frames (U-frame)

- First 2 bits of the control field is 11.
- Used to exchange session management and control information between connected devices.
- U-frames contain an information field, but one used for system management information, not user data.



Reference: 1. Ferouzan, Behrouz A., Data Communications and Networking, 2. Stallings William, Data and Computer Communication 3. ecomputernotes.co.in

Thank You