

## Point to Point Protocol.

|           |           |           |          |         |           |           |
|-----------|-----------|-----------|----------|---------|-----------|-----------|
| Flag      | Address   | Control   | Protocol | Data    | FCS       | Flag      |
| 0111 1110 | 1111 1111 | 0000 0011 | 16 bit   | = 0 bit | 16/32 bit | 0111 1110 |

### Protocol

- Number must be odd (LSB bit must be 1) in last byte and 0 in first byte.
- 0xxx ÷ 3xxx – network protocols
- 8xxx ÷ Bxxx – network control protocols
- 4xxx ÷ 7xxx – low appearance protocols (have no NCP)
- Cxxx ÷ Fxxx – link control protocols

| Type          | Network protocol | Network control protocol      |
|---------------|------------------|-------------------------------|
| IP            | 0x0021           | 0x8021                        |
| Apple Talk    | 0x0029           | 0x8029                        |
| IPX           | 0x002B           | 0x802B                        |
| NetBIOS Frame | 0x003F           | 0x803F                        |
| LCP           | 0xC021           | none, service protocol        |
| PAP           | 0xC023           | none, authentication protocol |
| CHAP          | 0xC223           | none, authentication protocol |

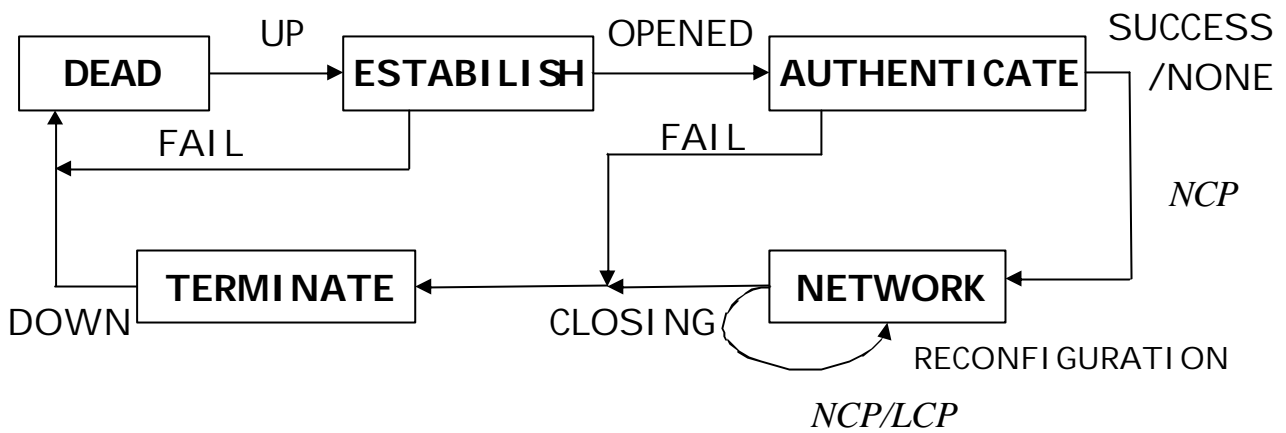
### Packet Encapsulation

|           |           |           |                    |           |           |
|-----------|-----------|-----------|--------------------|-----------|-----------|
| Flag      | Address   | Control   | Encapsulate by PPP | FCS       | Flag      |
| 0111 1110 | 1111 1111 | 0000 0011 |                    | 16/32 bit | 0111 1110 |

|                                  |           |         |
|----------------------------------|-----------|---------|
| IP protocol<br>00000000 00100001 | IP packet | padding |
|----------------------------------|-----------|---------|

|           |      |
|-----------|------|
| IP header | DATA |
|-----------|------|

## State diagram



## LCP Packet.

|                   |                      |                      |                   |  |                  |                   |              |                   |                 |  |  |
|-------------------|----------------------|----------------------|-------------------|--|------------------|-------------------|--------------|-------------------|-----------------|--|--|
| Flag<br>0111 1110 | Address<br>1111 1111 | Control<br>0000 0011 | Protocol          | Data (+padding)  | FCS<br>16/32 bit | Flag<br>0111 1110 |              |                   |                 |  |  |
|                   |                      |                      |                   | <table border="1"> <tr> <td>0xC021</td> <td>Code<br/>8 bits</td> <td>ID<br/>8 bits</td> <td>Length<br/>16 bits</td> <td>Data<br/>= 0 bit</td> </tr> </table> | 0xC021           | Code<br>8 bits    | ID<br>8 bits | Length<br>16 bits | Data<br>= 0 bit |  |  |
| 0xC021            | Code<br>8 bits       | ID<br>8 bits         | Length<br>16 bits | Data<br>= 0 bit  |                  |                   |              |                   |                 |  |  |

| Code | Name              | Meaning                        |
|------|-------------------|--------------------------------|
| 1    | Configure-Request | Link Configuration LCP packets |
| 2    | Configure-Ack     |                                |
| 3    | Configure-Nak     |                                |
| 4    | Configure-Reject  |                                |
| 5    | Terminate-Request | Link Termination LCP packets   |
| 6    | Terminate-Ack     |                                |
| 7    | Code-Reject       | Link Maintenance LCP packets   |
| 8    | Protocol-Reject   |                                |
| 9    | Echo-Request      |                                |
| 10   | Echo-Reply        |                                |
| 11   | Discard-Request   |                                |

## Password Authentication Protocol (0x023)

|         |            |         |                |         |                 |          |
|---------|------------|---------|----------------|---------|-----------------|----------|
| Code    | Identifier | Length  | Peer-ID Length | Peer-ID | Password Length | Password |
| 2 bytes | 1 byte     | 2 bytes | 1 byte         |         | 1 byte          |          |

## Serial Lines Internet Protocol

