MIL USB-to-CAN Data Packet Framing

# General Packet Framing:

|  |  |  |
| --- | --- | --- |
| BYTE[0] | BYTE[1:2+N] | BYTE[N+2:3] |
| *SOF* | *PAYLOAD* | *EOF* |

* SOF: 1 Byte
* Payload: 2-Header Bytes (Before Data) or 1 Checksum Byte (After Data) + n-Data Bytes
* EOF: 1 Byte
* N: Number of bytes to be received or sent

# Flag Descriptions:

|  |  |
| --- | --- |
| Flag | Description |
| SOF: Start of Frame [0xC0] | The Start of Frame flag indicates the beginning position of the Payload. |
| EOF: End of Frame [0xC1] | The End of Frame flag delimits the end of the CRC field and terminates the frame. This can be changed if needed! |

# Payload (Sending/Requesting Data Configuration):

|  |  |
| --- | --- |
| BYTE[1:N+2] | |
| BYTE[1:2] | **BYTE[3:N+2]** |
| *Header* | *Data* |

## Header:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 15 | 14 | 13 | 12 | 11 | | 10 | 9 | 8 |
| R\_nT\_ENABLE | **CHECKSUM 16** | | | | **DATA\_LENGTH** | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CAN\_FILTER\_ID[7:0] | | | | | | | |

* CAN\_FILTER\_ID: Desired device id to filter for/Or desired send ID
* CHECKSUM 16: Mod 16 of the sum of all payload and flag bytes (Excluding Checksum) – If checksum matches than the device will fulfill data request.
* R\_nT\_ENABLE: Receiver or Transmitter mode enable.
  + 1 – Receiver mode
  + 0 – Transmitter mode
* DATA\_LENGTH: data\_length+1 data bytes to transmit/receive.
  + data\_length = 0b000 -> 1 byte to transmit/receive
  + data\_length = 0b111 -> 8 bytes to transmit/receive
  + Because CAN is limited to 8 bytes at a time DATA\_LENGTH must be a maximum of 8 as well.

|  |
| --- |
| BYTE[3:N+2] |
| DATA |

* N = DATA\_LENGTH number of data bytes to send or receive.

# Payload (Data Receiving):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | | BYTE[1:N+1] | |
| CAN ID | **DATA LENGTH** | **BYTE[2:N+1]** | | **BYTE[N+3]** |
| *ID* | ***N*** | ***Data*** | | ***Checksum*** |

* CHECKSUM 16: Mod 16 of the sum of all payload and flag bytes (Excluding Checksum)

# Examples:

* To Send 1 byte of data (0x35) to the bus
  + 0xX0 0x30 0xXX 0x35 0xX1
    - Start Flag: 0xC0
    - R\_nT\_ENABLE: Transmitter Mode (0)
    - Checksum: 0x06 ((0x30 & 0x78) >> 3)
    - Data length: 1
    - CAN\_FILTER\_ID: Don’t Care
    - Data byte: 0x35
    - End Flag: 0xC1
* Receives happen as soon as data is available and will be in a packcet of the format above.