

## FlexRay for pcap and pcap-ng

Each packet contains a measurement header and a FlexRay frame. The measurement header is generated by a measurement device and precedes the FlexRay frame. The FlexRay frame consists of a frame header and the frame payload. The frame payload has a variable length of 0 to 254 bytes.

### Measurement Header

|         |      |             |
|---------|------|-------------|
| 2 bytes | Type | Error Flags |
|---------|------|-------------|

### FlexRay Frame

|               |               |
|---------------|---------------|
| 5 bytes       | Frame Header  |
| 0...254 bytes | Frame Payload |

## Measurement Header (2 bytes)

### Type Information

| 7  | 6   | 5   | 4   | 3   | 2   | 1   | 0   |
|----|-----|-----|-----|-----|-----|-----|-----|
| CS | TI6 | TI5 | TI4 | TI3 | TI2 | TI1 | TI0 |

CS - Channel Selection ...

Selection between Channel A (0) or Channel B (1)

TI[0..6] – Type Index ...

0x01: FlexRay Frame

0x02: FlexRay Symbol

### Error Flags

| 7 | 6 | 5 | 4      | 3       | 2       | 1       | 0      |
|---|---|---|--------|---------|---------|---------|--------|
| - | - | - | FESERR | FCRCERR | HCRCERR | TSSVIOL | CODERR |

FESERR – Frame End Sequence error

FCRCERR – Frame CRC error

HCRCERR – Header CRC error

TSSVIOL – TSS violation

CODERR – Coding error...

indicates if a Frame Start Sequence Error (FSSERR) or a Byte Start Sequence error (BSSERR) occurred

## FlexRay Frame (5 bytes + 0..254 bytes)

Extra low-level bits (TSS, FSS, BSS, FES) are not included in the frame. But a measurement device may set according error bits in the Error Flags if an error occurred during decoding of these bits (Bits CODERR, TSSVIOL, FESERR in Error Flags).

Also the Frame CRC is not included. If the Frame CRC is wrong the error bit FCRERR in Error Flags shall be set.

Please do not assume that only whole FlexRay Frames are contained in the log file – a measurement device may also produce truncated frames if errors occur. Truncation may happen at each byte boundary!

Bits 39 through 32 appear in the first octet, Bits 31 through 24 in the second octet., Bits 23 through 16 in the third octet, and so on. In the octet bits with bits 39-32 bit 39 is the high order bit and bit 32 is the low order bit, all further bits use the same bit counting policy.

### Frame Header (5 bytes)

| 39   | 38   | 37   | 36   | 35   | 34    | 33   | 32   |
|------|------|------|------|------|-------|------|------|
| -    | PPI  | NFI  | SFI  | STFI | FID10 | FID9 | FID8 |
| 31   | 30   | 29   | 28   | 27   | 26    | 25   | 24   |
| FID7 | FID6 | FID5 | FID4 | FID3 | FID2  | FID1 | FID0 |

| 23    | 22    | 21    | 20    | 19    | 18    | 17    | 16     |
|-------|-------|-------|-------|-------|-------|-------|--------|
| PL6   | PL5   | PL4   | PL3   | PL2   | PL1   | PL0   | HCRC10 |
| 15    | 14    | 13    | 12    | 11    | 10    | 9     | 8      |
| HCRC9 | HCRC8 | HCRC7 | HCRC6 | HCRC5 | HCRC4 | HCRC3 | HCRC2  |
| 7     | 6     | 5     | 4     | 3     | 2     | 1     | 0      |
| HCRC1 | HCRC0 | CC5   | CC4   | CC3   | CC2   | CC1   | CC0    |

PPI - Payload preamble indicator ... static segment: If this bit is set the first 0 to 12 bytes of the payload may optionally be used as a network management vector; dynamic segment: If this bit is set the first two bytes of the payload may optionally be used as a message ID field.

NFI - Null frame indicator ... indicates whether or not the frame is a NULL frame

NFI = "0" -> payload segment contains no valid data

NFI = "1" -> payload segment contains data

SFI - Sync frame indicator ... indicates whether or not the frame is a SYNC frame

SFI = "0" -> no receiving node shall consider the frame for synchronization

SFI = "1" -> all receiving nodes shall use the frame for synchronization

STFI – Startup frame indicator indicates whether or not a frame is a STARTUP frame

STFI = "0" -> frame is not a startup frame

STFI = "1" -> frame is a startup frame

A startup frame must always be a sync frame!

FID [0..10] - Frame ID ...

Values between 1 and 2047

FID10 is the most significant bit, FID0 is the least significant bit (big endian).

Frame ID 0 is an invalid frame ID!

PL[0..6] - Payload length in words (2 bytes) ... Values between 0 and 127

HCRC[0..10] - Header CRC ...

Values between 0 and 2047. HCRC10 is the most significant bit. HCRC0 is the least significant bit (big endian).

CC[0..5] - Cycle count ...

Values between 0 and 63

### Frame Payload (0..254 bytes)

The Data 0 through Data n bytes appear as octets following the PPI. The number of bytes may be calculated by multiplying the payload length information (PL) with 2. However, the actual number of bytes in data may be smaller than the calculated value because of truncation (e.g. because of an error on the bus). No padding is added after the data bytes.

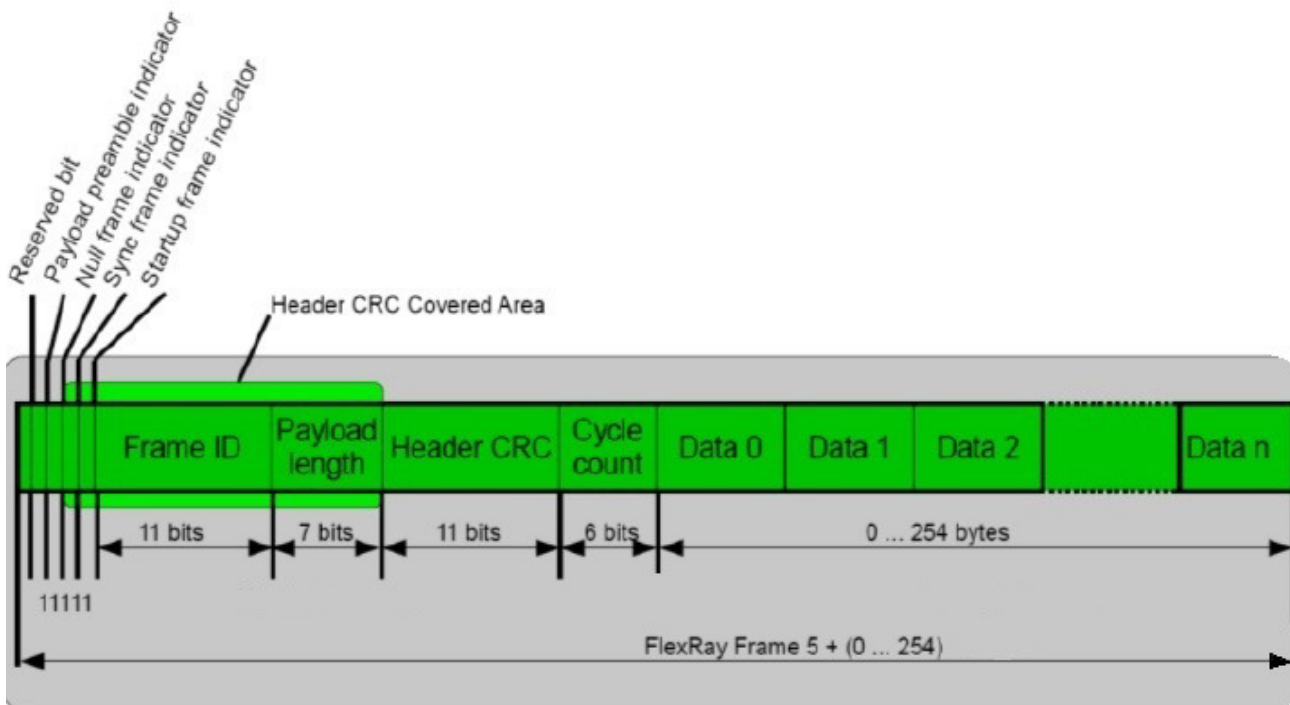


Figure 2: FlexRay Frame Format