

1722B – PROPOSAL FOR ENHANCED CONTROL FORMATS

DON PANNELL
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PUBLIC



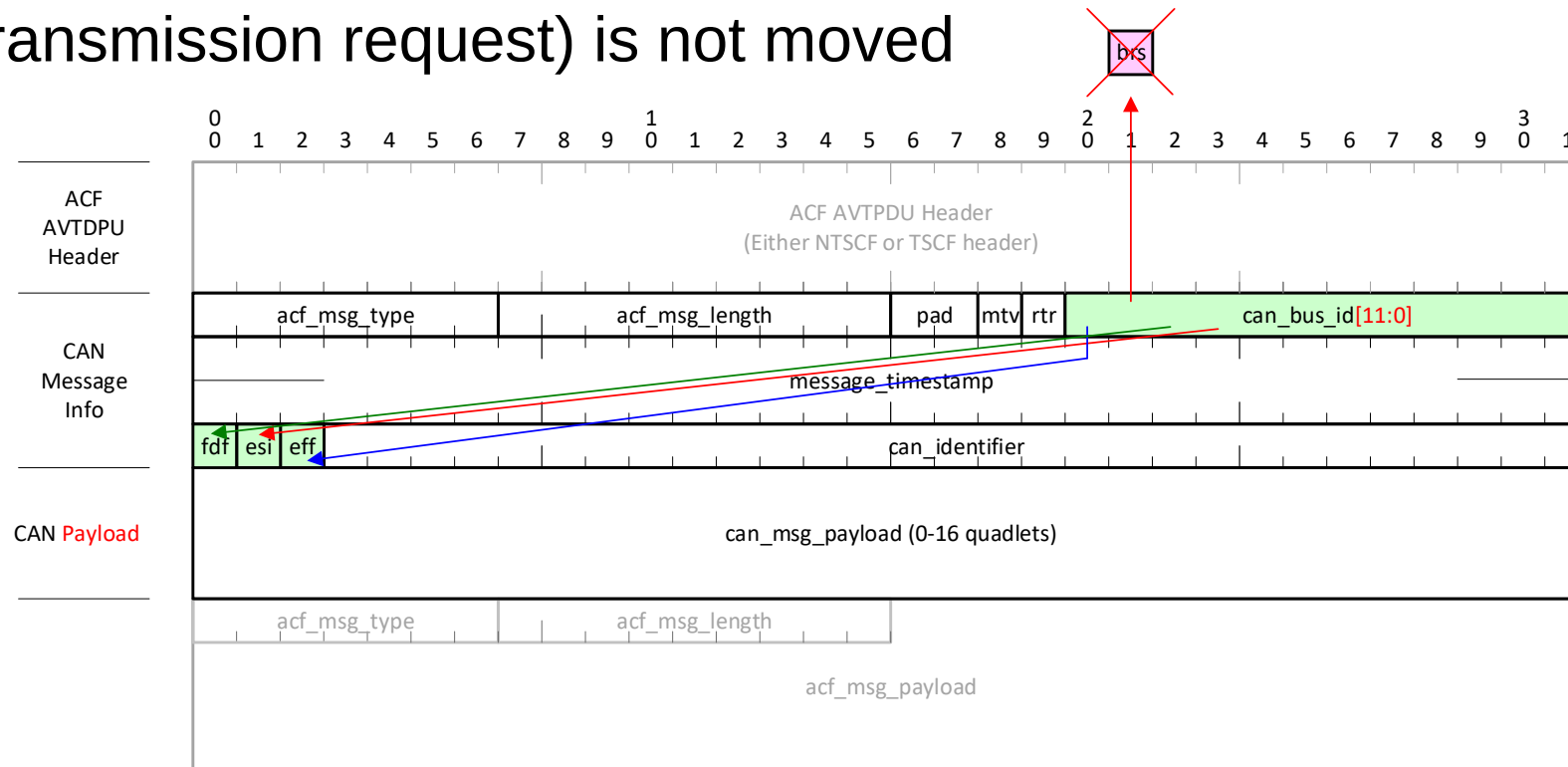
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Overview

- The need for enhancing the control formats in IEEE 1722b was discussed in IEEE1722b-pannell-larger_bus_id_size-2019-12 with examples for CAN & LIN
- Being part of the approved PAR work, this presentation is a proposal for a solution
- While the primary goal was to extend the bus_id sizes, a secondary goal emerged to harmonize the various formats since it was clear new formats were needed
 - The consistency of the formats allows for more efficient building & decoding of the frames
 - The current proposal is thus different from the 2019-12 one
- In working on the details, it also became evident that more than just CAN & LIN formats needed to be addressed
- An optional ACF Checksum message is proposed for safety systems that can be appended after any ACF message containing the preceding message's checksum
- ACF Message values for the proposed formats is included

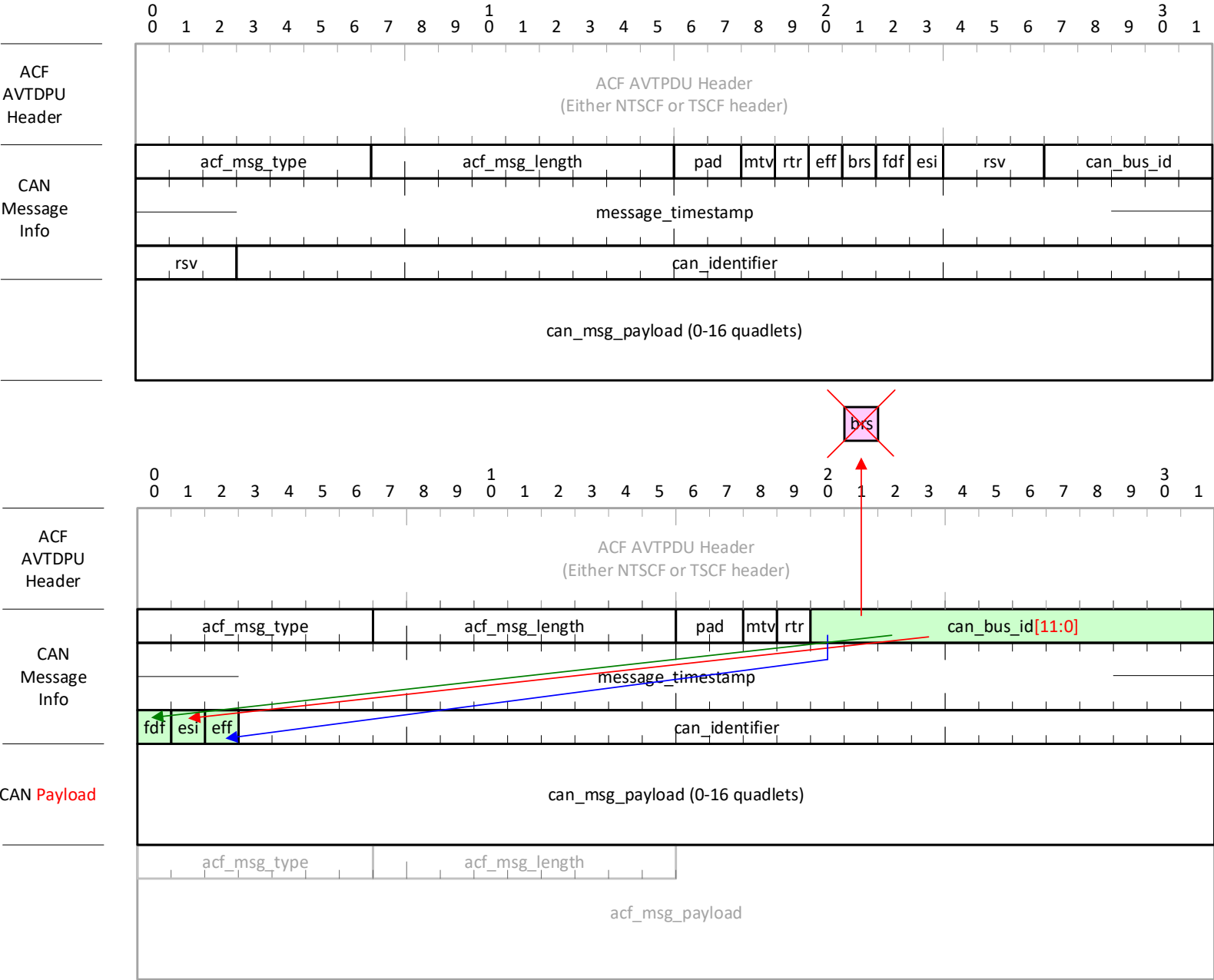
IEEE 1722b – Larger bus_id size – Proposal for CAN

- Move fdf (flexible data rate), esi (error state indicator) & eff (extended frame format) bits to previously reserved bits & remove the brs (bit rate switch) bit as shown
- Extend the can_bus_id to 12 bits (the lower 5 bits are in the same location)
- The CAN format requires the most bits, thus limiting the bus_id to 12 bits
- rtr (remote transmission request) is not moved



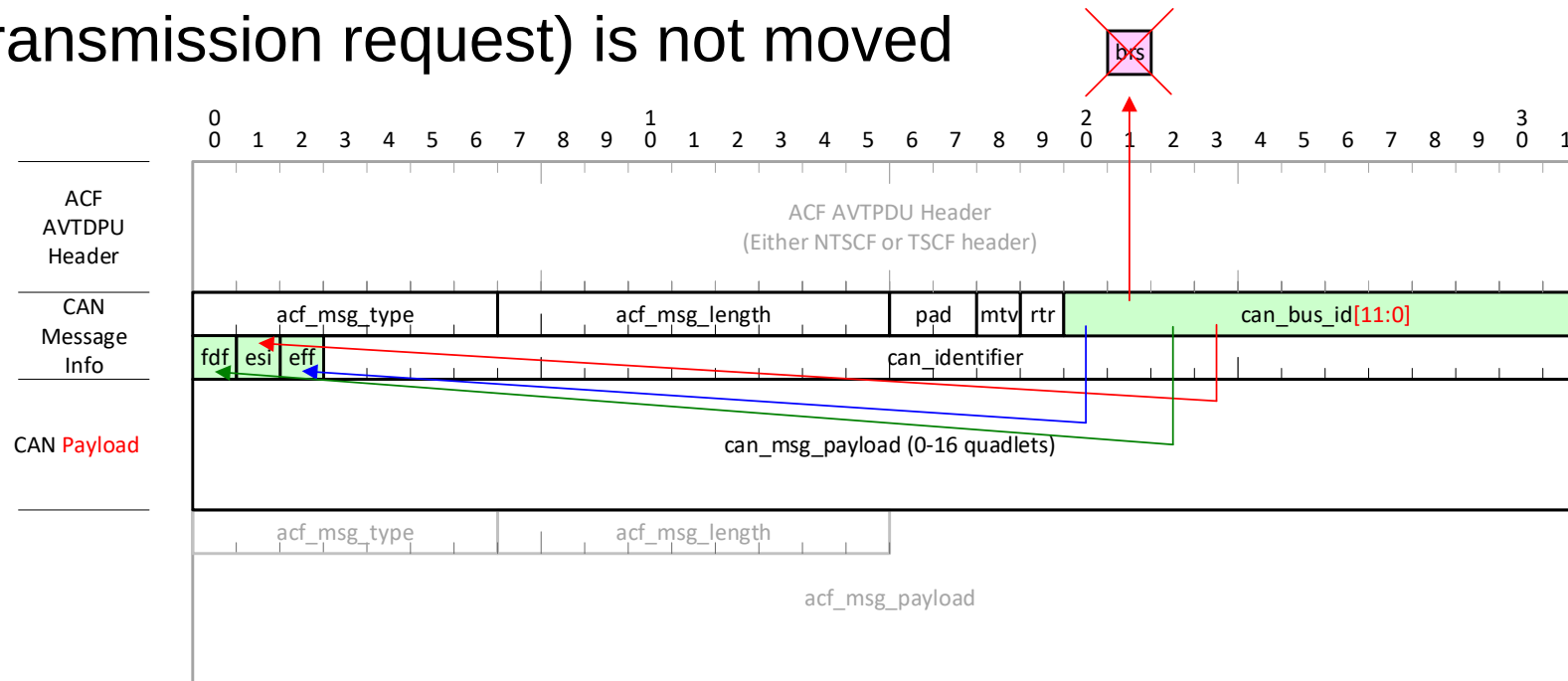
1722-2016

Proposal



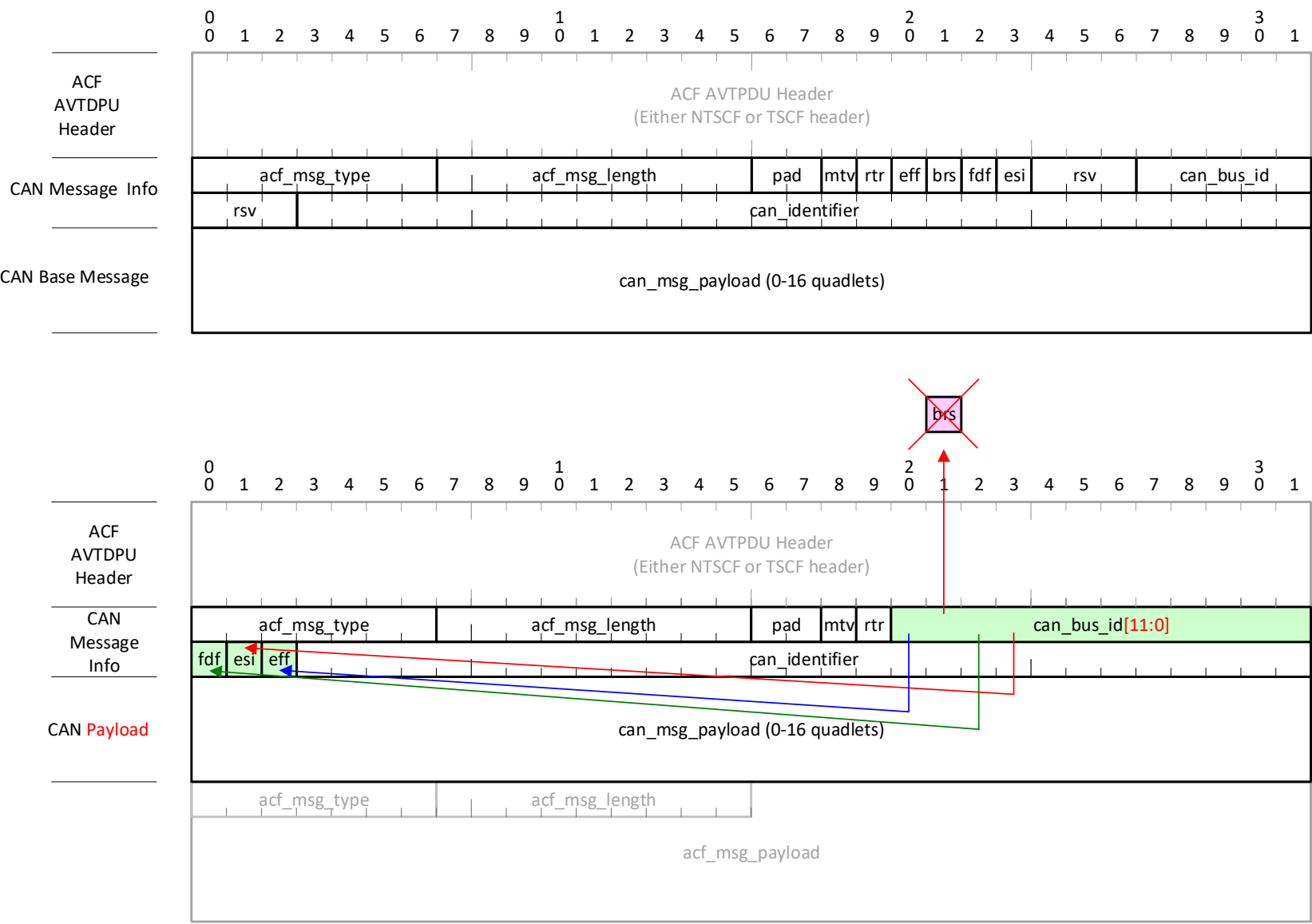
IEEE 1722b – Larger bus_id size – Proposal for CAN BRIEF

- CAN BRIEF gets the same changes as were done with CAN
- Move fdf (flexible data rate), esi (error state indicator) & eff (extended frame format) bits to previously reserved bits & remove the brs (bit rate switch) bit as shown
- Extend the can_bus_id to 12 bits (the lower 5 bits are in the same location)
- rtr (remote transmission request) is not moved



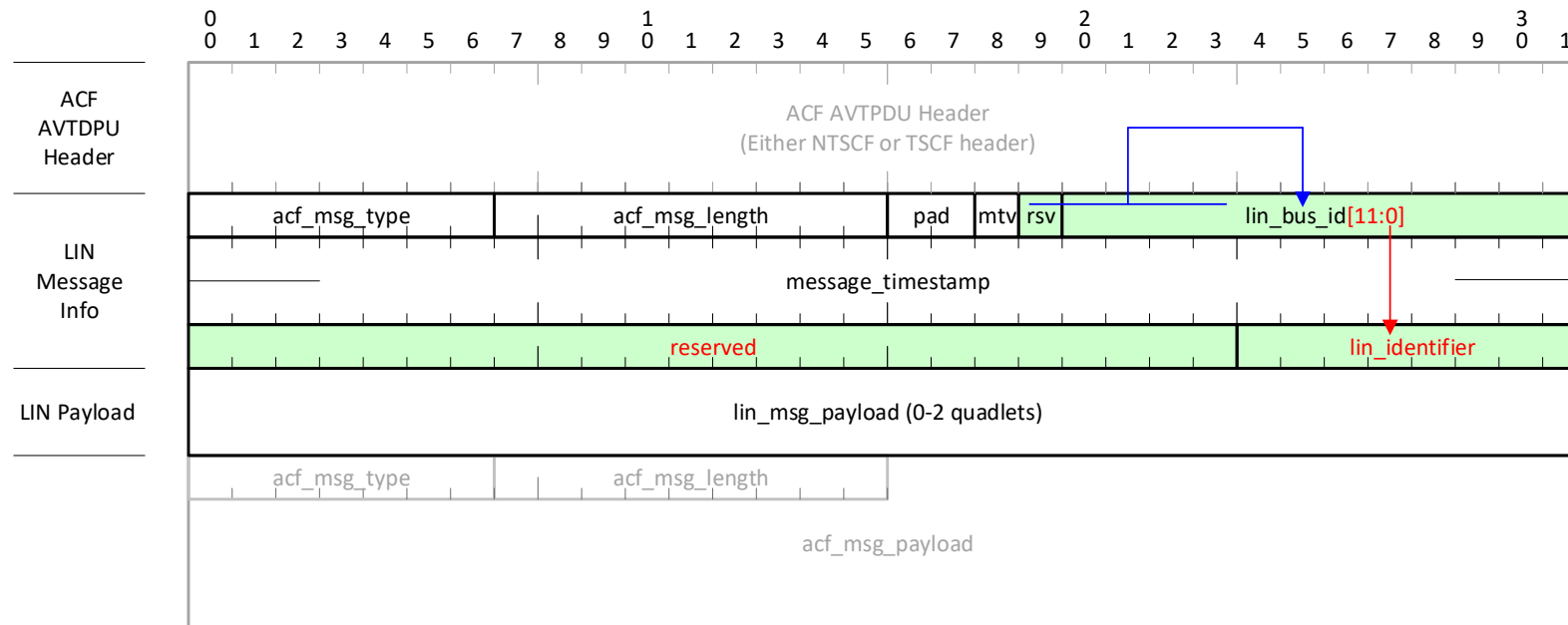
1722-2016

Proposal

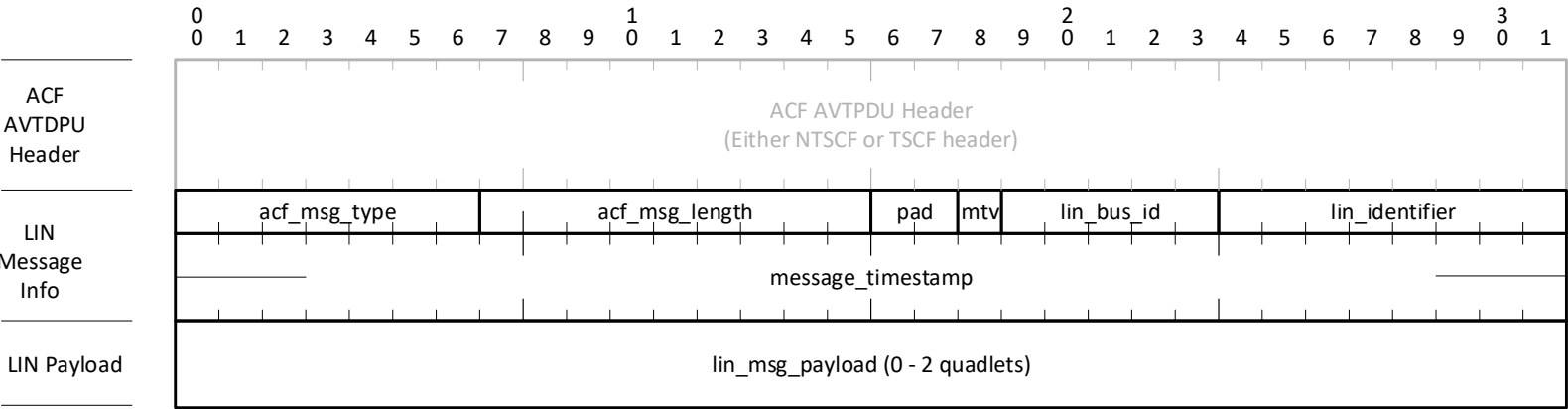


IEEE 1722b – Larger bus_id size – Proposal for LIN

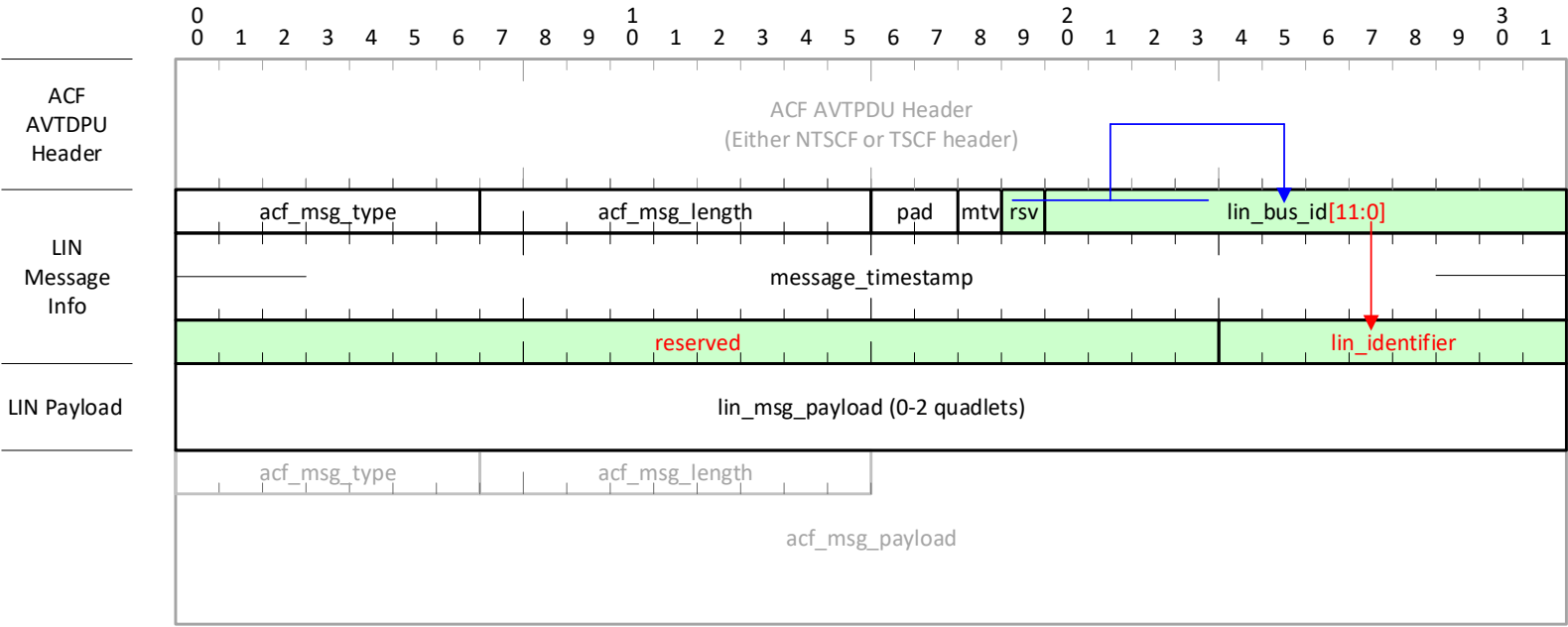
- LIN was fully packed, so a full quadlet needs to be added (added green quadlet)
- The lin_identifier is moved to the new quadlet in the same area as the can_identifier (although its not as large as CAN's)
- The lin_bus_id is shifted right by 8 bits & expanded to 12 bits leaving a rsv bit



1722-2016

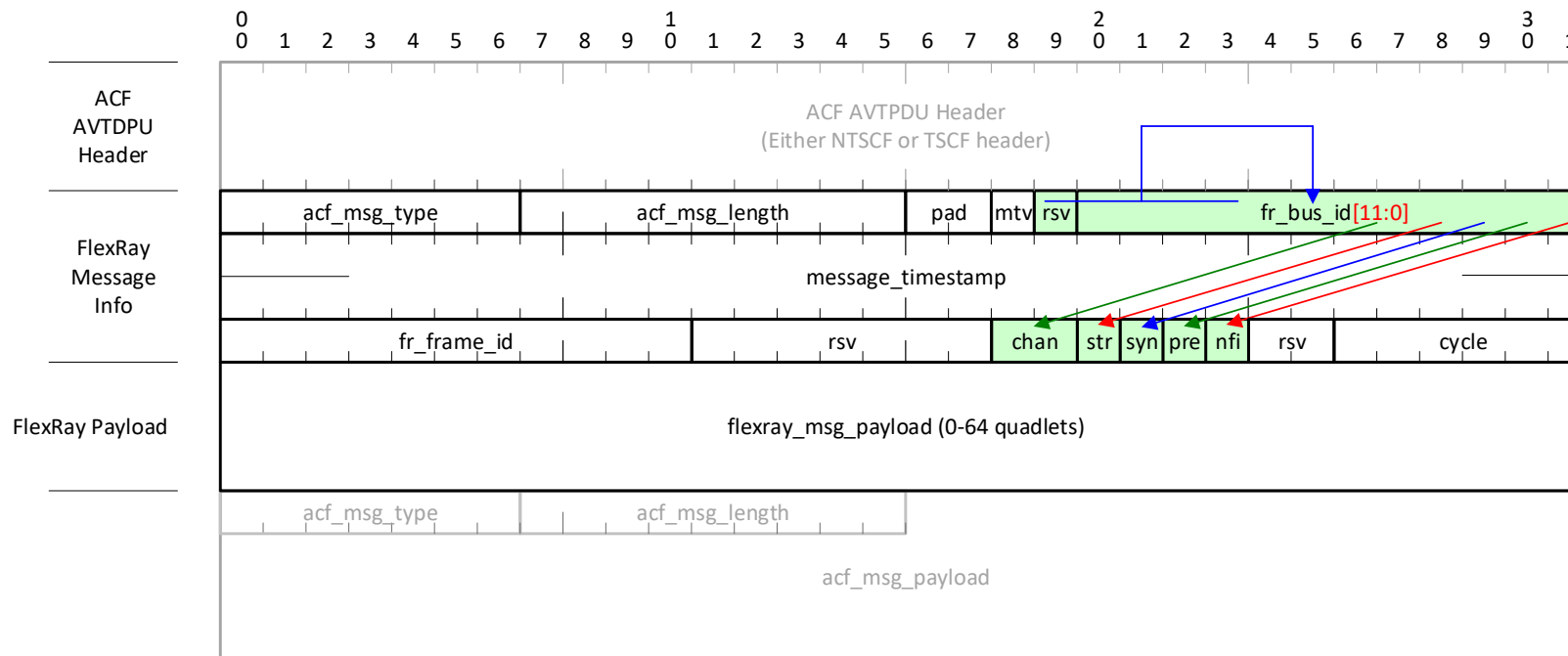


Proposal

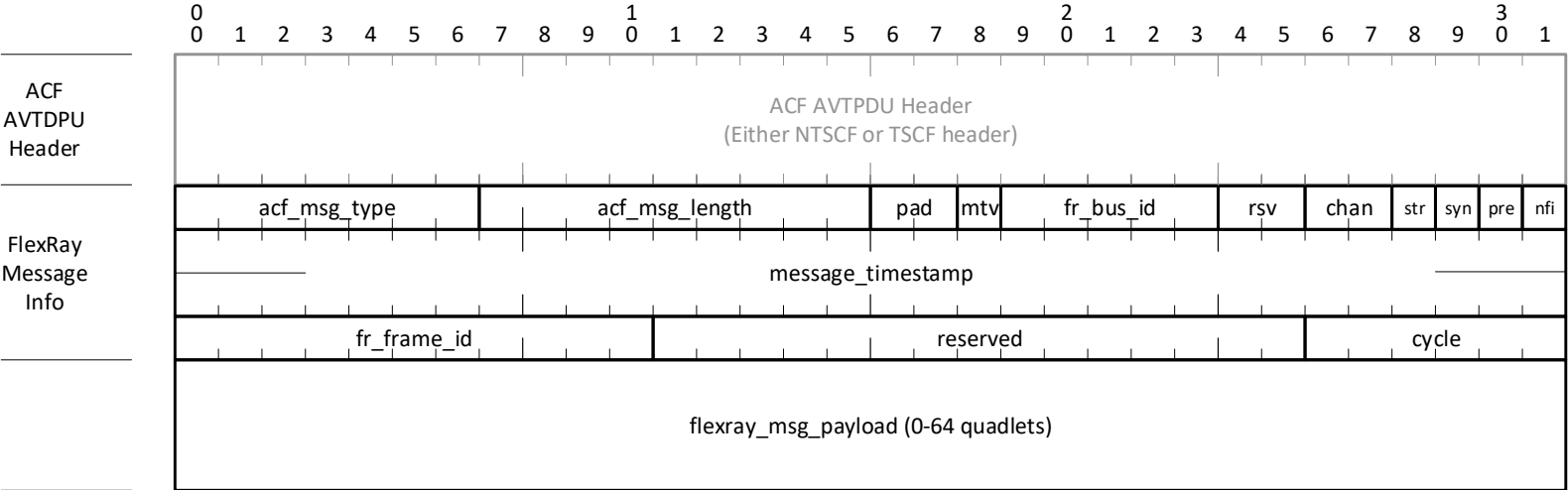


IEEE 1722b – Larger bus_id size – Proposal for FlexRay

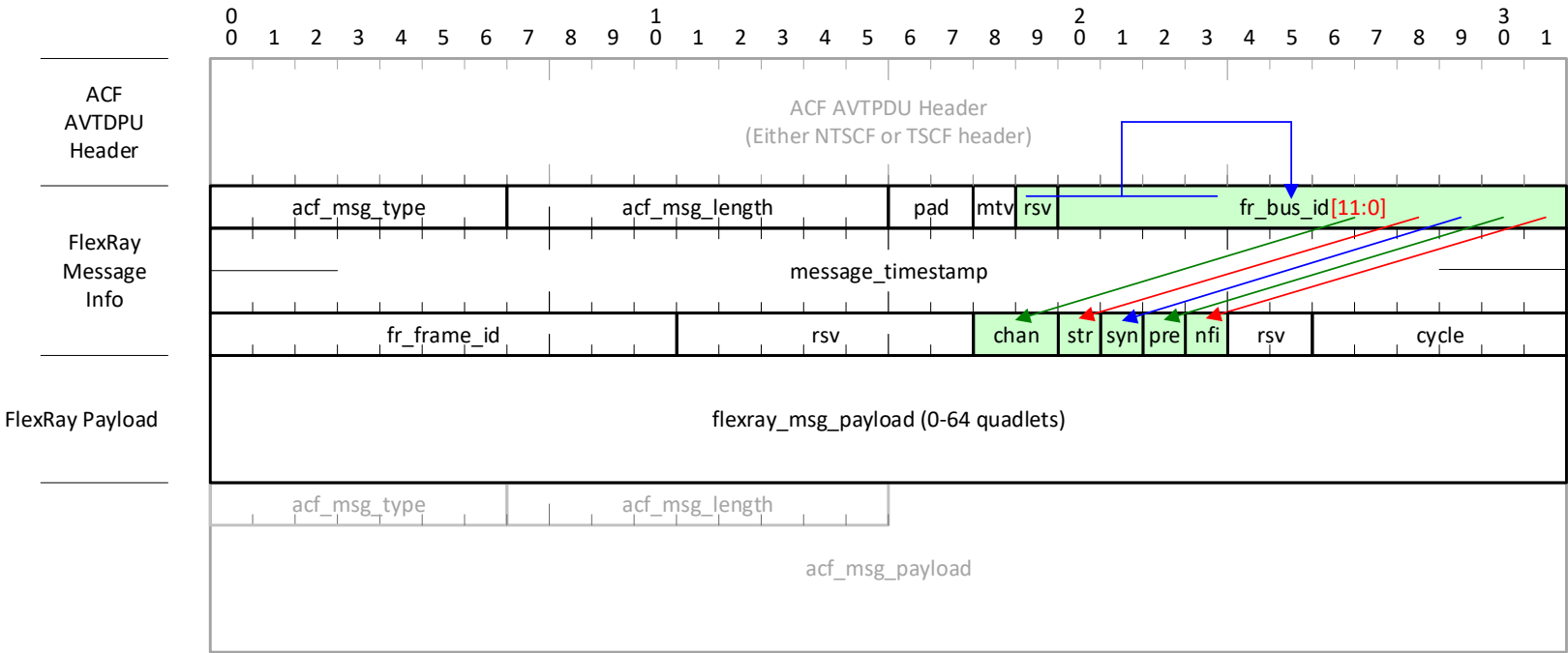
- Move the chan (source channel), str (startup), syn (sync), pre (payload preamble), & nfi (null frame indicator) bits to previously reserved bits as shown to free up room for the expanded fr_bus_id
- The fr_bus_id is shifted right by 8 bits & expanded to 12 bits leaving a rsv bit



1722-2016

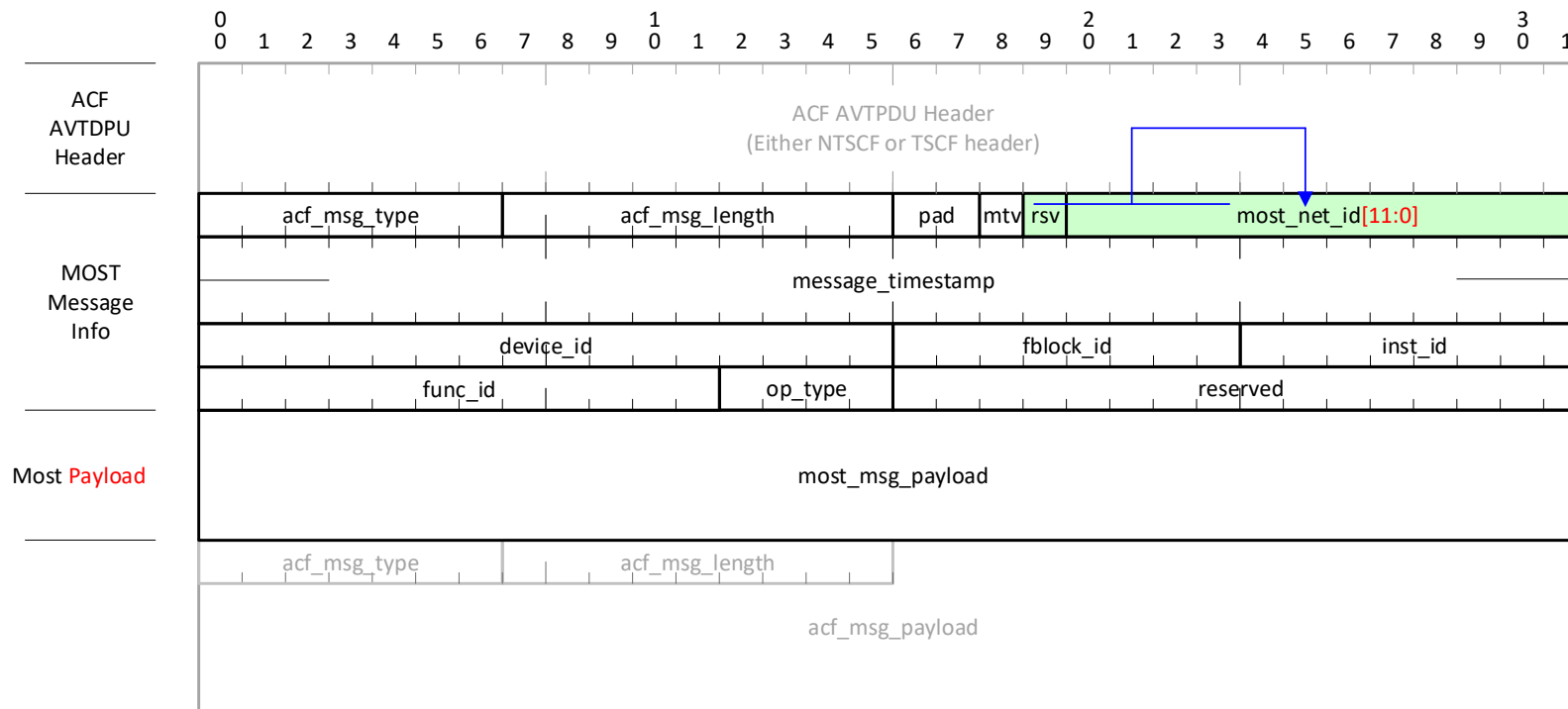


Proposal



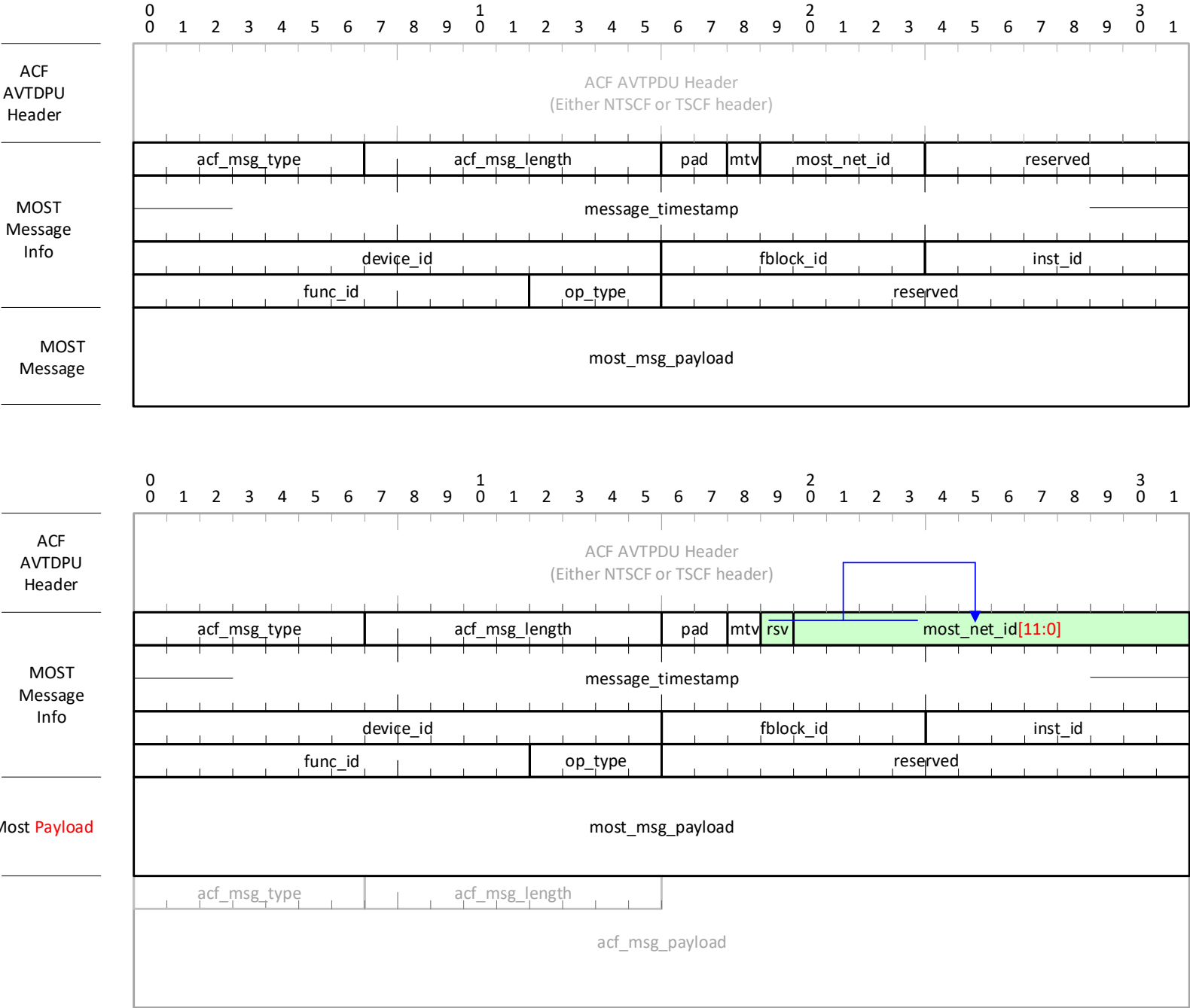
IEEE 1722b – Larger bus_id size – Proposal for MOST

- The most_net_id is shifted right by 8 bits & expanded to 12 bits leaving a rsv bit
- The lower 8-bits of the new most_net_id previously was reserved bits



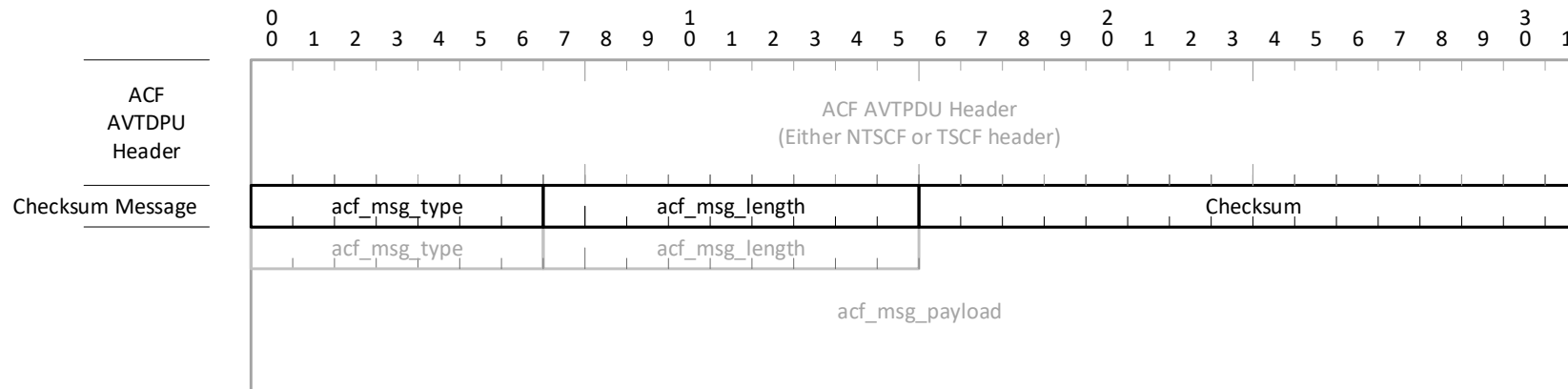
1722-2016

Proposal



IEEE 1722b – Proposal for New Checksum Message

- Some safety systems want to verify that a message has not been corrupted end-to-end & this needs to be done after the Ethernet CRC has been removed
- This proposal is to support a new single quadlet Checksum ACF Message type that when used, carries the checksum for the immediately previous acf_msg, in this same frame, for the previous message's acf_msg_length
- This is mainly needed as an enhancement for CAN & LIN, but when done this way it works for all acf_msg_types
- Rule of use: Before acting on a current message, a check needs to be made to see if there is a subsequent Checksum Message or not – this is not hard to do



Proposed New Table 22 – ACF Message Types (9.4.1.2)

Value	Name	Description	Subclause
00 ₁₆	ACF_FLEXRAY	FlexRay™ message	9.4.2
01 ₁₆	ACF_CAN	Controller Area Network (CAN)/CAN with Flexible Data-Rate (CAN FD) message	9.4.3
02 ₁₆	ACF_CAN_BRIEF	Abbreviated CAN/CAN FD message	9.4.4
03 ₁₆	ACF_LIN	LIN® message	9.4.5
04 ₁₆	ACF_MOST	MOST® message	9.4.6
05 ₁₆	ACF_GPC	General purpose control message	9.4.7
06 ₁₆	ACF_SERIAL	Serial port message	9.4.8
07 ₁₆	ACF_PARALLEL	Parallel port message	9.4.9
08 ₁₆	ACF_SENSOR	Analog sensor message	9.4.10
09 ₁₆	ACF_SENSOR_BRIEF	Abbreviated sensor message	9.4.11
0A ₁₆	ACF_AECP	IEEE Std 1722.1 AECP message	9.4.12
0B ₁₆	ACF_ANCILLARY	Video ancillary data message	9.4.13
0C ₁₆ to 1F ₁₆	Reserved	Reserved	—
20 ₁₆	ACF_FLEXRAY_V2	FlexRay™ message v2	9.4.2
21 ₁₆	ACF_CAN_V2	Controller Area Network (CAN)/CAN with Flexible Data-Rate (CAN FD) message v2	9.4.3
22 ₁₆	ACF_CAN_BRIEF_V2	Abbreviated CAN/CAN FD message v2	9.4.4
23 ₁₆	ACF_LIN_V2	LIN® message v2	9.4.5
24 ₁₆	ACF_MOST_V2	MOST® message v2	9.4.6
25 ₁₆ to 76 ₁₆	Reserved	Reserved	—
77 ₁₆	ACF_CHECKSUM	Optional checksum of the immediately preceding ACF message	???
78 ₁₆ to 7F ₁₆	ACF_USER	User-defined ACF message	—

Since the V2 formats are very similar to the originals, the proposal is to document them in the same Subclause as the originals



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