

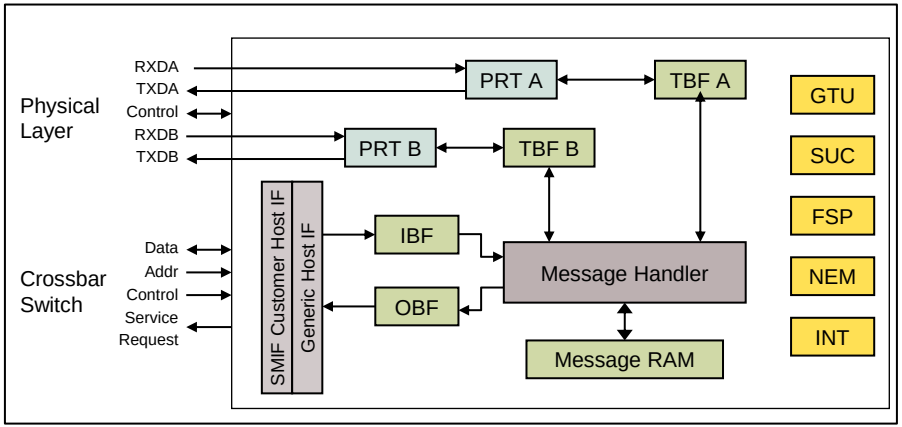
ERAY
FlexRay™ Controller

AURIX™ TC4xx Microcontroller

V1.0.0 2024-09

Please read the Important Notice and Warnings at the end of this document

E-Ray
FlexRay™ protocol controller



Highlights

- E-Ray module performs communication according to the FlexRay™ protocol specification v2.1
- E-Ray module supports data rates of up to 10 Mbit/s on each channel

Key Features

Configuration of up to 128 message buffers

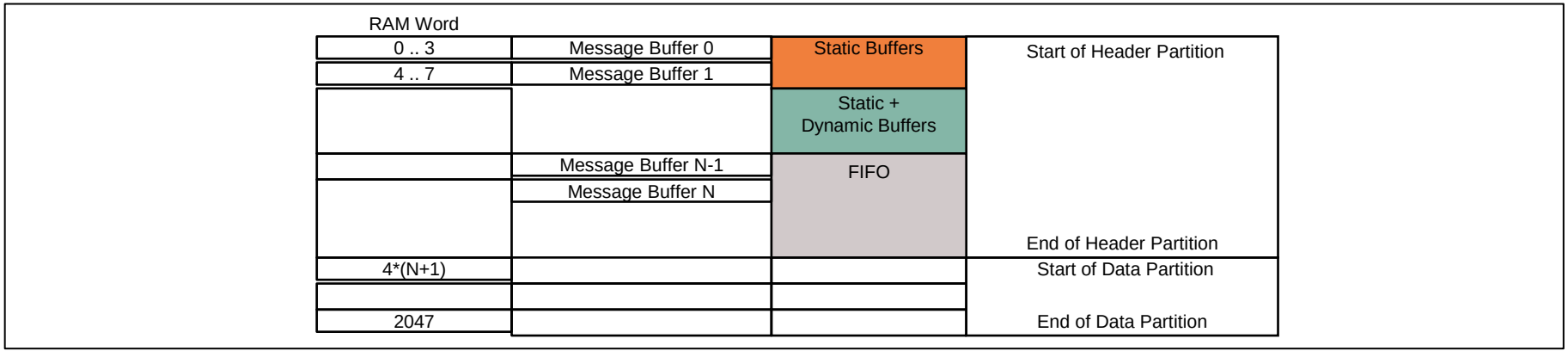
Filtering based on slot, cycle, and channel value

Customer Benefits

- Allows greater flexibility with definition of a network
- Simplifies definition of acceptance or transmit criteria for each message

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E-Ray
Configuration of up to 128 message buffers



- 8 Kbyte of Message RAM for storage of e.g. 128 Message Buffers with max. 48 byte data field or up to 30 Message Buffers with 254 byte Data Sections
- Configuration of Message Buffers with different payload lengths possible
- Each Message Buffer can be configured as receive buffer, as transmit buffer or as part of the receive FIFO
- Host access to Message Buffers via Input and Output Buffer
  - Input Buffer: Holds message to be transferred to the Message RAM
  - Output Buffer: Holds message read from the Message RAM

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E-Ray
Filtering based on slot, cycle, and channel value

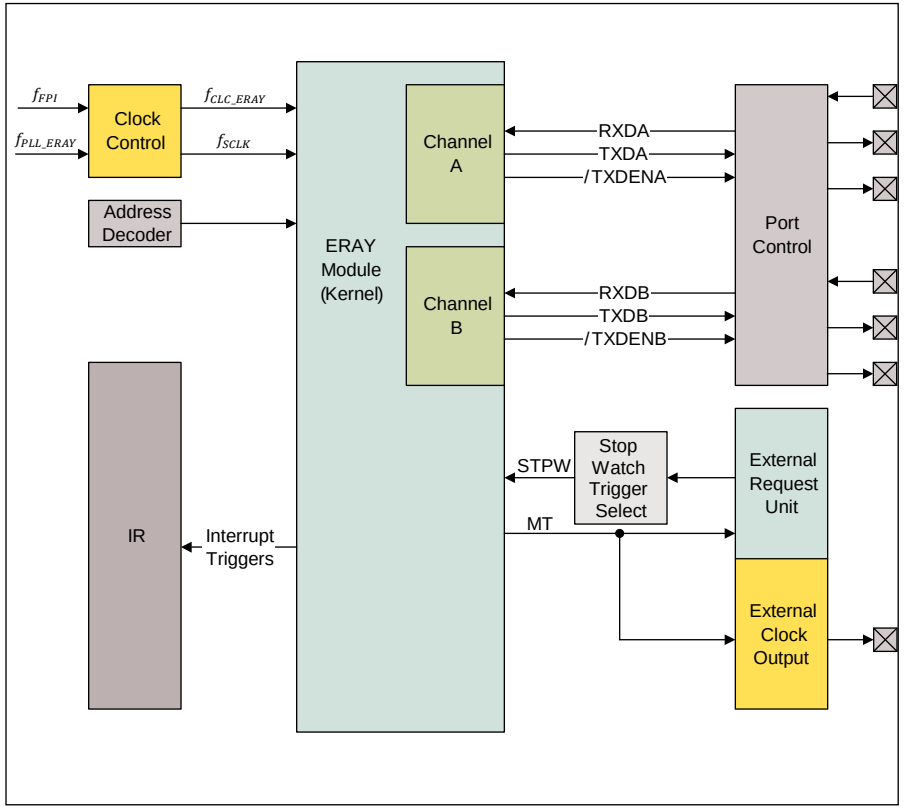
- Acceptance filtering ➔ checking specific fields in a received Frame against the corresponding configuration values of the valid Message Buffers
- Transmit filtering ➔ comparing the configuration constants of the valid Message Buffers against the actual slot and cycle counter values
- Filtering is done on the following fields:
  - Channel ID
  - Frame ID
  - Cycle counter
- The following filter combinations for acceptance / transmit filtering are allowed:
  - Frame ID + Channel ID
  - Frame ID + Channel ID + Cycle Counter

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E-Ray
System integration

E-RAY module is connected to several external modules:

- Clock Control:
  generates all the necessary clocks for the E-RAY module
- Interrupt Router:
  schedules service requests coming from various E-Ray interrupt sources
- Port Control:
  connects the E-RAY module pins to the external GPIO pins
- External Clock Output Unit (SCU module):
  distribution of Macro Tick as time base for distributed system control
- External Request Unit (SCU module):
  possibility of triggering stop watch events and providing global time e.g to the on-chip timers



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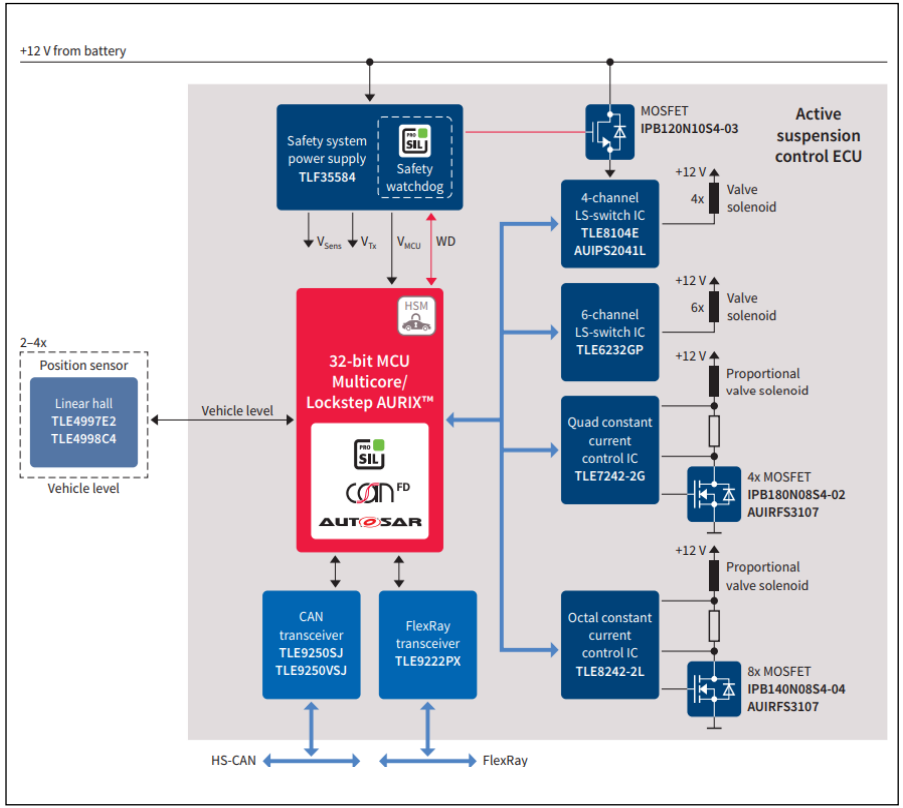
Application example
Active suspension control

Overview

- Used in the adaptive suspension control systems that act simultaneously as an active anti-roll stabilizer and an electronic shock absorber
- “X-by-Wire” system; mechanical or hydraulic control systems are replaced by fully electrical or electronic solutions

Advantages

- CAN lacks deterministic and fault-tolerant aspects that are mandatory for “X-by-Wire” systems
- Due to its higher bandwidth (10 Mbps) in comparison with CAN overall system complexity will be reduced, which offers a path for more cost-effective solutions



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Document reference
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