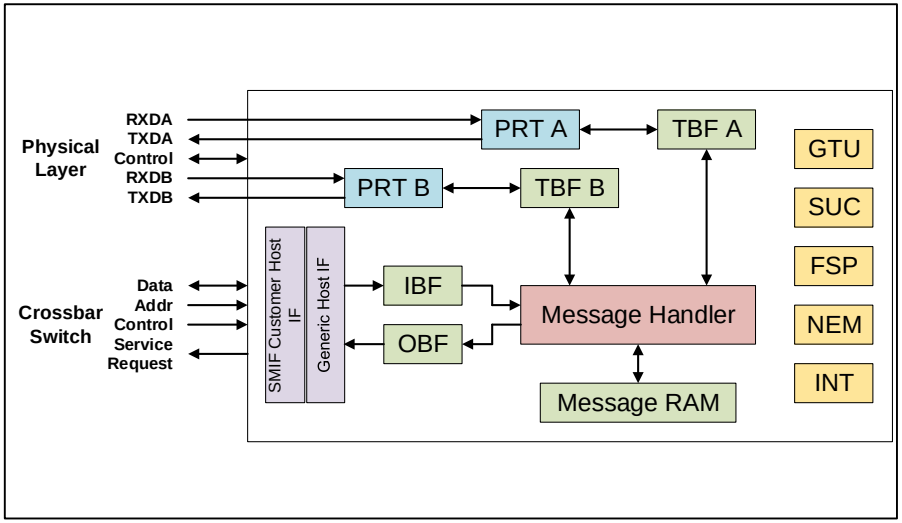
E-Ray

FlexRay™ Protocol Controller

AURIX™ Microcontroller Training
V1.0 2019-03

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

E-Ray
Configuration of up to 128 message buffers

RAM Word			
0..3	Message Buffer 0	Static Buffers	Start of Header Partition
4..7	Message Buffer 1		
	…	Static + Dynamic Buffers	
	Message Buffer N-1	FIFO	
	Message Buffer N		End of Header Partition
4*(N+1)			Start of Data Partition
	…		
2047			End of Data Partition

- 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

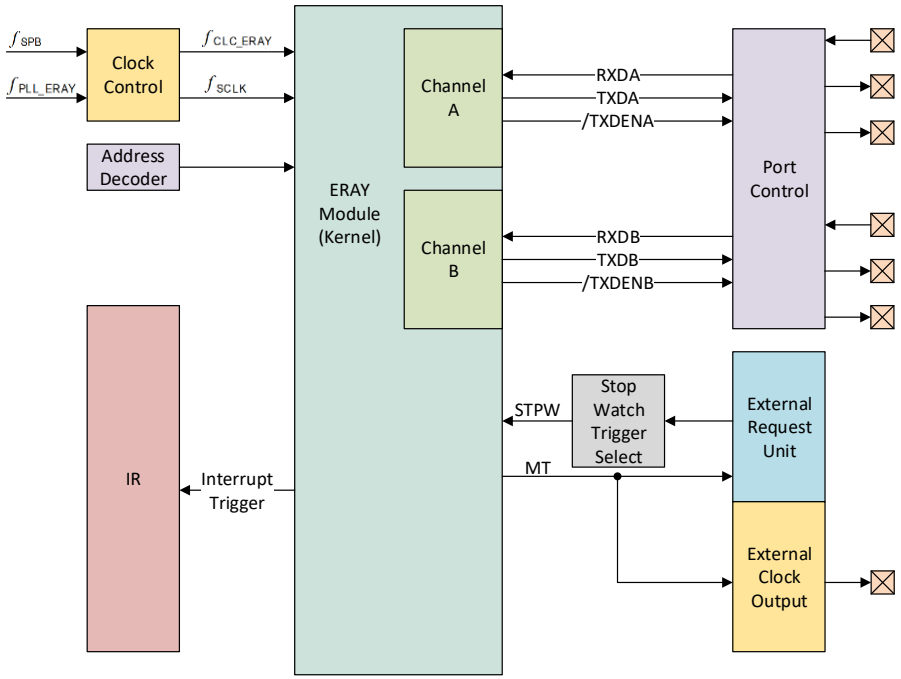
E-Ray
Filtering based on slot, cycle, and channel value

- 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

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



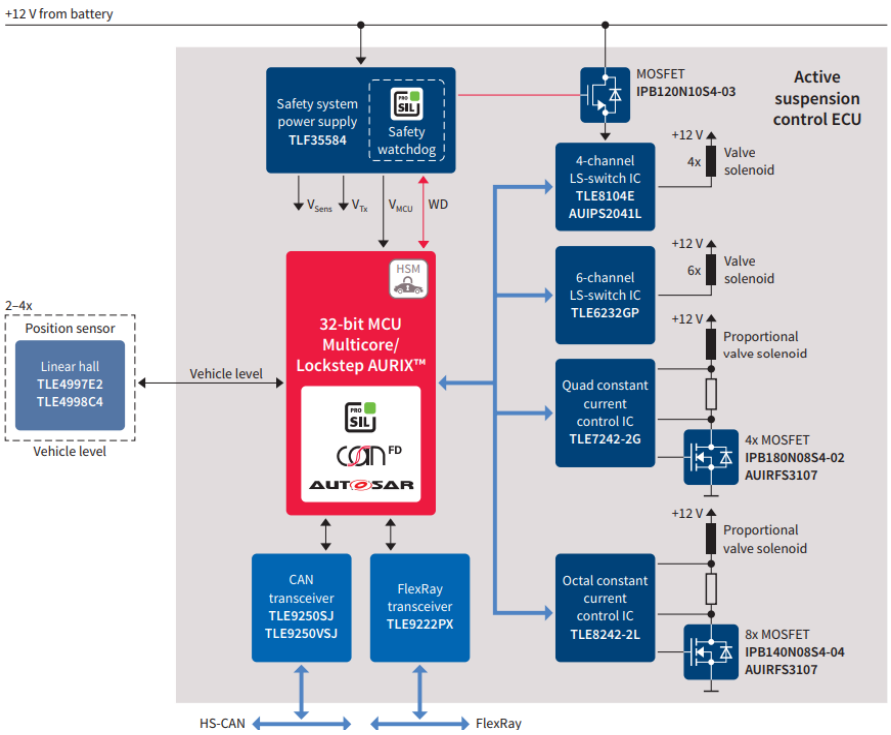
Application Example
Active suspension control

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



Trademarks
All referenced product or service names and trademarks are the property of their respective owners.

Edition 2019-03
Published by
Infineon Technologies AG
81726 Munich, Germany

Do you have a question about this document?
Email: erratum@infineon.com

Document reference
AURIX_Training_1_
FlexRay_Protocol_Controller

IMPORTANT NOTICE
The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics (“Beschaffenheitsgarantie”) .

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer’s compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer’s products and any use of the product of Infineon Technologies in customer’s applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer’s technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on the product, technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies office (www.infineon.com).

WARNINGS
Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies’ products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.