

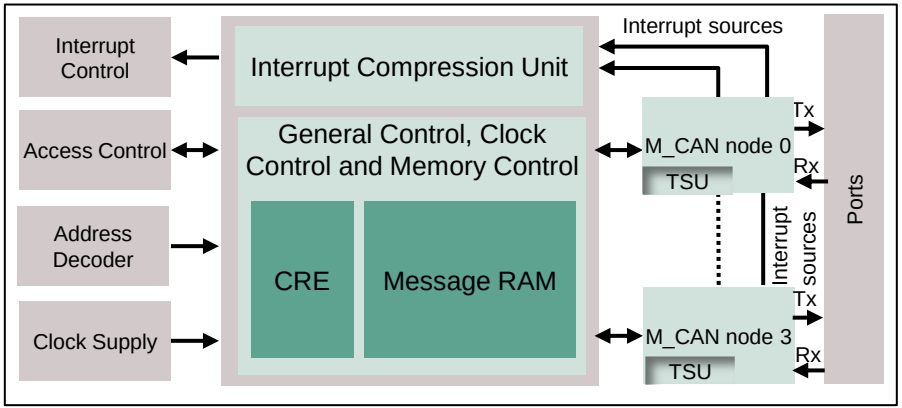
CAN
Controller Area Network interface

AURIX™ TC4xx Microcontroller

V1.0.0 2024-09

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MCMCAN
Controller Area Network interface



Highlights

- AURIX™ TC4xx MCMCAN module conforms to the ISO 11898-1 (classical CAN and CAN FD)
- The built-in Routing Engine (CRE) accelerates packet transfer of CAN to CAN, CAN to Ethernet or memory
- Hardware 32-bit wide timestamps using TSU module according to CiA 603

Key Features

Configurable Message RAM

Up to 4 independent CAN nodes

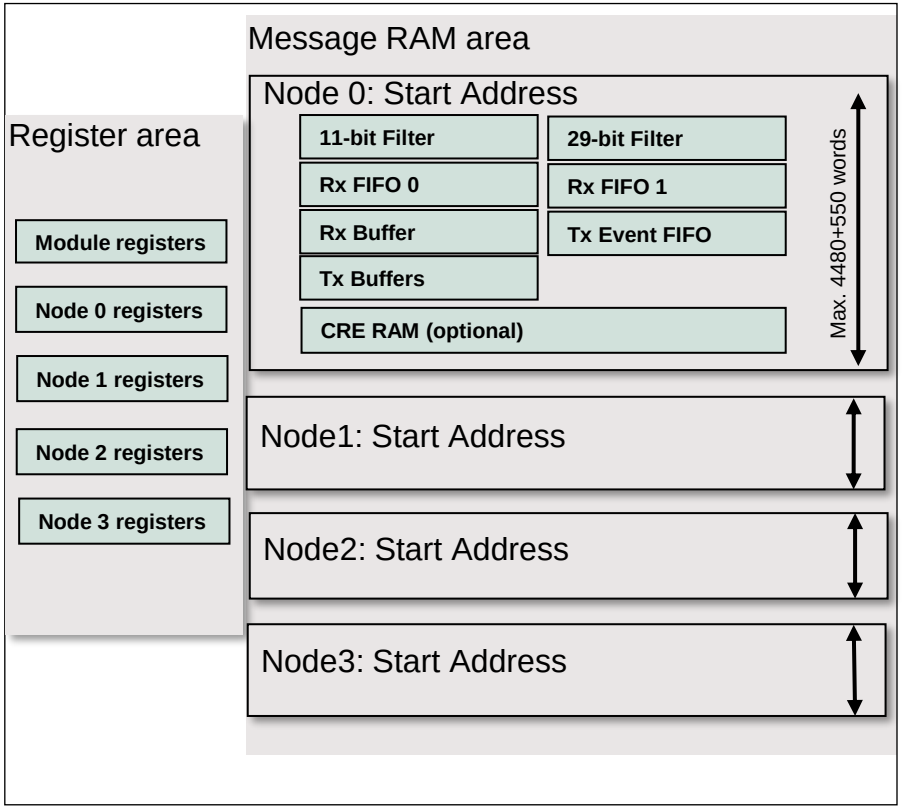
Configurable FIFOs for transmission and reception

Customer Benefits

- Easy setup of the required memory for each node
- Dedicated control registers for each CAN node increasing system flexibility
- Each FIFO can be resized to meet the requirements of the application

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MCMCAN
Configurable message RAM

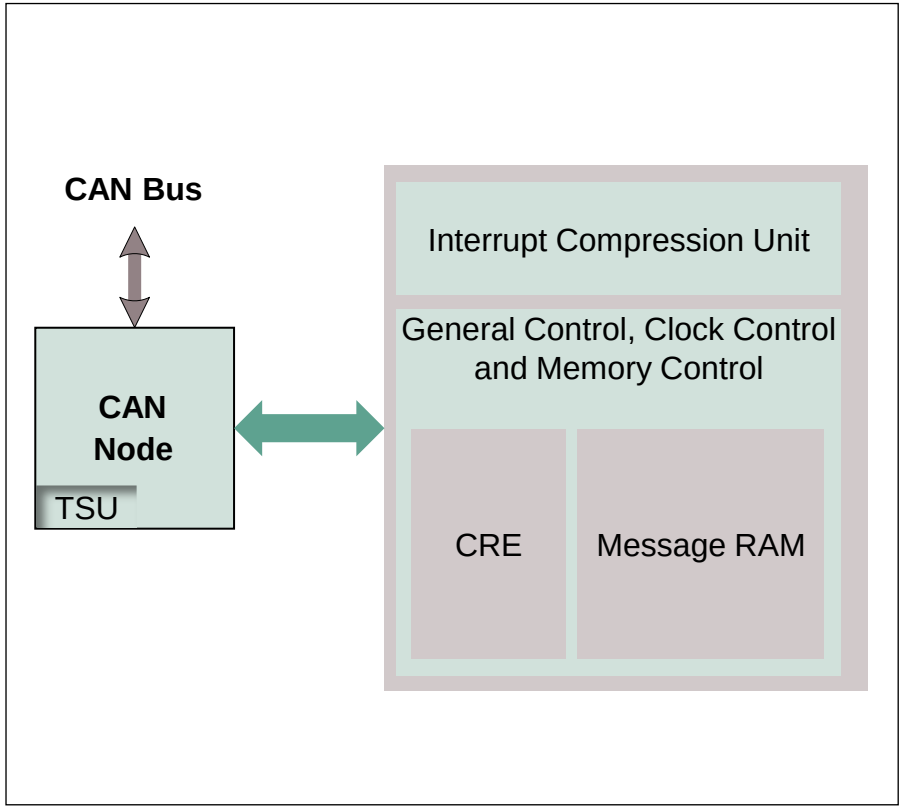


- MCMCAN has one register area and one message RAM with fixed size
- The Message RAM is shared across all CAN nodes and freely configurable for each CAN node within MCMCAN module
- The RAM structure for each node is defined via the start address, number and data bytes of different element blocks, which are individually configurable
- Each node has max. configurable element blocks (11-bit filter, 29-bit filter, RxFIFO0/1 etc.) The max. RAM size for each node is 4352 words+ (576 words for CRE)
- It is not necessary to configure each of the element block and there are no restrictions with respect to the order of the element blocks
- Strong filtering capabilities

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MCMCAN
Up to 4 independent CAN nodes

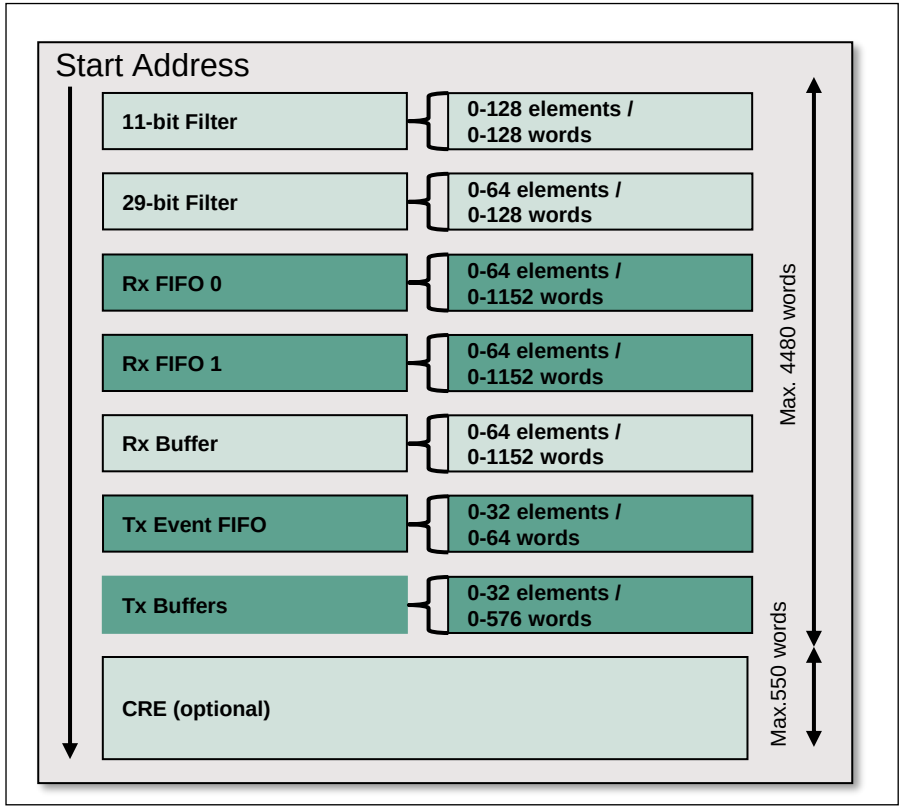
- Up to 4 independent CAN nodes flexibly connected to the Message RAM:
  - Baud rate settings
  - Operation and events control
  - Ports control
  - Error analysis
  - Timer Event
  - Routing control
  - Time stamp unit



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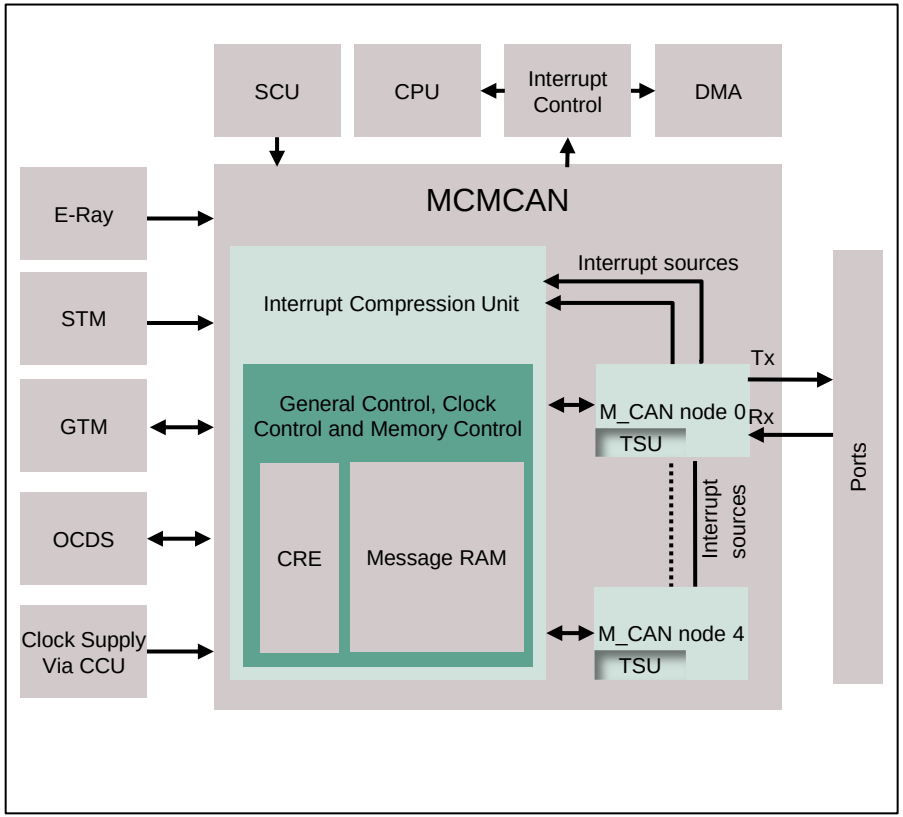
MCMCAN
Configurable FIFOs for transmission and reception

- Each node supports two Rx FIFOs, RxFIFO0/1 can be configured to hold up to 64 elements each
- In order to avoid an Rx FIFO overflow, the Rx FIFO watermark can be used. When the fill level reaches the watermark, an interrupt flag is set
- Each node supports max. 32 Tx Buffers, and they can be configured as Tx FIFO/Tx Queue or dedicated Tx Buffers
- The messages stored in the Tx FIFO are transmitted based on a buffer index, it enables a transmission in a defined order independently from their message ID
- After successful transmission the frame information (ID, timestamp etc.) can be stored in the Tx Event FIFO. The use of Tx Event FIFO is optional
- Signal of FIFO level/full condition is available



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MCMCAN
System integration



System integration

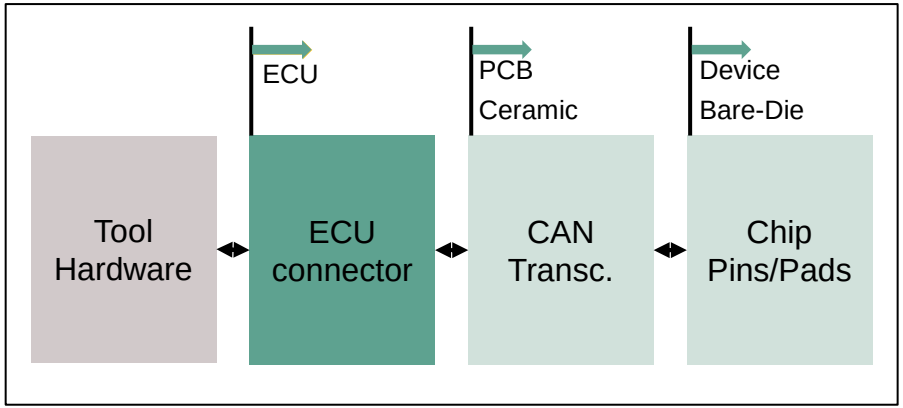
- Each Transmit/Receive line of every CAN node is available for several external ports through the port control logic
- Up to 16 interrupt lines connect ICU for CPU trigger and DMA service or as signal trigger of the GTM action
- Debugging of the MCMCAN module can be done using the trigger lines connected to OCDS

Target applications

- Automotive/motor control
- Industrial automation
- Connectivity
- General purpose

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Application example
Debugging via CAN



Advantages

The CAN bus signals are usually available at the ECU connector; therefore, this physical connection allows to use of different types of tools without opening the ECU housing

Overview

- There are two tool interfaces that are using MCMCAN:
  - DAP over CAN Physical Layer (DXCPL)
  - DAP over CAN Messages (DXCM)
- The main use case for DXCPL is the analysis of field returns. DXCPL is using DAP telegrams wrapped in CAN messages. Once DXCPL is activated, the CAN node is disconnected from the CAN bus
- In the case that the CAN node cannot be dedicated only for debugging, DXCM is sharing the bandwidth with the CAN node. In the case of DXCM, debug messages are sent together with the CAN node messages

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