

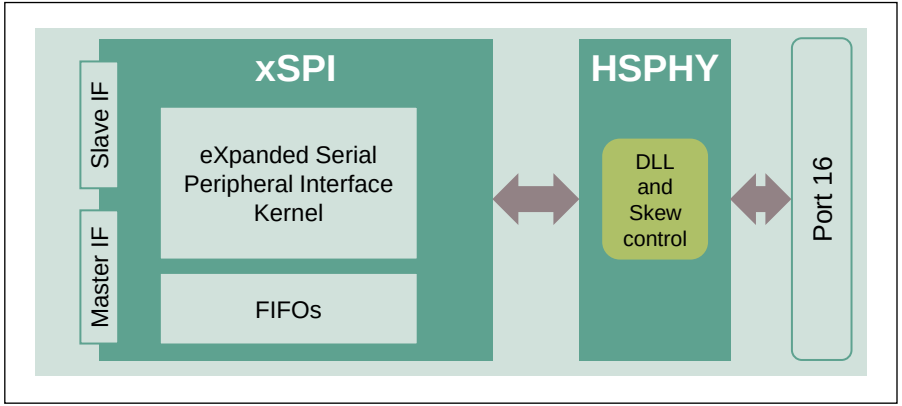
xSPI
eXpanded Serial Peripheral Interface

AURIX™ TC4xx Microcontroller

V1.0.0 2024-09

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xSPI
eXpanded Serial Peripheral Interface



Highlights

The xSPI module is a controller interface enabling communication with SPI slave devices compliant to the JESD251, JEDEC standard with read data strobe up to 200 MHz.
Support of multiple protocols:

- xSPI: Hyperflash, HyperRAM, Xcella, Octal SPI
- SPI/DualSPI/QuadSPI
- Semperflash support

Key Features

Single module for multiple NOR Flash standards

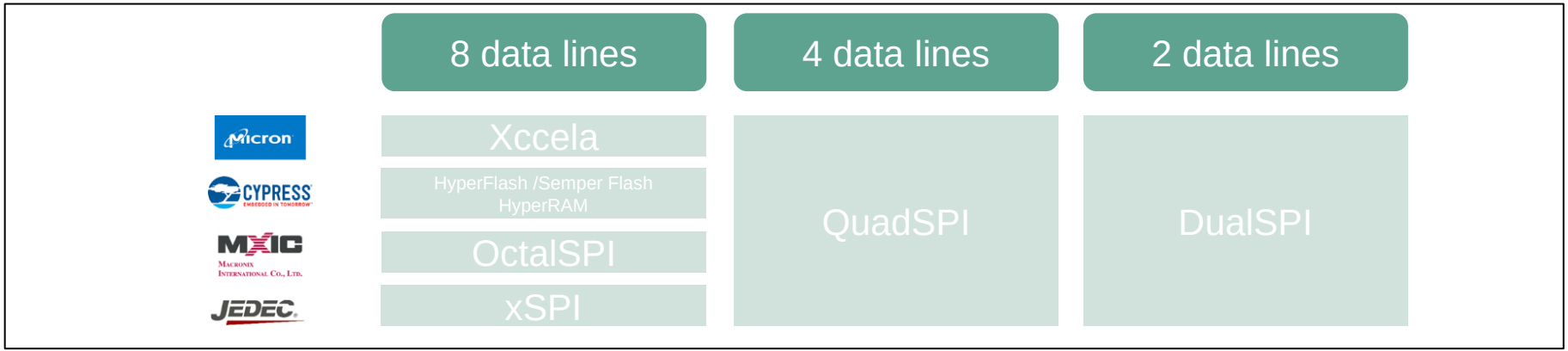
Memory mapped: code execution and operand read/write from external memory

Customer Benefits

- High flexibility of NOR Flash and RAM providers
- Acts as an extension of embedded Flash and RAM including support of code execution

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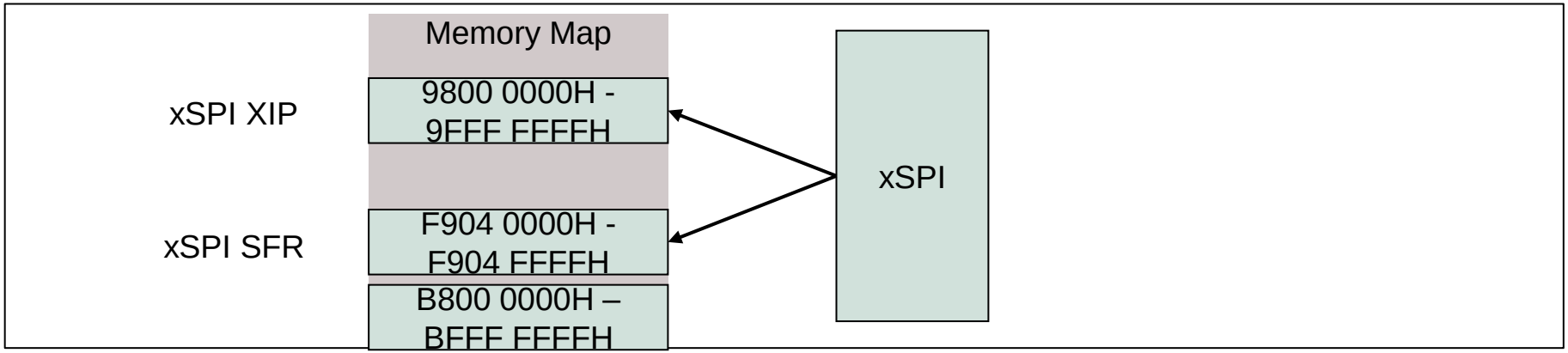
xSPI
Single module for multiple NOR Flash standards



- Support of multiple NOR Flash and RAM standards from different vendors
- Infineon offers the safe and secure SEMPER™ family, our HYPERBUS™ interface-based HYPERFLASH™ NOR Flash and HYPERRAM™ pSRAM memories

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xSPI
Memory mapped: code execution and operand read/write

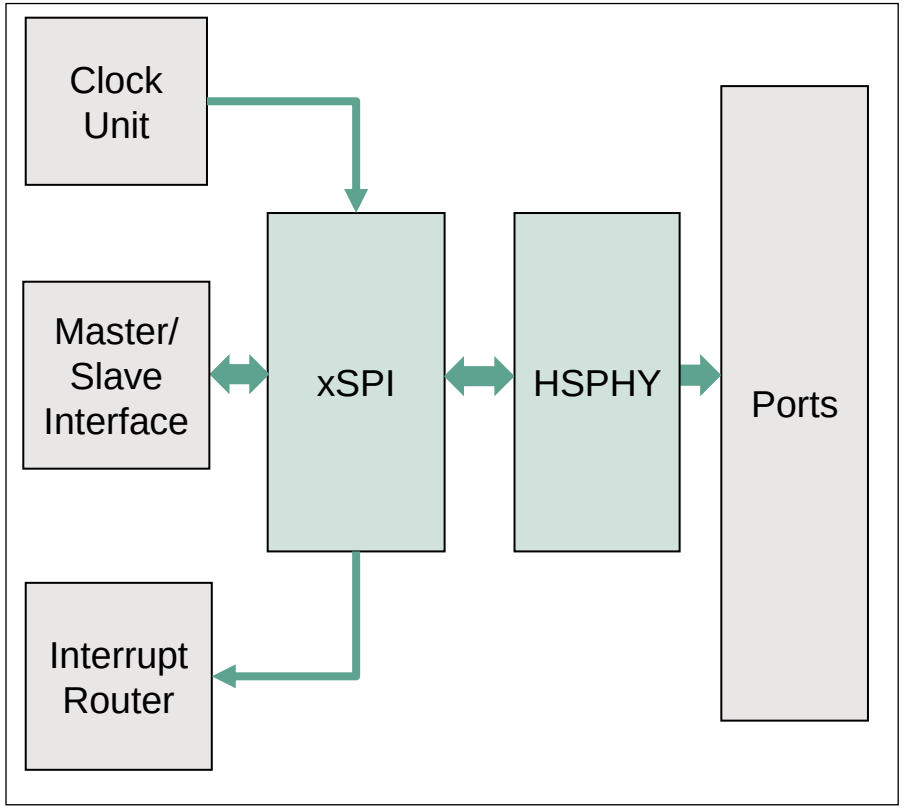


- After initialization of the xSPI module for XIP mode, the application can access the xSPI XIP memory address space and all read/write instructions will be automatically transferred to the external memory
- This will allow the CPU to execute code from that memory region

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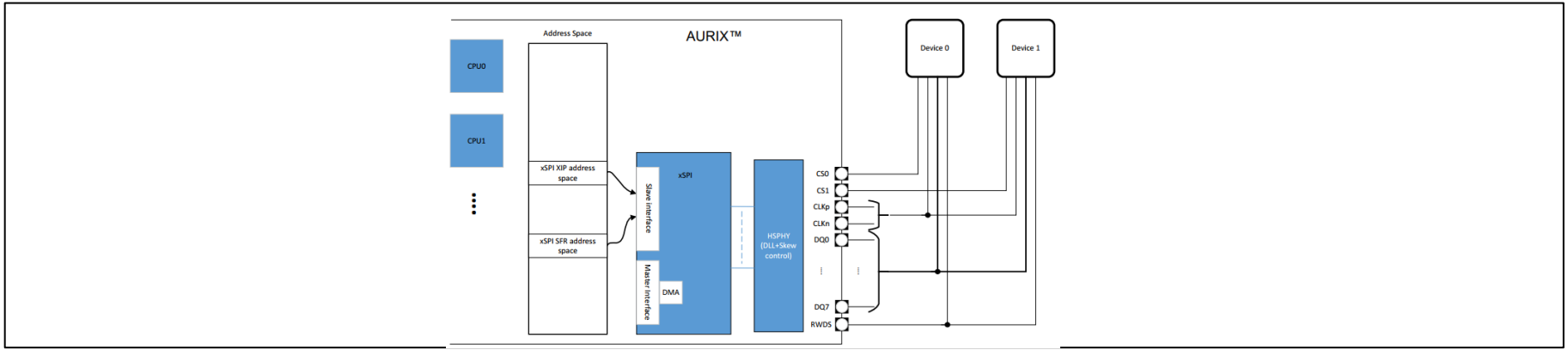
xSPI
System integration

- The xSPI provided a master and a slave bus interface to the AURIX™ internal infrastructure
- The master interface provide an internal xSPI Direct Memory Access (DMA) module to transfer data
- Slave interface can be used for register based transfers and will be accessed in the XIP mode
- xSPI input output signals are connected to the High Speed Physical Layer (HSPHY) functional block for utilizing the DLL to generate the timing skew on the signals connected to the ports
- The Clock Unit generates all the necessary clocks for the xSPI module
- The Interrupt Router schedules service requests coming from various xSPI interrupt sources



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Application example
System Memory Extension



Overview

- Used as memory extension in systems which need lager memory for firmware updates, data logging
- Up to two devices can be connected

Advantages

- Save IO's for external memory connections
- High flexibility of NOR Flash and RAM providers
- Acts as an extension of embedded Flash and RAM including support of code execution

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