

# **Closed-loop Delfino Control Systems: Multiple Industrial Protocol Support using the AMIC110 Sitara Processor**

**Part 1: Product solutions supported by the AMIC110 and Delfino system architecture**

# Training purpose & objectives

## Purpose:

- Industrial systems use a variety of industrial communication protocols including EtherCAT, PROFINET, PROFIBUS, Ethernet/IP, POWERLINK, SERCOS III, as well as custom protocols.
- System developers often need their closed-loop control solutions to support multiple industrial communication requirements flexibly and in a cost-efficient manner.
- The solution:
  - AMIC110 Sitara processor supporting multiple industrial communication protocols
  - Dual-core, dual-CLA Delfino TMS320F2837xD floating-point microcontroller unit (MCU)

## Objectives:

- Describe the advantages of an integrated AMIC110 + Delfino solution for multiprotocol industrial communications and control.
- Identify the key differentiators of the combined AMIC110 + Delfino solution .
- Describe how the AMIC110 + Delfino solution architecture can be used to provide a single solution for customers with multiple system requirements.

# Training series overview

AMIC110 Multiprotocol Industrial Interface for Closed-loop Delfino Control Systems:

- **Part 1: Product solutions supported by the AMIC110 and Delfino system architecture**
- Part 2: Implementation of multiprotocol industrial communications solutions
- Part 3: Industrial software and multiprotocol support

# Training agenda

- **Part 1: Product solutions supported by the AMIC110 and Delfino system architecture:**
  - Solution space
  - The capabilities and advantages of this system solution
  - Applications of this systems solution
- **Part 2: Implementation of multiprotocol industrial communications solutions:**
  - AMIC110 architecture
  - (TIDA-00299) AMIC110 ICE integration with dual-core MS320F2837x Delfino MCUs LaunchPad
- **Part 3: Industrial software and multi-protocol support:**
  - Software architecture
  - Multi-protocol support
  - Simple Open Real-Time Ethernet (SORTE)

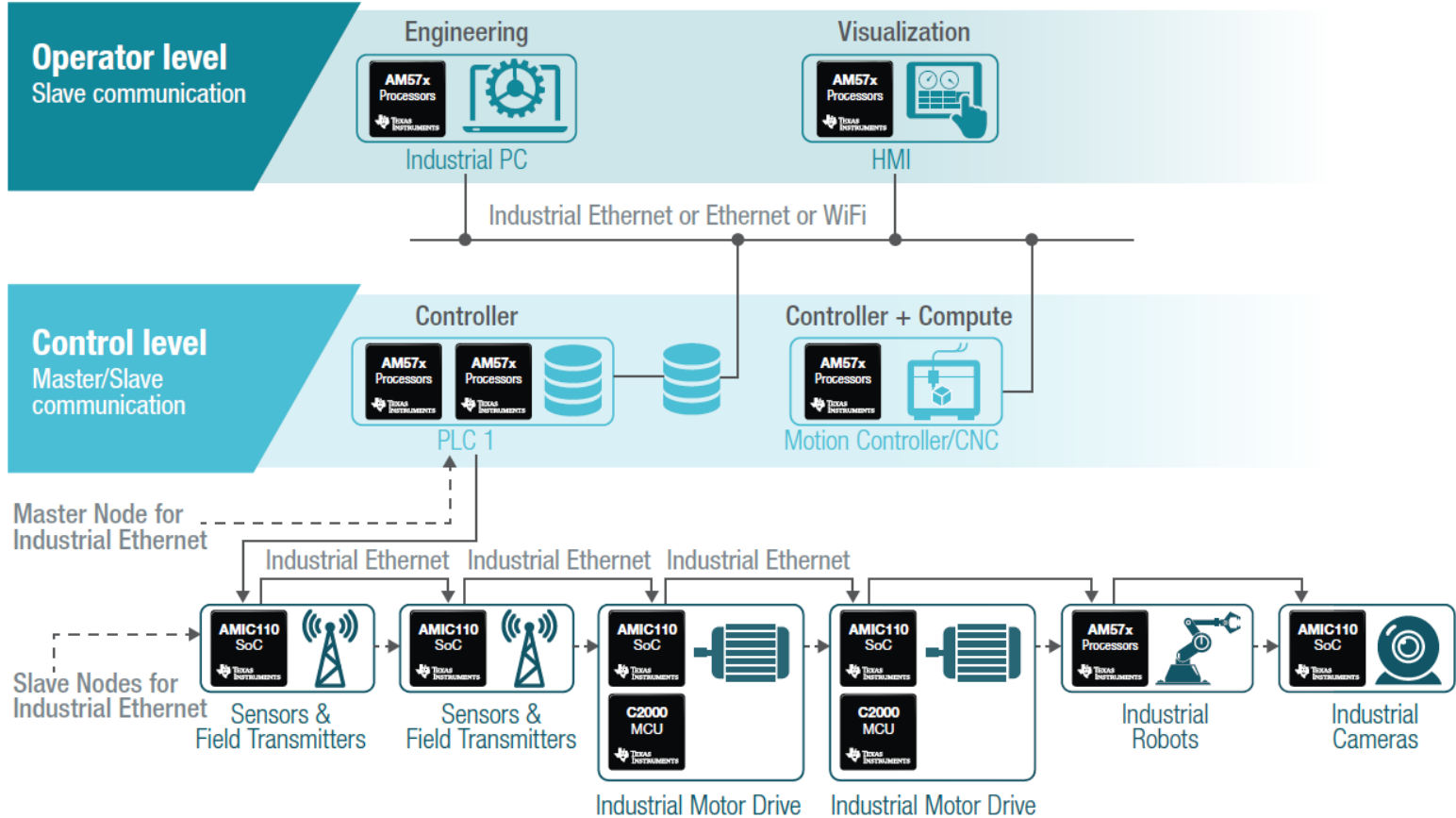
# Product solutions supported by the AMIC110 and Delfino system architecture

# Systems overview

## What problem is being solved?

- Advanced closed-loop control systems for factory, process, and power automation markets require powerful MCU solutions that can interface to variety of industrial communications protocols.
- Industrial communications protocols may evolve several times during the lifetime of a industrial product, as new features and capabilities are added.
- As a result, system providers can benefit from solutions that flexibly support multiple communications protocols and in-service updates without updating hardware.
- The flexibility of the AMIC110 solution enables existing Beckhoff ASIC EtherCAT customers a compatible path to add support for other industrial Ethernet protocols.

# Factory automation systems with AMIC110



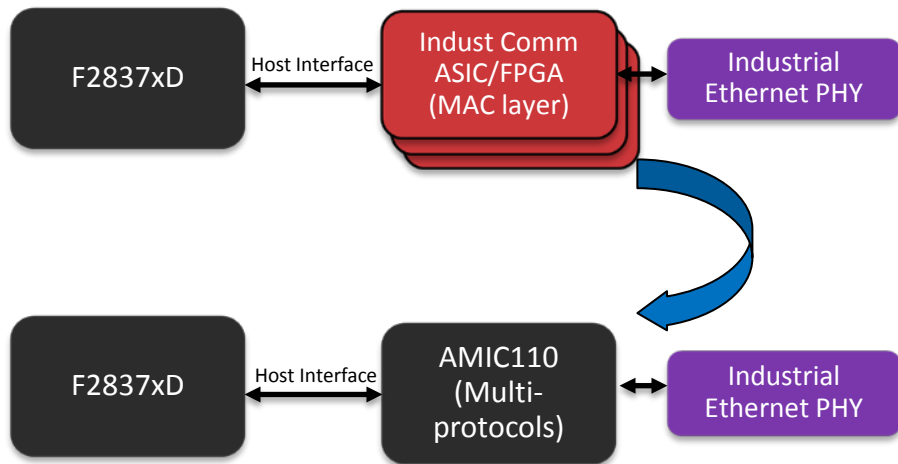
# Systems overview

## Why was this solution developed?

- AMIC110 was developed to provide a single low-cost, high-utility industrial communications solution supporting multiple communications protocols with software.
  - Supports EtherCAT, PROFINET, PROFIBUS, Ethernet/IP, POWERLINK, and SERCOS III industrial protocols
  - For existing Beckhoff EtherCAT ASIC customers, the AMIC110 supports Beckhoff ET1100 emulation supporting the ET9300 Slave Stack and provides a compatible transition path to multiprotocol support.
  - The implementation is software/firmware-based to support:
    - Multiple protocols enabled via software load
    - In-service updates with a software download and flash update
- When combined with the tools and capabilities of the Delfino MCU architecture, the system solution provides a family of end-to-end products, tools, and reference designs for communications and real-time control.



# TI solves multi-protocol support in a single SoC



## Typical Solution – Today

- F2837xD supports the application.
- Requires a separate external ASIC/FPGA for each industrial Ethernet communications protocol.

## TI's ARM + PRU-ICSS solution offers 3 benefits

- Avoids requiring an ASIC for each protocol in a F2837xD-based system.
- Single low-power, compact solution that supports multiple protocols using the same hardware, including ET1100 Emulation for existing Beckhoff customers.
- Adapts to evolving standards and product requirements through life of the product.

# For more information

- AMIC110 Multiprotocol Industrial Interface for Closed-loop Delfino Control Systems Training Series: <http://training.ti.com/industrial-closed-loop-delfino-amic110-series>
- TI Designs:
  - EtherCAT Slave BoosterPack Plug-in Module with SPI Interface: <http://www.ti.com/tool/TIDA-00299>
  - Simple Open Real-time Ethernet (SORTE) Device with PRU-ICSS Reference Design: <http://www.ti.com/tool/TIDEP-0086>
- AMIC110 software: <http://processors.wiki.ti.com/index.php/AMIC110SW>
- Sitara Industrial FAQ: [http://processors.wiki.ti.com/index.php/FAQ\\_Sitara\\_Industrial](http://processors.wiki.ti.com/index.php/FAQ_Sitara_Industrial)
- For questions about this training, refer to the TI E2E Community Sitara Processor Forum: [https://e2e.ti.com/support/arm/sitara\\_arm/f/791](https://e2e.ti.com/support/arm/sitara_arm/f/791)



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