Programmable Real-time Unit for Gigabit Industrial Communication Subsystem (PRU_ICSSG)
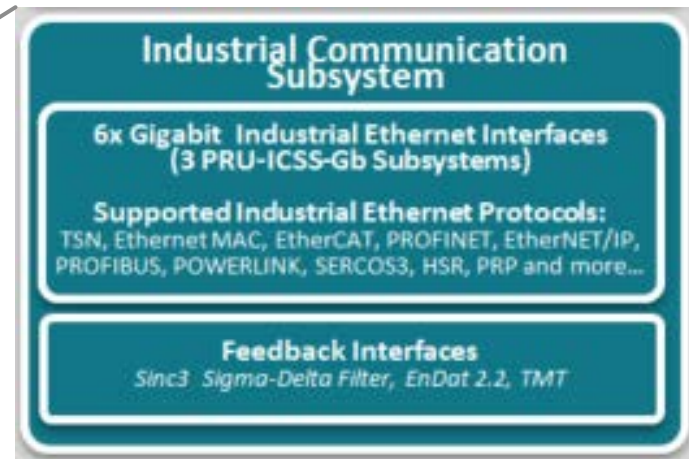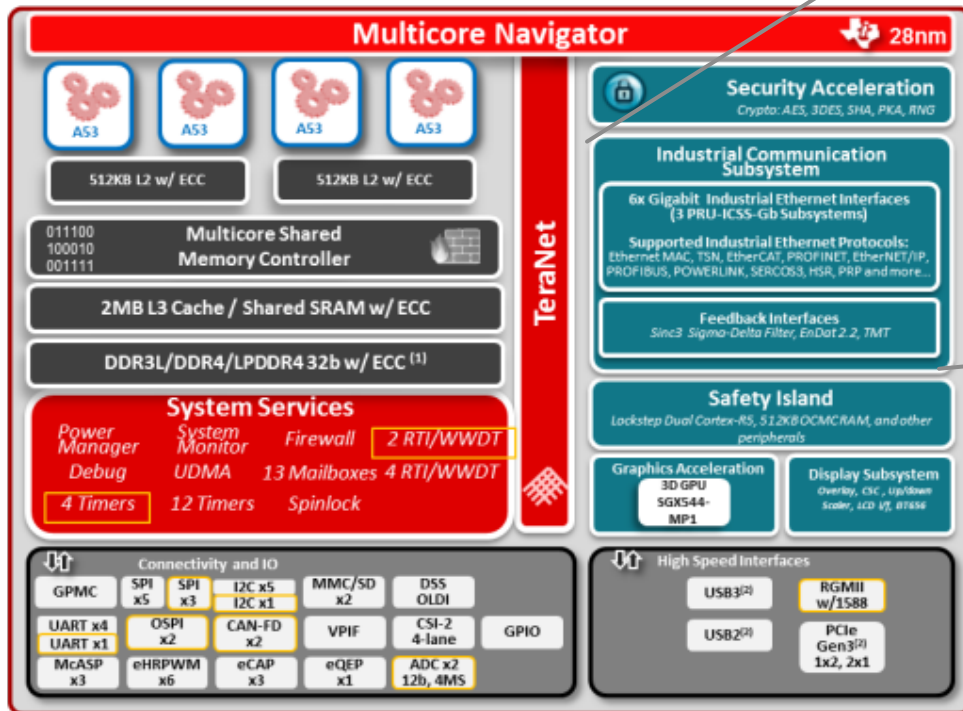
Overview

AM6548 diagram shown

What is the PRU_ICSSG?

The Programmable Real-time Unit and Industrial Communication Subsystem Gigabit (PRU_ICSSG) is a low-latency microcontroller subsystem:

- Builds on capabilities introduced in PRU-ICSS

- Has access to pins, events and all system-on-chip (SoC) resources

- Provides flexibility to implement the following:

    – Fast, real-time responses

    – Specialized data handling operations

    – Custom peripheral interfaces

    – Offloading of tasks from the other processor cores of the SoC

Feature comparison: PRU_ICSSG vs. PRU-ICSS

New to PRU_ICSSG | Upgraded in PRU_ICSSG

Feature	PRU_ICSSG	PRU-ICSS
Cores		
PRU cores	4	2
Max frequency	250 MHz	225 MHz or 200 MHz
Memory per PRU core	IRAM, DRAM, BS RAM	IRAM, DRAM
Shared DRAM	Yes	Yes
General Purpose Inputs		
Direct Input	Yes	Yes
16-bit Parallel Capture	Yes	Yes
28-bit Shift	Upgraded	Yes
3 Ch. Peripheral Interface (EnDAT)	Yes	Device dependent
9 Ch. Sigma Delta	Upgraded (not 100% backwards compatible)	Device dependent
General Purpose Outputs		
Direct Output	Upgraded	Yes
Shift out	Upgraded	Yes
Interrupt Controller / Manager		
INTC	Upgraded	Yes
Task Manager	New	--

Feature	PRU_ICSSG	PRU-ICSS
Accelerators: Data Processing		
MPY/MAC	Upgraded	Yes
CRC 16/32	Upgraded	Device dependent
Scratch Pad	4 banks (PRU), 2 banks (RTU_PRU)	3 banks
IPC Scratch Pad	New	--
Byte Swap	New	--
SUM32	New	--
Spinlock	New	--
Filter Data Base (FDB)	New	--
Accelerators: Data Movement		
XFR2VBUS	New	--
PSI TX & RX	New	--
XFR2TR	New	--
Peripherals		
UART	Yes	Yes
eCAP	Yes	Yes
IEP	2, Upgraded	1
MII_RT or MII_G_RT	Upgraded	Yes
MDIO	Yes	Yes
SGMII	New	--
PWM	New	--

PRU-ICSS sample applications

Industrial Networking

- Industrial Ethernet
- Serial Fieldbus
- Custom Interfaces

Feedback Interfaces / Motor Control

- Encoder Feedback
- Sigma Delta filter

General Purpose

- Signal Processing
- Application Synchronization
- Backplane Communication

PRU_ICSSG sample applications

New to PRU_ICSSG

Industrial Networking

- Industrial Ethernet
- Serial Fieldbus
- Custom Interfaces

- 1Gb Ethernet
- 1Gb Time Sensitive Networking

Feedback Interfaces / Motor Control

- Encoder Feedback
- Sigma Delta filter

- Integrated PWM

General Purpose

- Signal Processing
- Application Synchronization
- Backplane Communication

- Pre-emptible software execution

For more information

- PRU Training Series: https://training.ti.com/pru-training-series
- PRU-ICSS Feature Comparison: http://www.ti.com/lit/sprac90
- PRU_ICSSG Getting Starting Guide on Linux: http://www.ti.com/lit/sprace9
- PRU Read Latencies: http://www.ti.com/lit/sprace8
- PRU-ICSS / PRU_ICSSG Migration Guide http://www.ti.com/lit/spracj
- For questions about this training, refer to the E2E Community Forums at http://e2e.ti.com