i.MX RT1180: Crossover MCU with TSN Switch and EdgeLock®

Preproduction
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i.MX RT1180 Crossover MCUs are dual-core, real-time microcontrollers (MCUs) featuring an Arm® Cortex®-M7 and Arm® Cortex®M33 for high performance and real-time functionality. The i.MX RT1180 includes an integrated Gbps time-sensitive networking (TSN) switch and EtherCAT SubDevice Controller making it ideal for industrial and automotive communication applications.

The i.MX RT1180 CM7 operates at up to 800 MHz and the Arm Cortex-M33 up to 240 MHz with 1.5 MB on-chip RAM. The family supports multiple protocols, bridging communications between real-time Ethernet and Industry 4.0 systems. The i.MX RT1180 offers advanced security with the integrated EdgeLock® Secure Enclave.

The i.MX RT1180 family is supported by the MCUXpresso developer experience, which includes an SDK, a choice of IDEs and secure provisioning and configuration tools to enable rapid development.
i.MX RT1180 Crossover MCU Block Diagram

**System Control**
- Secure JTAG
- PLL, OSC
- 6 x Watchdog
- 2 x GP Timer
- 4 x Quad Timer
- 8 x Quad Timer
- 4 x FlexPWM
- 3 x LPTMR
- 6 x LPTPM

**Power Management**
- Internal Memory
  - Up to 1.5 MB SRAM w/ ECC
- Analog
  - 2 x 16b ADC 3.5Mmps
  - 1 x DAC
  - 4 x ACMP

**Main CPU Platform**
- Arm® Cortex®-M7 (up to 800 MHz)
- 32 KB I-cache
- 32 KB D-cache
- FPU
- MPU
- NVIC
- Up to 512KB TCM w/ ECC

**Secure CPU Platform**
- Arm Cortex-M33 (up to 240 MHz)
- 16 KB C-cache
- 16 KB S-cache
- FPU
- MPU
- NVIC
- 256 KB TCM w/ ECC
- TrustZone

**Connectivity**
- 2 x eMMC 5.1 / SD 3.0
- 12 x UART
- 8x8 Keypad
- 2 x i3C
- 2 x FlexIO
- 2 x USB2.0 OTG w/ PHY
- 2 x USB2.0 OTG w/ PHY
- 4 x SAI
- Delta-sigma Demodulator
  - (3 x SINC filters)
- 3 x CAN-FD

**Networking**
- TSN End-point GMAC
- 4-ports TSN Switch
  - with 1x TSN End point
- 2-Ports EtherCAT SubDevice*

**Internal Memory**
- 2 x FlexSPI (Dual-Channel QSPI)
- HyperRAM™, Hyper Flash™ w/OTF/AD
- External Memory Controller
- 8/16/32-bit
- DDRAM/LPSDRAM, SRAMC, NAND/Parallel NOR Flash
- SRAM controller
- Async 8/16bit ADMUX/Non-ADMUX SRAM

**External Memory**
- 2 x eMMC 5.1 / SD 3.0
- 12 x UART
- 2 x FlexIO
- 4 x SAI
- Delta-sigma Demodulator
  - (3 x SINC filters)
- 3 x CAN-FD

**Peripheral Interface**
- GPIO
- FlexSPI Follower
- SPDIF
- 8-ch. Digital Mic Input
- TSN End-point GMAC
- Port 4
- 4-ports TSN Switch
  - with 1x TSN End point
- 2-Ports EtherCAT SubDevice*
- Port 2
- Port 1
- Port 0

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**EdgeLock® Secure Enclave**
- Secure Boot
- Secure Debug
- PKC: RSA / ECC
- AES (CBC/CMAC/HMAC/GCM)
- TRNG
- SHA2 (224/256/384/512)

* 2-ports can be selected from Port 0 to Port 4

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- 12 x UART
- 8x8 Keypad
- 2 x i3C
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- Delta-sigma Demodulator
  - (3 x SINC filters)
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