

# i.MX RT1180 Crossover MCUs Industry 4.0 Network Solution

The [i.MX RT1180 crossover MCU](#) family includes a Gb Time Sensitive Networking (TSN) Switch to enable real-time rich networking for both TSN-based and industrial real-time communications. The i.MX RT1180 supports multiple protocols to bridge communication between existing systems and future Industry 4.0 applications.

## Product highlights

### Designed for efficiency

- Dual core architecture offering 800 MHz Arm® Cortex®-M7 and Cortex®-M33 @ 300 MHz for ultimate design flexibility
- Improved real-time execution through large low latency Tightly Coupled Memories (TCM) and embedded shared memories
- Designed for power efficiency with use cases starting from 250 mW across industrial environments
- Scalable and seamless host/companion chip communication going up to 1Gbps without an on-board PHY helps reduce power and cost in industrial designs. High-speed 16-bit Analog to Digital converters, advanced timer/PWM and Delta-Sigma demodulators to supporting multi-axis motor control

### Multiprotocol Networking

- Crossover MCU with an integrated Gb Time Sensitive Network (TSN) to support multiple communication protocols
  - Real-time industrial ethernet protocols such as Profinet, Ethernet/IP, EtherCAT, CC-Link IE Field, HSR, and more
  - Latest generation of TSN standards compliant to IEC 60802 for Industrial Automation
  - TSN based protocols such as OPC UA Pub-Sub, Profinet over TSN and CC-Link IE TSN

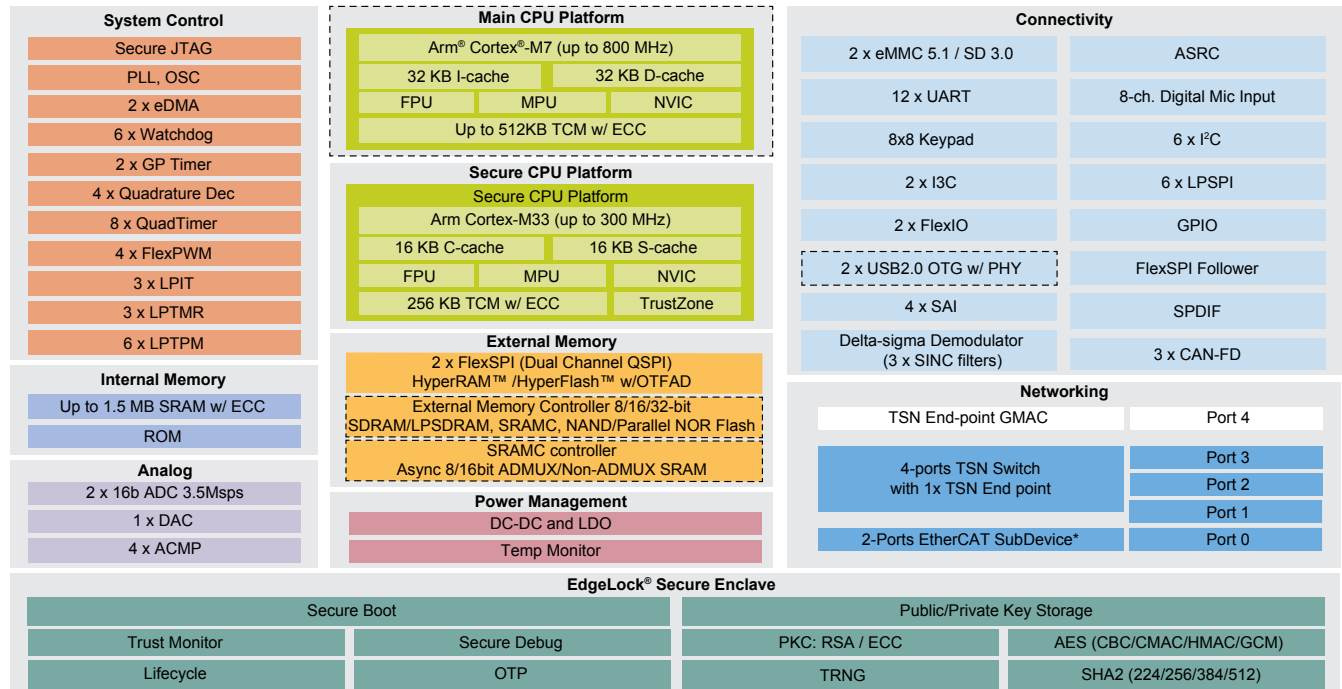
### Advanced security

- Trusted Resource Domain Controller (TRDC)
- TrustZone®-M (TZ-M) on Cortex-M33
- Physical Unclonable Function (PUF)
- EdgeLock® secure enclave
- Providing component level foundation for IEC 62443 system compliance

### Target applications

- Industrial control
- Compact motion control
- Industrial networking and gateway
- Network companion
- AC/Servo drives
- Automotive: In-vehicle networking

## i.MX RT1180 Block Diagram



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

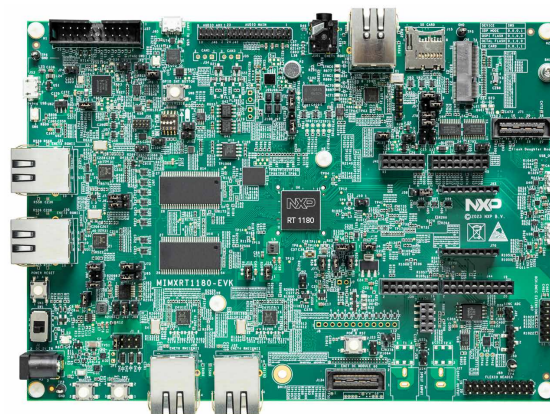
  Available on certain products within the family

## i.MX RT1180 – Family comparison

|                           | i.MX RT1189                        | i.MX RT1187                        | i.MX RT1186                       | i.MX RT1182         | i.MX RT1181         |
|---------------------------|------------------------------------|------------------------------------|-----------------------------------|---------------------|---------------------|
| <b>Cortex M7</b>          | 800 MHz                            | 800 MHz                            | 800 MHz                           | –                   | –                   |
| <b>Cortex M33</b>         | 300 MHz                            | 300 MHz                            | 300 MHz                           | 300 MHz             | 300 MHz             |
| <b>TCM</b>                | 512 KB + 256 KB w ECC              | 512 KB + 256 KB w ECC              | 512 KB + 256 KB w ECC             | 256 KB w ECC        | 256 KB w ECC        |
| <b>Total OCRAM</b>        | 1.5 MB w ECC                       | 1.5 MB w ECC                       | 1.5 MB w ECC                      | 1 MB w ECC          | 1 MB w ECC          |
| <b>GPIO</b>               | 173                                | 173                                | 120                               | 82                  | 82                  |
| <b>External memory</b>    | SEMC 1x 32 b,<br>FLEXSPI x2, SRAMC | SEMC 1x 32 b,<br>FLEXSPI x2, SRAMC | SEMC 1x 16 b<br>FLEXSPI x2, SRAMC | FLEXSPI x2, SRAMC   | FLEXSPI x2, SRAMC   |
| <b>TSN switch</b>         | 4+1 port(5x 1 Gbps)                | 4+1 port(5x 1 Gbps)                | 2+1 port(3x 1 Gbps)               | 2+1 port(3x 1 Gbps) | 2+1 port(3x 1 Gbps) |
| <b>EtherCAT SubDevice</b> | Yes                                | No                                 | Yes                               | Yes                 | No                  |
| <b>USB</b>                | USB 2.0 OTG x2 w PHY               | USB 2.0 OTG x2 w PHY               | USB 2.0 OTG x1 w PHY              | –                   | –                   |
| <b>LPUART</b>             | 12                                 | 12                                 | 8                                 | 8                   | 8                   |
| <b>LPI2C</b>              | 6                                  | 6                                  | 4                                 | 3                   | 3                   |
| <b>CAN FD</b>             | 3                                  | 3                                  | 2                                 | 2                   | 2                   |
| <b>QTimer</b>             | 8                                  | 8                                  | 8                                 | 4                   | 4                   |
| <b>LPTPM</b>              | 6                                  | 6                                  | 4                                 | 2                   | 2                   |
| <b>LPTMR</b>              | 3                                  | 3                                  | 3                                 | 1                   | 1                   |
| <b>SINC Filter</b>        | 3x 4-ch.                           | 3x 4-ch.                           | 1-ch.+2-ch.+4-ch.                 | –                   | –                   |
| <b>16b ADC</b>            | 2                                  | 2                                  | 2                                 | 1                   | 1                   |
| <b>ACMP</b>               | 4                                  | 4                                  | 1                                 | 1                   | 1                   |
| <b>Package</b>            | 289 BGA                            | 289 BGA                            | 196 BGA                           | 144 BGA             | 144 BGA             |

## i.MX RT1180 EVK Specifications

|                                |                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Processor</b>               | <ul style="list-style-type: none"><li>• MIMXRT1189CVM8B (289 MAPBGA, 14 x 14 mm, 0.8 mm pitch)</li></ul>                                                                                                                                                                                                                                        |
| <b>Memory and Mass Storage</b> | <ul style="list-style-type: none"><li>• SDRAM 256 Mb, 200MHz</li><li>• 4 Mbit LPSPi Flash</li><li>• 512 Mbit Hyper Flash</li><li>• 128 Mbit Quad SPI Flash</li><li>• TF Card Slot</li></ul>                                                                                                                                                     |
| <b>Audio</b>                   | <ul style="list-style-type: none"><li>• 3.5 mm Audio Stereo Headphone Jack</li><li>• Board-Mounted Microphone</li><li>• Left &amp; Right Speaker Out Connectors</li><li>• SPDIF Interface(unpopulated)</li><li>• Audio Extension connector</li></ul>                                                                                            |
| <b>Connectivity</b>            | <ul style="list-style-type: none"><li>• 10/100 Mbit/s Ethernet Connector. PHY Chip: RTL8201FI-VC-CG</li><li>• 10/100/1000 Mbit/s Ethernet Connector. PHY Chip: RTL8211FDI-CG</li><li>• 2x Micro-USB OTG connectors</li><li>• 2x CAN Bus Connector</li><li>• ARDUINO® interface, M.2 interface, Flash daughter card, Mikro-e, 8CH DMIC</li></ul> |
| <b>Debug</b>                   | <ul style="list-style-type: none"><li>• JTAG 20-pin Connector (SWD by default)</li><li>• MCU-Link: LPC55S69JEV98</li></ul>                                                                                                                                                                                                                      |
| <b>Sensor</b>                  | <ul style="list-style-type: none"><li>• FXLS8974CFR3: 3-Axis Accel</li></ul>                                                                                                                                                                                                                                                                    |
| <b>User Indicator</b>          | <ul style="list-style-type: none"><li>• Power Status, Reset, USER LED</li></ul>                                                                                                                                                                                                                                                                 |
| <b>PCB</b>                     | <ul style="list-style-type: none"><li>• 7.677-inch x 5.511-inch (19.5cm x 14cm), 6-layer board</li></ul>                                                                                                                                                                                                                                        |



### Get started now

The [i.MX RT1180 evaluation kit \(EVK\)](#) helps you take your design to the next level by reducing complexity and accelerating time to market.

### Software and tools

NXP's [MCUXpresso software and tools](#) offer comprehensive development solutions designed to optimize, ease and accelerate embedded system development of applications based on Cortex-M core devices from NXP, including its general purpose, crossover and Bluetooth-enabled MCUs.

Visit [nxp.com/iMXRT1180](https://nxp.com/iMXRT1180)

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Document Number: IMXRT1180FAMFS REV 2

