Reaching new heights through the convergence of applications processors and MCUs

i.MX RT Series of Crossover Processors

Combining high performance with real-time functionality, the i.MX RT series of crossover processors support next-generation IoT applications with a high level of integration and security balanced with MCU-level usability at an affordable price.

APPLICATIONS PROCESSOR PERFORMANCE + MCU USABILITY

- Move Fast, React Fast with real-time, low latency response
- Create Advanced Multimedia with advanced on-chip integration
- Connect and Protect with a high level of security
- Save Time and Money by leveraging existing MCU toolchains

TARGET APPLICATIONS

- Audio Subsystem—professional microphone, guitar pedals
- Consumer Products—Smart appliances, cameras, LCDs
- Home and Building Automation—HVAC climate control, security, lighting control panels, IoT gateways
- Industrial Computing Designs—EBS, PLCs, factory automation, test and measurement, M2M, HMI control assembly line robotics, QR reader, barcode scanner
- Motor Control and Power Conversion—3D printers, thermal printers, unmanned autonomous vehicles, robotic vacuum cleaners

PERFORMANCE HIGHLIGHTS

- Highest performing Arm® Cortex®-M7
  - 3020 CoreMark®/1284 DMIPS @ 600 MHz
- Real-time, low-latency response
  - Up to 512 KB tightly coupled memory (TCM)
  - Fastest real-time response with latency as low as 20 ns
- Low-power operation
  - Industry's lowest dynamic power with integrated DC-DC converter
  - Low-power run modes at 24 MHz

i.MX RT BLOCK DIAGRAM

Available on certain product families
### USABILITY HIGHLIGHTS

**Highly Integrated**
- Advanced multimedia for GUI and enhanced HMI
  - 2D graphics acceleration engine
  - Parallel camera sensor interface
  - LCD display controller (up to WXGA 1366 x 768)
  - 3 x I²S for high-performance, multichannel audio
- Extensive external memory interface options
  - NAND, eMMC, QuadSPI NOR flash, and Parallel NOR flash

**Easy to Use**
- MCU customers can leverage current toolchain
  - MCUXpresso, IAR, Keil®
- Rapid and easy prototyping and development
  - FreeRTOS™, SDK, Arm® Mbed™, Zephyr™, and the global Arm ecosystem

**Faster development using low-cost evaluation kit (EVK)**
**Single voltage input simplifies power circuit design**

**Low BOM Cost**
- Starting from $0.99 resale
- DC-DC converter—eliminates need for external PMIC
- LQFP and BGA packages with optimized pinout for low-cost 2-layer and 4-layer PCB design

---

**i.MX RT1010**
- Core/Speed: Cortex-M7 @ 500 MHz
- Cache: 16 KB-I, 8 KB-D
- External Memory: -
- Security: TRNG, AES-128, SHA, Secure Boot
- UART/SPI/I²C: 4/2/2
- ADC: 1M sample/s x 1
- FlexPWM/Quad Timer/Quad ENC: 1/0/0
- Pin-to-Pin Compatible: -
- Temperature: Consumer: 0 to 95 °C (Tj)
- Package: LQFP-80

**i.MX RT1015**
- Core/Speed: Cortex-M7 @ 500 MHz
- Cache: 16 KB-I, 16 KB-D
- External Memory: -
- Security: TRNG, AES-128, SHA, Secure Boot
- UART/SPI/I²C: 4/2/2
- ADC: 1M sample/s x 1
- FlexPWM/Quad Timer/Quad ENC: 1/1/1
- Pin-to-Pin Compatible: -
- Temperature: Consumer: 0 to 95 °C (Tj)
- Package: LQFP-100

**i.MX RT1020**
- Core/Speed: Cortex-M7 @ 500 MHz
- Cache: 16 KB-I, 16 KB-D
- External Memory: -
- Security: TRNG, AES-128, SHA, Secure Boot
- UART/SPI/I²C: 8/4/4
- ADC: 1M sample/s x 1
- FlexPWM/Quad Timer/Quad ENC: 2/2/2
- Pin-to-Pin Compatible: i.MX RT1020 LQFP-100
- Temperature: Consumer: 0 to 95 °C (Tj)
- Package: LQFP-100

**i.MX RT1050**
- Core/Speed: Cortex-M7 @ 600 MHz
- Cache: 32 KB-I, 32 KB-D
- External Memory: -
- Security: TRNG, AES-128, SHA, Secure Boot
- UART/SPI/I²C: 8/4/4
- ADC: 1M sample/s x 2
- FlexPWM/Quad Timer/Quad ENC: 4/4/4
- Pin-to-Pin Compatible: i.MX RT1015 LQFP-100
- Temperature: Consumer: 0 to 95 °C (Tj)
- Package: LQFP-144

**i.MX RT1060/RT1064**
- Core/Speed: Cortex-M7 @ 600 MHz
- Cache: 32 KB-I, 32 KB-D
- External Memory: -
- Security: TRNG, AES-128, SHA, Secure Boot
- UART/SPI/I²C: 8/4/4
- ADC: 1M sample/s x 2
- FlexPWM/Quad Timer/Quad ENC: 4/4/4
- Pin-to-Pin Compatible: i.MX RT1060/RT1064
- Temperature: Consumer: 0 to 95 °C (Tj)
- Package: BGA-196

---

**Feature** | **i.MX RT1010** | **i.MX RT1015** | **i.MX RT1020** | **i.MX RT1050** | **i.MX RT1060/RT1064**
---|---|---|---|---|---
Core/Speed | Cortex-M7 @ 500 MHz | Cortex-M7 @ 500 MHz | Cortex-M7 @ 500 MHz | Cortex-M7 @ 600 MHz | Cortex-M7 @ 600 MHz
Cache | 16 KB-I, 8 KB-D | 16 KB-I, 16 KB-D | 16 KB-I, 16 KB-D | 32 KB-I, 32 KB-D | 32 KB-I, 32 KB-D
External Memory | - | - | 8-/16-bit interface for SDRAM, SRAM, NOR, NAND | 8-/16-bit interface for SDRAM, SRAM, NOR, NAND | 8-/16-bit interface for SDRAM, SRAM, NOR, NAND
SDIO | - | - | - | - | SD3.0/eMMC4.5 x 2
SDPI / HyperBus | Dual Channel /8-bit | Dual Channel /8-bit | Dual-channel/8-bit | Dual-channel/8-bit | Up to 2 x Dual-channel/8-bit
Ethernet | - | - | 10/100 Mbit/s x 1 | 10/100 Mbit/s x 1 | 10/100 Mbit/s x 2
USB with PHY | OTG, HS/FS x 1 | OTG, HS/FS x 1 | OTG, HS/FS x 1 | OTG, HS/FS x 1 | OTG, HS/FS x 1
CAN | - | - | FlexCAN x 2 | FlexCAN x 2 | FlexCAN x 2 + CANFD x 1
Graphics | - | - | - | - | PxP for 2D acceleration
CSI | - | - | - | - | PxP for 2D acceleration
LCD | - | - | - | - | 8-/16-/18-bit parallel
SPI/SPDIF | 2/1 | 3/1 | 3/1 | 3/1 | 3/1
ADC | 1M sample/s x 1 | 1M sample/s x 1 | 1M sample/s x 2 | 1M sample/s x 2 | 1M sample/s x 2
ACMP | - | - | 4 | 4 | 4
FlexPWM/Quad Timer/Quad ENC | 1/0/0 | 1/1/1 | 2/2/2 | 4/4/4 | 4/4/4
Package | LQFP - 80 | - | i.MX RT1020 LQFP-100 | i.MX RT1015 LQFP-100 | i.MX RT1060/RT1064
Pin-to-Pin Compatible | - | - | i.MX RT1020 LQFP-100 | i.MX RT1015 LQFP-100 | i.MX RT1050
Temperature | Consumer: 0 to 95 °C (Tj) | Consumer: 0 to 95 °C (Tj) | Consumer: 0 to 95 °C (Tj) | Consumer: 0 to 95 °C (Tj) | Consumer: 0 to 95 °C (Tj)
Industrial: -40 to 105 °C (Tj) | Industrial: -40 to 105 °C (Tj) | Industrial: -40 to 105 °C (Tj) | Industrial: -40 to 105 °C (Tj) | Industrial: -40 to 105 °C (Tj) | Industrial: -40 to 105 °C (Tj)