Driving 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 are designed to support the next generation IoT applications with a high level of integration and security balanced with MCU-level usability at an affordable price.

## THE NEW CROSSOVER PROCESSOR MARKET

As a leading supplier of both applications processors and microcontrollers (MCUs), NXP is in a unique position to introduce a new class of embedded processors driven by the growing consumer demand for enhanced user experience in their smart, secure, high performance products.

- Greater performance
- Real-time operation
- Richer Integration
- Ease-of-use

## 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
- **Motor Control and Power Conversion**—3D printers, thermal printers, unmanned autonomous vehicles, robotic vacuum cleaners

## CROSSOVER PROCESSORS

## 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

## PERFORMANCE HIGHLIGHTS

- Highest performing Arm® Cortex®-M7
  - 3015 CoreMark/1284 DMIPS @ 600 MHz
- Real-time, low-latency response
  - Up to 512KB Tightly Coupled Memory (TCM)
  - Fastest real-time response with latency as low as 20ns
- Low power Operation
  - Industry's lowest dynamic power with integrated DC-DC converter
  - Low power run modes at 24MHz

## 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 1366x768)
  - 3x I²S for high-performance, multichannel audio
- Extensive external memory interface options
  - NAND, eMMC, QuadSPI NOR Flash, and Parallel NOR Flash
- Wireless connectivity interface for
  - Wi-Fi®, Bluetooth®, BLE, ZigBee® and Thread™

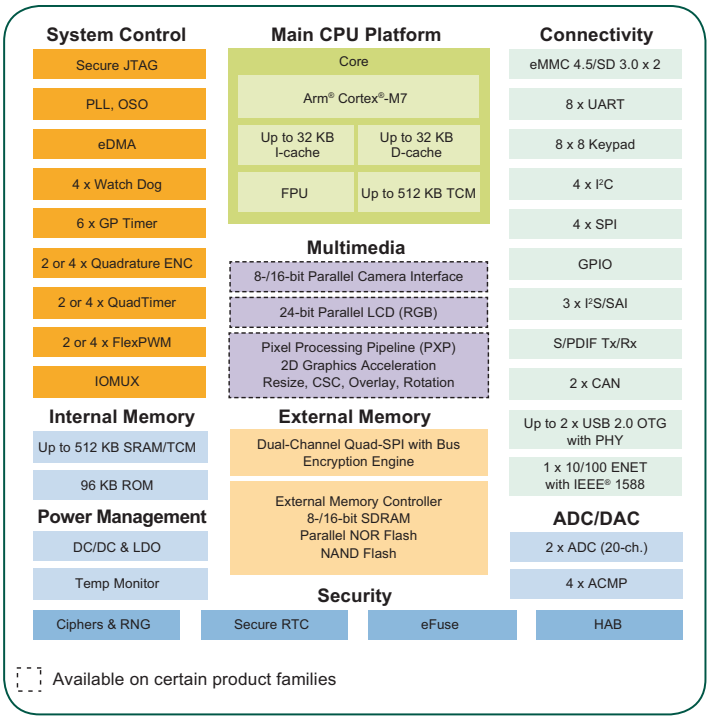
### Easy to Use

- MCU customers can leverage current toolchain
  - MCUXpresso, IAR, Keil
- Rapid and easy prototyping and development
  - FreeRTOS, SDK, Arm® Mbed™, and the global Arm ecosystem
- Faster development using low-cost evaluation kit (EVK)
- Single voltage input simplifies power circuit design

### Low BOM Cost

- 10k 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 RT BLOCK DIAGRAM




## i.MX RT Features

| Feature | i.MX RT1020 | i.MX RT1050 |
|---|---|---|
| Core/Speed | Arm Cortex-M7 @ 500 MHz | Arm Cortex-M7 @ 600 MHz |
| Cache | 16 KB-I, 16KB-D | 32 KB-I, 32KB-D |
| On-chip RAM | 256KB | 512KB |
| External Memory | 8/16-bit Interface for SDRAM, SRAM, NOR, NAND | 8/16-bit Interface for SDRAM, SRAM, NOR, NAND |
| SDIO | SD3.0/eMMC4.5 x2 | SD3.0/eMMC4.5 x2 |
| QSPI / HyperBus | Dual Channel / 8-bit | Dual Channel / 8-bit |
| Ethernet | 10/100Mbps x1 | 10/100Mbps x1 |
| USB with PHY | OTG, HS/FS x 1 | OTG, HS/FS x 2 |
| CAN | FlexCAN x2 | FlexCAN x2 |
| Graphics | - | PxP for 2D acceleration |
| CSI | - | 8/10/16-bit Parallel |
| LCD | - | 8/16/18/24-bit Parallel |
| Security | TRNG, AES-128, SHA Secure Boot | TRNG, AES-128, SHA Secure Boot |
| UART/SPI/I²C | 8/4/4 | 8/4/4 |
| I²S/SPDIF/ASRC | 3/1/0 | 3/1/0 |
| ADC | 1M sample/s x2 | 1M sample/s x2 |
| ACMP/DAC | 4/0 | 4/0 |
| Quad ENC/Quad Timer/FlexPWM | 2/2/2 | 4/4/4 |
| GP Timer / WDOG | 6/4 | 6/4 |
| Package | LQFP-100, LQFP-144 | BGA-196 |
| Temperature | Consumer: 0C to 95C (Tj) | Consumer: 0C to 95C (Tj) |
| | Industrial: -40C to 105C (Tj) | Industrial: -40C to 105C (Tj) |

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**www.nxp.com/iMXRT**



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