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 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

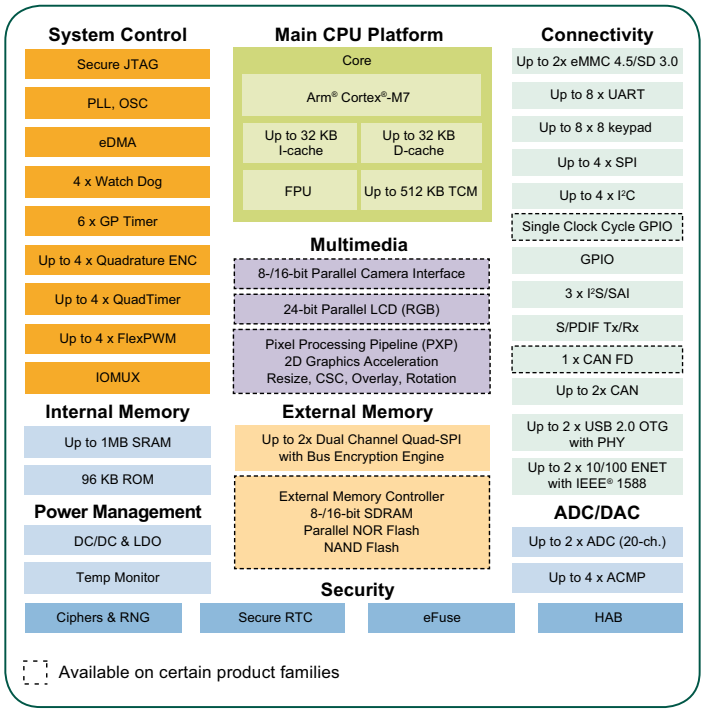
As a leading supplier of both applications processors and microcontrollers (MCUs), NXP® is in a unique position to introduce a new class of embedded processors driven by the growing consumer demand for enhanced user experience in their smart and secure high-performance products.

- 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, QR reader, barcode scanner
- **Motor Control and Power Conversion**—3D printers, thermal printers, unmanned autonomous vehicles, robotic vacuum cleaners

i.MX RT BLOCK DIAGRAM



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
  - 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

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
- Wireless connectivity interface for
  - Wi-Fi®, Bluetooth®, BLE, ZigBee® and Thread™

Feature	i.MX RT1015	i.MX RT1020	i.MX RT1050	i.MX RT1060
Core/Speed	Cortex-M7 @ 500 MHZ	Cortex-M7 @ 500 MHz	Cortex-M7 @ 600 MHz	Cortex-M7 @ 600 MHz
Cache	16 KB-I, 16 KB-D	16 KB-I, 16 KB-D	32 KB-I, 32 KB-D	32 KB-I, 32 KB-D
TCM	Up to 128 KB	Up to 256 KB	Up to 512 KB	Up to 512 KB
On-chip RAM	128 KB	256 KB	512 KB	1 MB
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 x1	SD3.0/eMMC4.5 x 2	SD3.0/eMMC4.5 x 2	SD3.0/eMMC4.5 x 2
QSPI / HyperBus	Dual Channel / 8-bit	Dual-channel/8-bit	Dual-channel/8-bit	2x 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
CAN	-	FlexCAN x 2	FlexCAN x 2	FlexCAN x 2 + CANFD x 1
Graphics	-	-	PxP for 2D acceleration	PxP for 2D acceleration
CSI	-	-	8-/10-/16-bit parallel	8-/10-/16-bit parallel
LCD	-	-	8-/16-/18-/24-bit parallel	8-/16-/18-/24-bit parallel
Security	TRNG, AES-128, SHA, Secure Boot	TRNG, AES-128, SHA, Secure Boot	TRNG, AES-128, SHA, Secure Boot	TRNG, AES-128, SHA, Secure Boot
UART/SPI/I²C	4/2/2	8/4/4	8/4/4	8/4/4
I²S/SPDIF	3/1	3/1	3/1	3/1
ADC	1M sample/s x 1	1M sample/s x 2	1M sample/s x 2	1M sample/s x 2
ACMP	0	4	4	4
Quad ENC/ Quad Timer/ FlexPWM	1/1/1	2/2/2	4/4/4	4/4/4
GP Timer / WDOG	6/4	6/4	6/4	6/4
Package	LQFP-100	LQFP-100, LQFP-144	BGA-196	BGA-196
Pin-to-Pin Compatible	i.MX RT1020 LQFP-100	i.MX RT1015 LQFP-100	i.MX RT1060	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)
	Industrial: -40 to 105 °C (Tj)	Industrial: -40 to 105 °C (Tj)	Industrial: -40 to 105 °C (Tj)	Industrial: -40 to 105 °C (Tj)

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

- 10k resale sub $1.50
- 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

www.nxp.com/iMXRT

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