

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

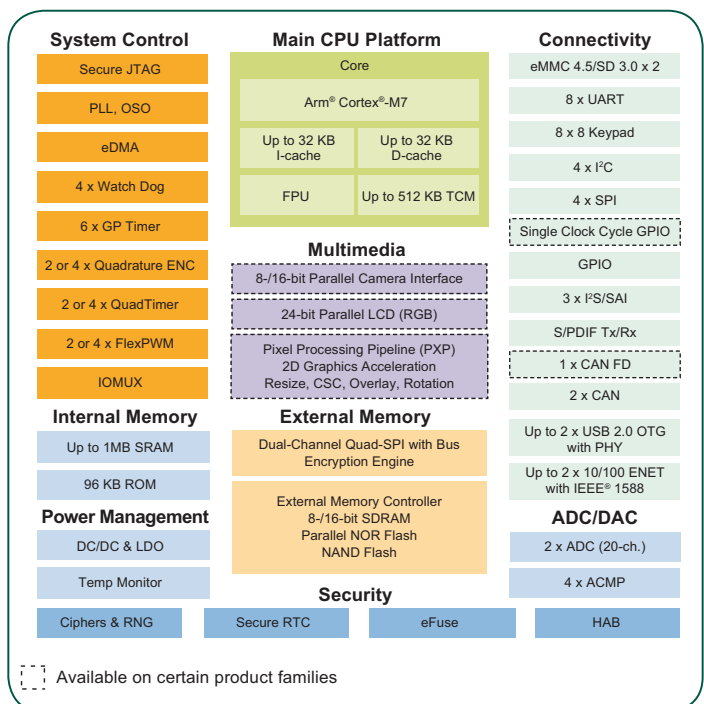
As a leading supplier of both applications processors and microcontrollers (MCUs), NXP is in a unique position to introduce a new class of embedded processors driven by the growing consumer demand for enhanced user experience in their smart, secure, high performance products.

- ▶ 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

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 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™

i.MX RT Features

Feature	i.MX RT1020	i.MX RT1050	i.MX RT1060
Core/Speed	Arm Cortex-M7 @ 500 MHz	Arm Cortex-M7 @ 600 MHz	Arm Cortex-M7 @ 600 MHz
Cache	16 KB-I, 16KB-D	32 KB-I, 32KB-D	32 KB-I, 32KB-D
TCM	Up to 256KB	Up to 512KB	Up to 512KB
On-chip RAM	256KB	512KB	1MB
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 x2	SD3.0/eMMC4.5 x2	SD3.0/eMMC4.5 x2
QSPI / HyperBus	Dual Channel / 8-bit	Dual Channel / 8-bit	Dual Channel / 8-bit
Ethernet	10/100Mbps x 1	10/100Mbps x 1	10/100Mbps x 2
USB with PHY	OTG, HS/FS x 1	OTG, HS/FS x 2	OTG, HS/FS x 2
CAN	FlexCAN x2	FlexCAN x2	FlexCAN x2 + 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
UART/SPI/I ² C	8/4/4	8/4/4	8/4/4
I ² S/SPDIF/ASRC	3/1/0	3/1/0	3/1/0
ADC	1M sample/s x2	1M sample/s x2	1M sample/s x2
ACMP/DAC	4/0	4/0	4/0
Quad ENC/Quad Timer/FlexPWM	2/2/2	4/4/4	4/4/4
GP Timer / WDOG	6/4	6/4	6/4
Package	LQFP-100, LQFP-144	BGA-196	BGA-196
Pin-to-Pin Compatible	-	Yes	Yes
Temperature	Consumer: 0C to 95C (Tj) Industrial: -40C to 105C (Tj)	Consumer: 0C to 95C (Tj) Industrial: -40C to 105C (Tj)	Consumer: 0C to 95C (Tj) Industrial: -40C to 105C (Tj)

Red indicates change from column to the left

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 at sub \$2.50
- ▶ 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

NXP and the NXP logo are trademarks of NXP B.V. All other product or service names are the property of their respective owners. All other product or service names are the property of their respective owners. Arm, Cortex and TrustZone are registered trademarks of Arm Limited (or its subsidiaries) in the EU and/or elsewhere. All rights reserved. © 2018 NXP B.V.

Document Number: IMXRTSERIESFS REV 2