



# i.MX RT SERIES OF CROSSOVER MCUs

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## USHERING IN THE GHZ MCU ERA

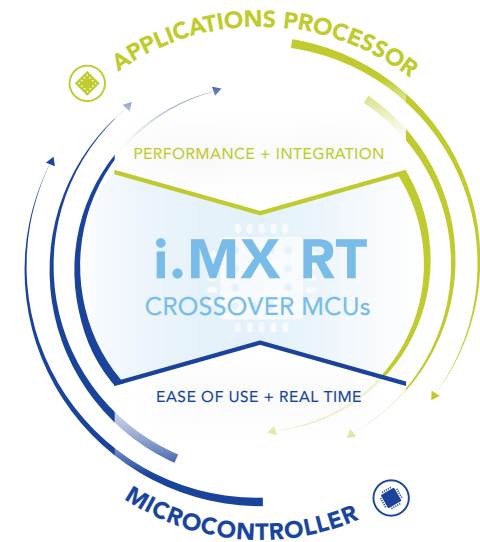
NXP's crossover processors and MCUs marry the simplicity of MCUs with the complexity of applications processors into a hybrid device designed to address the growing consumer demand for enhanced user experiences in smart and secure high-performance products. Included in this class of products is the i.MX RT series of crossover MCUs that combines unprecedented performance with reliability and high levels of integration and security to propel industrial, IoT and automotive applications.

### PORTFOLIO HIGHLIGHTS

- Variety of high performing Arm® Cortex®-M and DSP cores
- Hardware accelerators (PXP, 2D GPU, PowerQuad DSP coprocessor)
- Large, low-latency on-chip SRAM memory
- Low-power operation
  - Low dynamic power with integrated DC-DC converter
  - Low-power quiescent power modes
- Highly integrated with advanced multimedia for GUI and enhanced HMI
- Extensive memory interface options, including Quad/Octal SPI and HyperFlash™/HyperRAM™, SDRAM, NAND Flash, NOR Flash, SD/eMMC
- Security
  - Hardware protected keys for secure boot
  - AES engine for data encryption
  - On-the-fly decryption for execute-in-place (XIP) from Quad/Octal SPI/HyperFlash
  - Hardware elliptic curve cryptography
  - Cryptography hardware coprocessor

### TARGET APPLICATIONS

-  [Audio subsystems](#)
-  [Automotive graphic applications and electronic controllers](#)
-  [Consumer products](#)
-  [Home and building automation](#)
-  [Industrial computing designs](#)
-  [ML-based edge applications](#)
-  [Motor control and power conversion](#)
-  [Personal devices](#)
-  [Personal health and fitness](#)
-  [Voice-enabled IoT devices](#)



## MEMORY EXPANSION WITH i.MX RT MCUS

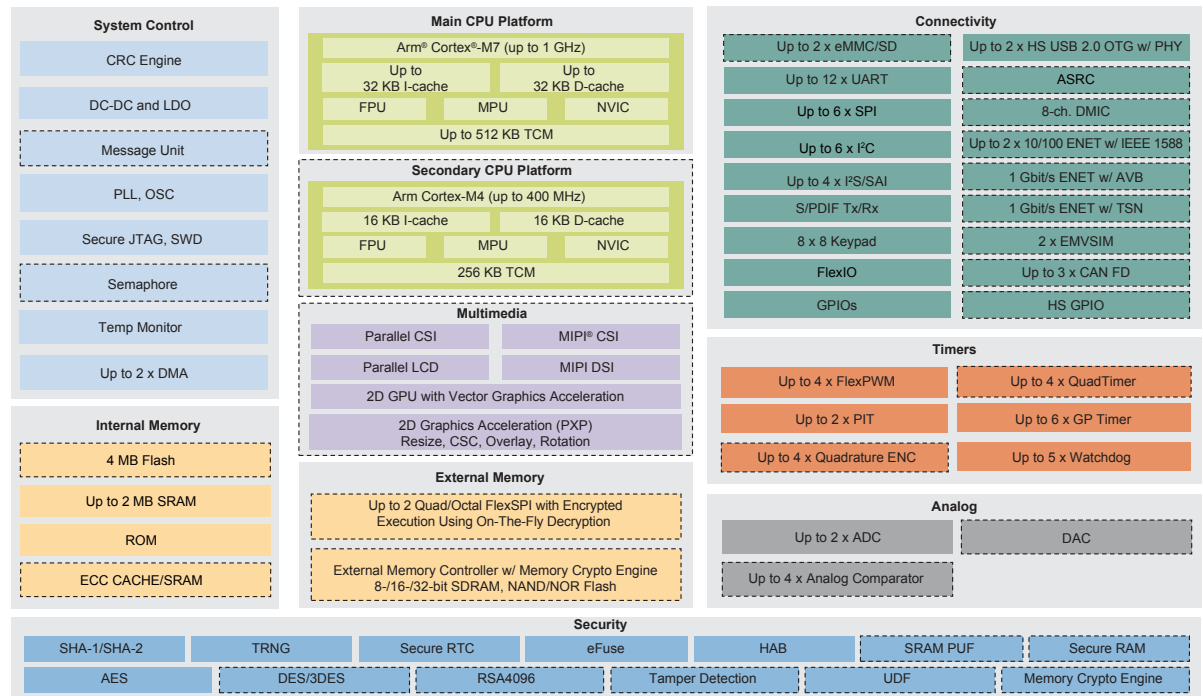
i.MX RT crossover MCUs shed the burden of on-chip flash, which helps reduce the cost and helps enable higher frequency operation for increased performance. In turn, it helps you boost capabilities, increase efficiency and add more features. The i.MX RT FlexSPI interface provides memory expansion for external memories such as serial flash/PSRAM, quad or octal data lines. This memory expansion offers increased design flexibility and helps to ensure a high level of performance and security. The i.MX RT series integrates high densities of SRAM, which is further configured within the crossover design architecture to function as TCM with “zero-wait” single-cycle access to dramatically increase system performance. This key design feature helps enable the crossover processor’s effective performance to be better than the traditional MCU counterpart.

## NEXT-GENERATION HMI DESIGN

The i.MX RT1000 portfolio includes scalable solutions for HMI applications with features such as parallel camera interface, dedicated LCD controllers and the PXP for 2D graphics acceleration. The PXP is a high-performance pixel processor for operations such as color-space conversion, alpha blending and rotation. It also supports traditional pixel/frame processing paths for still-image and video processing applications.

For more advanced HMI designs, the i.MX RT1160, i.MX RT1170 and i.MX RT500 devices offer additional features, including MIPI CSI, MIPI DSI and a 2D GPU with vector graphics acceleration. Additionally, NXP has partnered with several third parties to deliver embedded graphics software as part of the MCUXpresso SDK.

## i.MX RT1000 AND i.MX RT1100 CROSSOVER MCU<sub>s</sub> BLOCK DIAGRAM



Available on certain product families

## ADVANCED SECURITY

Secure development with the i.MX RT leverages years of experience gained from its applications processor lineage. The ROM firmware on the devices, as well as the tools used in the development and manufacturing processes, have been used and tested. With the i.MX RT and its associated software and tools for secure boot, the foundation for meeting today’s security requirements can be achieved.

## LOW POWER DESIGN

The i.MX RT series is optimized for achieving the lowest possible power consumption at the required performance levels. Specifically, the i.MX RT600 and i.MX RT500 offer various reduced power modes and use various low power design techniques to enable long battery life in both active and sleep modes.

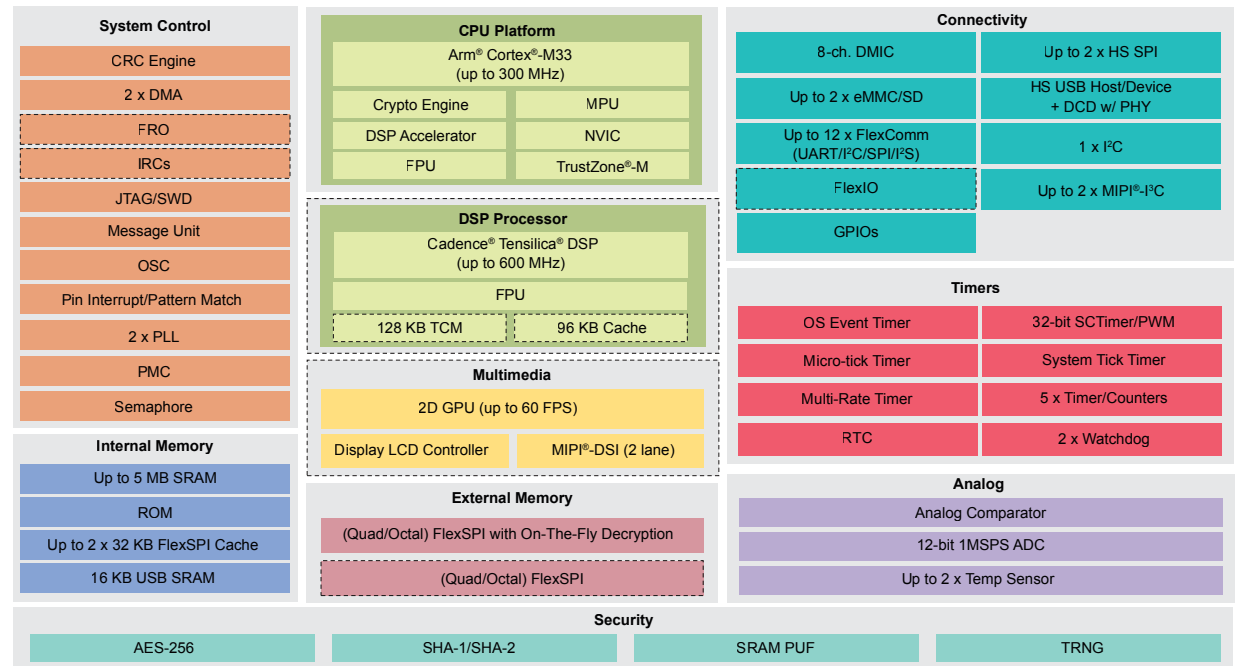
## MAXIMUM FLEXIBILITY WITH FlexIO

FlexIO is a highly configurable module providing a wide range of functionality, including emulation of a variety of communication protocols such as UART, I<sup>2</sup>C, SPI and I<sup>2</sup>S. This means that you have the flexibility in your design to add more of the peripherals you need. Additionally, the FlexIO module consists of a flexible 16-bit timer with support for a variety of trigger, reset, enable and disable conditions.

## MCU + DSP = UNLIMITED CAPABILITIES

Take advantage of the integrated DSP technology and enhance your design with audio features, voice capabilities and sensor processing, all while maintaining low power consumption with the i.MX RT600 and i.MX RT500 MCUs. The Cadence® Tensilica® HiFi 4 and Fusion DSPs provide the right level of high-performance audio digital signal processing power and include algorithm-specific operations for a fully programmable approach that provides maximum flexibility. All Cadence Tensilica DSPs support multiple existing and developing standards, as well as specific algorithms.

## i.MX RT500 AND i.MX RT600 CROSSOVER MCUs BLOCK DIAGRAM



Available on certain product families

## i.MX RT1000 MCU FAMILIES | STANDARD KEY FEATURES

i.MX RT1000 MCUs are NXP's first generation crossover MCUs, which combine high performance and integration with ease of use and real-time functionality. The i.MX RT1000 MCUs run on the Arm Cortex-M7 cores up to 600 MHz.

| Feature                               | i.MX RT1010                                               | i.MX RT1015                                               | i.MX RT1020                                               | i.MX RT1024                                               | i.MX RT1040                                                        | i.MX RT1050                                               | i.MX RT1060                                                                                        | i.MX RT1064                                               |
|---------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| <b>Core/Speed</b>                     | Arm Cortex-M7 @ 500 MHz                                   | Cortex-M7 @ 500 MHz                                       | Cortex-M7 @ 500 MHz                                       | Cortex-M7 @ 500 MHz                                       | Cortex-M7 @ 600 MHz                                                | Cortex-M7 @ 600 MHz                                       | Cortex-M7 @ 600 MHz                                                                                | Cortex-M7 @ 600 MHz                                       |
| <b>Cache</b>                          | 16 KB-I, 8 KB-D                                           | 16 KB-I, 16 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                                          | 32 KB-I, 32 KB-D                                                                                   | 32 KB-I, 32 KB-D                                          |
| <b>TCM</b>                            | Up to 128 KB                                              | Up to 128 KB                                              | Up to 256 KB                                              | Up to 256 KB                                              | Up to 512 KB                                                       | Up to 512 KB                                              | Up to 512 KB                                                                                       | Up to 512 KB                                              |
| <b>On-chip RAM</b>                    | 128 KB                                                    | 128 KB                                                    | 256 KB                                                    | 256 KB                                                    | 512 KB                                                             | 512 KB                                                    | 1 MB                                                                                               | 1 MB                                                      |
| <b>On-chip flash</b>                  | -                                                         | -                                                         | -                                                         | 4 MB                                                      | -                                                                  | -                                                         | -                                                                                                  | 4 MB                                                      |
| <b>External memory</b>                | -                                                         | -                                                         | 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                     | 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            |
| <b>Quad/Octal SPI/HyperBus™</b>       | Dual-channel/8-bit                                        | Dual-channel/8-bit                                        | Dual-channel/8-bit                                        | Up to 2 x dual-channel/8-bit                              | Up to 2 x dual-channel/8-bit                                       | Dual-channel/8-bit                                        | Up to 2 x dual-channel/8-bit                                                                       | Up to 2 x dual-channel/8-bit                              |
| <b>SDIO</b>                           | -                                                         | -                                                         | SD 3.0/eMMC 4.5 x 2                                       | SD 3.0/eMMC 4.5 x 2                                       | SD 3.0/eMMC 4.5 x 2                                                | SD 3.0/eMMC 4.5 x 2                                       | SD 3.0/eMMC 4.5 x 2                                                                                | SD 3.0/eMMC 4.5 x 2                                       |
| <b>Ethernet</b>                       | -                                                         | -                                                         | 10/100 Mbit/s x 1 w/ IEEE 1588                            | 10/100 Mbit/s x 1 w/ IEEE 1588                            | 10/100 Mbit/s x 2 w/ IEEE 1588                                     | 10/100 Mbit/s x 1 w/ IEEE 1588                            | 10/100 Mbit/s x 2 w/ IEEE 1588                                                                     | 10/100 Mbit/s x 2 w/ IEEE 1588                            |
| <b>USB with PHY</b>                   | 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                                                     | OTG, HS/FS x 2                                            | OTG, HS/FS x 2                                                                                     | OTG, HS/FS x 2                                            |
| <b>CAN</b>                            | -                                                         | -                                                         | FlexCAN x 2                                               | FlexCAN x 2                                               | FlexCAN x 2 + CAN FD x 1                                           | FlexCAN x 2                                               | FlexCAN x 2 + CAN FD x 1                                                                           | FlexCAN x 2 + CAN FD x 1                                  |
| <b>Graphics</b>                       | -                                                         | -                                                         | -                                                         | -                                                         | PxP for 2D acceleration                                            | PxP for 2D acceleration                                   | PxP for 2D acceleration                                                                            | PxP for 2D acceleration                                   |
| <b>CSI</b>                            | -                                                         | -                                                         | -                                                         | -                                                         | -                                                                  | 8-/10-/16-bit parallel                                    | 8-/10-/16-bit parallel                                                                             | 8-/10-/16-bit parallel                                    |
| <b>LCD</b>                            | -                                                         | -                                                         | -                                                         | -                                                         | 8-/16-/18-/24-bit parallel                                         | 8-/16-/18-/24-bit parallel                                | 8-/16-/18-/24-bit parallel                                                                         | 8-/16-/18-/24-bit parallel                                |
| <b>Security</b>                       | TRNG, AES-128, SHA, Secure Boot, Boot, OTFAD              | TRNG, AES-128, SHA, Secure Boot, BEE                      | TRNG, AES-128, SHA, Secure Boot, BEE                      | TRNG, AES-128, SHA, Secure Boot, BEE                      | TRNG, AES-128, SHA, Secure Boot, BEE                               | TRNG, AES-128, SHA, Secure Boot, BEE                      | TRNG, AES-128, SHA, Secure Boot, BEE                                                               | TRNG, AES-128, SHA, Secure Boot, BEE                      |
| <b>UART/SPI/I<sup>2</sup>C/FlexIO</b> | 4/2/2/1                                                   | 4/2/2/1                                                   | 8/4/4/1                                                   | 8/4/4/1                                                   | 8/4/4/3                                                            | 8/4/4/2                                                   | 8/4/4/3                                                                                            | 8/4/4/3                                                   |
| <b>I<sup>2</sup>S/SPDIF</b>           | 2/1                                                       | 3/1                                                       | 3/1                                                       | 3/1                                                       | 3/1                                                                | 3/1                                                       | 3/1                                                                                                | 3/1                                                       |
| <b>ADC</b>                            | 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                                                    | 1M sample/s x 2                                           | 1M sample/s x 2                                                                                    | 1M sample/s x 2                                           |
| <b>Analog Comparator</b>              | -                                                         | -                                                         | 4                                                         | 4                                                         | 4                                                                  | 4                                                         | 4                                                                                                  | 4                                                         |
| <b>FlexPWM/quad timer/quad ENC</b>    | 1/0/0                                                     | 1/1/1                                                     | 2/2/2                                                     | 2/2/2                                                     | 4/4/4                                                              | 4/4/4                                                     | 4/4/4                                                                                              | 4/4/4                                                     |
| <b>GPT/PIT/WDOG</b>                   | 2/1/4                                                     | 2/1/4                                                     | 2/1/4                                                     | 2/1/4                                                     | 2/1/4                                                              | 2/1/4                                                     | 2/1/4                                                                                              | 2/1/4                                                     |
| <b>Package</b>                        | 80 LQFP                                                   | 100 LQFP                                                  | 100 LQFP, 144 LQFP                                        | 144 LQFP                                                  | 169 BGA                                                            | 196 BGA                                                   | 225 BGA, 196 BGA                                                                                   | 196 BGA                                                   |
| <b>Temperature (T<sub>j</sub>)</b>    | Commercial: 0 °C to 95 °C<br>Industrial: -40 °C to 105 °C | Commercial: 0 °C to 95 °C<br>Industrial: -40 °C to 105 °C | Commercial: 0 °C to 95 °C<br>Industrial: -40 °C to 105 °C | Commercial: 0 °C to 95 °C<br>Industrial: -40 °C to 105 °C | Commercial: 0 °C to 95 °C<br>Extended Industrial: -40 °C to 125 °C | Commercial: 0 °C to 95 °C<br>Industrial: -40 °C to 105 °C | Commercial: 0 °C to 95 °C<br>Industrial: -40 °C to 105 °C<br>Extended Industrial: -40 °C to 125 °C | Commercial: 0 °C to 95 °C<br>Industrial: -40 °C to 105 °C |

## i.MX RT1100 MCU FAMILIES | STANDARD KEY FEATURES

The i.MX RT1170 MCU family is setting speed records at 1GHz. This ground-breaking family combines superior computing power and multiple media capabilities with ease of use and real-time functionality. The dual core i.MX RT1170 runs on the Arm® Cortex®-M7 core at 1 GHz and Cortex-M4 core at 400 MHz. The dual core i.MX RT1160 runs on the Cortex-M7 core at 600 MHz and Cortex-M4 core at 240MHz. Both product families provide advanced security in addition to support over a wide temperature range making it ideal for several markets.

| Feature                          | i.MX RT1170                                                                                                                      | i.MX RT1160                                                                                                                      |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Core/Speed                       | Arm Cortex-M7 @ 1 GHz, Cortex-M4 @ 400 MHz                                                                                       | Cortex-M7 @ 600 MHz, Cortex-M4 @ 240 MHz                                                                                         |
| Cache                            | 32 KB-I, 32 KB-D                                                                                                                 | 32 KB-I, 32 KB-D                                                                                                                 |
| TCM                              | Up to 512 KB for M7, 256 KB for M4                                                                                               | Up to 512 KB                                                                                                                     |
| On-chip RAM                      | 2 MB                                                                                                                             | 1 MB                                                                                                                             |
| On-chip flash                    | -                                                                                                                                | -                                                                                                                                |
| External memory                  | 8-/16-/32-bit interface for SDRAM, SRAM, NOR, NAND                                                                               | 8-/16-/32-bit interface for SDRAM, SRAM, NOR, NAND                                                                               |
| Quad/Octal SPI/HyperBus™         | 1 x dual-channel/8-bit 1 x dual-channel/ 16-bit                                                                                  | 1 x dual-channel/8-bit 1 x dual-channel/ 16-bit                                                                                  |
| SDIO                             | SD 3.0/eMMC 5.0 x 2                                                                                                              | SD 3.0/eMMC 5.0 x 2                                                                                                              |
| Ethernet                         | 1 Gbit/s w/ AVB + 1Gbit/s w/ TSN + 10/100 Mbit/s w/ IEEE 1588                                                                    | 1 Gbit/s w/ AVB + 10/100 Mbit/s w/ IEEE 1588                                                                                     |
| USB with PHY                     | OTG, HS/FS x 2                                                                                                                   | OTG, HS/FS x 2                                                                                                                   |
| CAN                              | CAN FD x 3                                                                                                                       | CAN FD x 3                                                                                                                       |
| Graphics                         | PxP for 2D acceleration, 2D GPU with vector graphics acceleration                                                                | PxP for 2D acceleration, 2D GPU with vector graphics acceleration                                                                |
| Camera interface                 | 8-/10-/16- bit parallel, 2-lane MIPI CSI                                                                                         | 8-/10-/16- bit parallel, 2-lane MIPI CSI                                                                                         |
| LCD                              | 8-/16-/18-/24-bit parallel, 2-lane MIPI DSI                                                                                      | 8-/16-/18-/24-bit parallel, 2-lane MIPI DSI                                                                                      |
| Security                         | TRNG, AES-128/256, SHA1/SHA2, Secure Boot, RSA4096, DES/3DES, Tamper Detection PUF, UDF, Secure RAM, Elliptic Curve Cryptography | TRNG, AES-128/256, SHA1/SHA2, Secure Boot, RSA4096, DES/3DES, Tamper Detection PUF, UDF, Secure RAM, Elliptic Curve Cryptography |
| UART/SPI/I <sup>2</sup> C/FlexIO | 12/6/6/2                                                                                                                         | 12/6/6/2                                                                                                                         |
| I <sup>2</sup> S/SPDIF           | 4/1                                                                                                                              | 4/1                                                                                                                              |
| ADC                              | 4.2M sample/s x 2                                                                                                                | 4.2M sample/s x 2                                                                                                                |
| Analog Comparator/DAC            | 4/1                                                                                                                              | 4/1                                                                                                                              |
| FlexPWM/quad timer/quad ENC      | 4/4/4                                                                                                                            | 4/4/4                                                                                                                            |
| GPT/PIT/WDOG                     | 6/2/6                                                                                                                            | 6/2/6                                                                                                                            |
| Package                          | 289 BGA                                                                                                                          | 289 BGA                                                                                                                          |
| Temperature (T <sub>j</sub> )    | Commercial: 0 °C to 95 °C Industrial: -40 °C to 105 °C<br>Automotive -40 °C to 125 °C                                            | Commercial: 0 °C to 95 °C Industrial: -40 °C to 105 °C<br>Extended Industrial: -40 °C to 125 °C                                  |

## i.MX RT600 and i.MX RT500 MCU FAMILIES | STANDARD KEY FEATURES

The i.MX RT500 and i.MX RT600 families of secure and embedded crossover MCUs pair a high-performance DSP core with the real-time functionality of an Arm Cortex-M33 core to help unlock the potential of IoT edge applications.

| Feature                                            | i.MX RT500                                                                                                          | i.MX RT600                                                                                                          |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Core/Speed</b>                                  | Arm Cortex-M33 @ 275 MHz + Cadence® Tensilica® Fusion F1 DSP* @ 275 MHz                                             | Arm Cortex-M33 @ 300 MHz + Cadence Tensilica HiFi 4 DSP @ 600 MHz                                                   |
| <b>Cache</b>                                       | 2 x 32 KB (FlexSPI)                                                                                                 | 32 KB (FlexSPI), 96 KB (DSP)                                                                                        |
| <b>SRAM</b>                                        | Up to 5 MB                                                                                                          | 4.5 MB                                                                                                              |
| <b>Quad/Octal SPI HyperBus</b>                     | 2 x dual-channel, on-the-fly decryption (on 1 x FlexSPI)                                                            | 1 x dual-channel, on-the-fly decryption                                                                             |
| <b>SDIO</b>                                        | 2 x eMMC 5.0/SD 3.0                                                                                                 | 2 x eMMC 5.0/SD 3.0                                                                                                 |
| <b>USB with PHY</b>                                | 1 x HS/FS                                                                                                           | 1 x HS/FS                                                                                                           |
| <b>Graphics*</b>                                   | 2D GPU with vector graphics acceleration                                                                            | -                                                                                                                   |
| <b>CSI</b>                                         | 8/10/16-bit parallel (FlexIO)                                                                                       | -                                                                                                                   |
| <b>LCD</b>                                         | 8/10/16/18/24-bit parallel (FlexIO) + LCD Interface + MIPI DSI                                                      | -                                                                                                                   |
| <b>Security</b>                                    | AES-256, SHA1/SHA2, secure boot, SRAM PUF, TRNG, cryptography hardware coprocessor attached to Cortex-M33 CPU       | AES-256, SHA1/SHA2, secure boot, SRAM PUF, TRNG, cryptography hardware coprocessor attached to Cortex-M33 CPU       |
| <b>FlexComm</b>                                    | Up to 17 x FlexComm (14x config. as I <sup>2</sup> C/UART/SPI/I <sup>2</sup> S + 2 x HS SPI + 1 x I <sup>2</sup> C) | Up to 10 x FlexComm (8 x config. as I <sup>2</sup> C/UART/SPI/I <sup>2</sup> S + 1 x HS SPI + 1 x I <sup>2</sup> C) |
| <b>FlexIO/HS SPI/I<sup>2</sup>C/I<sup>3</sup>C</b> | 1/2/1/2                                                                                                             | 0/1/1/1                                                                                                             |
| <b>ADC</b>                                         | 1M sample/s                                                                                                         | 1M sample/s                                                                                                         |
| <b>Analog Comparator</b>                           | 1                                                                                                                   | 1                                                                                                                   |
| <b>PWM</b>                                         | 10 GP/PWM outputs + 8 GP inputs                                                                                     | 10 GP/PWM outputs + 8 GP inputs                                                                                     |
| <b>DMIC</b>                                        | 8 channels w/ decimators and voice activation detect                                                                | 8 channels w/ decimators and voice activation detect                                                                |
| <b>GPT/SCT/WDOG</b>                                | 5/1/2                                                                                                               | 5/1/2                                                                                                               |
| <b>GPIOs</b>                                       | Up to 136                                                                                                           | Up to 147                                                                                                           |
| <b>Packages</b>                                    | 249 FOWLP (Q1 2021), 141 CSP (Q2 2021)                                                                              | 249 FOWLP, 176 BGA, 114 CSP                                                                                         |
| <b>Temperature (T<sub>j</sub>)</b>                 | Commercial: -20 °C to 70 °C                                                                                         | Commercial: -20 °C to 85 °C                                                                                         |

\*Product variants without integrated DSP and/or graphics are also available.

## GET STARTED NOW

Take advantage of the robust enablement to reduce development effort and speed time-to-market with a comprehensive offering of software and development 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, including Kinetis® and LPC microcontrollers, and i.MX RT crossover MCUs.

The i.MX RT evaluation kits (EVKs) help you take your design to the next level by reducing complexity and accelerating time to market. You can also enjoy the ability to expand upon this feature-rich EVK with compatible Arduino™ hardware shields.

- Toolchains
  - MCUXpresso software and tools
  - IAR Embedded Workbench® IDE
  - Keil® IDE
  - Cadence Tensilica Xplorer IDE
- Software
  - MCUXpresso SDK with Amazon FreeRTOS™
  - Cadence Tensilica Xplorer SDK
  - Zephyr® operating system (OS)
  - Arm Mbed™ OS and the global Arm ecosystem
  - NXP® eIQ™ machine learning software
    - TensorFlow Lite inference engine
    - Arm CMSIS-NN kernels
    - Glow neural network compiler



## Libraries and Codecs

Libraries and codecs are distributed and licensed for customer production use on specific NXP devices.

The following libraries and codecs are provided complimentary:









- Xtensa Audio Framework (XAF)
- NatureDSP Library
- CMSIS DSP Library (Arm Cortex-M33)
- RPMsg Lite
- AAC decoder
- MP3 decoder
- Opus codec (encoder/decoder)
- Synchronous and asynchronous sample rate converters
- SBC decoder
- SBC encoder
- Ogg/Vorbis decoder (i.MX RT600 only)





## i.MX RT1000 AND i.MX RT1100 EVALUATION KIT FEATURES

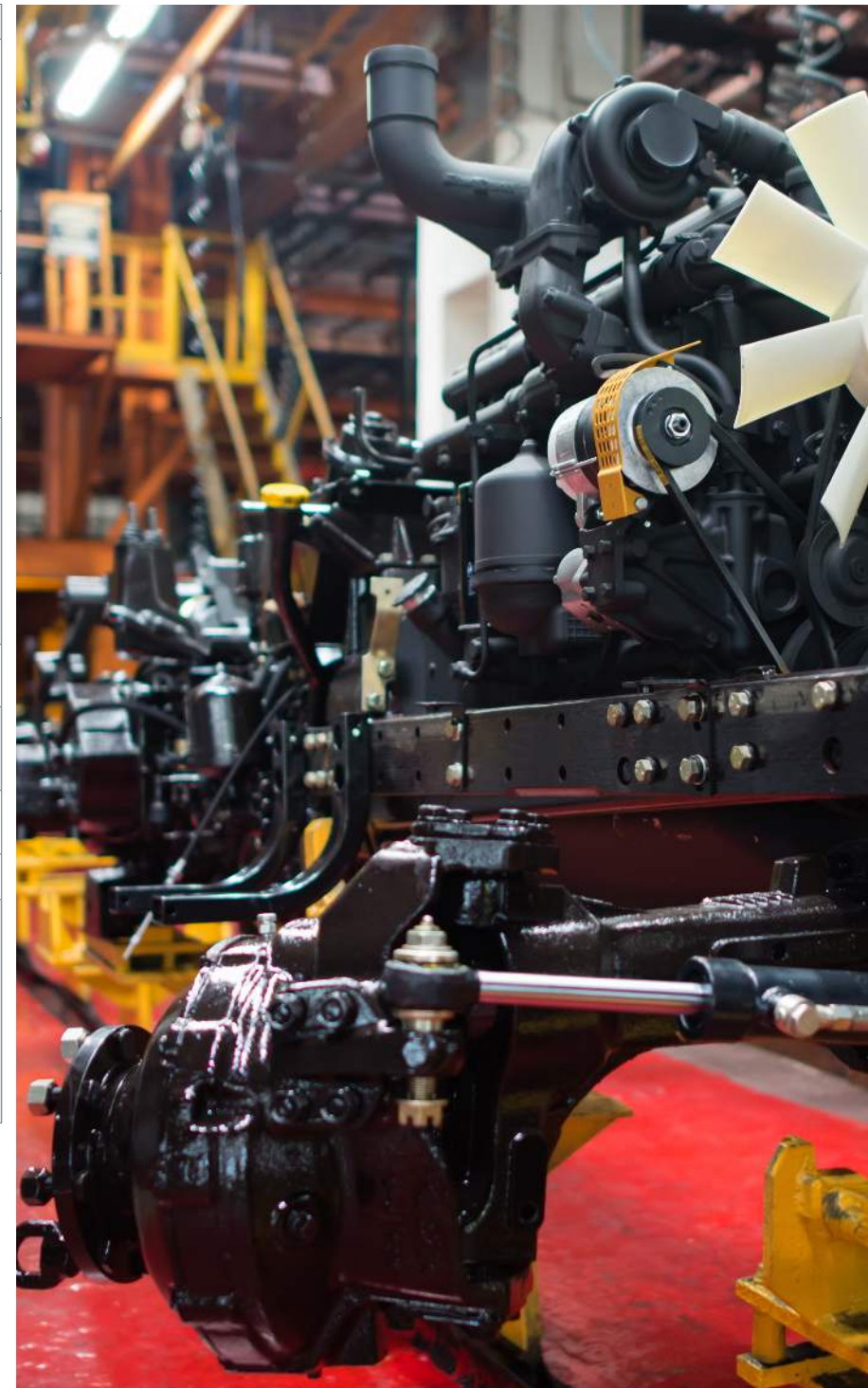
i.MX RT1010, i.MX RT1015, i.MX RT1020 and i.MX RT1024 EVKs are two-layer through-hole PCBs enabled with a six-axis e-compass sensor, multiple audio features and debug options.

i.MX RT1040, i.MX RT1050, i.MX RT1060 and i.MX RT1064 EVKs are four-layer through-hole PCBs that also offer additional features, including camera and LCD support.



| EVK                  | i.MX RT1010                                                                                        | i.MX RT1015                                                                                        | i.MX RT1020                                                                                                                            | i.MX RT1024                                                                                                                            | i.MX RT1040                                                                                              | i.MX RT1050                                                                                                                            | i.MX RT1060                                                                                                                                                                  | i.MX RT1064                                                                                                                            |
|----------------------|----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Processor</b>     | • MIMXRT1011DAE5A                                                                                  | • MIMXRT1015DAF5A                                                                                  | • MIMXRT1021DAG5A                                                                                                                      | • MIMXRT1024DAG5A                                                                                                                      | • MIMXRT1042XJM5B                                                                                        | • MIMXRT1052DVL6B                                                                                                                      | • MIMXRT1062DVL6A/B                                                                                                                                                          | • MIMXRT1064DVL6A                                                                                                                      |
| <b>Memory</b>        | • 128 Mbit QSPI flash                                                                              | • 128 Mbit QSPI flash                                                                              | • 256 Mbit SDRAM memory<br>• 64 Mbit QSPI Flash<br>• TF socket for SD card                                                             | • 256 Mbit SDRAM memory<br>• 64 Mbit QSPI Flash<br>• TF socket for SD card                                                             | • 256 Mbit SDRAM memory<br>• 64 Mbit QSPI Flash<br>• TF socket for SD card                               | • 256 Mbit SDRAM memory<br>• 512 Mbit HyperFlash™<br>• 64 Mbit QSPI flash<br>• TF socket for SD card                                   | • 256 Mbit SDRAM memory<br>• 512 Mbit HyperFlash<br>• 64 Mbit QSPI flash<br>• TF socket for SD card                                                                          | • 256 Mbit SDRAM memory<br>• 512 Mbit HyperFlash<br>• 64 Mbit QSPI flash<br>• TF socket for SD card                                    |
| <b>Display</b>       | N/A                                                                                                | N/A                                                                                                | N/A                                                                                                                                    | N/A                                                                                                                                    | • Parallel LCD connector                                                                                 | • Parallel LCD connector<br>• Camera connector                                                                                         | • Parallel LCD connector<br>• Camera sensor module                                                                                                                           | • Parallel LCD connector<br>• Camera sensor module                                                                                     |
| <b>Audio</b>         | • Audio codec<br>• 4-pole audio headphone jack<br>• External speaker connection<br>• Microphone    | • Audio codec<br>• 4-pole audio headphone jack<br>• External speaker connection<br>• Microphone    | • Audio codec<br>• 4-pole audio headphone jack<br>• External speaker connection<br>• Microphone                                        | • Audio codec<br>• 4-pole audio headphone jack<br>• External speaker connection<br>• Microphone                                        | • Audio codec<br>• 4-pole audio headphone jack<br>• External speaker connection<br>• Microphone          | • Audio codec<br>• 4-pole audio headphone jack<br>• External speaker connection<br>• Microphone<br>• SPDIF connector                   | • Audio codec<br>• 4-pole audio headphone jack<br>• External speaker connection<br>• Microphone<br>• SPDIF connector<br>• Audio extension support                            | • Audio codec<br>• 4-pole audio headphone jack<br>• External speaker connection<br>• Microphone<br>• SPDIF connector                   |
| <b>Connectivity</b>  | • Micro USB OTG connector<br>• Arduino interface                                                   | • Micro USB OTG connector<br>• Arduino interface                                                   | • Micro USB host connector<br>• Micro USB OTG connector<br>• Ethernet (10/100T) connector<br>• CAN transceivers<br>• Arduino interface | • Micro USB host connector<br>• Micro USB OTG connector<br>• Ethernet (10/100T) connector<br>• CAN transceivers<br>• Arduino interface | • Micro USB OTG connector<br>• Ethernet (10/100T) connector<br>• CAN transceivers<br>• Arduino interface | • Micro USB host connector<br>• Micro USB OTG connector<br>• Ethernet (10/100T) connector<br>• CAN transceivers<br>• Arduino interface | • Micro USB host connector<br>• Micro USB OTG connector<br>• Ethernet (10/100T) connector<br>• CAN transceivers<br>• Arduino interface<br>• M.2 interface<br>• MFI interface | • Micro USB host connector<br>• Micro USB OTG connector<br>• Ethernet (10/100T) connector<br>• CAN transceivers<br>• Arduino interface |
| <b>Debug</b>         | • JTAG connector<br>• Onboard DAP-link debugger                                                    | • JTAG connector<br>• Onboard DAP-link debugger                                                    | • JTAG connector<br>• Onboard DAP-link debugger                                                                                        | • JTAG connector<br>• Onboard DAP-link debugger                                                                                        | • JTAG connector<br>• Onboard DAP-link debugger                                                          | • JTAG connector<br>• Onboard DAP-link debugger                                                                                        | • JTAG connector<br>• Onboard DAP-link debugger                                                                                                                              | • JTAG connector<br>• Onboard DAP-link debugger                                                                                        |
| <b>Sensor</b>        | • 6-axis e-compass sensor<br>• NXP FXOS8700CQ                                                      | • 6-axis e-compass sensor<br>• NXP FXOS8700CQ                                                      | • 6-axis e-compass sensor<br>• NXP FXOS8700CQ                                                                                          | • 6-axis e-compass sensor<br>• NXP FXOS8700CQ                                                                                          | • 3-axis accelerometer sensor<br>• NXP FXLS8974CFR3                                                      | • 6-axis e-compass sensor<br>• NXP FXOS8700CQ                                                                                          | • 6-axis e-compass sensor<br>• NXP FXOS8700CQ                                                                                                                                | • 6-axis e-compass sensor<br>• NXP FXOS8700CQ                                                                                          |
| <b>Part Number</b>   | MIMXRT1010-EVK                                                                                     | MIMXRT1015-EVK                                                                                     | MIMXRT1020-EVK                                                                                                                         | MIMXRT1024-EVK                                                                                                                         | MIMXRT1040-EVK                                                                                           | IMXRT1050-EVKB                                                                                                                         | MIMXRT1060-EVK,<br>MIMXRT1060-EVKB                                                                                                                                           | MIMXRT1064-EVK                                                                                                                         |
| <b>Camera Sensor</b> | N/A                                                                                                | N/A                                                                                                | N/A                                                                                                                                    | N/A                                                                                                                                    | N/A                                                                                                      | N/A                                                                                                                                    | MT9M114 image sensor (included w/ MIMXRT1062DVL6A only)                                                                                                                      | MT9M114 image sensor (included)                                                                                                        |
| <b>Display</b>       | N/A                                                                                                | N/A                                                                                                | N/A                                                                                                                                    | N/A                                                                                                                                    | RK043FN66HS-CTG/<br>RK043FN02H-CT 4.3"<br>(purchase separately)                                          | RK043FN02H-CT 4.3"<br>(purchase separately)                                                                                            | RK043FN02H-CT 4.3"<br>(purchase separately)                                                                                                                                  | RK043FN02H-CT 4.3"<br>(purchase separately)                                                                                            |
| <b>Board Image</b>   | <br>i.MX RT1010 | <br>i.MX RT1015 | <br>i.MX RT1020                                     | <br>i.MX RT1024                                    | <br>i.MX RT1040     | <br>i.MX RT1050                                   | <br>i.MX RT1060                                                                         | <br>i.MX RT1064                                   |

## i.MX RT1100 EVALUATION KIT FEATURES

|                             |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                  |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Processor</b>            | <ul style="list-style-type: none"> <li>• MIMXRT1176DVMAA</li> </ul>                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>• MIMXRT1166DVM6A</li> </ul>                                                                                                                                                                                                                              |
| <b>Memory</b>               | <ul style="list-style-type: none"> <li>• 512 Mbit SDRAM memory</li> <li>• 512 Mbit Octal flash</li> <li>• 128 Mbit QSPI flash</li> <li>• 2 Gbit Raw NAND flash</li> <li>• 64 Mbit LPSPFI flash</li> <li>• TF socket for SD card</li> </ul>                                                                                | <ul style="list-style-type: none"> <li>• 512 Mbit SDRAM memory</li> <li>• 512 Mbit Octal flash</li> <li>• 128 Mbit QSPI flash</li> <li>• TF socket for SD card</li> </ul>                                                                                                                        |
| <b>Graphics</b>             | <ul style="list-style-type: none"> <li>• MIPI LCD connector</li> <li>• MIPI camera sensor connector</li> </ul>                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>• MIPI LCD connector</li> <li>• MIPI camera sensor connector</li> </ul>                                                                                                                                                                                   |
| <b>Audio</b>                | <ul style="list-style-type: none"> <li>• Audio codec</li> <li>• 4-pole audio headphone jack</li> <li>• External speaker connection</li> <li>• Microphone (analog and digital)</li> <li>• SPDIF connector</li> </ul>                                                                                                       | <ul style="list-style-type: none"> <li>• Audio codec</li> <li>• 4-pole audio headphone jack</li> <li>• External speaker connection</li> <li>• Microphone (analog and digital)</li> </ul>                                                                                                         |
| <b>Connectivity</b>         | <ul style="list-style-type: none"> <li>• 2 x Micro USB OTG connectors</li> <li>• Ethernet (10/100/1000M) connector</li> <li>• Ethernet (10/100M) connector</li> <li>• M.2 connector</li> <li>• CAN transceivers</li> <li>• Arduino® interface</li> <li>• FRDM motor control interface</li> <li>• SIM card slot</li> </ul> | <ul style="list-style-type: none"> <li>• 2 x Micro USB OTG connectors</li> <li>• Ethernet (10/100/1000M) connector</li> <li>• Ethernet (10/100M) connector</li> <li>• M.2 connector</li> <li>• CAN transceivers</li> <li>• Arduino® interface</li> <li>• FRDM motor control interface</li> </ul> |
| <b>Debug</b>                | <ul style="list-style-type: none"> <li>• JTAG connector</li> <li>• Onboard DAP-Link debugger</li> </ul>                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>• JTAG connector</li> <li>• Onboard DAP-Link debugger</li> </ul>                                                                                                                                                                                          |
| <b>Sensor</b>               | <ul style="list-style-type: none"> <li>• 6-Axis ecompass (3-Axis magnetometer, 3-Axis accelerometer) sensor FXOS8700CQ</li> <li>• Camera sensor OV5640 MIPI camera module</li> </ul>                                                                                                                                      | <ul style="list-style-type: none"> <li>• 6-Axis ecompass (3-Axis magnetometer, 3-Axis accelerometer) sensor FXOS8700CQ</li> <li>• Camera sensor OV5640 MIPI camera module</li> </ul>                                                                                                             |
| <b>Ordering Information</b> | <ul style="list-style-type: none"> <li>• MIMXRT1170-EVK</li> <li>• RK055HDMIPI4M (5.5" 720p display)</li> </ul>                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>• MIMXRT1160-EVK</li> <li>• RK055HDMIPI4M (5.5" 720p display)</li> </ul>                                                                                                                                                                                  |
| <b>Power</b>                | <ul style="list-style-type: none"> <li>• 5V/3A power adaptor</li> </ul>                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>• 5V/3A power adaptor</li> </ul>                                                                                                                                                                                                                          |
| <b>Board Image</b>          |                                                                                                                                                                                                                                        |                                                                                                                                                                                                              |



## i.MX RT500 and i.MX RT600 EVALUATION KIT FEATURES

| Features     | i.MX RT500 EVK                                                                                                                                                                                                                 | i.MX RT600 EVK                                                                                                                                                                                                                 |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Part Number  | MIMXRT595-EVK                                                                                                                                                                                                                  | MIMXRT685-EVK                                                                                                                                                                                                                  |
| Processor    | MIMXRT595SFFOC                                                                                                                                                                                                                 | MIMXRT685SFVKB                                                                                                                                                                                                                 |
| Memory       | <ul style="list-style-type: none"> <li>64 MB Macronix Octal SPI Flash</li> <li>8 MB PSRAM</li> <li>16 GB SanDisk eMMC</li> </ul>                                                                                               | <ul style="list-style-type: none"> <li>64 MB Macronix Octal SPI Flash</li> <li>8 MB PSRAM</li> </ul>                                                                                                                           |
| Display      | MIPI-DSI connector                                                                                                                                                                                                             | N/A                                                                                                                                                                                                                            |
| Audio        | <ul style="list-style-type: none"> <li>DMIC header</li> <li>Dual Knowles SPH0641IM4H digital microphone</li> <li>Stereo audio codec with audio line in/out</li> <li>Dual Class-D amplifiers with speaker connectors</li> </ul> | <ul style="list-style-type: none"> <li>DMIC header</li> <li>Dual Knowles SPH0641IM4H digital microphone</li> <li>Stereo audio codec with audio line in/out</li> <li>Dual Class-D amplifiers with speaker connectors</li> </ul> |
| Connectivity | <ul style="list-style-type: none"> <li>HS/FX USB port with micro-A/B connector</li> <li>SD card slot</li> <li>Arduino and PMOD expansion connectors</li> </ul>                                                                 | <ul style="list-style-type: none"> <li>HS/FX USB port with micro-A/B connector</li> <li>SD card slot</li> <li>Arduino and PMOD expansion connectors</li> </ul>                                                                 |
| Debug        | <ul style="list-style-type: none"> <li>10-pin and 20-pin JTAG/SWD connectors</li> <li>On-board debug probe, with VCOM and CMSIS-DAP or J-link firmware options</li> </ul>                                                      | <ul style="list-style-type: none"> <li>10-pin and 20-pin JTAG/SWD connectors</li> <li>On-board debug probe, with VCOM and CMSIS-DAP or J-link firmware options</li> </ul>                                                      |
| Sensor       | <ul style="list-style-type: none"> <li>6-axis e-compass sensor</li> <li>NXP FXOS8700CQ</li> </ul>                                                                                                                              | <ul style="list-style-type: none"> <li>6-axis e-compass sensor</li> <li>NXP FXOS8700CQ</li> </ul>                                                                                                                              |
| Display      | <ul style="list-style-type: none"> <li>RK055HDMIPI4M* (MIPI I/F) - 5.5", 720 x 1280</li> <li>G1120B0MIPI* (MIPI I/F) -1.2", 390 x 390</li> <li>MIKROE-2406** (FlexIO I/F) - 5", 800 x 480, capacitive touch</li> </ul>         | N/A                                                                                                                                                                                                                            |
| Board Image  |                                                                                                                                              |                                                                                                                                            |

\* Purchased separately from NXP

\*\* Purchased separately from third party

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