

## New ARM Cortex-M processors offer the next industry standard for secure IoT

### Highlights

- ARM® Cortex®-M23 and Cortex-M33, the first in a new family of ARMv8-M based processors, bringing proven ARM TrustZone™ technology to secure even the smallest of embedded devices
- The new processors make it easier for developers to create extremely energy-efficient, secure and connected IoT devices
- Licensed by the majority of the top 10 global MCU suppliers and backed by the world's No. 1 embedded ecosystem, Cortex-M23 and Cortex-M33 are set to become the processors of choice for microcontrollers, extending TrustZone as a standard for creating secure IoT solutions
- Publically announced silicon partners include Analog Devices, Microchip, Nuvoton, NXP, Renesas, Silicon Labs, STMicroelectronics

### Efficiency, security and scale are essential to IoT growth

IoT and connected embedded intelligence are becoming integral to how we live our lives and how enterprises do business. Today, use cases such as remote health monitoring, smart lighting, streamlining logistics and managing flood defenses are offering just a glimpse of what innovation is possible. The reliability and integrity of these future mission-critical systems depends on robust security.

Confidentiality of data will be paramount to the global acceptance of more IoT applications. Integration of secure technology at a hardware level is essential for future IoT devices to be trusted. Security needs to be easy for the anticipated millions of IoT developers to build and scale, and yet it must be energy-efficient for products to run.

### Product overview

For IoT to reach its potential, its foundation must be based on proven and trusted technology. The first Cortex-M processors, based on the ARMv8-M architecture with TrustZone technology, will lead the way to secure, pervasive, 32-bit embedded compute and enable the acceleration of IoT adoption.

- The Cortex-M33 offers 20% performance increase in the same process technology compared to the high embedded performance bars already established by Cortex-M3 and Cortex-M4 processors, while improving power efficiency
- The Cortex-M23 brings security to even the most constrained devices and carries forward the standard set by Cortex-M0+ as the ultra-low power microprocessor in a tiny footprint.

As well as security, these new processors deliver a range of additional features, including an enhanced bus interface to facilitate multi-processor designs. They offer a scalable solution, making it easier for developers to create solutions that span different performance points.

- Cortex-M33 is highly versatile – a single processor spanning wide capabilities. It provides configurable support for TrustZone, DSP, and floating point computation. Its new co-processor interface enables tightly coupled custom processing to be added while retaining all of the benefits of a vibrant tools ecosystem. The Cortex-M33 core will be the general-purpose 32-bit MCU processor of choice for secure embedded applications
- Cortex-M23 is built for small, energy sipping IoT and embedded products. It extends the capability of the smallest lowest power devices, providing security, enhanced efficiency, performance and scalability for deployment even in the most constrained contexts.

## Security

The security foundation for billions of Cortex-A devices, TrustZone technology is trusted in a diverse range of everyday applications from secure payment and content protection to IoT gateways.

- TrustZone for ARMv8-M is optimized for the real-time deterministic and extremely low-power requirements addressed by Cortex-M processors
- Next-generation Cortex-M processors are designed for securing data, firmware and peripherals, while simplifying and reducing the amount of code needed for secure embedded solutions. The processing overhead of providing advanced security is reduced with fast switching between secure and non-secure states for industry-leading energy efficiency
- TrustZone for ARMv8-M provides a standard on which portable secure software and debug solutions can be more easily developed, further enhancing the range of security software and tools available within the Cortex-M ecosystem.

## Processor of choice

- 390+ Cortex-M licenses
- 22 billion Cortex-M processors shipped to-date
- 3600+ catalog parts
- No. 1 embedded ecosystem with the widest selection of quality software and tools

## Complete solution

- Cortex-M23 and Cortex-M33 are part of a comprehensive ARM system solution designed to work seamlessly together
- Design teams can reduce time to market by 6-12 months with ARM CoreLink™ SSE-200 IoT subsystem for Cortex-M33 with integrated and secure mbed OS and an interface to ARM Cordio IP
- CoreLink SIE-200 provides the interconnects and peripherals to extend TrustZone across the entire SoC
- TrustZone CryptoCell-312 further enhances SoC security with features that include secure storage, key management, TRNG and crypto acceleration
- Both processors are suitable for functional safety applications, with safety documentation packages to help silicon partners achieve IEC 6150 SIL3 and ISO 26262 ASIL D certification to follow.

## Find out more

- Web: [Cortex-M family of processors](#)
- Blog: [Cortex-M23 and Cortex-M33 - Security foundation for billions of connected devices](#)

## Partner supporting quotes from Analog Devices, Microchip, Nuvoton, NXP, Renesas, Silicon Labs, STMicroelectronics

### Analog Devices

“Security and trust are of paramount importance for internet of things devices,” said Mark Cox, director IoT platform group, Analog Devices. “The Cortex-M33 processor puts a TrustZone security foundation into the heart of the processor and ARM CoreLink SIE-200 extends this across the entire SoC. This allows us to strengthen SoC security in the easiest, most energy-efficient way for connected devices.”

## **Microchip**

“The licensing of the new Cortex-M processors reflects Microchip’s commitment to providing secure solutions for embedded applications including IoT,” said Ganesh Moorthy, president and chief operating officer of Microchip Technology Inc. “The ARMv8-M based microcontrollers will further enhance Microchip’s strong portfolio of products and solutions for securing software and data, essential in this era of connected embedded intelligence.”

## **NXP**

“Security is the critical building block for IoT solutions,” said Geoff Lees, Senior Vice President and general manager of the microcontroller business at NXP® Semiconductors. “With TrustZone technology, the strength of the ARM ecosystem of tools and software, and the NXP experience in developing secured solutions, the Cortex-M23 and Cortex-M33 will become the next industry standard for microcontrollers, providing an efficient security foundation for a wide range of embedded applications.”

## **Nuvoton**

“The ARMv8-M based TrustZone architecture addresses both data and software security in IoT devices,” said Jason Lin, vice-president of Nuvoton MCU Application Business Group. “The Cortex-M23 processor is a natural extension for Nuvoton’s microcontrollers and will give developers access to a range of security solutions that reduce fragmentation, overheads and time to market.”

## **Renesas**

“With the diverse market requirements of IoT, our customers realize excellent TCO from Renesas Synergy™, an integrated platform of qualified hardware, software, and tools,” said Yoshikazu Yokota, Executive Vice President of Renesas Electronics Corporation. “The integral security features in Cortex-M23 and Cortex-M33 will expand the connected application scenarios enabled through safe lifecycle management delivered in the Synergy Platform.”

## **Silicon Labs**

“A natural evolution of ARM’s Cortex-M processor portfolio, Cortex-M23 and Cortex-M33 make it easier for developers to build a security foundation into even the smallest of embedded devices,” said Tom Pannell, director of IoT marketing at Silicon Labs. “We welcome the addition of these new processors, addressing the needs of IoT developers as they become more security conscious.”

## **STMicroelectronics**

“The Cortex-M processor family has enabled developers to push the boundaries in embedded intelligence over the last decade.” said Michel Buffa, group vice president & microcontroller division general manager, STMicroelectronics. “Cortex-M23 and Cortex-M33 are set to unleash the next wave of innovation in IoT, where trust and security will be foundational.”