# MCX E31: Robust 5 V MCU for Safe, Secure Industrial Automation
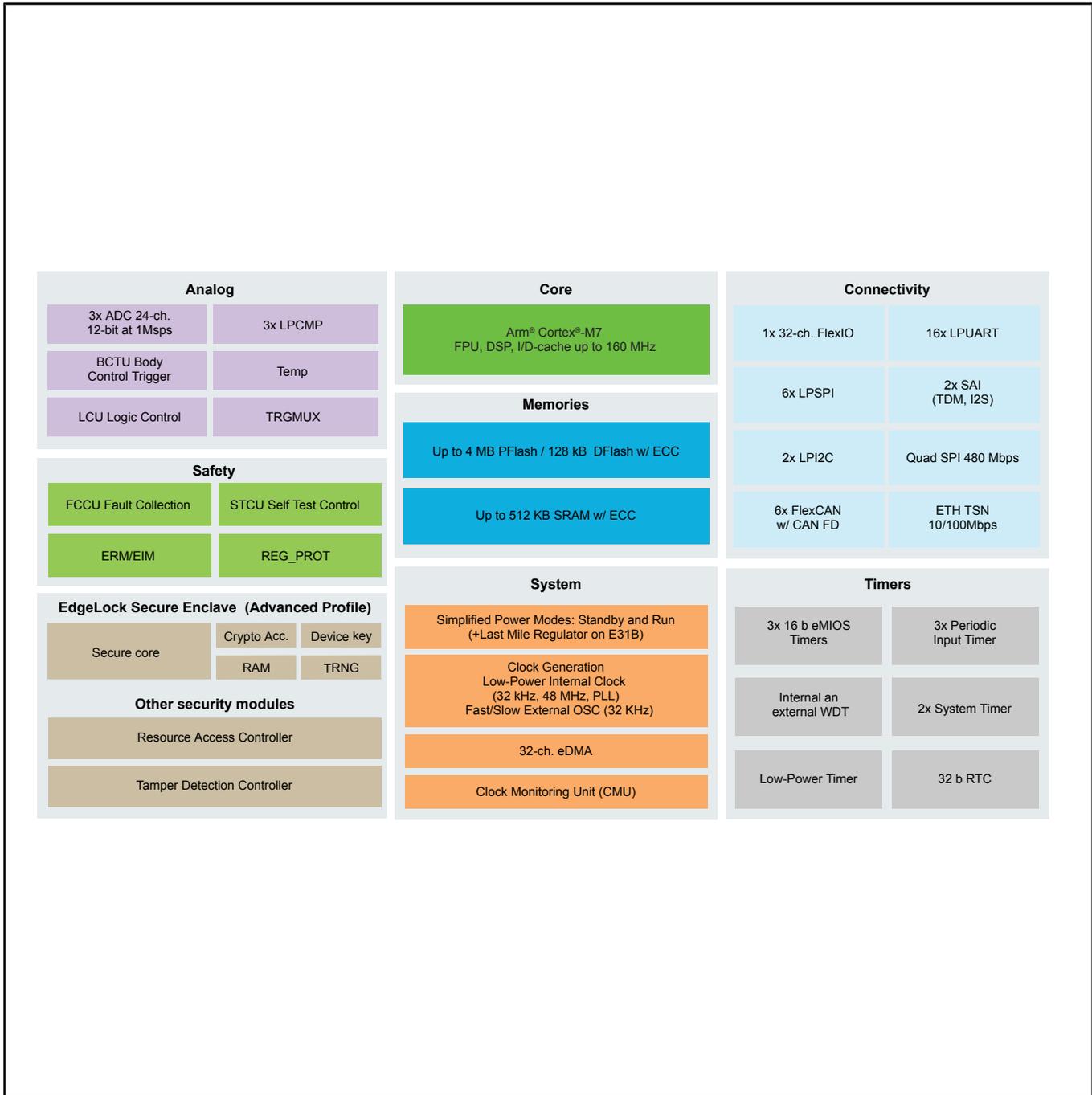
## MCX-E31

Last Updated: Feb 27, 2026

The MCX E31 expands NXP's scalable portfolio of Arm® Cortex® M-based microcontrollers with a higher-performance Cortex M7 core, increased memory, IEC 61508 SIL 2 functional safety support and an advanced security enclave. Our NXP Safe Assure program helps customers achieve functional safety certification.

Designed for safe and robust operation in commercial and industrial environments, the MCX E31 is ideal for applications that are exposed to harsh electrical conditions. It offers a cost-optimized solution with compact package options, a broad range of memory and peripheral configurations. Consistent pinouts across the family enable easy migration and design reuse.

These devices are supported by the MCUXpresso Developer Experience to facilitate optimized embedded system development.

# MCX E31 MCUs Block Diagram

## Analog

| 3x ADC 24-ch. 12-bit at 1Msps | 3x LPCMP |
| --- | --- |
| BCTU Body Control Trigger | Temp |
| LCU Logic Control | TRGMUX |

## Safety

| FCCU Fault Collection | STCU Self Test Control |
| --- | --- |
| ERM/EIM | REG_PROT |

## EdgeLock Secure Enclave (Advanced Profile)

| Secure core | Crypto Acc. | Device key |
| --- | --- | --- |
| | RAM | TRNG |

### Other security modules

Resource Access Controller

Tamper Detection Controller

## Core

Arm® Cortex®-M7
FPU, DSP, I/D-cache up to 160 MHz

## Memories

Up to 4 MB PFlash / 128 kB DFlash w/ ECC

Up to 512 KB SRAM w/ ECC

## System

Simplified Power Modes: Standby and Run
(+Last Mile Regulator on E31B)

Clock Generation
Low-Power Internal Clock
(32 kHz, 48 MHz, PLL)
Fast/Slow External OSC (32 KHz)

32-ch. eDMA

Clock Monitoring Unit (CMU)

## Connectivity

| 1x 32-ch. FlexIO | 16x LPUART |
| --- | --- |
| 6x LPSPI | 2x SAI (TDM, I2S) |
| 2x LPI2C | Quad SPI 480 Mbps |
| 6x FlexCAN w/ CAN FD | ETH TSN 10/100Mbps |

## Timers

| 3x 16 b eMIOS Timers | 3x Periodic Input Timer |
| --- | --- |
| Internal an external WDT | 2x System Timer |
| Low-Power Timer | 32 b RTC |

View additional information for MCX E31: Robust 5 V MCU for Safe, Secure Industrial Automation.

**Note:** The information on this document is subject to change without notice.

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