

# PSOC™ Edge E81 MCUs

## The Next Generation of Machine Learning Enabled Microcontrollers

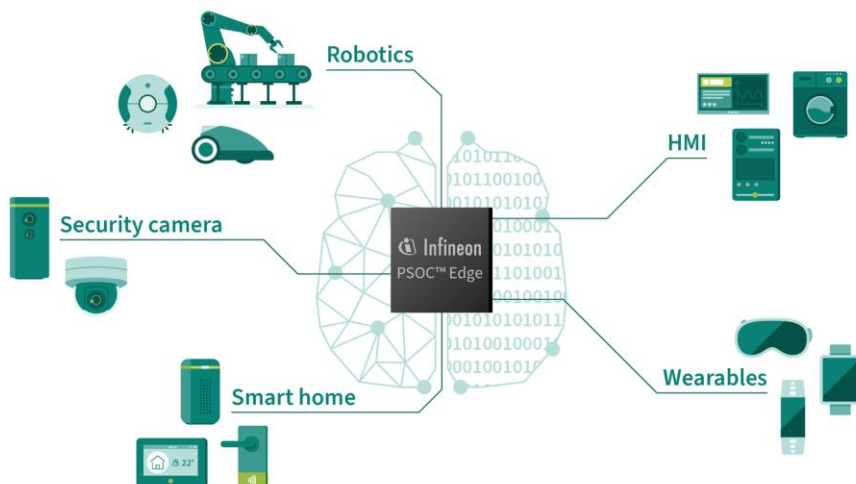
The PSOC™ Edge E81 series of Arm® Cortex®-M microcontrollers feature high-performance, low-power, secured MCUs with hardware-assisted machine learning (ML) acceleration for next generation applications. The PSOC Edge devices are based on high-performance Cortex-M55, including Helium DSP support as well as a low-power Cortex-M33 paired with Infineon’s ultra-low power NNLite hardware accelerator intended to accelerate neural networks in Machine Learning and AI applications. In addition, the PSOC™ Edge E81 features always-on acoustic activity detection capability that enables HMI operation with low active and standby power consumption supporting longer battery life for battery powered products.

The PSOC™ Edge E81 includes support for voice and audio communications with keyword spotting and wake word detection included, as well as timing peripherals built for a variety of consumer and industrial applications including HMI, smart home, wearables, robotics, and other smart connected IoT products. In addition, PSOC™ Edge is supported by a rich set of enablement with the industry-recognized ModusToolbox software including integration with the Imagimob Studio AI solution and its off-the shelf ML models.

Multi-domain architecture for high-performance and fine-grained power optimization

- High-performance Cortex-M55 CPU with Helium DSP
- Low-power Cortex-M33 with FPU, DSP and NNLite for AI/ML hardware acceleration
- HMI interfaces
  - Audio multi-microphone interface for far-field applications
  - Keyword spotting and Wake word detection
- State-of-the-art security
  - Lockstep secured enclave in low-power always-on domain
  - Infineon Edge Protect Category 4
  - Off-the-shelf Trusted Firmware-M enablement and Mbed-TLS for crypto operations
- ModusToolbox™ software
  - Comprehensive collection of multi-platform tools and software libraries
  - Includes board support packages (BSPs), peripheral driver library (PDL), and middleware such as CAPSENSE™

### Target Applications



### Key features

- 32-bit MCU Subsystems
  - Up to 400MHz Arm® Cortex®-M55 including Helium DSP
  - Up to 200MHz Arm® Cortex®-M33
- Machine Learning
  - NNLite for AI/ML hardware NN compute
  - End-to-end ML solution with Imagimob
- Memory and SoC Integration
  - Large memory integration for next-gen applications
  - Embedded ultra low-power RRAM Technology
  - Richer peripheral set to reduce system cost
  - Highly integrated analog subsystem
- Security
  - Secured enclave based on Infineon Edge Protect Technology
- HMI
  - Keyword spotting and wake word detection

### Key benefits

- Low-Power ML Capabilities
  - Presence/Gesture/Motion
  - Predictive maintenance
  - Anomaly detection
  - Autonomous operation
- Security
- Motor control

PSOC™ Edge E81 Block Diagram

PRE-PRODUCTION

System Power Modes: Active/Sleep DeepSleep Hibernate

High Performance CPU System

Compute Memory DSP

Arm® Cortex®-M55, 50-400 MHz		
Helium™ DSP	FPU	MPU
NVIC	32 kB I-Cache	32 kB D-Cache
HPDMA	256 kB I-TCM	256 kB D-TCM
Up to 4 MB SRAM		512 kB RRAM

ML Enhanced Next Gen HMI

Keyword Spotting
Wake Word Detection

Secured Enclave

Secure Key Storage	Side Channel Resistance
TRNG	Crypto Accel.
OTP	Secure JTAG
Secure Boot	Tamper Protect

Low Power CPU System

Compute Memory DSP

Arm® Cortex®-M33, 50-200 MHz		
NNLite	DMA	64 kB ROM
1 MB SRAM		16 kB I-Cache

Peripherals & IO

12b ADC 5/0.2 Msps	11x SCB (UART,I <sup>2</sup> C,SPI)	
2x 12b DAC	1x SCB (I <sup>2</sup> C,SPI)	10/100 Ethernet
2x 4b Prog. Ref.	2x TDM/I2S	2x CAN FD
2x PTCOMP	1x I3C	2x Smart IO
2x LPCOMP	6x PDM	USB HS/FS w/ PHY
4x Amplifiers	32x TCPWM	

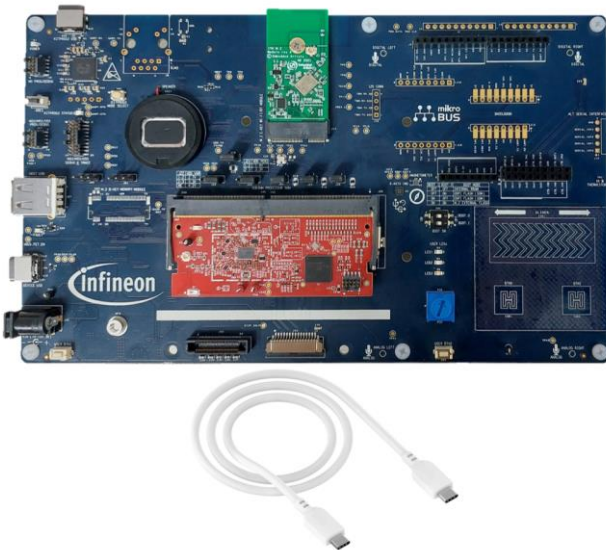
System Resources

Power Mgmt.		Clock Mgmt.	
Sleep Control		Clock Control	
POR	BOD	PILO	IHO
LVD		WCO	ECO
Reset Control		3x DPLL	
Retention LDOs		WDT   RTC	
Active LDOs		3x LPTimer	
Buck Converters		16x HFCLK DIV	

External Memory

2x Serial Memory IF, xSPI/Hyperbus, On-the-fly Encrypted XIP
2x SD Host Controller (SD/SDIO/eMMC)

PSOC™ Edge Evaluation Kit



For more information, please contact your Infineon representative: <https://www.infineon.com/cms/en/about-infineon/company/contacts/>



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