Manuals+ — User Manuals Simplified.

SILICON LABS 8 Bit and 32 Bit Microcontrollers User Guide

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8 Bit and 32 Bit Microcontrollers

MCU SELECTOR GUIDE FOR IOT
8-bit and 32-bit Microcontrollers

Experience Easy Migration to Wireless Connectivity with the Lowest Power, Highest Performance MCUs
Microcontrollers (MCUs) are the backbone of IoT devices, providing the processing power and functionality required for everything from smart home devices to wearables and complex industrial machines. They are often thought of as the brains of many devices and systems, clearly making them one of the most vital components.
When selecting processors, device makers are often looking for small size, affordability, and low power consumption — making MCUs the clear contender. What's more, they can make the digital control of devices and processes practical by reducing size and cost
compared to designs that call for separate microprocessors and memories.
The selection of the right processor platform is crucial. Whether looking to build connected or non-connected devices, you have come to the right place. All Silicon Labs' products are MCU-based, so we can promise device makers reliability and performance in every application given our decades of experience.

Silicon Labs' MCU Portfolio comprises of two MCU families, each serving a specific purpose:

Silicon Labs 32-bit MCUs
Power sensors, advanced features

Silicon Labs 8-bit MCUs
All the essentials, light on price

The Silicon Labs' MCU Portfolio

Our MCU portfolio is built on a foundation of radio design and a history of technological innovation. Silicon Labs offers both 8-bit and 32-bit MCUs, designed to meet the varying demands of modern IoT applications as a one-stop solution for wired and wireless application development.

With fast access to already-known developer resources, our platform offers a full complement of low-power, high-speed microcontrollers, development kits, specialized example code, and advanced debugging capabilities, as well as easier migration to wireless functionality across protocols.

Both 8-bit and 32-bit MCUs address distinct challenges and have a place in modern IoT development.
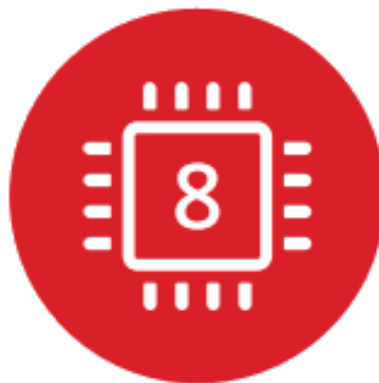
8-bit MCUs
Do more in less time with:

- Lower power
- Lower latency
- Optimized analog and digital peripherals
- Flexible pin mapping
- High system clock speeds

32-bit MCUs

The world's most energy-friendly MCUs, ideal for:

- Ultra-low power applications
- Energy-sensitive applications
- Scaling power consumption
- Real-time embedded tasks
- AI/ML

## What Sets Silicon Labs' MCU Portfolio Apart

8-bit MCUs: Small Size, Great Power

Silicon Labs' 8-bit MCU portfolio was designed to deliver the fastest speeds and lowest power, while solving mixed-signal and low-latency embedded challenges.

The newest addition to the 8-bit portfolio, EFM8BB5 MCUs empowers developers with a versatile, highly integrated platform, ideal for transitioning from older 8-bit offerings.

Industry Leading Security

When you want your products to withstand the most challenging cybersecurity attacks, you can trust Silicon Labs' technology to safeguard your customers' privacy.
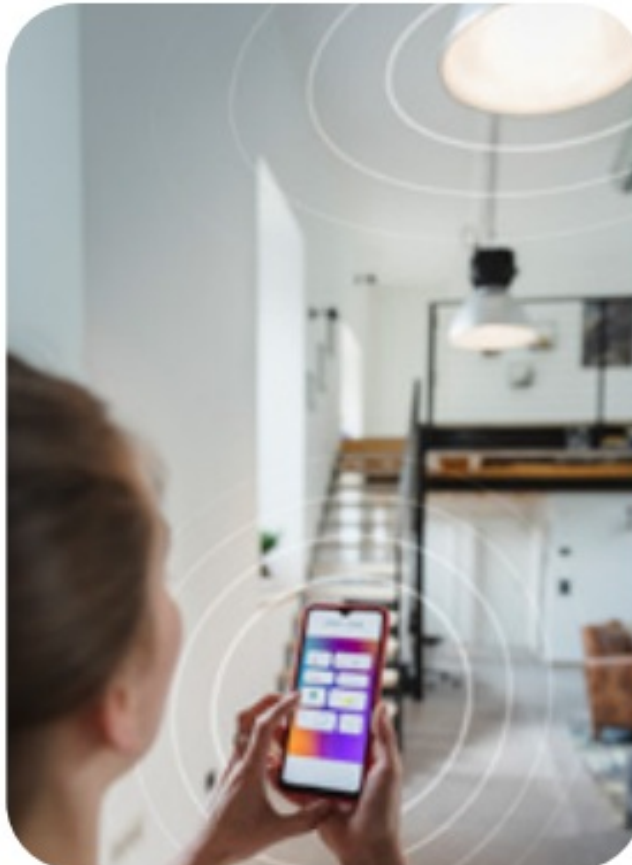
Best-in-Class Tools

Industry-leading RTOS with a free kernel, IDE support for Keil, IAR, and GCC Tools to optimize the development journey.

Scalable Platform
Our MCUs offer device makers a one-stop solution for wired and wireless application development and migration to wireless functionality across protocols.

Unified Development Environment
Simplicity Studio is designed to make the development process easier, faster, and more efficient by providing designers with everything needed from start to finish.

Feature-Density
Our highly integrated MCUs feature a full complement of high-performance, peripherals and powermanagement functions.

Low-Power Architecture
For applications with low power requirements, our portfolio of 32-bit and 8-bit MCUs are the most energy-friendly devices available.

Spotlight on EFM8BB5 MCUs: Because Simplicity Matters

With compact package options as small as 2 mm x 2 mm and competitive pricing to cater to even the most budget-conscious designers, the BB5 family excels both as a means to augment existing products with simple functionality and as the primary MCU.

Their smart, small design makes them the most advanced general-purpose 8-bit MCU, offering advanced analog and communication peripherals and making them ideal for space-constrained applications.

Optimize board
Minimize MCU package size
Reduce product costs

	BB52	**BB51**	**BB50**
Description	General purpose	General purpose	General purpose
Core	Pipelined C8051 (50 MHz)	Pipelined C8051 (50 MHz)	Pipelined C8051(50 MHz)
Max Flash	32 kB	16 kB	16 kB
Max RAM	2304 B	1280 B	512 B
Max GPIO	29	16	12

8-bit Applications:
The Demand for 8-BitMCUs is Here to Stay Many industries still call for MCUs that perform
a task reliably and with as little complexity as possible. With Silicon Labs' 8-bit MCUs, manufacturers can focus on the problems that require higher maintenance. We got the rest.

	Toys
	Medical devices
	Security
	Home Appliances
	Power tools
	Smoke alarms
	Personal Care
	Automobile electronics

32-bit MCUs: Low Power Architecture

Silicon Labs' EFM32 32-bit MCU families are the world's most energy friendly microcontrollers, especially suited for use in low-power and energy sensitive applications, including energy, water, and gas metering, building automation, alarm and security, and portable medical/fitness equipment.

Since battery replacement is often not possible for reasons of access and cost, such applications need to operate for as long as possible without external power or operator intervention.

Based on ARM® Cortex® -M0+, Cortex-M3, Cortex-M4 and Cortex-M33 cores, our 32-bit MCUs extend battery life for those "hard-to-reach", power-sensitive consumer and industrial applications.

	PG22	PG23	PG28	PG26	TG11	GG11	GG12
Description	General purpose	Low Power, Metrology	General purpose	General purpose	Energy Friendly	High Performance Low energy	High Performance Low energy
Core	Cortex-M33 (76.8 MHz)	Cortex-M33 (80 MHz)	Cortex-M33 (80 MHz)	Cortex-M33 (80 MHz)	ARM Cortex-M0+ (48 MHz)	ARM Cortex xM4 (72 MHz)	ARM Cortex xM4 (72 MHZ)
Max Flash (kB)	512	512	1024	3200	128	2048	1024
Max RAM (kB)	32	64	256	512	32	512	192
Max GPIO	26	34	51	64 + 4 Dedicated Analog IO	67	144	95

What Sets our 32-bitPortfolio Apart

Low Power Architecture
EFM32 MCUs feature the ARM Cortex® cores with floatingpoint unit and Flash memory and are architected for low power using only as little as 21 µA/MHz in active mode. The devices are designed to scale power consumption with capabilities in four energy modes, including a deep sleep mode as low as 1.03 µA, with 16 kB RAM retention and operating real-time clock, as well as a 400 nA hibernation mode with 128 bytes of RAM retention and cryo-timer.

Best-in-Class Tools
Embedded OS, connectivity software stacks, IDE's and tools to optimize design — it's all in one place.Industry-leading RTOS with a free kernel IDE support for Keil, IAR and GCC Tools to optimize designs with features that enable actions like the profiling of energy usage and easy visualization of the internals of any embedded system.

Security to Withstand the Most Challenging Attacks
Encryption is only as strong as the security offered by the physical device itself. The easiest device attack is a remote attack on software to inject malware which is why a hardware root of trust secure boot is critical.

Many IoT devices are easily acquired in the supply chain and allow "Hands-On" or "Local" attacks, which allow attacking the debug port or using physical attacks like side-channel analysis to recover keys during communication encryption.

Trust Silicon Labs' technology will safeguard your customers' privacy regardless of the type of attack.

Functional Density to Reduce Costs
Highly integrated microprocessors boast a rich selection of available high-performance and lowpower peripherals on-chip non-volatile memory, scalable memory footprints, crystal-less 500 ppm sleep timer, and integrated power-management functions.

About Silicon Labs

Silicon Labs is the leading provider of silicon, software, and solutions for a smarter, more connected world. Our industry-leading wireless solutions feature a high level of functional integration. Multiple complex mixed-signal functions are integrated into a single IC or system-on-chip (SoC) device, saving valued space, minimizing overall power consumption requirements, and improving products' reliability. We are the trusted partner for the leading consumer and industrial brands. Our customers develop solutions for a wide range of applications, from medical

devices to smart lighting to building automation, and much more.

Documents / Resources

SILICON LABS 8 Bit and 32 Bit Microcontrollers [pdf] User Guide
8 Bit and 32 Bit Microcontrollers, 8 Bit and 32 Bit Microcontrollers, Bit and 32 Bit Microcontrollers, Bit Microcontrollers, Microcontrollers

References

- **User Manual**