

# EFM<sup>®</sup>32

*... the world's most energy friendly microcontrollers*

**32-bit ARM Cortex-M0 and Cortex-M3 microcontrollers for:**

- Energy, gas, water and smart metering • Alarm and security systems
- Health and fitness applications • Industrial and home automation

## EFM32 increases battery life by reducing the total energy consumption

### 1. Very low active power consumption

EFM32 only uses 160  $\mu\text{A}/\text{MHz}$  with a 3 volts power supply while running application code



### 2. Reduced processing time

The low power, high performance 32-bit Cortex-M3 and Cortex-M0 reduce the spent time in active mode



### 3. Very fast wake-up time

Short 2  $\mu\text{s}$  wake-up time supports high efficiency energy modes and increases responsiveness



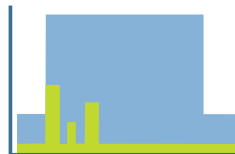
### 4. Ultra-low standby current

Full RAM and CPU retention + POR + BOD + RTC while using only 0.9  $\mu\text{A}$  (Energy Mode 2)



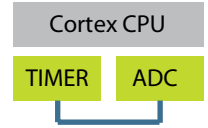
### 5. Autonomous peripheral operation

Applications can perform advanced tasks without using the Cortex CPU



### 6. PRS - Peripheral Reflex System

Predictable and fast signalling between peripherals without any CPU intervention



### 7. Well architected Energy Modes

Optimize your application with 5 flexible Energy Modes and sub  $\mu\text{A}$  operation



### 8. Extremely energy efficient peripherals

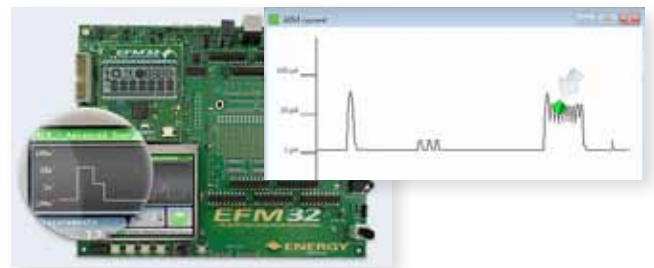
- ADC: 12-bit, 1 Msps at only 350  $\mu\text{A}$
- Analog Comparator: using as little as 100 nA
- LCD Controller: 8x36 segments at only 0.55  $\mu\text{A}$
- LEUART: Full UART @ 9600 bps using only 150 nA
- AES: 128/256-bit AES crypto-engine in only 54/75 cycles

### 9. AEM - Advanced Energy Monitoring

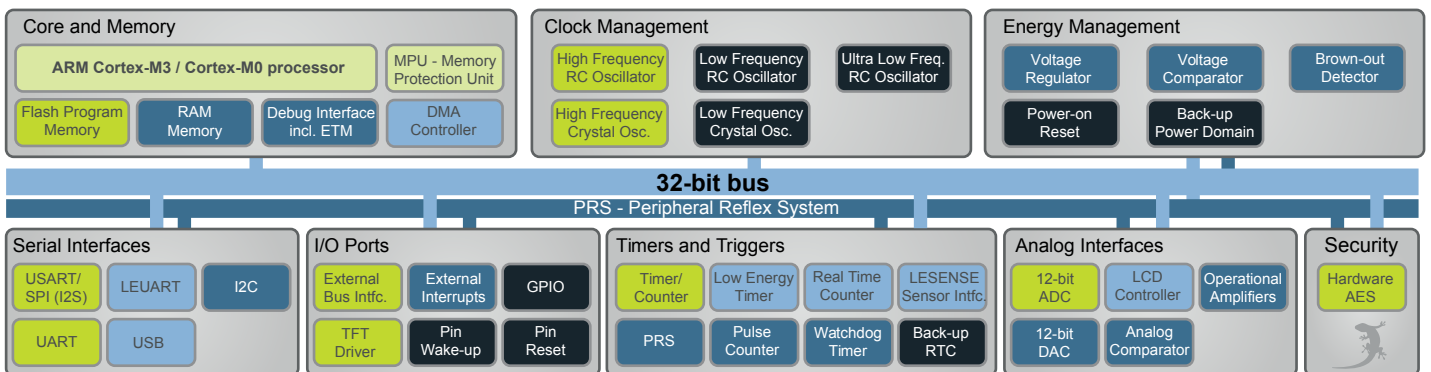
Measure and review your prototype's current consumption profile in real-time on our starter kits

### 10. Simplicity Studio and energyAware software

Fast design cycles, power profiling and energy debugging of application code to remove current drains



## EFM32 includes the most energy friendly peripherals and energy modes



EFM32 with 3V power supply. Real application from memory.	EM0 Run Mode	EM1 Sleep Mode	EM2 Deep Sleep	EM3 Stop Mode	EM4 Shutoff Mode
Current consumption	160 $\mu\text{A}/\text{MHz}$	45 $\mu\text{A}/\text{MHz}$	0.9 $\mu\text{A}$	0.6 $\mu\text{A}$	20 nA
Wake-up time	-	0	2 $\mu\text{s}$	2 $\mu\text{s}$	160 $\mu\text{s}$
Wake-up events	Any	Any	32 kHz peripherals	Async IRQ, I2C slave, Analog Comparators, Voltage Comparators	Reset, GPIO rising/falling edge
CPU (Cortex-M3/M0)	On	-	-	-	-
High frequency peripherals	Available	Available	-	-	-
Low frequency peripherals	Available	Available	Available	-	-
Asynchronous peripherals	Available	Available	Available	Available	-
Full CPU and SRAM retention	On	On	On	On	-
Power-on Reset/Brown-out Detector	On	On	On	On	On

Zero GECKO Cortex-M0			20 Zero Gecko MCUs Memory Options (KB) Flash RAM	GPIO Pins		USB	LCD (max)	USART/SPI (I2S)	LEUART	I2C	Timer (PWM)	RTC	LETIMER	PCNT	Watchdog	ADC (pins)	DAC (pins)	ACMP (pins)	OPAMP	LESENSE	EBI	AES	Size (mm)	Ordering No. (X = Flash size in KB)
EFM32ZG103	4	8	16	32	9	-	-	1 (1)	-	1	2 (6)	1	-	1	1	-	-	-	-	-	-	-	4x4	EFM32ZG103FX-QFN16
EFM32ZG108	4	8	16	32	17	-	-	1 (1)	-	1	2 (6)	1	-	1	1	-	-	1 (2)	-	-	-	-	5x5	EFM32ZG108FX-QFN24
EFM32ZG110	4	8	16	32	17	-	-	1 (1)	-	1	2 (6)	1	-	1	1	1 (2)	-	1 (2)	-	-	-	-	5x5	EFM32ZG110X-QFN24
EFM32ZG210	4	8	16	32	24	-	-	1 (1)	-	1	2 (6)	1	-	1	1	1 (4)	-	1 (2)	-	-	-	-	6x6	EFM32ZG210FX-QFN32
EFM32ZG222	4	8	16	32	37	-	-	1 (1)	-	1	2 (6)	1	-	1	1	1 (4)	-	1 (5)	-	-	-	-	7x7	EFM32ZG222FX-QFP48

Tiny GECKO Cortex-M3			23 Tiny Gecko MCUs Memory Options (KB) Flash RAM	GPIO Pins		USB	LCD (max)	USART/SPI (I2S)	LEUART	I2C	Timer (PWM)	RTC	LETIMER	PCNT	Watchdog	ADC (pins)	DAC (pins)	ACMP (pins)	OPAMP	LESENSE	EBI	AES	Size (mm)	Ordering No. (X = Flash size in KB)
EFM32TG108	4	8	16	32	17	-	-	1 (1)	1	1	2 (6)	1	1	1	1	-	-	2 (4)	-	Y*	-	-	5x5	EFM32TG108FX-QFN24
EFM32TG110	4	8	16	32	17	-	-	2 (1)	1	1	2 (6)	1	1	1	1	1 (2)	2 (1)	2 (4)	3	Y	-	Y	5x5	EFM32TG110FX-QFN24
EFM32TG210	8	16	32	64	24	-	-	2 (1)	1	1	2 (6)	1	1	1	1	1 (4)	2 (1)	2 (5)	3	Y	-	Y	6x6	EFM32TG210X-QFN32
EFM32TG222	8	16	32	64	37	-	-	2 (1)	1	1	2 (6)	1	1	1	1	1 (8)	2 (2)	2 (12)	3	Y	-	Y	7x7	EFM32TG222FX-QFP48
EFM32TG230	8	16	32	64	56	-	-	2 (1)	1	1	2 (6)	1	1	1	1	1 (8)	2 (2)	2 (16)	3	Y	-	Y	9x9	EFM32TG230FX-QFN64
EFM32TG822	8	16	32	64	37	-	8x11	2 (1)	1	1	2 (6)	1	1	1	1	1 (4)	2 (1)	2 (4)	3	Y	-	Y	7x7	EFM32TG822FX-QFP48
EFM32TG840	8	16	32	64	56	-	8x20	2 (1)	1	1	2 (6)	1	1	1	1	1 (8)	2 (2)	2 (8)	3	Y	-	Y	9x9	EFM32TG840FX-QFN64

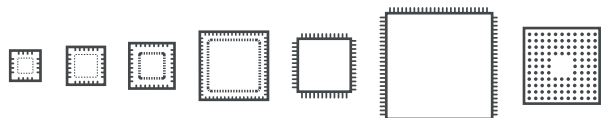
Gecko Cortex-M3			25 Gecko MCUs Memory Options (KB) Flash RAM	GPIO Pins		USB	LCD	USART/SPI + UART	LEUART	I2C	Timer (PWM)	RTC	LETIMER	PCNT	Watchdog	ADC (pins)	DAC (pins)	ACMP (pins)	OPAMP	LESENSE	EBI	AES	Size (mm)	Ordering No. (X = Flash size in KB)
EFM32G200	16	32	64	128	24	-	-	2	1	1	2 (6)	1	1	1	1	1 (4)	1 (1)	2 (5)	-	-	-	-	6x6	EFM32G200FX-QFN32
EFM32G210	16	32	64	128	24	-	-	2	1	1	2 (6)	1	1	1	1	1 (4)	1 (1)	2 (5)	-	-	-	Y	6x6	EFM32G210FX-QFN32
EFM32G222	32	64	128	256	37	-	-	2	2	1	3 (9)	1	1	3	1	1 (4)	1 (1)	2 (12)	-	-	-	Y	7x7	EFM32G222FX-QFP48
EFM32G230	32	64	128	256	56	-	-	3	2	1	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (16)	-	-	-	Y	9x9	EFM32G230FX-QFN64
EFM32G280	32	64	128	256	86	-	-	3+1	2	1	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (16)	-	-	Y	Y	14x14	EFM32G280FX-QFP100
EFM32G290	32	64	128	256	90	-	-	3+1	2	1	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (16)	-	-	Y	Y	10x10	EFM32G290FX-BGA112
EFM32G840	32	64	128	256	56	-	4x24	3	2	1	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (8)	-	-	-	Y	9x9	EFM32G840FX-QFN64
EFM32G880	32	64	128	256	86	-	4x40	3+1	2	1	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (16)	-	-	Y**	Y	14x14	EFM32G880FX-QFP100
EFM32G890	32	64	128	256	90	-	4x40	3+1	2	1	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (16)	-	-	Y**	Y	10x10	EFM32G890FX-BGA112

Giant GECKO Cortex-M3			48 Giant Gecko MCUs Memory Options (KB) Flash RAM	GPIO Pins		USB	LCD	USART/SPI + UART	LEUART	I2C	Timer (PWM)	RTC	LETIMER	PCNT	Watchdog	ADC (pins)	DAC (pins)	ACMP (pins)	OPAMP	LESENSE	EBI	AES	Package Size (mm)	Ordering No. (X = Flash size in KB)
EFM32GG230	256	512	1024	2048	56	-	-	3	2	2	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (16)	3	Y	-	Y	9x9	EFM32GG230FX-QFN64
EFM32GG280	256	512	1024	2048	86	-	-	3+2	2	2	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (16)	3	Y	Y	Y	14x14	EFM32GG280FX-QFP100
EFM32GG290	256	512	1024	2048	90	-	-	3+2	2	2	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (16)	3	Y	Y	Y	10x10	EFM32GG290FX-BGA112
EFM32GG330	64	128	256	512	52	Y	-	3	2	2	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (12)	3	Y	-	Y	9x9	EFM32GG330FX-QFN64
EFM32GG380	64	128	256	512	81	Y	-	3+2	2	2	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (12)	3	Y	Y	Y	14x14	EFM32GG380FX-QFP100
EFM32GG390	64	128	256	512	86	Y	-	3+2	2	2	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (12)	3	Y	Y	Y	10x10	EFM32GG390FX-BGA112
EFM32GG840	256	512	1024	2048	56	-	8x20	3	2	2	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (8)	3	Y	-	Y	9x9	EFM32GG840FX-QFN64
EFM32GG880	256	512	1024	2048	86	-	8x36	3+2	2	2	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (16)	3	Y	Y**	Y	14x14	EFM32GG880FX-QFP100
EFM32GG890	256	512	1024	2048	90	-	8x36	3+2	2	2	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (16)	3	Y	Y**	Y	10x10	EFM32GG890FX-BGA112
EFM32GG940	64	128	256	512	52	Y	8x20	3	2	2	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (4)	3	Y	-	Y	9x9	EFM32GG940FX-QFN64
EFM32GG980	64	128	256	512	81	Y	8x36	3+2	2	2	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (12)	3	Y	Y**	Y	14x14	EFM32GG980FX-QFP100
EFM32GG990	64	128	256	512	86	Y	8x36	3+2	2	2	3 (9)	1	1	3	1	1 (8)	2 (2)	2 (12)	3	Y	Y**	Y	10x10	EFM32GG990FX-BGA112

\* Reduced LESENSE functionality without DAC

\*\* Reduced LCD Controller functionality when using EBI (External Bus Interface)

Operation range: 1.8 - 3.8 volts, -40 - 85 C  
 On-chip memory: Up to 1 MB Flash and 128 KB RAM  
 General Purpose IO: Up to 90 pins with 20 mA drive strength



QFN16 (4x4 mm)

QFN24 (5x5 mm, 0.65 pitch)

QFN32 (6x6 mm, 0.65 pitch)

QFN64 (9x9 mm, 0.50 pitch)

QFP48 (7x7 mm, 0.5 pitch)

QFP100 (14x14 mm, 0.5 pitch)

BGA112 (10x10 mm, 0.8 pitch)



# Simplicity

EFM32 microcontrollers are supported by development tools designed to significantly cut design time



**Development Kits**  
EFM32-G2xx-DK  
EFM32-G8xx-DK (LCD support)

[energymicro.com/tools](http://energymicro.com/tools)



**Starter Kits**  
EFM32-G8xx-STK (LCD support)  
EFM32-TG-STK3300 (LCD support)

[energymicro.com/tools](http://energymicro.com/tools)



**Online Documentation**  
Free manuals, datasheets,  
application notes, software  
library and code examples.

[energymicro.com/downloads](http://energymicro.com/downloads)



**Simplicity Studio**  
Instant, one-click access to all  
your EFM32 tools, software, news,  
documents and resources.

[energymicro.com/simplicity](http://energymicro.com/simplicity)



**energyAware Profiler**  
Unique real-time power profiler and  
energy debugger finds and removes  
energy bugs from your code.

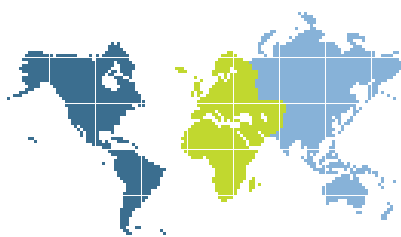
[energymicro.com/software](http://energymicro.com/software)



**energyAware Designer**  
Fast and easy EFM32 MCU  
configuration tool that instantly  
resolves pin conflicts.

[energymicro.com/software](http://energymicro.com/software)

Abatron	Keil
AVIX-RT	Lauterbach
CMX	Micrium $\mu$ C/OS
CodeSourcery	OLIMEX
CooCox	RK-SYSTEM
ELNEC	Rowley Associates
FreeRTOS	SEgger
GOPEL	SMX RTOS
Hitex	ThreadX RTOS
IAR Systems	Wicentric



**Large community**  
The EFM32 microcontrollers are supported by major third party partners and the ARM Cortex community.

[energymicro.com/tools/third-party-network](http://energymicro.com/tools/third-party-network)

**Need Help?**  
Contact the EFM32 experts directly at Energy Micro HQ. Submit requests via your own support page here:

[support.energymicro.com](http://support.energymicro.com)

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