![Energy Micro logo] ENERGY® micro

EFM®32

... the world's most energy friendly microcontrollers

Ultra low energy consumption in Active mode increases battery life

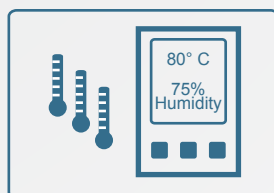High speed autonomous low power operation

Low speed autonomous operation

Sub µA Energy Modes

32-bit ARM Cortex-M3

Right on target

with the ultimate solution for long battery lifetime applications

Energy Metering

001122 kWh
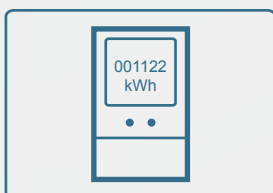
Industrial/Home Automation

80° C 75% Humidity

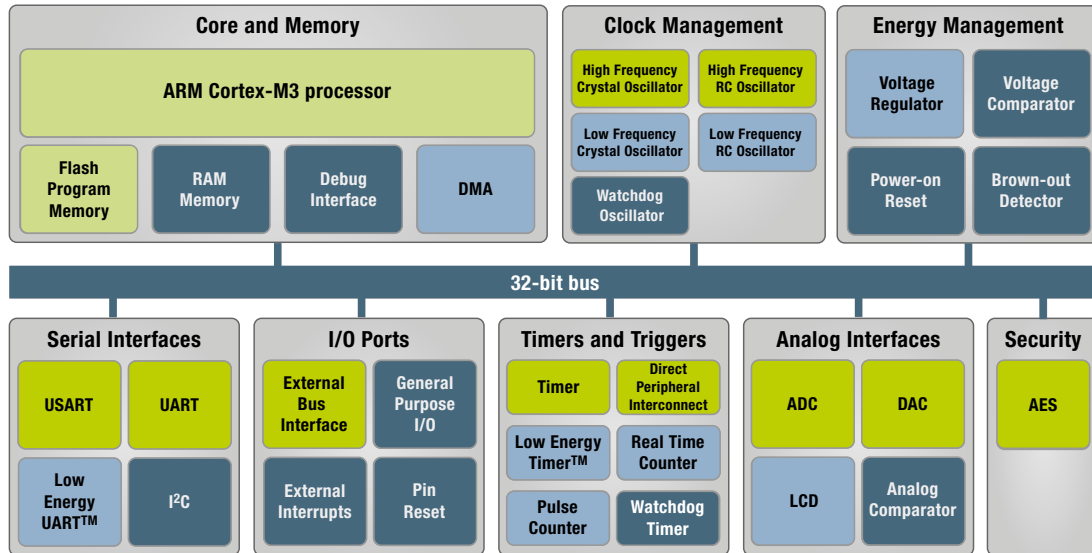**Wireless Alarm/Security**
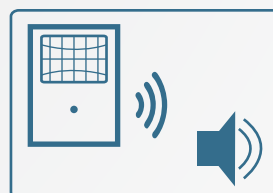
Medical Systems

EFM32 is perfect for low energy applications

Energy Micro® provides new, innovative, and energy friendly microcontroller technology with the EFM®32. The 32-bit microcontroller is packed with peripherals built for low energy operation. Low power features deliver high throughput and autonomous operation supported by an ARM® CPU and effective Energy Modes. Everything designed to significantly increase the lifespan of battery operated application.

Peripherals can be enabled and disabled by software, see the color codes in the Energy Mode circles

Autonomous low energy feature set

Core and Memory

ARM Cortex-M3 processor

| Flash Program Memory | RAM Memory | Debug Interface | DMA |

Clock Management

High Frequency Crystal Oscillator	High Frequency RC Oscillator
Low Frequency Crystal Oscillator	Low Frequency RC Oscillator
Watchdog Oscillator	

Energy Management

| Voltage Regulator | Voltage Comparator |
| Power-on Reset | Brown-out Detector |

32-bit bus

Serial Interfaces

| USART | UART |
| Low Energy UART™ | I²C |

I/O Ports

| External Bus Interface | General Purpose I/O |
| External Interrupts | Pin Reset |

Timers and Triggers

Timer	Direct Peripheral Interconnect
Low Energy Timer™	Real Time Counter
Pulse Counter	Watchdog Timer

Analog Interfaces

| ADC | DAC |
| LCD | Analog Comparator |

Security

| AES |

EFM32 Energy Modes increase battery and application lifetime

Highly efficient Energy Modes and only 2 µs wake-up to Active Mode lets applications spend less energy performing complex tasks. Embedded designers get the flexibility to tune their systems energy behavior and complexity. Peripherals can be enabled, communicate with each other, and perform advanced operations without any CPU intervention in the low energy modes.

Effective Energy Modes

0 1 2 3 4

- *Energy Mode 0**
  Active Mode. Cortex-M3 system active. All peripherals are software selectable
- *Energy Mode 1**
  High speed autonomous operation. Cortex-M3 disabled. All peripherals are software selectable
- *Energy Mode 2**
  Low speed autonomous operation. 32 kHz oscillator and low energy peripherals are selectable
- *Energy Mode 3 - 0.3 µA*
  Low speed autonomous operation. Selected peripherals. Full MCU, peripheral and RAM retention
- *Energy Mode 4 - 0.1 µA*
  Standby Mode   * Visit www.energymicro.com when we reveal the low power numbers

Highly integrated and low power features

- 32-bit ARM Cortex-M3 running up to 32 MHz
- Single 1.8 to 3.8 volt power supply
- -40° to 85°C operation range
- Up to 128 KB Flash and 16 KB RAM
- Up to 90 GPIO pins with 16 External Interrupts
- External Bus Interface (EBI)
- DMA Controller
- DPI for fast, predictable, and autonomous operation
- Power and Reset Control with POR, BOD, WDOG
- On-chip Voltage Regulator and Comparator

- High security with hardware AES-256 encrypt/decrypt
- Integrated high and low frequency oscillators
- USARTs with UART and SPI modes
- LEUART™ with sub µA operation
- 16-bit Timer/Counters with Compare/Capture
- LETIMER™ with optional pulse outputs
- Real Time Counter and Pulse Counter
- Up to 4x40 LCD Controller
- 12-bit ADC and DAC
- Analog Comparators with Cap Sense capability

## EFM32 includes the industry leading 32-bit ARM Cortex-M3

The 32-bit Cortex™-M3 is ARM's flagship Cortex-M processor and offers superior efficiency and flexibility. It was specifically developed for response and power sensitive applications. EFM32 microcontrollers use the Cortex-M3 CPU's low power and high performance abilities in combination with unique low power peripherals to create the best low power embedded systems platform ever.

Low Power

- 32-bit processor designed for low power operation
- High power efficiency with Thumb-2 instruction set
- Small core footprint with integrated power mode support

High Performance

- 1.25 DMIPS/MHz
- Superior Math Capability
- Excellent clock per instruction ratio
- Separate data- and instruction bus
- High code density and performance with Thumb-2 instruction set
- Nested Vectored Interrupt Controller for outstanding interrupt handling
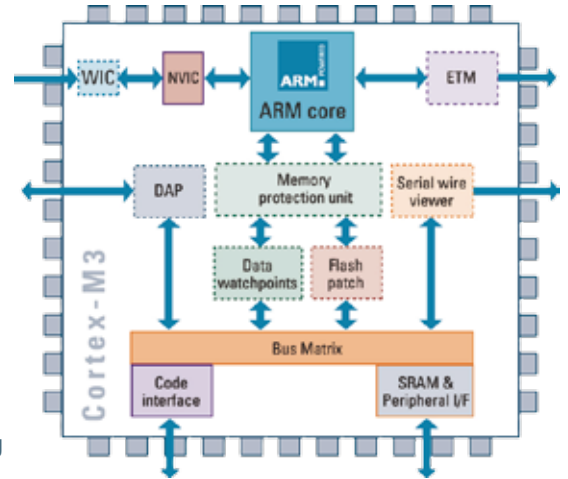
32-bit ARM Cortex-M3
(dotted boxes may not appear in EFM32)

Large EFM32 MCU family and package options

Accelerate the migration from legacy components to industry standard 32-bit microcontrollers with EFM32. All EFM32 MCUs offer the Cortex-M3 CPU with a number of peripheral configurations and small footprint packages. Code compatibility and scalability across the whole range of devices make it easy to change a system's features and complexity. EFM32 is also provided as Application Specific and Custom microcontrollers.

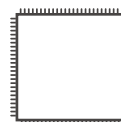|	QFN32	QFN64	QFP100	BGA112
LCD		**EFM32G840Fx** 32/64/128 KB Flash 8/16/16 KB RAM 56 General Purpose I/O 4x24 LCD 3x USART, 2x LEUART, I2C 3x 16-bit Timer, LETIMER RTC, 3x PCNT, WDOG ADC, 2x DAC, 2x ACMP AES	**EFM32G880Fx** 32/64/128 KB Flash 8/16/16 KB RAM 85 General Purpose I/O 4x40 LCD 3x USART, UART 2x LEUART, I2C 3x 16-bit Timer, LETIMER RTC, 3x PCNT, WDOG ADC, 2x DAC, 2x ACMP AES, EBI	**EFM32G890F** 32/64/128 KB Flash 8/16/16 KB RAM 90 General Purpose I/O 4x40 LCD 3x USART, UART 2x LEUART, I2C 3x 16-bit Timer, LETIMER RTC, 3x PCNT, WDOG ADC, 2x DAC, 2x ACMP AES, EBI
No LCD	**EFM32G210F128** 128 KB Flash 16 KB RAM 24 General Purpose I/O 2x USART, LEUART, I2C 2x 16-bit Timer, LETIMER RTC, PCNT, WDOG ADC, DAC, 2x ACMP AES	**EFM32G230Fx** 32/64/128 KB Flash 8/16/16 KB RAM 56 General Purpose I/O 3x USART, 2x LEUART, I2C 3x 16-bit Timer, LETIMER RTC, 3x PCNT, WDOG ADC, 2x DAC, 2x ACMP AES	**EFM32G880Fx** 32/64/128 KB Flash 8/16/16 KB RAM 85 General Purpose I/O 3x USART, UART 2x LEUART, I2C 3x 16-bit Timer, LETIMER RTC, 3x PCNT, WDOG ADC, 2x DAC, 2x ACMP AES, EBI	**EFM32G890Fx** 32/64/128 KB Flash 8/16/16 KB RAM 90 General Purpose I/O 3x USART, UART 2x LEUART, I2C 3x 16-bit Timer, LETIMER RTC, 3x PCNT, WDOG ADC, 2x DAC, 2x ACMP AES, EBI
	EFM32G200Fx 16/32/64 KB Flash 8/8/16 KB RAM 24 General Purpose I/O 2x USART, LEUART, I2C 2x 16-bit Timer, LETIMER RTC, PCNT, WDOG ADC, DAC, 2x ACMP			

QFN32
6 x 6 mm
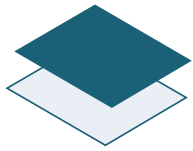*0.65 mm pitch*

QFN64
9 x 9 mm
0.5 mm pitch

QFP100
14 x 14 mm
0.5 mm pitch

BGA112
10 x 10 mm
0.8 mm pitch

Small footprint
(ill. are actual size)

... the world's most energy friendly microcontrollers

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Fax: +47 23 00 98 01*

EFM32 Development Tools

EFM32 microcontrollers are supported by a complete range of high-end, low-cost development kits and evaluation tools. Tools come with integrated emulator for software development and debugging, and a software library supported by major tool chains such as IAR Embedded Workbench®, KEIL µVision® and GNU GCC. EFM32 tools are designed to make prototyping and product development a breeze.

- On-board USB based programming and debugging
- User interface with 320*240 RGB display and LEDs
  - Joystick, switches, and potentiometer
- Modular design with plug-in MCU boards and expansion port
- Large I/O capability
  - EXP32 expansion port, 2x RS232, IrDA, Memory Card
  - EXP32 prototyping module
- 3-axis acceleration sensor and light sensor
- Board Support Package and Device Support Library
- Development support for major tool chains

The world's most licensed 32-bit architecture

ARM's innovations in high performance, low power technology are supported by the industry's largest network of Partners – the ARM Connected Community. Leading silicon, systems, design support, software, and training organizations provide a complete solution for products based on the ARM Architecture.

Lowest Energy ARM Cortex-M3 MCU
Energy Micro's EFM32 microcontroller family

Software and Hardware Support
EFM32 development kits and board support package

Compilers and Debuggers

- *IAR Systems®*
- *KEIL™*
- *Segger*
- *Hitex*
- *GNU GCC for ARM*

EFM®32 ... the world's most energy friendly microcontrollers

- *Full scalability the with ARM Cortex-M3 CPU platform*
- *Extends your battery life more than 300%*
- *Unique energy management system*
- *High speed autonomous peripherals*

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