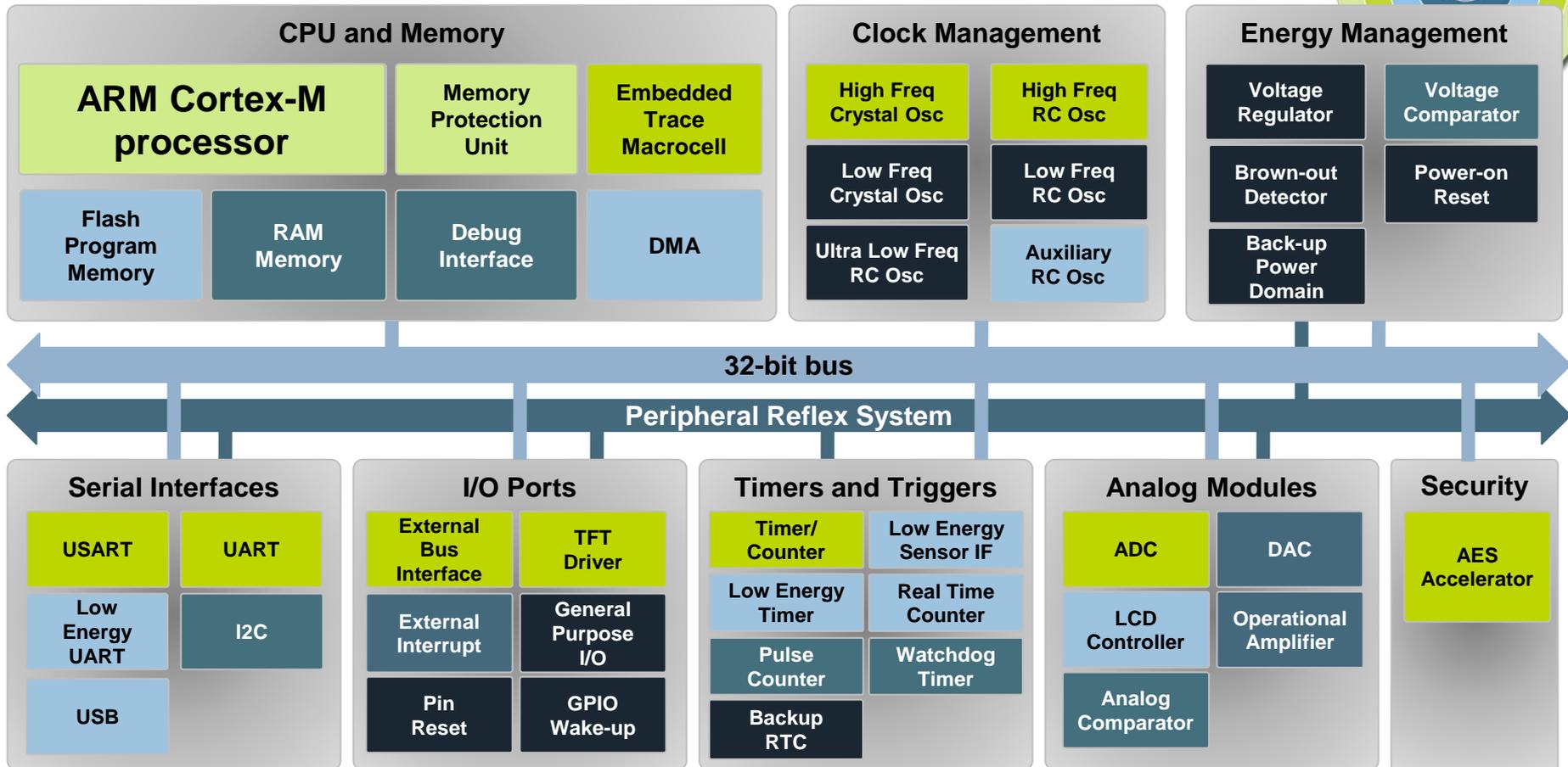


Lizard Labs

EFM32 Product Introduction



EFM32 – a truly unique microcontroller



Available down to:

EM0 (Run Mode)	EM1 (Sleep)	EM2 (Deep Sleep)	EM3 (Stop Mode)	EM4 (Shutoff Mode)
-------------------	----------------	---------------------	--------------------	-----------------------



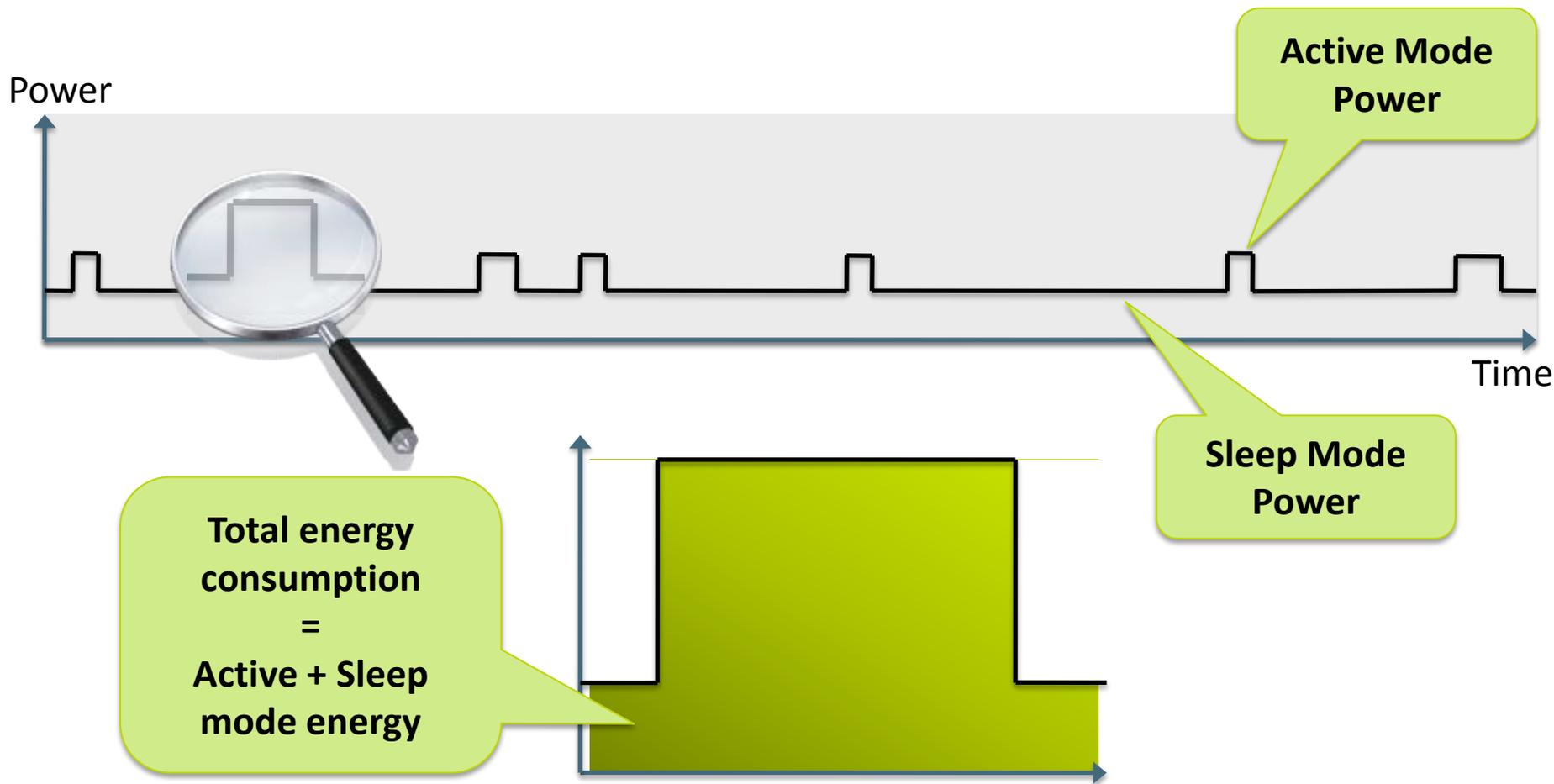
***10 Factors That Make EFM32
The World's Most Energy Friendly Microcontroller***





Battery life vs energy consumption

$$\text{Energy} = \text{Power} \times \text{Time}$$



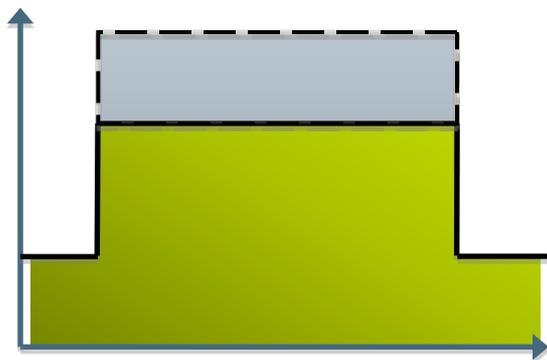


Very low active power consumption

1

$\mu\text{A}/\text{MHz}$ @3V @1 MHz	$\mu\text{A}/\text{MHz}$ @3V @25 MHz	$\mu\text{A}/\text{MHz}$ @3V @32 MHz
-------------------------------------------	--------------------------------------------	--------------------------------------------

210	150	150
------------	------------	------------

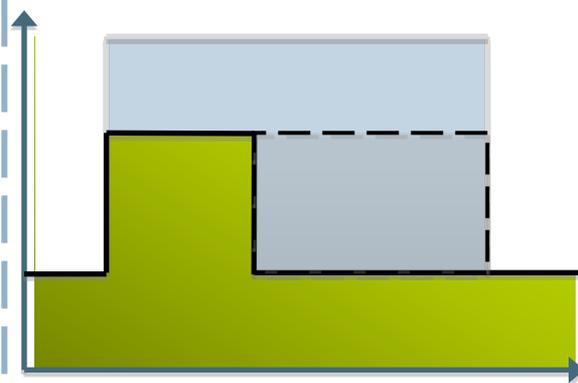


Reduced processing time

2

Cortex-M3 DMIPS/MHz	Cortex-M3 CoreMark/MHz
------------------------	---------------------------

1.25	2.17
-------------	-------------

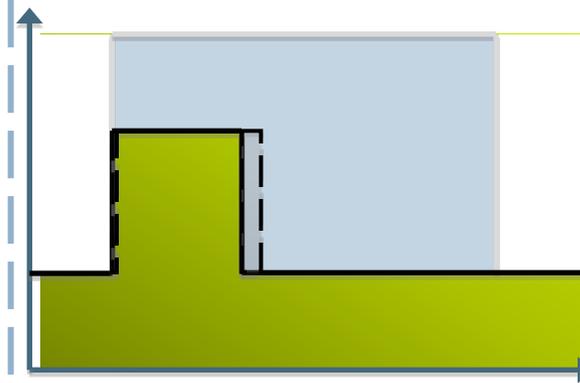


Very fast wake-up time

3

Wake-up time from sleep modes

2 μs

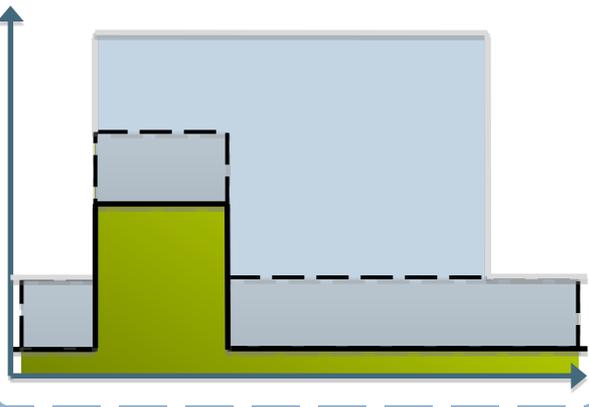




Ultra-low standby current

4

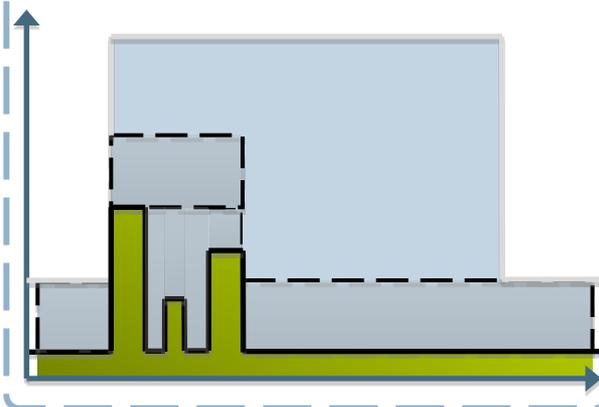
Shutoff current @ 3V	Deep Sleep @ 3V <i>incl. POR, BOD, RTC, RAM and CPU retained</i>
20 nA	900 nA



Autonomous peripherals

5

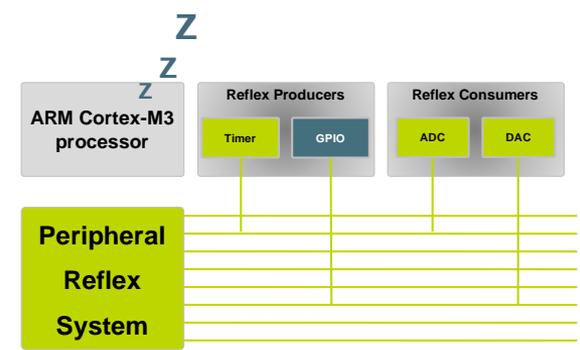
- Operation while CPU sleeps
- Extensive DMA Support
- All peripherals can operate autonomously



Peripheral Reflex System

6

- Direct peripheral interconnection system
- Boosting the value of autonomous operation
- Highly configurable





Well designed Energy Modes

7

EM0 "Run Mode": 150 μ A/MHz

EM1 "Sleep Mode": 45 μ A/MHz

EM2 "Deep Sleep Mode": 900 nA
RTC, Brown-Out Detection, RAM and CPU retained

EM3 "Stop Mode": 590 nA
Brown-Out Detection, RAM & CPU retained

EM4 "Shutoff Mode": 20 nA
Pin/GPIO Reset

RTC + 512-byte backup memory : 400 nA



Ultra energy efficient peripherals

8

Analog to Digital Converter
12-bit @ 1 MSamples/s: 350 μ A

Low Energy UART
*Full UART with 32 kHz clock
150 nA @ 9600 baud/s*

LCD Controller
*Directly driving up to 8x36 segment LCDs
Boost/Contrast/Animation/Blink
550 nA for 4x40*



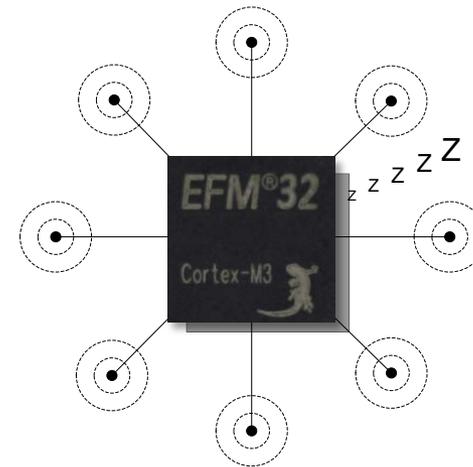
Low Energy Sensor Interface

9

Autonomous sensor monitoring in deep sleep

Up to 16 sensors simultaneously

Highly configurable
Resistive, Capacitive, Inductive



AEM - Advanced Energy Monitoring and the energyAware Profiler

10

```

#include EFM32_Gem32000em/rtc
static volatile bool rtcDelayComplete;
static void rtc_delay(void)
{
    rtcDelayComplete = true;

    /* ===== */
    /* Brief Enables LFACLK and selects LFXO as clock source for RTC
    /* ===== */
static void rtc_init(void)
{
    RTC_InitTypeDef init;
    rtcInitialized = 1;

    /* Ensure IE modules are accessible */
    CMU_ClockInit(&cmuClock_CORELE, true);
    /* Enable LFXO as LFACLK in CMU (will also enable oscillator if not enabled) */
    CMU_ClockSelect(&cmuClock_LFXO, cmuSelect_LFXO);
    /* Enable clock to RTC module */
    CMU_ClockEnable(&cmuClock_RTC, true);

    init.enable = false;
    init.debugRun = false;
    init.compTop = false; /* Count to max before wrapping */
    RTC_Init(&init);

    /* Disable interrupt generation from RTC */
    RTC_InitTypeDef rtc_irq_init;
    /* Enable interrupts */
    RTC_InitTypeDef rtc_irq_init;
    RTC_InitTypeDef rtc_irq_init;
}

/* ===== */
/* Brief RTC polled delay
/* Param need Number of msec to delay (poll based)
/* ===== */
void rtc_delay(uint32_t msec)
{
    rtcDelayComplete = false;
    RTC_InitTypeDef rtc_irq_init;
    while (!rtcDelayComplete);
}

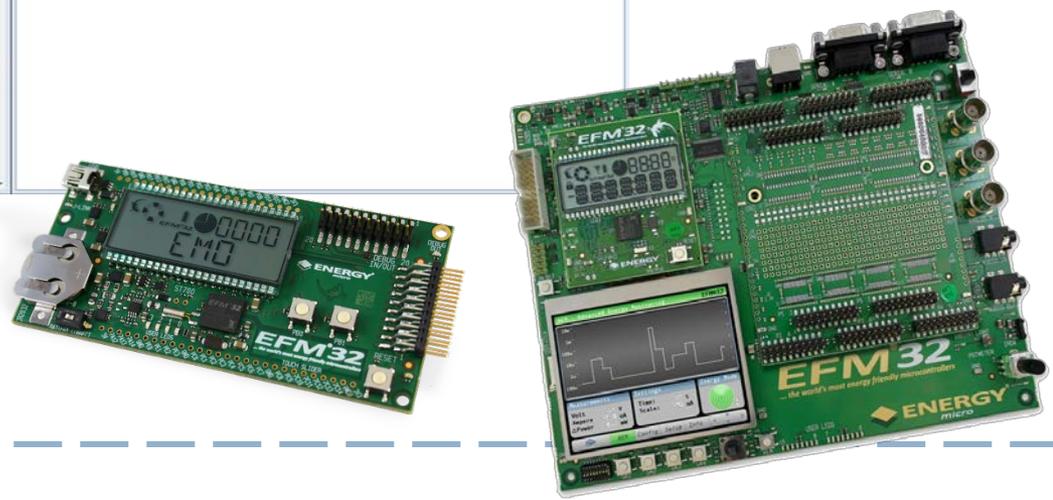
/* ===== */
/* Brief RTC Interrupt Handler, invoke callback if defined.
/* The interrupt table is in assembly startup_file_startup_efm32.a
/* ===== */
void rtc_irq_handler(void)
{
    /* Disable RTC */
    
```

AEM Current

Legend: rtc_irq_handler

Function	Energy (uJ)	Contribution (%)
WTFAND_Perp...	29	36%
Segment_CD...	20	25%
Segment_CD_N...	13	16%
LCD_SegmentDef	13	16%
Test	2	2%

The energyAware Profiler is an energy debugging tool that use Advanced Energy Monitoring (AEM) data available from the development tools to perform real-time profiling and debugging of the associated object code.



Simplicity Studio

- Easily access all free software tools
- Always the latest updates and news



The image displays four overlapping software windows:

- energyAware Profiler:** Shows a graph of current consumption over time with red and green data series.
- Simplicity Studio:** The central window, showing a dashboard with sections for Products (Leopard Gecko EFM32LG995F64), Tools, Chip Documentation, Software and Kits, Resources, and Downloads.
- energyAware Designer:** Displays a circuit board layout with various components and connections.
- energyAware Battery:** Shows a battery icon and associated data, likely representing battery life or consumption profiles.

Full featured hardware tools

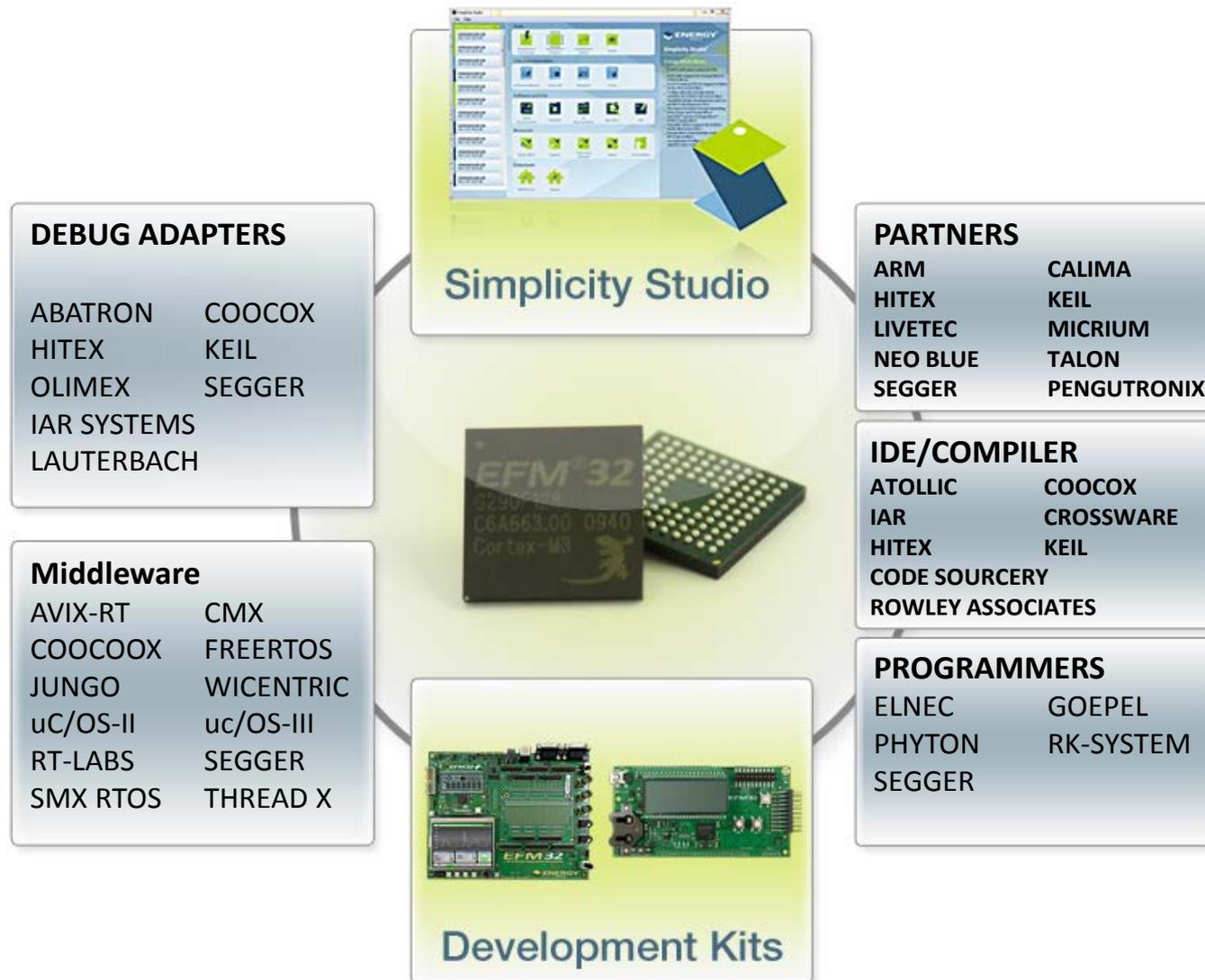


	\$69	\$69	\$79	\$299	\$309	\$349
	Gecko Starter Kit	Tiny Gecko Starter Kit	Leopard Gecko/ Giant Gecko Starter Kit	Gecko Development Kit	Gecko Development Kit	Leopard Gecko/ Giant Gecko Development Kit
						
Device	EFM32G890F128	EFM32TG840F32	EFM32LG990F256 EFM32GG990F1024	EFM32G890F128 EFM32G290F128	EFM32G890F128	EFM32LG990F256 EFM32GG990F1024
Advanced Energy Monitoring	Yes	Yes	Yes	Yes	Yes	Yes
USB J-Link Debugger	Yes	Yes	Yes	Yes	Yes	Yes
Plug-in MCU and prototyping board	-	-	-	Yes	Yes	Yes
Onboard J-Trace	-	-	-	-	-	Yes
Screen	4x40 segment LCD	8x20 segment LCD	8x20 segment LCD	4x40 segment LCD (EFM32G890-DK only) 320x240 RGB TFT	4x40 segment LCD 320x240 RGB TFT w/touch	320x240 RGB TFT w/touch

2-Oct-13



Simplicity Ecosystem

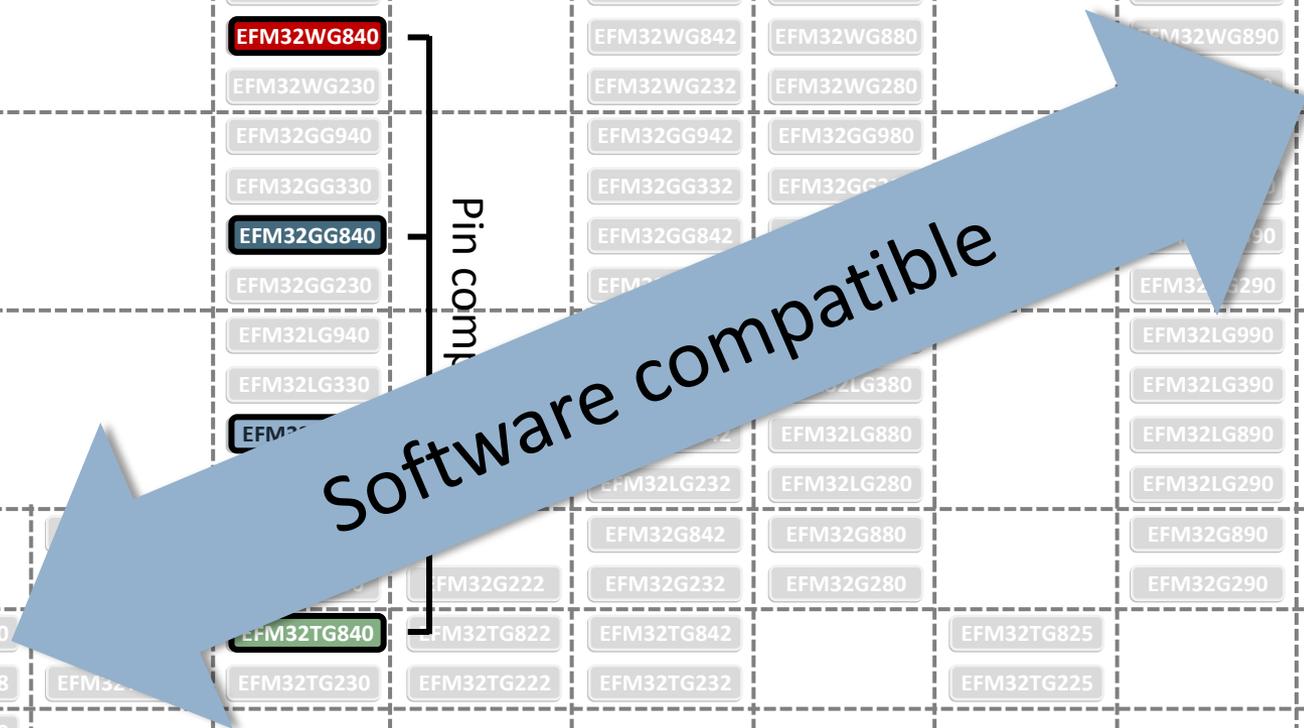


240+ Scalable Low Energy EFM32s



- Software compatible
- Pin compatibility within each package

Series	Package	Optional Features	QFN24	QFN32	QFN64	QFP48	QFP64	QFP100	BGA48	BGA112	BGA120
M4F	Wonder	USB LCD TFT DSP with FPU	EFM32WG940		EFM32WG940		EFM32WG942	EFM32WG980		EFM32WG990	EFM32WG995
			EFM32WG330		EFM32WG330		EFM32WG332	EFM32WG380		EFM32WG390	EFM32WG395
M3	Giant	USB LCD TFT	EFM32GG840		EFM32GG840		EFM32GG842	EFM32GG980		EFM32GG990	EFM32GG995
			EFM32GG940		EFM32GG940		EFM32GG942	EFM32GG980		EFM32GG990	EFM32GG995
M3	Leopard	USB LCD TFT	EFM32LG940		EFM32LG940		EFM32LG942	EFM32LG980		EFM32LG990	EFM32LG995
			EFM32LG330		EFM32LG330		EFM32LG332	EFM32LG380		EFM32LG390	EFM32LG395
M0+	Tiny	LCD	EFM32TG110		EFM32TG840		EFM32TG842	EFM32TG880		EFM32TG825	
			EFM32TG108	EFM32TG108	EFM32TG230	EFM32TG222	EFM32TG842	EFM32TG232	EFM32TG280	EFM32TG290	EFM32TG295
M0+	Zero		EFM32ZG110								
			EFM32ZG108	EFM32ZG210	EFM32ZG222						



Pin comp

 <p>ZERO Up to 32 MHz Flash: 4 - 32 RAM: 2 - 4</p>	 <p>TINY Up to 32 MHz Flash: 4 - 32 RAM: 2 - 4</p>	 <p>GECKO Up to 32 MHz Flash: 16 - 128 RAM: 8 - 16</p>	 <p>LEOPARD Up to 48 MHz Flash: 64 - 256 RAM: 32</p>	 <p>GIANT Up to 48 MHz Flash: 512 - 1024 RAM: 128</p>	 <p>WONDER Up to 48 MHz Flash: 64 - 256 RAM: 32</p>
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www.silabs.com

