SiM3C1xx

High-Performance, Low-Power, 32-Bit MCU Family with up to 256 kB of Flash

32-bit ARM® Cortex™-M3 CPU

- 80 MHz maximum frequency
- Single-cycle multiplication, hardware division support
- Nested vectored interrupt control (NVIC) with 16 levels of interrupt priority

Memory

- 32–256 kB Flash, in-system programmable
- 8–32 kB SRAM (including 4 kB retention SRAM)
- External bus interface supports up to 16 MB of external memory and a parallel LCD interface with QVGA resolution

Power Management

- Low drop-out (LDO) regulator
- Power-on reset circuit and brownout detectors
- 5-to-3.3 V voltage regulator supports up to 150 mA to drive the device directly from up to 5 V supply
- Programmable external regulator supports up to 3.6 V, 1000 mA
- Multiple power modes supported for low power optimization

Clock Sources

- Internal oscillator with PLL: Fine frequency resolution up to 80 MHz; spread-spectrum mode for reduced EMI
- Low power internal oscillator: 20 MHz and 2.5 MHz modes
- Low frequency internal oscillator: 16.4 kHz
- External oscillators: Crystal, RC, C, CMOS and RTC Crystal
- Flexible clock divider: Reduce frequency by up to 128x from any clock source

128/192/256-bit Hardware AES Encryption

- Hardware-supported Electronic Codebook (ECB), Cipher-Block Chaining (CBC) and Counter (CTR) algorithms
- All cipher operations can be performed without any firmware intervention for a set of 4-word blocks (up to 32 kB)

16/32-bit CRC

- Hardware support for common 32-bit and 16-bit polynomials

Timers/Counters

- 2 x 32-bit or 4 x 16-bit timers with capture/compare
- 2 x 16-bit, 2-channel counters with capture/compare/PWM
- 16-bit, 6-channel counter with capture/compare/PWM and dead-time controller with differential outputs
- 16-bit low power timer/pulse counter operational in the lowest power mode
- 32-bit real time clock (RTC) with multiple alarms
- Watchdog timer

Current-to-Voltage Converter

- Supports up to 6 mA input range

Supply Voltage

- 2.7 to 5.5 V (regulator enabled)
- 1.8 to 3.6 V (regulator disabled)

Low Power Features

- 85 nA current mode with voltage supply monitor enabled
- 350 nA current mode with RTC (internal oscillator)
- 620 nA current mode with RTC (external oscillator)
- 10 µs wakeup (lowest power mode); 1.5 µs analog setting time
- 275 µA/MHz active current
- Clocks can be gated off from unused peripherals to save power

2 x 12-Bit Analog-to-Digital Converters

- Up to 28 input channels
- Up to 250 ksps 12-bit mode or 1 Msps 10-bit mode
- Single, simultaneous, and interleaving modes supported
- Channel sequencer enables automatic multiplexing of multiple channels without firmware intervention
- Internal VREF or external VREF supported

2 x 10-Bit Digital-to-Analog Converters

- DMA support for waveform generation
- Four-word circular buffer to enable 12-bit mode

16-Channel Capacitance-to-Digital Converter

- Supports buttons, sliders, wheels, and capacitive proximity
- Fast conversion time; <1 µA wake-on-touch average current

Two Low-Current Comparators

- Integrated 6-bit programmable reference voltage
- 400 nA current consumption in low power mode

16-Channel DMA Controller

- Supports ADC, DAC, I2C, I^2S, SPI, USART, AES, EPCA, capacitive sensing, external triggers, and timers

Up to 65 Flexible I/O

- Up to 59 contiguous GPIO with two priority crossbars providing flexibility in pin assignments; 12 x 5 V tolerant GPIO
- Up to 6 programmable high drive capable (5–300 mA, 1.8–6 V) I/O can drive LEDs, power MOSFETs, buzzers, etc.

Communication Interfaces

- 2 x USARTs and 2 x UARTs with IrDA and ISO7816 SmartCard
- 3 x SPIs, 2 x I2C, I^2S (receive and transmit)

On-Chip Debugging

- Serial wire debug (SWD) and JTAG allow for full-speed, non-intrusive debug
- Serial wire viewer (SWV) available in 64 / 80 / 92-pin packages
- Cortex-M3 embedded trace macrocell (ETM) in 80 / 92-pin packages

Temperature Range: –40 to +85 °C

Package Options

- QFN options: 40-pin (6 x 6 mm), 64-pin (9 x 9 mm)
- TQFP options: 64-pin (10 x 10 mm), 80-pin (12 x 12 mm)
- LGA option: 92-pin (7 x 7 mm)

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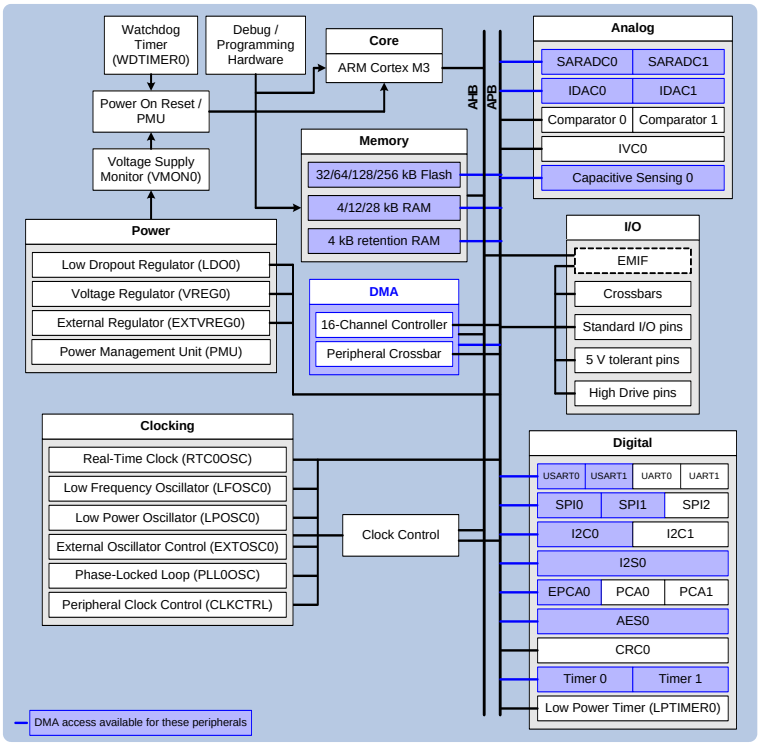

SiM3C1xx Block Diagram

Engineered to make your job easier

- Patented crossbar architecture enables maximum flexibility
  Developers can choose their peripherals and their pinout
- Free GUI-based "AppBuilder" for quick initialization w/ auto code generation
  Configure peripherals and pinout, modify properties, set up clocks, etc.
- Free Eclipse-based IDE and GNU-based complier and debugger
  Download and try today; Keil and IAR tools suites also supported
- Extensive software library "Si32Library"
  Modules for memory allocation, buffer management, data transfer, USB classes, multitasking, etc.
- Silicon Labs "Dashboard"
  Single location for all software, documentation, support, and news

www.silabs.com/32bit-MCU
www.silabs.com/32bit-software

Firmware and Software Tools

Product Selection Guide

Ordering Part Number	Flash Memory (kB)	RAM (kB)	External Memory Interface (EMIF)	Max # of EMIF Address/Data Pins	Digital Port I/Os (Total)	Digital Port I/Os with High Drive Capability	# of SARADC0 Channels	# of SARADC1 Channels	# of CAPSENSE0 Channels	# of Comparator 0/1 Inputs (±)	# of PMU Pin Wake Sources	JTAG Debugging Interface	ETM Debugging Interface	Serial Wire Debugging Interface	Lead-free (RoHS Compliant)	Package
SiM3C167-B-GM	256	32	✓	24	65	6	16	16	16	8/8	16	✓	✓	✓	✓	LGA-92
SiM3C167-B-GQ	256	32	✓	24	65	6	16	16	16	8/8	16	✓	✓	✓	✓	TQFP-80
SiM3C166-B-GM	256	32	✓	16	50	4	13	15	15	6/6	15	✓		✓	✓	QFN-64
SiM3C166-B-GQ	256	32	✓	16	50	4	13	15	15	6/6	15	✓		✓	✓	TQFP-64
SiM3C164-B-GM	256	32			28	4	7	11	12	3/3	10			✓	✓	QFN-40
SiM3C157-B-GM	128	32	✓	24	65	6	16	16	16	8/8	16	✓	✓	✓	✓	LGA-92
SiM3C157-B-GQ	128	32	✓	24	65	6	16	16	16	8/8	16	✓	✓	✓	✓	TQFP-80
SiM3C156-B-GM	128	32	✓	16	50	4	13	15	15	6/6	15	✓		✓	✓	QFN-64
SiM3C156-B-GQ	128	32	✓	16	50	4	13	15	15	6/6	15	✓		✓	✓	TQFP-64
SiM3C154-B-GM	128	32			28	4	7	11	12	3/3	10			✓	✓	QFN-40
SiM3C146-B-GM	64	16	✓	16	50	4	13	15	15	6/6	15	✓		✓	✓	QFN-64
SiM3C146-B-GQ	64	16	✓	16	50	4	13	15	15	6/6	15	✓		✓	✓	TQFP-64
SiM3C144-B-GM	64	16			28	4	7	11	12	3/3	10			✓	✓	QFN-40
SiM3C136-B-GM	32	8	✓	16	50	4	13	15	15	6/6	15	✓		✓	✓	QFN-64
SiM3C136-B-GQ	32	8	✓	16	50	4	13	15	15	6/6	15	✓		✓	✓	TQFP-64
SiM3C134-B-GM	32	8			28	4	7	11	12	3/3	10			✓	✓	QFN-40

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