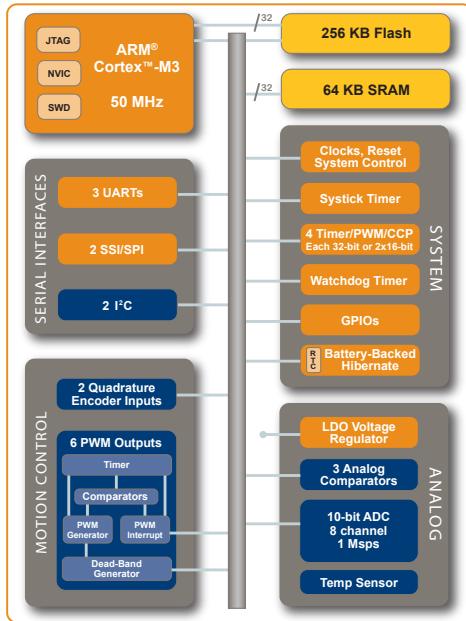


# LM3S1133 Microcontroller



**LM3S1000 Series Block Diagram.** This block diagram shows the superset of features for the LM3S1000 series of microcontrollers.

## Product Features

### 32-Bit RISC Performance

- 50-MHz operation with 32-bit ARM® Cortex™-M3 architecture
- Thumb®-compatible Thumb-2-only instruction set, with hardware-division and single-cycle-multiplication
- Integrated Nested Vectored Interrupt Controller (NVIC) provides deterministic interrupt handling
- 33 interrupt channels with eight priority levels
- Memory protection unit (MPU)
- Unaligned data access enables data to be efficiently packed into memory
- Atomic bit manipulation (bit-banding) delivers maximum memory utilization and streamlined peripheral control

### On-Chip Memory

- 64 KB single-cycle flash with two forms of flash protection on a 2-KB block basis
- 16 KB single-cycle SRAM

### Flexible Timer Capability

- Four general-purpose timers, each configurable as one 32-bit or two 16-bit timers
- Real-Time Clock (RTC) capability
- 24-bit system (SysTick) timer
- 32-bit watchdog timer

### Serial Interfaces

- Two synchronous serial interfaces (SSI) with master and slave modes for SPI, MICROWIRE, or TI synchronous serial
- I<sup>2</sup>C interface (master and slave)
- Three fully programmable 16C550-type UARTs with IrDA support

### UART

- Three fully programmable 16C550-type UARTs with IrDA support
- Separate 16x8 transmit (TX) and 16x12 receive (RX) FIFOs to reduce CPU interrupt service loading
- Programmable baud-rate generator with fractional divider

### Analog-to-Digital Converter (ADC)

- Single- and differential-input configurations
- Two 10-bit channels (inputs) when used as single-ended inputs
- Sample rate of 250 thousand samples/second
- On-chip temperature sensor

### Analog Comparators

- One integrated analog comparator
- Configurable for output to: drive an output pin, generate an interrupt, or initiate an ADC sample sequence
- Compare external pin input to external pin input or to internal programmable voltage reference

### Inter-Integrated Circuit (I<sup>2</sup>C) Interface

- Master and slave receive and transmit operation with transmission speed up to 100 Kbps in Standard mode and 400 Kbps in Fast mode
- Interrupt generation
- Master with arbitration and clock synchronization, multimaster support, and 7-bit addressing mode

### Dedicated Motion-Control PWM

- One PWM generator block, each with one 16-bit counter, two comparators, a PWM generator, and a dead-band generator
- Flexible output control block with PWM output enable of each PWM signal
- Can initiate an ADC sample sequence

### GPIOs

- 9-44 GPIOs, depending on configuration
- 5-V-tolerant input/outputs
- Programmable interrupt generation
- Fast toggle capable of a change every two clock cycles
- Can initiate an ADC sample sequence

### Power

- On-chip Low Drop-Out (LDO) voltage regulator, with programmable output user-adjustable from 2.25 V to 2.75 V
- Battery-backed hibernation module with real-time clock and 256-bytes of non-volatile memory
- 3.3-V supply brown-out detection
- Low-power options on controller: Sleep and Deep-sleep modes
- Low-power options for peripherals: software controls shutdown of individual peripherals
- User-enabled LDO unregulated voltage detection and automatic reset
- On-chip temperature sensor

### Flexible Reset Sources

- Power-on reset (POR)



# LM3S1133 Microcontroller

LUMINARY MICRO®

- Reset pin assertion
- Brown-out (BOR) detector alerts to system power drops
- Software reset
- Watchdog timer reset
- Internal low drop-out (LDO) regulator output goes unregulated

## Additional Features

- Six reset sources
- Programmable clock source control
- Clock gating to individual peripherals for power savings
- IEEE 1149.1-1990 compliant Test Access Port (TAP) controller
- Debug access via JTAG and Serial Wire interfaces
- Full JTAG boundary scan

## Package and Temperature

- 100-pin RoHS-compliant LQFP package
  - Industrial-range (-40°C to +85°C)
  - Extended-range (-40°C to +105°C)
- 108-ball RoHS-compliant BGA package
  - Industrial-range (-40°C to +85°C)

## Target Applications

- Motion control
- Factory automation
- Fire and security
- HVAC and building control
- Test and measurement equipment

## Ordering Information

Orderable Part Number	Description
LM3S1133-IQC50	Stellaris® LM3S1133 Microcontroller Industrial Temperature
LM3S1133-IQC50 (T) <sup>a</sup>	
LM3S1133-EQC50	Stellaris® LM3S1133 Microcontroller Extended Temperature
LM3S1133-EQC50 (T)	
LM3S1133-IBZ50	Stellaris® LM3S1133 Microcontroller Industrial Temperature
LM3S1133-IBZ50 (T)	

a. T= Tape and Reel.

## Evaluation Kit

The Luminary Micro Stellaris® LM3S1968 Evaluation Kit provides the hardware and software tools to speed development using the LM3S1968 microcontroller's peripherals and Hibernation module. Ask your Luminary Micro distributor for part number EKK-LM3S1968 (ARM RealView® MDK tools), EK1-LM3S1968 (IAR Embedded Workbench® tools), EKC-LM3S1968 (CodeSourcery Sourcery G++ tools), or EKT-LM3S1968 (Code Red Technologies Code Suite tools). See the Luminary Micro web site for the latest tools available.



Luminary Micro, Inc. • 108 Wild Basin, Suite 350 • Austin, TX 78746  
 Main: +1-512-279-8800 • Fax: +1-512-279-8879 • <http://www.luminarymicro.com>

Copyright © 2007-2008 Luminary Micro, Inc. All rights reserved. Stellaris, Luminary Micro, and the Luminary Micro logo are registered trademarks of Luminary Micro, Inc. or its subsidiaries in the United States and other countries. ARM and Thumb are registered trademarks and Cortex is a trademark of ARM Limited. Other names and brands may be claimed as the property of others.

PB-LM3S1133-01

