LM3S317 Microcontroller

LUMINARY MICRO®

Block Diagram

- ARM Cortex-M3 25 MHz
- 16 KB Flash
- 4 KB SRAM
- Analog Comparator
- LDO/POR/BOR
- SSI
- Watchdog Timer
- UART
- GPIOs
- 6 Channel 10-Bit ADC
- Internal Temp Sensor
- Motor Control
  - Capture and Compare
  - 6 PWM Outputs
- 3 Timers
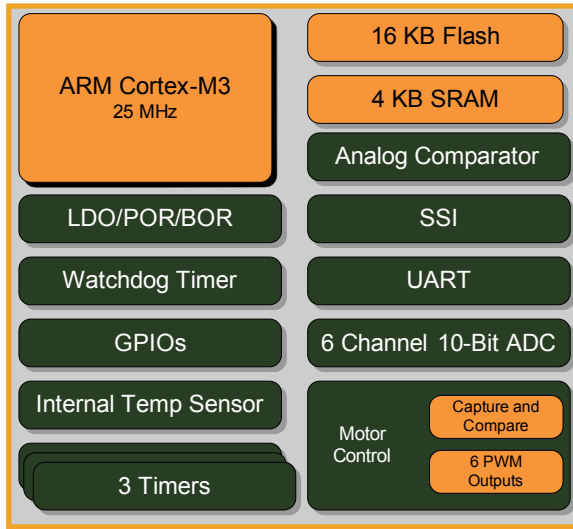
Product Features

32-Bit RISC Performance

- 32-bit ARM® Cortex™-M3 v7M architecture optimized for small-footprint embedded applications
- 25-MHz operation
- System timer (SysTick) provides a simple, 24-bit clear-on-write, decrementing, wrap-on-zero counter with a flexible control mechanism
- Thumb®-compatible Thumb-2-only instruction set processor core for high code density
- Integrated Nested Vectored Interrupt Controller (NVIC) provides deterministic interrupt handling
- 24 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

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

General-Purpose Timers

- Three General-Purpose Timer Modules (GPTM), each configurable as one 32-bit or two 16-bit timers with capture and simple PWM modes, or to initiate an ADC event
- Real-Time Clock (RTC) capability

Watchdog Timer

- 32-bit down counter with a programmable load register
- Separate watchdog clock with an enable
- Programmable interrupt generation logic with interrupt masking
- Lock register protection from runaway software
- Reset generation logic with an enable/disable

Synchronous Serial Interface (SSI)

- Programmable interface operation for Freescale SPI, MICROWIRE, or Texas Instruments synchronous serial interfaces
- Master or slave operation

UART

- Fully programmable 16C550-type UART
- 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
- Six 10-bit channels (inputs) when used as single-ended inputs
- Sample rate of 250 thousand samples/second
- Flexible, configurable analog-to-digital conversion
  - Four programmable sample conversion sequences from one to eight entries long, with corresponding conversion result FIFOs
  - Each sequence triggered by software or internal event (timers, analog comparators, PWM or GPIO)
- 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

PWM

- Three 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

- 3-30 GPIOs, depending on configuration
- 5-V-tolerant input/outputs
- Programmable interrupt generation
- Can initiate an ADC sample sequence
- Programmable drive strength and slew-rate control

Power

- On-chip Low Drop-Out (LDO) voltage regulator, with programmable output user-adjustable from 2.25 V to 2.75 V
- 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
- 3.3-V supply brown-out detection and reporting via interrupt or reset
- On-chip temperature sensor

Flexible Reset Sources

- Power-on reset (POR)

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- 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

- 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

- 48-pin RoHS-compliant LQFP package
  - Industrial-range (-40°C to +85°C)
  - Extended-range (-40°C to +105°C)

Target Applications

- Factory automation and control
- Industrial control power devices
- Building and home automation
- Stepper motors
- Brushless DC motors
- AC induction motors

High-performance ARM Cortex-M3 microcontroller for real-time embedded applications
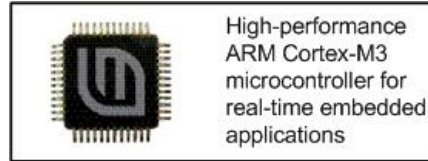
Ordering Information

Orderable Part Number	Description
LM3S317-IQN25 LM3S317-IQN25(T)[a]	Stellaris® LM3S317 Microcontroller Industrial Temperature
LM3S317-EQN25 LM3S317-EQN25(T)	Stellaris® LM3S317 Microcontroller Extended Temperature

a. T= Tape and Reel.

Development Kit

The Luminary Micro Stellaris™ Family Development Kit provides the hardware and software tools that engineers need to begin development quickly. Ask your Luminary Micro distributor for part number . See the Luminary Micro website for the latest tools available.

Tools to begin development quickly

PB-LM3S317-01