LM3S818 Microcontroller

STELLARIS®
microcontrollers

Features

32-Bit RISC Performance

- 32-bit ARM® Cortex™-M3 v7M architecture optimized for small-footprint embedded applications
- 50-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
- 26 interrupt channels with eight priority levels
- Memory protection unit (MPU) provides a privileged mode for protected operating system functionality
- 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
- 8 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
- Programmable clock bit rate and prescale
- Separate transmit and receive FIFOs, 16 bits wide, 8 locations deep
- Programmable interface operation for Freescale SPI, MICROWIRE, or Texas Instruments synchronous serial interfaces
- Programmable data frame size from 4 to 16 bits
- Internal loopback test mode for diagnostic/debug testing

UART

- Two fully programmable 16C550-type UARTs
- Separate 16x8 transmit (TX) and 16x12 receive (RX) FIFOs to reduce CPU interrupt service loading
- Programmable baud-rate generator allowing speeds up to up to 3.125 Mbps
- Programmable FIFO length, including 1-byte deep operation providing conventional double-buffered interface
- FIFO trigger levels of 1/8, ¼, ½, ¾, and 7/8
- Standard asynchronous communication bits for start, stop, and parity
- False-start-bit detection
- Line-break generation and detection

Analog-to-Digital Converter (ADC)

- Single- and differential-input configurations
- Six 10-bit channels (inputs) when used as single-ended inputs
- Sample rate of one million 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

Quadrature Encoder Inputs

- Hardware position integrator tracks the encoder position

TEXAS INSTRUMENTS

- Velocity capture using built-in timer
- Interrupt generation on index pulse, velocity-timer expiration, direction change, and quadrature error detection

GPIOs

- 0-30 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)
- 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)

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
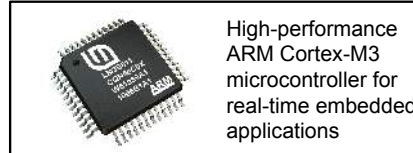
Ordering Information

Orderable Part Number	Description
LM3S818-IQN50-C2	Stellaris® LM3S818 Microcontroller Industrial Temperature
LM3S818-IQN50-C2T	Stellaris® LM3S818 Microcontroller Industrial Temperature Tape-and-reel
LM3S818-EQN50-C2	Stellaris® LM3S818 Microcontroller Extended Temperature
LM3S818-EQN50-C2T	Stellaris® LM3S818 Microcontroller Extended Temperature Tape-and-reel

Development Kit

The Stellaris® Family Development Kit provides the hardware and software tools that engineers need to begin development quickly. Ask your distributor for part number DK-LM3S818. See the website for the latest tools available.

Tools to begin development quickly

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

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