

**LM3S3000 Series Block Diagram.** This block diagram shows the superset of features for the LM3S3000 series of microcontrollers.

## 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
- 41 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

- 128 KB single-cycle flash with two forms of flash protection on a 2-KB block basis
- 64 KB single-cycle SRAM
- Pre-programmed ROM containing the Stellaris® family peripheral driver library (DriverLib) and Stellaris® boot loader

### DMA Controller

- Developed and tested by ARM

- Up to a maximum of 32 configurable DMA channels, each with dedicated handshake signals and configurable priority levels
- Supports memory-to-memory, memory-to-peripheral, and peripheral-to-memory transfers
- Supports DMA transfers using data widths of 8, 16, or 32-bits
- Supports USB, UART, and SSI
- Compatible with the AMBA AHB-Lite protocol
- Number of transfers in each DMA cycle is programmable in binary steps from 1 to 1024
- Each DMA channel has separate outputs to indicate when a DMA cycle is active or complete

### 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

### USB

- Standards-based universal serial bus controller
- USB 2.0 full-speed (12 Mbps) operation
- USB 2.0 Host/Device
- Flexible configuration option
  - USB Device mode
  - USB Host mode
- Integrated PHY
- 4 transfer types: Control, Interrupt, Bulk, and Isochronous
- 1 dedicated bi-directional control endpoint
- 3 Receive and 3 Transmit configurable endpoints
- 2 KB dedicated endpoint memory
  - Direct memory access (DMA)
  - One endpoint may be defined for double-buffered 1023-byte isochronous packet size

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

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

### Analog Comparators

- Two independent integrated analog comparators
- Configurable for output to: drive an output pin or generate an interrupt
- 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 (I²C) Interface

- Two I²C modules
- 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

# LM3S3748 Microcontroller

STELLARIS®  
microcontrollers

TEXAS INSTRUMENTS



- Master with arbitration and clock synchronization, multimaster support, and 7-bit addressing mode

## PWM

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

## GPIOs

- 3-61 GPIOs, depending on configuration
- 5-V-tolerant input/outputs
- Programmable interrupt generation
- Low interrupt latency; as low as 6 cycles and never more than 12 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
- 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

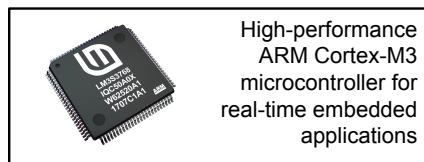
## Package and Temperature

- 100-pin RoHS-compliant LQFP 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
- Remote monitoring
- Electronic point-of-sale (POS) machines
- Network appliances and switches
- Gaming equipment



## Ordering Information

| Orderable Part Number | Description   |
|-----------------------|---|
| LM3S3748-IQC50-A0     | Stellaris® LM3S3748 Microcontroller Industrial Temperature 108-pin LQFP               |
| LM3S3748-IQC50-A0T    | Stellaris® LM3S3748 Microcontroller Industrial Temperature 108-pin LQFP Tape-and-reel |

## Evaluation Kit

The Stellaris® LM3S3748 Evaluation Kit provides the hardware and software tools to speed development of powerful, USB-connected host devices. Ask your distributor for part number EKK-LM3S3748 (ARM RealView® MDK tools), EKI-LM3S3748 (IAR Embedded Workbench® tools), EKC-LM3S3748 (CodeSourcery Sourcery G++ tools), or EKT-LM3S3748 (Code Red Technologies Red Suite tools). See the website for the latest tools available.



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