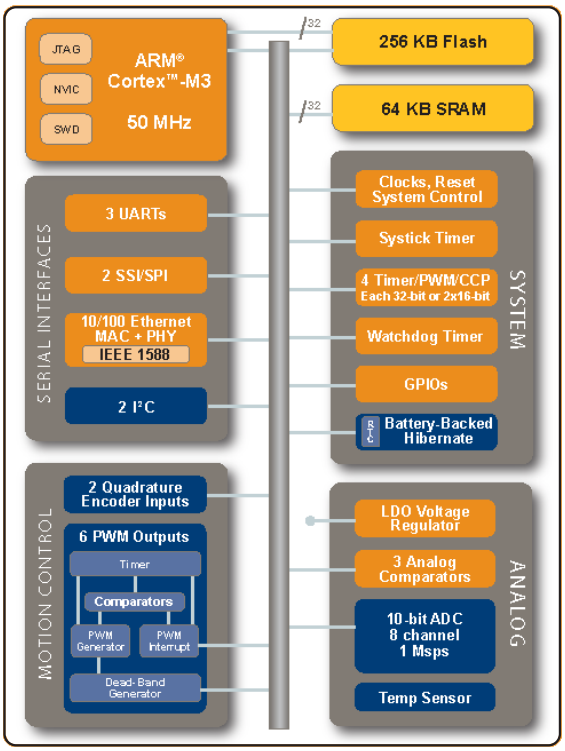
LM3S6965 Microcontroller

STELLARIS® microcontrollers

TEXAS INSTRUMENTS



LM3S6000 Series Block Diagram. This block diagram shows the superset of features for the LM3S6000 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
- 38 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

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

10/100 Ethernet Controller

- Conforms to the IEEE 802.3-2002 Specification
- Full- and half-duplex for both 100 Mbps and 10 Mbps operation
- Integrated 10/100 Mbps Transceiver (PHY)
- Automatic MDI/MDI-X cross-over correction
- Programmable MAC address

Serial Interfaces

- Synchronous serial interface (SSI) with master and slave modes for SPI, MICROWIRE, or TI synchronous serial
- Two I^2C interfaces (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 allowing speeds up to up to 3.125 Mbps

Analog-to-Digital Converter (ADC)

- Single- and differential-input configurations
- Four 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, 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^2C) Interface

- Two I^2C 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
- Master with arbitration and clock synchronization, multimaster support, and 7-bit addressing mode

Dedicated Motion-Control 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

- Two hardware position integrators track the encoder position
- Velocity capture using built-in timer
- Interrupt generation on index pulse, velocity-timer expiration, direction change, and quadrature error detection

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GPIOs

- 0-42 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

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
- Power and energy
- Test and measurement equipment
- Medical instrumentation
- Remote monitoring
- Electronic point-of-sale (POS) machines
- Network appliances and switches
- Gaming equipment

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

Ordering Information

Orderable Part Number	Description
LM3S6965-IBZ50-A2	Stellaris® LM3S6965 Microcontroller Industrial Temperature 108-ball BGA
LM3S6965-IBZ50-A2T	Stellaris® LM3S6965 Microcontroller Industrial Temperature 108-ball BGA Tape-and-reel
LM3S6965-EQC50-A2	Stellaris® LM3S6965 Microcontroller Extended Temperature 100-pin LQFP
LM3S6965-EQC50-A2T	Stellaris® LM3S6965 Microcontroller Extended Temperature 100-pin LQFP Tape-and-reel
LM3S6965-IQC50-A2	Stellaris® LM3S6965 Microcontroller Industrial Temperature 100-pin LQFP
LM3S6965-IQC50-A2T	Stellaris® LM3S6965 Microcontroller Industrial Temperature 100-pin LQFP Tape-and-reel

Evaluation Kit

The Stellaris® LM3S6965 Evaluation Kit provides the hardware and software tools to speed development of powerful, network-connected devices. Ask your distributor for part number EKK-LM3S6965 (ARM RealView® MDK tools), EKI-LM3S6965 (IAR Embedded Workbench® tools), EKC-LM3S6965 (CodeSourcery Sourcery G++ tools), or EKT-LM3S6965 (Code Red Technologies Red Suite tools). See the website for the latest tools available.

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ARM POWERED

Cortex Intelligent Processors by ARM

PB-LM3S6965-02