



8-bit HCS08 Embedded Controllers

# MC9S08SV16/8

## 8-bit microcontrollers

### Target Applications

- Home appliances
  - Air conditioners
  - Microwave ovens
  - Washing machines
  - Dishwashers
  - Water heaters
  - Refrigerators
- UPS
- E-bikes
- Step machines
- Induction ovens
- Note counters
- Disinfectors

### Overview

The 8-bit MC9S08SV16/8 (SV16/8) MCU family provides best-in-class performance, system reliability and design flexibility to meet the tough design requirements of industrial applications. The SV16/8 family offers an advanced peripheral set with high resolution 12-ch., 10-bit ADC, TPM and modulo timers and ACMP for precise and fast sensing and control. The family increases design flexibility with an industry-leading 30 GPIO pins. It also simplifies software design through an interrupt priority controller with nested interrupt capability. Enhanced EMC/EMI (5V) performance provides peace of mind when designing products for noisy environments.

### Features

#### 8-bit HCS08 Central Processing Unit (CPU)

- Up to 20 MHz internal bus (40 MHz HCS08 core) frequency with 2.7V to 5.5V operation across temperature range of -40°C to +85°C

#### On-Chip Memory

- Up to 16K flash read/program/erase across entire operating voltage and temperature ranges
- Up to 1024 bytes random access memory (RAM)
- Security circuitry

#### Power-Saving Modes

- Two-low power stop modes, reduced-power wait mode

#### Clock Source Options

- Oscillator (XOSC) clock source options include oscillator, crystal or ceramic resonator
- Up to 20 MHz internal clock source (ICS) module

#### Peripherals

- Interrupt priority controller (IPC)
- Analog-to-digital converter (ADC)—12-channel, 10-bit resolution
- Timer/pulse-width modulator module (TPM)—1 x 6-channel and 1 x 2-channel
- MTIM16—One 16-bit modulo timer with optional prescaler
- SCI module with optional 13-bit break, LIN extensions

### Benefits

- Offers reliable performance across the entire voltage range
- Allows user to take full advantage of in-application re-programmability benefits in virtually any environment
- Reduces development time by providing more RAM for programming
- Protects data/code in flash and RAM from unauthorized access
- Allows uninterrupted sampling application in a reduced-power state, which cuts overall system power consumption
- Optimizes power consumption and provides greater design flexibility
- Provides accurate on-chip clock source and saves cost by eliminating the need for external components

- Provides hardware-based nested interrupt capability to simplify software design
- Provides fast and easy conversion of analog inputs
- Featured integrated on-chip temperature sensor and bandgap
- Flexible multiple time bases and channels provide system timing and functions
- Supports precise and fast sensing and control
- Provides UART communications

**Cost-Effective Development Tools****DEMO9S08SV16 (\$49 USD\*)**

This demonstration kit comes with everything required to complete an entire project using the SV16/8 family. Complimentary\*\* built-in OSBDM circuitry is available for debugging and programming. A getting-started DVD includes necessary software, documents and resources to jump start new product development.

**CodeWarrior™ Development Studio for Microcontrollers 6.2**

Special Edition (complimentary\*\*)

CodeWarrior Development Studio for Microcontrollers is an integrated tool suite that supports software development for Freescale's microcontrollers. Designers can further accelerate application development with the help of the award-winning Processor Expert™ tool in the CodeWarrior tool suite.

\* Prices indicated are MSRP

\*\* Subject to license agreement

**Package Options****MC9S08SV16CBM**

Temp Range: -40°C to +85°C

Package: 32 SDIP

**MC9S08SV16CLC**

Temp Range: -40°C to +85°C

Package: 32 LQFP

**MC9S08SV8CBM**

Temp Range: -40°C to +85°C

Package: 32 SDIP

**MC9S08SV8CLC**

Temp Range: -40°C to +85°C

Package: 32 LQFP

**Features** (continued)

- SPI module in 8-bit data length modes with a receive data buffer hardware match function
- I<sup>2</sup>C module capable of up to 100 kbps operation with maximum bus loading
- Analog comparator (ACMP) with option to compare to internal reference
- Real time counter (RTC)

**Benefits**

- Delivers fast communication to and from peripheral devices
- Delivers fast communication to and from peripheral devices
- Fast and efficient response to analog signals
- Improves task-scheduling for applications requiring time-of-day calendar functions. Frees up timers for other activities.

**Input/Output**

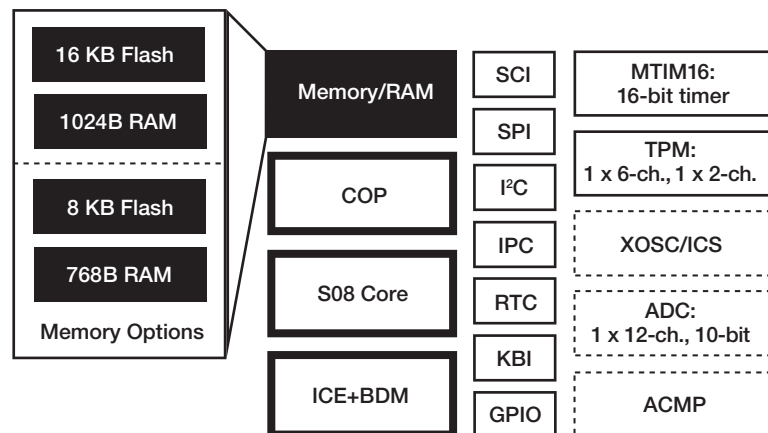
- 30 general purpose input/output (GPIO) pins including one input-only pin and one output-only pin
- KBI—8-pin keyboard interrupt module
- Improves flexibility by allowing interfacing to a large number of pins that are capable of generating interrupts
- Offers flexibility to generate interrupts

**System Protection**

- Watchdog computer operating properly (COP) module can be reset with option to run from dedicated 1 kHz internal clock source or bus clock
- Low-voltage detection with reset or interrupt, selectable trip points
- Illegal opcode detection with reset
- Illegal address detection with reset
- Flash block protection
- Provides system protection using backup oscillator by resetting the MCU to a known state
- Built-in system protection to help secure data and warn of possible voltage loss conditions
- Allows the device to recognize erroneous code and to reset the processor to help avoid lock-up states
- Resets the MCU to a known state following inadvertent access
- Helps provide security by protecting code from unauthorized or unintentional access

**Development Support**

- Single-wire background debug interface
- Breakpoint setting capability
- On-chip in-circuit emulator (ICE) debug module containing two comparators and nine trigger points
- Allows developers to use the same interface for multiple platforms
- Allows single breakpoint setting during in-circuit debugging, helping simplify the software development and debugging
- Reduces development time by enabling real-time, on-chip emulation without the added expense of traditional emulator hardware

**MC9S08SV16/8 Block Diagram**

**Learn more:** For more information about the SV16/8 family, please visit [www.freescale.com/8bit](http://www.freescale.com/8bit).