icrocontrollers

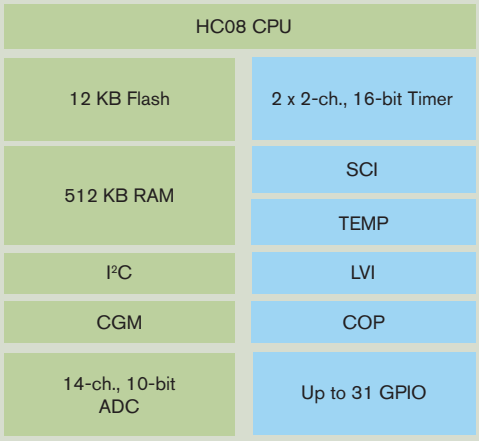
MC68HC908SR12

Target Applications

> Smart batteries
> Battery chargers
> Instrumentation
> Data acquisition
> Temperature sensing and control

Overview

Freescale Semiconductor's MC68HC908SR12 features advanced analog integration with on-chip temperature sensor, current sensor, 10-bit analog-to-digital converter (ADC) and programmable amplifier. Other valuable peripherals include System Management Bus (SMBus), pulse-width modulation (PWM), clock generator module (CGM) with Phase-Lock Loop (PLL) , I²C and timebase module.



Features	Benefits
High-Performance 68HC08 CPU Core	
> 8 MHz bus operation at 5V operation for 125 ns minimum instruction cycle time > 4 MHz bus operation at 3V for 250 ns minimum instruction cycle time > Efficient instruction set including multiply and divide > 16 flexible addressing modes including stack relative with 16-bit stack pointer > Fully static low-voltage, low-power design with wait and stop modes	> Object code compatible with the 68HC05 family > Easy to learn and use architecture > C-optimized architecture provides compact code
Integrated Second-Generation Flash Memory	
> In-application reprogrammable > Extremely fast programming, encoding 64 bytes in as fast as 2 ms > Flash programming across the 68HC08's full operating supply voltage with no extra programming voltage > 10K write/erase cycles minimum over temperature > Flexible block protection and security	> Cost-effective programming changes and field software upgrades via in-application programmability and reprogrammability > Reduces production programming costs through ultra-fast programming > Allows reprogrammable battery-powered applications > Byte-writable for data as well as program memory > Protects code from unauthorized reading and to guard against unintentional erasing/writing of user-programmable segments of code
Advanced Analog Functions	
> Temperature sensor > Current sensor > Programmable amplifier	> Provides cost savings by moving functions on-chip > Better than 1°C resolution, range –20°C to +70°C > Amplifier gain up to 16x reduces the need for external op-amps > Generates an interrupt when current is detected to conserve power
10-bit Analog-to-Digital Converter	
> 14 channels (11 for the 42-pin package) > Single conversion in 8 µs	> Fast, easy conversion from analog inputs like temperature, pressure and fluid levels to digital values for CPU processing
Clock generation module with Phase-Lock Loop (PLL)	
> Programmable clock frequency in integer multiples of external crystal reference > Crystal reference of 32 kHz to 100 kHz > External clock option with or without PLL	> Provides high performance using low-cost, low-frequency reference crystals > Reduces generated noise while still providing high performance (up to 32 MHz internal clock) > Fast, easy conversion from analog inputs like temperature, pressure and fluid levels to digital values for CPU processing
8-bit Pulse-Width Modulation	
> Three independent PWM signals > Automatic phase control > 125 ns resolution at 8 MHz bus	> Provides multiple motor or multi-phase control capability > Precise phase difference between PWM output signals

freescale™ semiconductor

Features	Benefits
Four Programmable 16-bit Timer Channels	
> 125 ns resolution at 8 MHz bus > External clock input pin > Free-running counter or modulo up-counter	> Provides input capture, output compare or unbuffered PWM > Pairing timer channels provides a buffered PWM function
Timebase Module	
> Eight user-selectable periodic real-time interrupts > Optionally operate in low-power stop mode	> Provides auto wakeup from low-power stop mode to maintain real-time clock or check external device status such as sensors
Multi-Master I²C Bus	
	> SMBus (System Management Bus) version 1.0/1.1 compatible
Serial Communications Interface (SCI)	
> UART asynchronous communications system > Flexible baud rate generator > Double buffered transmit and receive > Optional hardware parity checking and generation	> Asynchronous communication between the MCU and a terminal, computer or a network of microcontrollers
Computer Operating Properly (COP) Watchdog Timer	
	> Provides system protection in the event of runaway code by resetting the MCU to a known state
Low-Voltage Inhibit (LVI)	
	> Improves reliability by resetting the MCU when voltage drops below trip point > Integration reduces system cost
Up to 31 Bidirectional Input/Output (I/O) Lines	
> Keyboard scan with selectable interrupts on eight I/O pins > Software programmable pullups on eight pins	> Keyboard scan with programmable pullups eliminates external glue logic when interfacing to simple keypads

Cost-Effective Development Tools

For more information on development tools, please refer to the Freescale Development Tool Selector Guide (SG1011).

FSICEKITSR12 ***$2195****	Complete FSICE High-performance emulator kit; includes emulator module, cables, head adapters and programming adapters
M68EML08SR12 ***$495****	Emulation module for FSICE system
M68CYCLONEPRO ***$499****	HC08/HCS08/HC12/HCS12 stand-alone Flash programmer or in-circuit emulator, debugger, Flash programmer; USB, serial or Ethernet interface options
USBMULTILINK08 ***$99****	Universal HC08 in-circuit debugger and Flash programmer; USB PC interface
M68CPA08QF324448 ***$199****	Programming adapter for MON08 cables and single MCU: 32-pin 0.8mm QFP packages, 44-pin 0.8mm QFP packages and 48-pin 0.5mm QFP packages.
M68CPA08P40B56 ***$99****	Programming adapter for MON08 cables and single MCU: DIP packages up to 40 pins and SDIP packages up to 56 pins.
CWX-H08-SE ***Free****	CodeWarrior Special Edition for HC(S)08 MCUs. Includes IDE, linker, debugger, unlimited assembler, Processor Expert™ auto-code generator, full-chip simulation, and 16K C Compiler.

Application Notes

AN2093	Creating Efficient Code for the MC68HC08
AN1752	Data Structures for 8-bit MCUs
AN1705	Noise Reduction Techniques for MCU-Based Systems
AN1219	M68HC08 Integer Math Routines
AN1218	HC05 to HC08 Optimization
AN1837	Non-Volatile Memory Technology Review
AN1259	System Design and Layout Techniques for Noise Reduction in MCU-Based Systems
AN1263	Designing for Electromagnetic Compatibility with Single-Chip Microcontrollers
AN1050	Designing for Electromagnetic Compatibility (EMC) with HCMOS Microcontrollers
AN1705	Noise Reduction Techniques for Microcontroller-Based Systems

Package Options

Part Number	Package	Temp. Range
MC68HC908SR12CB	42 SDIP	-40 to +85°C
MC68HC908SR12MB	42 SDIP	-40 to +125°C
MC68HC908SR12CFA	48 LQFP	-40 to +85°C
MC68HC908SR12MFA	48 LQFP	-40 to +125°C

42-Pin Plastic SDIP

48-Lead QFP

Learn More: For more information about Freescale's products, please visit **www.freescale.com**.

*Price indicated is MSRP.

Document Number: 68HC908SR12FS
REV 0