icrocontrollers

MC68HC908QL4/3/2

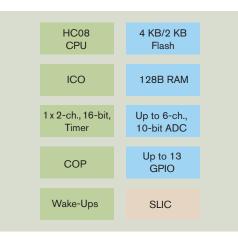
Target Applications

- > Automotive LIN applications
 - Mirror and window motor control
 - Power seat motors
- HVAC actuators and sensors
- > Network and control systems
- > Home and industrial security systems
- > Industrial networked motor and actuator control

Overview

Freescale Semiconductor's MC68HC908QL4/3/2 is a low pin count, fully integrated microcontroller (MCU) created to make system design easier by eliminating external peripherals wherever possible. The Slave LIN Interface Controller (SLIC) module, a dedicated hardware LIN module, minimizes the resource requirement of the CPU and reduces system costs. The integrated second-generation Flash memory programs up to 100 times faster than prior Flash solutions and offers in-application programming. Features include a 10-bit analog-to-digital converter (ADC), an autowake-up from stop feature, low-voltage inhibit (LVI) and a watchdog timer.

All products are fully LIN 2.0 and SAE J2602 compliant.



Low-Cost LIN Family

Second-Generation Flash or Low-Cost ROM Memory Options

- > Embedded fully automotive Flash
- > Range of memory from 2 KB to 4 KB
- > 10K write/erase cycles at -40°C to +125°C
- > Low-cost ROM versions available—contact your sales representative
- > Ultra-fast programming: 64B in 2 ms
- > Flash block protection
- > Flash reprogrammable in circuit

Internal Clock Oscillator (ICO)

- > Fully trimmable internal oscillator
- > Multiple speeds

Slave LIN Interface Controller (SLIC) Module

- > Automatic baud rate and LIN message frame synchronization
- > Full LIN message buffering of identifier and eight data bytes
- > Automatic processing and verification of LIN header (SYNCH break and byte)
- > Automatic checksum calculation and verification with error reporting
- > Maximum of two interrupts per LIN message frame
- > Streamlined interrupt servicing through use of a state vector register

Powerful HC08 CPU

- > 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

- Qualified for high temperatures, shock, vibrations and humidity as required by the automotive industry
- > Cost-reduction path for high-volume stable programs
- Reduced production programming costs through ultra-fast programming at operating voltage
- > Protects code from unauthorized reading and guards against unintentional writing/erasing of user-programmable segments of code
- > Allows real-time Flash updates
- > Eliminates the cost of external clock components
- > Reduces board space
- > Minimizes or reduces EMI generated from external clocks
- Input clock tolerance as high as ±50 percent, allowing internal oscillator to remain untrimmed
- > Incoming break symbols allowed to be 10 to 20 bit times without message loss
- > Minimizes CPU resource requirement, maintaining performance, even in traffic-intensive applications
- > Object code compatible with 68HC05
- > Easy to learn and use architecture
- > C-optimized architecture provides compact code





10-bit Analog-to-Digital Converter (ADC)

- > Six channels
- > Single conversion in 17 µs

Selectable Trip Point Low-Voltage Inhibit (LVI)

- > Programmable LVI reset
- > Selectable LVI trip voltage
- > Programmable stop mode operation
- > Fast, easy conversion from analog inputs, such as temperature, pressure and fluid levels, to digital values for CPU processing

Cost-Effective Development Tools

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

M68EVB908QL4 \$199	Evaluation board with serial port, switches, LEDs, potentiometer, ZIF sockets and demo software including source code	
FSICEKITQBLTY \$1,695	Complete FSICE high-performance emulator kit; includes emulator module, cables, head adapters and programming adapters	
M68EM08QBLTY \$495	Emulation module for FSICE system	
M68CPA08W1628T20 \$149	Programming adapter for MON08 cables and single MCU: 7.5 mm SOIC packages up to 28 pins, 5.3 mm SOIC packages up to 16 pins and TSSOP packages up to 20 pins	
M68CPA08P40B56 \$99	Programming adapter for MON08 cables and single MCU: DIP packages up to 40 pins and SDIP packages up to 56 pins	
USBMULTILINKBDM \$99	Universal HCS08/HCS12 in-circuit emulator, debugger and Flash programmer; USB PC interface	
M68CYCLONEPRO \$499	HC08/HCS08/HC12/HCS12 stand-alone Flash programmer or in-circuit emulator, debugger, Flash programmer; USB, serial or Ethernet interface options	
CWX-H08-SE Free	CodeWarrior [™] Special Edition for HC(S)08 MCUs; includes integrated development environment (IDE), linker, debugger, unlimited assembler, Processor Expert [™] auto-code generator, full-chip simulation and 16 KB C compiler	

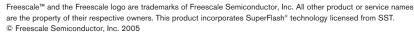
Data Sheet MC68HC908QL4

Application Notes				
AN2103	Local Interconnect Network (LIN) Demonstration			
AN2205	Car Door Keypad Using LIN			
AN2264	LIN Node Temperature Display			
AN2343	HC908 LIN Monitor			
AN2432	LIN Sample Application for the MC68HC908EY16			
AN2470	MC68HC908EY16 Controlled Robot Using the LIN Bus			
AN2573	LINkits LIN Evaluation Boards			
AN2633	LIN Drivers for SLIC Module on the MC68HC908QL4			
AN2767	LIN 2.0 Connectivity on Freescale 8/16-bit MCUs Using Volcano LTP			

Device and Package Options



Learn More: For more information about Freescale's LIN products and services, please visit us at www.freescale.com/lin.



Document Number: 68HC908QL432FS REV 0



Package Options

PART NUMBER	FLASH	ADC	PACKAGE	TEMP. RANGE
MC908QL4CDW	4 KB	Yes	16 SOIC	-40°C to +85°C
MC908QL4VDW	4 KB	Yes	16 SOIC	-40°C to +105°C
MC908QL4MDW	4 KB	Yes	16 SOIC	-40°C to +125°C
MC908QL4CDT	4 KB	Yes	16 TSSOP	-40°C to +85°C
MC908QL4VDT	4 KB	Yes	16 TSSOP	-40°C to +105°C
MC908QL4MDT	4 KB	Yes	16 TSSOP	-40°C to +125°C
MC908QL3CDW	4 KB	-	16 SOIC	-40°C to +85°C
MC908QL3VDW	4 KB	-	16 SOIC	-40°C to +105°C
MC908QL3MDW	4 KB	-	16 SOIC	-40°C to +125°C
MC908QL3CDT	4 KB	-	16 TSSOP	-40°C to +85°C
MC908QL3VDT	4 KB	-	16 TSSOP	-40°C to +105°C
MC908QL3MDT	4 KB	-	16 TSSOP	-40°C to +125°C
MC908QL2CDW	2 KB	Yes	16 SOIC	-40°C to +85°C
MC908QL2VDW	2 KB	Yes	16 SOIC	-40°C to +105°C
MC908QL2MDW	2 KB	Yes	16 SOIC	-40°C to +125°C
MC908QL2CDT	2 KB	Yes	16 TSSOP	-40°C to +85°C
MC908QL2VDT	2 KB	Yes	16 TSSOP	-40°C to +105°C
MC908QL2MDT	2 KB	Yes	16 TSSOP	-40°C to +125°C

> Improves reliability by resetting the MCU

- optimum operation in both 5V
- > Integration reduces system cost

13 Bidirectional Input/Output (I/O) Lines and One Input Only

- > Six shared with keyboard interrupt function
- > One shared with reset
- > One input only shared with external interrupt (IRQ)
- > High current sink/source capability
- > Selectable pull-ups on all ports (pull-up/down on port A)

> High-current I/O allows direct drive of LED and other circuits to eliminate external drivers and reduce system costs

when voltage drops below trip point > Selectable trip points allow

- and 3V nominal systems