



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.

HC08 CPU	4 KB/2 KB Flash
ICO	128B RAM
1 x 2-ch., 16-bit, Timer	Up to 6-ch., 10-bit ADC
COP	Up to 13 GPIO
Wake-Ups	SLIC

Low-Cost LIN Family

Features	Benefits
Second-Generation Flash or Low-Cost ROM Memory Options	
<ul style="list-style-type: none"> > Embedded fully automotive Flash > Range of memory from 2 KB to 4 KB > 10K write/erase cycles at -40°C to +125°C 	<ul style="list-style-type: none"> > Qualified for high temperatures, shock, vibrations and humidity as required by the automotive industry
<ul style="list-style-type: none"> > Low-cost ROM versions available—contact your sales representative 	<ul style="list-style-type: none"> > Cost-reduction path for high-volume stable programs
<ul style="list-style-type: none"> > Ultra-fast programming: 64B in 2 ms 	<ul style="list-style-type: none"> > Reduced production programming costs through ultra-fast programming at operating voltage
<ul style="list-style-type: none"> > Flash block protection 	<ul style="list-style-type: none"> > Protects code from unauthorized reading and guards against unintentional writing/erasing of user-programmable segments of code
<ul style="list-style-type: none"> > Flash reprogrammable in circuit 	<ul style="list-style-type: none"> > Allows real-time Flash updates
Internal Clock Oscillator (ICO)	
<ul style="list-style-type: none"> > Fully trimmable internal oscillator 	<ul style="list-style-type: none"> > Eliminates the cost of external clock components
<ul style="list-style-type: none"> > Multiple speeds 	<ul style="list-style-type: none"> > Reduces board space
	<ul style="list-style-type: none"> > Minimizes or reduces EMI generated from external clocks
Slave LIN Interface Controller (SLIC) Module	
<ul style="list-style-type: none"> > Automatic baud rate and LIN message frame synchronization 	<ul style="list-style-type: none"> > Input clock tolerance as high as ±50 percent, allowing internal oscillator to remain untrimmed
<ul style="list-style-type: none"> > Full LIN message buffering of identifier and eight data bytes 	<ul style="list-style-type: none"> > Incoming break symbols allowed to be 10 to 20 bit times without message loss
<ul style="list-style-type: none"> > Automatic processing and verification of LIN header (SYNCH break and byte) 	<ul style="list-style-type: none"> > Minimizes CPU resource requirement, maintaining performance, even in traffic-intensive applications
<ul style="list-style-type: none"> > Automatic checksum calculation and verification with error reporting 	
<ul style="list-style-type: none"> > Maximum of two interrupts per LIN message frame 	
<ul style="list-style-type: none"> > Streamlined interrupt servicing through use of a state vector register 	
Powerful HC08 CPU	
<ul style="list-style-type: none"> > Efficient instruction set, including multiply and divide 	<ul style="list-style-type: none"> > Object code compatible with 68HC05
<ul style="list-style-type: none"> > 16 flexible addressing modes, including stack relative with 16-bit stack pointer 	<ul style="list-style-type: none"> > Easy to learn and use architecture
<ul style="list-style-type: none"> > Fully static, low-voltage, low-power design with wait and stop modes 	<ul style="list-style-type: none"> > C-optimized architecture provides compact code

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

- > Six channels
 - > Single conversion in 17 μ s
- > Fast, easy conversion from analog inputs, such as temperature, pressure and fluid levels, to digital values for CPU processing

Selectable Trip Point Low-Voltage Inhibit (LVI)

- > Programmable LVI reset
 - > Selectable LVI trip voltage
 - > Programmable stop mode operation
- > Improves reliability by resetting the MCU when voltage drops below trip point
 - > Selectable trip points allow optimum operation in both 5V and 3V nominal systems
 - > 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

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

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

Device and Package Options


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