

# HC08 EY Family

## Target Applications

- > Automotive
- > Industrial and home lighting
- > Security systems
- > Home appliances
- > Sensors
- > Electronic power meters
- > Wireless communication
- > PDA attachments

## Overview

Freescale's MC68HC908EY16A is a general multi-purpose fully integrated microcontroller (MCU) created to make system design easier by eliminating external peripherals wherever possible. The enhanced SCI (ESCI) module with a special timer functionality for break detection and generation and the internal clock generator eliminates the need for an external clock source and helps reduce system costs. Both of these features simplify LIN interaction. The integrated second-generation Flash memory programs up to 100 times faster than prior Flash solutions and offers in-application programming. Features include a synchronous serial peripheral interface (SPI), an analog-to-digital converter (ADC), an autowake-up from stop feature, low-voltage inhibit (LVI) and a watchdog timer.

HC08 CPU	KBI
16 KB Flash	8-ch., 10-bit ADC
512 B RAM	ESCI
LVI	SPI
COP	2 x 2-ch. 16-bit Timer
Internal Clock Generator	24 GPIO

### Features

#### High-Performance 68HC08 CPU Core

- > 8 MHz bus operation at 5V operation for 125 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

### Benefits

- > Object code compatible with the 68HC05
- > Architecture—easy to learn and use
- > 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 guards against unintentional writing/erasing of user-programmable segments of code

#### 24 Bidirectional Input/Output (I/O) Lines

- > 10 mA sink/source on all I/O pins
- > 15 mA sink capability on five I/O pins
- > Keyboard scan with selectable interrupts on eight I/O pins
- > Software programmable pull-ups on 23 I/O pins

- > High-current I/O allows direct drive of LED and other circuits to eliminate external drivers and reduce system costs
- > Keyboard scan with programmable pull-ups eliminates external glue logic when interfacing to simple keypads

#### Two Programmable 16-bit Timer Channels

- > 125 ns resolution at 8 MHz bus
- > Free-running counter or modulo up-counter

- > Each channel independently programmable for input capture, output compare or unbuffered pulse-width modulation (PWM)
- > Pairing timer channels provides a buffered PWM function

#### Internal Clock Generator

- > Software-selectable bus frequencies
- > Two percent accurate with trim capability
- > Clock monitor
- > Option to allow use of external clock source or external crystal/ceramic resonator

- > Eliminates the need and cost for an external clock source
- > Improved accuracy across temperature and voltage

## Features

## Benefits

### Timebase Module

- > Eight user-selectable periodic real-time interrupts
- > Optionally operate in low-power stop mode

- > Provides autowake-up from low-power stop mode to maintain real-time clock or check external device status such as sensors

### Enhanced Serial Communications Interface (ESCI)

- > UART asynchronous communications system
- > Flexible baud rate generator
- > Double buffered transmit and receive
- > Optional hardware parity checking and generation

- > Enables synchronous serial communications with peripheral devices
- > Allows full-duplex, asynchronous, NRZ serial communication between the MCU and remote devices

### Serial Peripheral Interface

- > Full-duplex 3-wire synchronous transfers
- > Maximum master bit rate of 4 MHz for 8 MHz system clock

- > High-speed synchronous communication between multiple MCUs or between MCU and serial peripherals
- > Cost-effective serial peripheral expansion to applications including EEPROM, high-precision analog-to-digital and digital-to-analog converters, and real-time clocks

### Computer Operating Properly Watchdog Timer

- > Issues reset in the event of runaway code

### Selectable Trip Point Low-Voltage Inhibit

- > Improves reliability by resetting the MCU when voltage drops below trip point
- > Two trip points allow optimum operation in both 5V and 3V nominal systems
- > Integration reduces system cost

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

- > 8 channels
- > Single conversion in 17  $\mu$ s

- > Fast, easy conversion from analog inputs, such as temperature, pressure and fluid levels, to digital values for CPU processing

## Application Notes

AN1837	Non-Volatile Memory Technology Overview
AN1853	Embedding Microcontrollers in Domestic Refrigeration Appliances
AN2103	Local Interconnect Network (LIN) Demonstration
AN2205	Car Door Keypad Using LIN
AN2264	LIN Node Temperature Display
AN2295	Developer's Serial Bootloader for M68HC08
AN2295SW	Software for AN2295
AN2321	Designing for Board Level Electromagnetic Compatibility
AN2343	HC908EY16 LIN Monitor
AN2344	HC908EY16 EMI Radiated Emission Results
AN2432	LIN Sample Application for the MC68HC908EY16 Evaluation Board

**Learn More:** For more information about Freescale's products, please visit [www.freescale.com](http://www.freescale.com).

\*Price indicated is MSRP

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Document Number: 68HC908EY16AFS

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## Cost-Effective Development Tools

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

**FSICEKITEY16AE**  
\$1,695\*

Complete FSICE high-performance emulator kit; includes emulator module, cables, head adapters and programming adapters

**M68EML08EY16AE**  
\$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 0.8 mm QFP packages, 44-pin 0.8 mm QFP packages and 48-pin 0.5 mm QFP packages

**CWX-HXX-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

## Package Options

Part Number	Package	Temp. Range
MC908EY16ACFJE	32 QFP	-40°C to +85°C
MC908EY16AVFJE	32 QFP	-40°C to +105°C
MC908EY16AMFJE	32 QFP	-40°C to +125°C
MC908EY16AKFJE	32 QFP	-40°C to +135°C
MC908EY8ACFJE	32 QFP	-40°C to +85°C
MC908EY8AVFJE	32 QFP	-40°C to +105°C
MC908EY8AMFJE	32 QFP	-40°C to +125°C
MC908EY8AKFJE	32 QFP	-40°C to +135°C

32-Lead QFP

