MC908JL16

Target Applications

> Home appliances

> Industrial controls

> Metering controls

> Uninterruptible power supplies (UPS)

> PC peripherals

> Sensing systems

> Security and alarm systems

Overview

The MC908JL16 utilizes a HC08 CPU core and provides a cost-effective re-programmable Flash memory. The device is part of the growing JL Family that includes multiple clock options, up to two 16-bit timers, keyboard interrupts, low voltage inhibit, a watchdog timer and up to 26 bidirectional input/output (I/O) pins. In particular, the MC908JL16 has a built-in serial communications interface module, master inter-integrated circuit (I²C) interface and 10-bit analog-to-digital converter.
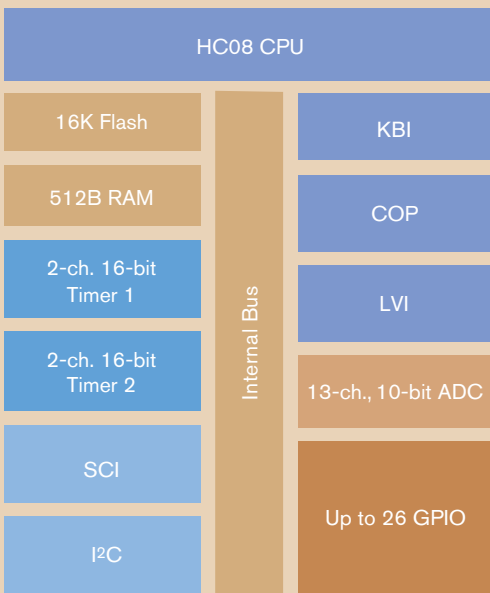
Features	Benefits
High-Performance HC08 CPU Core	
> 8-MHz bus operation at 5V operation for 125 ns minimum instruction cycle time > 4-MHz bus operation at 3V operation for 250 ns minimum instruction cycle time > Efficient instruction set including multiply and divide > 16 flexible addressing modes including multiply and divide > Fully static low-voltage, low-power design with wait and stop modes	> Object code compatible with the 68HC05 > Easy to learn and use architecture > C optimized architecture provides compact code
Integrated Second-Generation Flash Memory	
> In-application re-programmable > 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 > 100K write/erase typical > Flexible block protection and security > Pre-installed in-circuit programming and emulated electrically erasable programmable read-only memory (EEPROM) software routines in ROM	> Cost-effective programming changes and field software upgrades via in-application programmability and re-programmability > Reduces production programming costs through ultra-fast programming > Allows re-programmable battery-powered applications > Byte-writable for data and program memory > Protects code from unauthorized reading and guards against unintentional erasing/writing of user-programmable segments of code > Pre-installed programming routines simplify user codes
Multiple Clock Options	
> Crystal, ceramic or RC oscillator > External clock	> Flexible clock options optimize timing accuracy with system cost
Two Programmable 16-bit Timers, each with 2 Channels	
> 125 ns resolution at 8-MHz bus > Free-running counter or modulo up-counter	> Each channel independently programmable for input capture, output compare and unbuffered PWM > Pairing timer channels provides a buffered PWM function

HC08 CPU

16K Flash

512B RAM

2-ch. 16-bit Timer 1

2-ch. 16-bit Timer 2

SCI

I²C

Internal Bus

KBI

COP

LVI

13-ch., 10-bit ADC

Up to 26 GPIO

freescale ™
semiconductor

Benefits

10-bit Analog-to-Digital Converter

> 13-channel A/D converter
> 11µs, 10-bit single conversion time

> Fast, easy conversion from analog inputs—such as from temperature, pressure and fluid levels—to digital values
> Robust specified operation down to 2.7V

Computer Operating Properly

> Watchdog computer operating properly (COP)

> Provides system protection

Selectable Trip Point Low-Voltage Inhibit

> Low-voltage detection with reset or interrupt

> 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

Serial Communications Interface

> 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

I²C Bus Module

> Internal serial communication

> For fast and convenient communication between MCU and other I²C devices

Up to 26 Bidirectional I/O Lines

> 25 mA sink capability on two I/O pins
> Keyboard scan with selectable interrupts on seven I/O pins
> Software programmable pullups on nine I/O pins

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

Development Tools

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

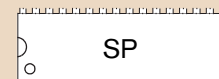| Part Number	Description
DEMO908JL16	Cost-effective demonstration board
USBMULTILINK08	Universal HC08 in-circuit debugger and Flash programmer; USB/PC interface
FSICEBASE	Freescale in-circuit emulator base station
EML08JLJK	JL/JK emulation module for FSICEBASE system
TH08JLP28	JL 28-pin DIP target head adapter
TH08JLSP32	JL 32-pin SDIP target head adapter
TH08JLFA32	JL 32-pin LQFP target head adapter
EMCBL60	60-pin flex cable
M68CPA08P40B56	DIP/SDIP programming adapter
M68CPA008QF3244448	32-, 44- and 48-pin QFP programming adapter

Package Options

Part Number	Package	Temp. Range
MC908JL16CPE	28-PDIP	-40 to +85°C
MC908JL16CDWE	28-SOIC	-40 to +85°C
MC908JL16CSPE	32-SDIP	-40 to +85°C
MC908JL16CFJE	32-LQFP	-40 to +85°C

Package Options

Data Sheets

> MC68HC908JL16

Application Notes/Engineering Bulletins

> AN1218: 68HC05 to 68HC08 Optimization
> AN1831: Using the MC68HC908 On-Chip Flash Programming Routines
> AN1837: Nonvolatile Memory Technology Review
> AN2093: Creating Efficient C Code for the MC68HC08
> AN1752: Data Structures for 8-bit MCUs
> AN1219: M68HC08 Integer Math Routines
> AN1705: Noise Reduction Techniques for MCU-Based Systems

> AN1259: System Design and Layout Techniques for Noise Reduction in MCU-Based Systems
> AN1263: Designing for Electromagnetic Compatibility with Single-Chip Microcontrollers
> AN2158: Designing with the MC68HC908JL/JK Microcontroller Family
> AN2321: Designing for Board Level Electromagnetic Compatibility

32-Pin LQFP

FJ

0.8 mm Pitch
7 mm x 7 mm Body
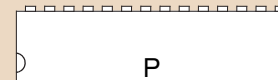
32-Pin SDIP

SP

70 mil/1.778 mm Pitch
1.10 in x 0.35 in Body
(70 mil x 400 mil pin centers)

28-Lead SOIC

DW

50 mil/1.27 mm Pitch
18.0 mm x 7.5 mm Body

28-Pin DIP

P

100 mil/2.54 mm Pitch
1.45 in x 0.55 in Body
(100 mil x 600 mil pin centers)

Learn More: For current information about Freescale products and documentation, please visit **www.freescale.com**.