icrocontrollers

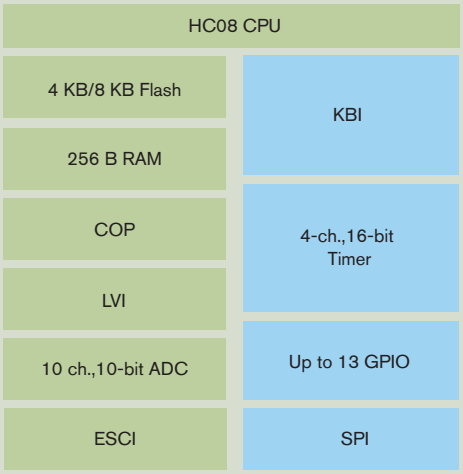
MC908QB8/4

Target Applications

- > Discrete replacement
- > Appliances
- > Control systems
- > Home and industrial security systems
- > Fluorescent light ballasts
- > Electromechanical replacement
- > Motion control

Overview

Freescale Semiconductor's MC908QB8/4 microcontrollers (MCUs) help reduce system cost by eliminating the need for external low-voltage inhibit (LVI), external drivers with high-current input/output (I/O) and external data EEPROM and help reduce programming cost with fast Flash programming. Other valuable features include a 10-bit analog-to-digital converter (ADC) and an internal clock oscillator. It helps maximize efficiency and speed time to market with the ability to change code in-application with Flash and free professional-quality development tools including a C compiler, simulator, assembler, linker, Flash programmer and auto-code generator, all specifically geared to function with Freescale's QY/QB lines of MCUs.



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 operation 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	> Easy to learn and use architecture > Object compatible with 68HC05 > Allows for efficient, compact modular coding in assembly or C compiler
Integrated Second-Generation Flash Memory	
> In-application reprogrammable	> Cost-effective programming changes and field software upgrades via in-application programmability and reprogrammability > Virtually eliminates scrap, costly rework and cost of socket > The benefits of Flash at competitive one-time programmable (OTP) prices
> Extremely fast programming ▪ As fast as 32 µs/byte ▪ Up to 100x faster than most embedded Flash	> Helps to reduce production programming costs through ultra-fast programming > Helps to reduce power and speed application when writing nonvolatile data is required
> Flash easily used for data EEPROM ▪ 10K minimum write/erase cycles across temperature ▪ 100K typical ▪ Byte writeable ▪ No restrictions or special instructions to access data in Flash program memory	> Virtually eliminates the need and cost for external serial data EEPROM > Easily performs table lookup and data manipulation without slow and cumbersome special table instructions
> Flexible block protection and security	> Helps to protect code from unauthorized reading > Guards against unintentional writing/erasing of user-programmable segments of code
Internal Clock Oscillator	
> 3.2 MHz nominal bus frequency > ± 25 percent trimmable > ± 5 percent accurate to 125°C > ± 2 percent typical	> Can eliminate the cost of all external clock components > Helps to reduce board space > Can eliminate electromagnetic interface (EMI) generated from external clocks > Allows option of external radio controller (RC), external clock or external crystal/resonator
Up to 13 Bidirectional Input/Output (I/O) Lines	
> High-current drive > Programmable pull-ups/keyboard interrupt	> High-current I/O allows direct drive of LED and other circuits to virtually eliminate external drivers and reduce system costs > Keyboard scan with programmable pull-ups virtually eliminates external glue logic when interfacing to simple keypads

freescale™ semiconductor

Features	Benefits
10-bit Analog-to-Digital Converter (ADC)	
> Up to 10 channels	> Fast conversion in <10 µs > Easy interface to analog inputs, such as sensors
Four Programmable 16-bit Timer Channels	
> 125 ns resolution at 8 MHz > 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
System Protection	
> COP watchdog timer with autowake-up from stop capability > Low-voltage inhibit with selectable trip points	> Provides system protection in the event of runaway code by resetting the MCU to a known state > Helps to reduce power usage while automatically providing wake-up to check external sensors or perform periodic servicing > Designed to improve reliability by resetting the MCU when voltage drops below trip point
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

Application Notes

AN2305	User Mode Monitor Access for MC68HC908QT/QY Series MCUs
AN2312	QY4 Internal Oscillator Usage Notes
AN2317	Low-Cost Programming and Debugging Options for M68HC08 MCUs

Data Sheets

MC68HC908QB8	Data Sheet for QB8/QB4/QY8

Package Options

Part Number	Package	Temp. Range
MC908QB4CPE	16 DIP	-40°C to +85°C
MC908QB4VPE	16 DIP	-40°C to +105°C
MC908QB4MPE	16 DIP	-40°C to +125°C
MC908QB4CDWE	16 SOIC	-40°C to +85°C
MC908QB4VDWE	16 SOIC	-40°C to +105°C
MC908QB4MDWE	16 SOIC	-40°C to +125°C
MC908QB4CDTE	16 TSSOP	-40°C to +85°C
MC908QB4VDTE	16 TSSOP	-40°C to +105°C
MC908QB4MDTE	16 TSSOP	-40°C to +125°C
MC908QB8CPE	16 DIP	-40°C to +85°C
MC908QB8VPE	16 DIP	-40°C to +105°C
MC908QB8MPE	16 DIP	-40°C to +125°C
MC908QB8CDWE	16 SOIC	-40°C to +85°C
MC908QB8VDWE	16 SOIC	-40°C to +105°C
MC908QB8MDWE	16 SOIC	-40°C to +125°C
MC908QB8CDTE	16 TSSOP	-40°C to +85°C
MC908QB8VDTE	16 TSSOP	-40°C to +105°C
MC908QB8MDTE	16 TSSOP	-40°C to +125°C

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

Freescale™ and the Freescale logo are trademarks of Freescale Semiconductor, Inc. All other product or service names are the property of their respective owners. This product incorporates SuperFlash® technology licensed from SST.
© Freescale Semiconductor, Inc. 2005

Document Number: MC908QB84FS
REV 0

freescale™ semiconductor