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What is "**Embedded - Microcontrollers**"?

"**Embedded - Microcontrollers**" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

Applications of "**Embedded - Microcontrollers**"

Details

Product Status	Active
Core Processor	HC08
Core Size	8-Bit
Speed	8MHz
Connectivity	SCI, SPI
Peripherals	LVD, POR, PWM
Number of I/O	13
Program Memory Size	4KB (4K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	128 x 8
Voltage - Supply (Vcc/Vdd)	2.7V ~ 5.5V
Data Converters	A/D 10x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 125°C (TA)
Mounting Type	Surface Mount
Package / Case	16-SOIC (0.295", 7.50mm Width)
Supplier Device Package	16-SOIC
Purchase URL	https://www.e-xfl.com/pro/item?MUrl=&PartUrl=mc908qb4mdwer

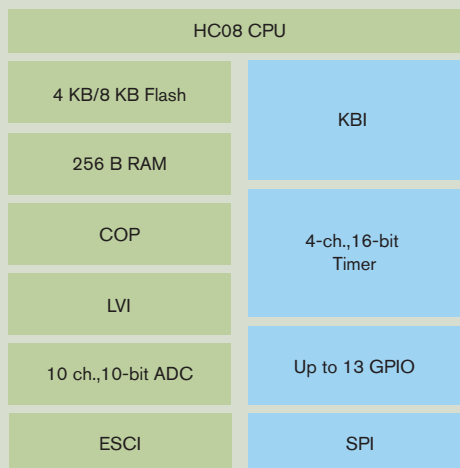# MC908QB8/4

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.

HC08 CPU	
4 KB/8 KB Flash	KBI
256 B RAM	
COP	4-ch.,16-bit Timer
LVI	
10 ch.,10-bit ADC	Up to 13 GPIO
ESCI	SPI

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
> Flexible block protection and security
	> 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
	> 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

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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	> Each channel independently programmable for input capture, output compare or unbuffered pulse-width modulation (PWM)
> Free-running counter or modulo up-counter	
	> Pairing timer channels provides a buffered PWM function
System Protection	
> COP watchdog timer with autowake-up from stop capability	> Provides system protection in the event of runaway code by resetting the MCU to a known state
> Low-voltage inhibit with selectable trip points	> 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	> Enables synchronous serial communications with peripheral devices
> Flexible baud rate generator	
> Double buffered transmit and receive	> Allows full-duplex, asynchronous, NRZ serial communication between the MCU and remote devices
> Optional hardware parity checking and generation	
Serial Peripheral Interface	
> Full-duplex 3-wire synchronous transfers	> High-speed synchronous communication between multiple MCUs or between MCU and serial peripherals
> Maximum master bit rate of 4 MHz for 8 MHz system clock	
	> 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**.

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