icrocontrollers

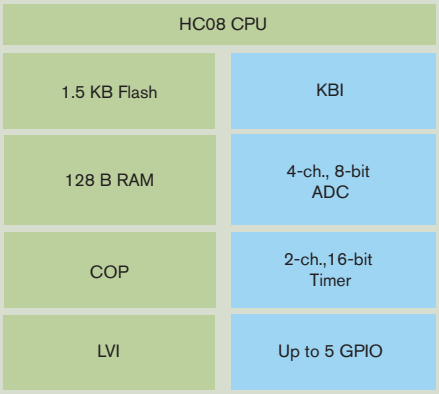
MC68HC908QT2

Target Applications

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

Overview

Freescale Semiconductor's MC68HC908QT2 microcontroller (MCU) helps 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 helps reduce programming cost with fast Flash programming. Other valuable features include 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 QT/QY line 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 > Object compatible with 68HC05 > Allows for efficient, compact modular coding in assembly or C compiler
1.5 KB 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 ▪ Byte-writable ▪ 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 105°C	> Can eliminate the cost of all external clock components > Helps to reduce board space > Can eliminate electromagnetic interference (EMI) generated from external clocks > Allows option of external radio controller (RC), external clock or external crystal/resonator
Up to 5 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
8-bit Analog-to-Digital Converter (ADC)	
> Four channels	> Fast conversion in 17 µs > Easy interface to analog inputs such as sensors
Two 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

Cost-Effective Development Tools

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

M68DEMO908QT4 ***$25***	Cost-effective demonstration board in small form factor with potentiometer, LEDs, and a serial port for debugging and programming
FSICEKITQBLTY ***$1,695***	Complete FSICE high-performance emulator kit; includes emulator module, cables, head adapters and programming adapters
M68EML08QBLTY ***$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
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
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

Application Notes

AN2305	User Mode Monitor Access for MC68HC908QT/QY Series MCUs
AN2310	MC68HC908QT4 Low-Power Application
AN2312	QY4 Internal Oscillator Usage Notes
AN2317	Low-Cost Programming and Debugging Options for M68HC08 MCUs
AN2322	Reprogramming the M68DEMO908QT4

Data Sheets

MC68HC908QY4	Data Sheet for QY4/QY2/QY1/QT4/QT2/QT1

Package Options

Part Number	Package	Temp. Range**
MC68HC908QT2CFQ	8 DFN	-40°C to +85°C
MC68HC908QT2VFQ	8 DFN	-40°C to +105°C
MC68HC908QT2MFQ	8 DFN	-40°C to +125°C
MC68HC908QT2CP	8 DIP	-40°C to +85°C
MC68HC908QT2VP	8 DIP	-40°C to +105°C
MC68HC908QT2MP	8 DIP	-40°C to +125°C
MC68HC908QT2CDW	8 SOIC	-40°C to +85°C
MC68HC908QT2VDW	8 SOIC	-40°C to +105°C
MC68HC908QT2MDW	8 SOIC	-40°C to +125°C

8-Lead DIP

8-Lead SOIC

8-Pin DFN

**Contact your sales representative for extended temperature availability.

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

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