

## A FLASH MCU SOLUTION

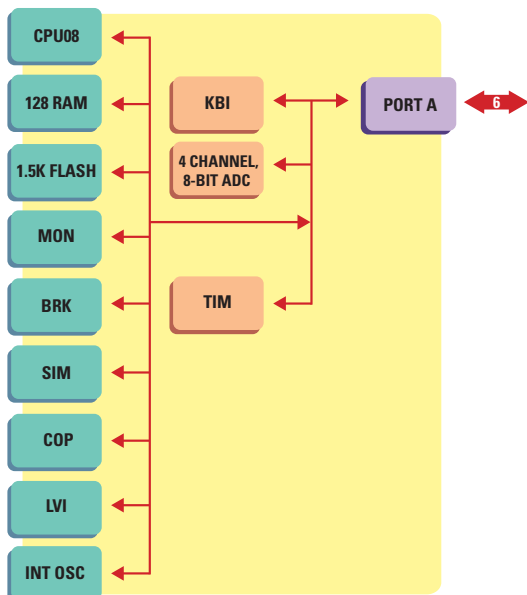
# 68HC908QT2

## 8-bit Microcontroller

### TARGET APPLICATIONS

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

The 68HC908QT2 helps reduce system cost by eliminating the need for external low-voltage inhibit, external drivers with high-current I/O and external data EEPROM and helps reduce programming cost with Fast FLASH programming. Other valuable features include an analog-to-digital converter (ADC) and an internal clock oscillator. It helps maximize efficiency and speed time-to-market with the ability change code in-application with FLASH and free, professional-quality development tools including a QT/QY C compiler, simulator, assembler, linker, FLASH programmer and auto-code generator.



### FEATURES

### BENEFITS

#### HIGH-PERFORMANCE 68HC08 CPU CORE

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| <ul style="list-style-type: none"> <li>• 8 MHz bus operation at 5V operation for 125 nsec minimum instruction cycle time</li> <li>• 4 MHz bus operation at 3V operation for 250 nsec minimum instruction cycle time</li> <li>• Efficient instruction set including multiply and divide</li> <li>• 16 flexible addressing modes including stack relative with 16-bit stack pointer</li> </ul> | <ul style="list-style-type: none"> <li>• Easy-to-learn, easy-to-use architecture</li> <li>• Object compatible with 68HC05</li> <li>• Allows for efficient, compact modular coding in assembly or C</li> </ul> |
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#### 1.5K BYTES INTEGRATED SECOND-GENERATION FLASH MEMORY

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| <ul style="list-style-type: none"> <li>• In-application reprogrammable</li> <li>• Extremely fast programming             <ul style="list-style-type: none"> <li>– As fast as 32 <math>\mu</math>sec/byte</li> <li>– Up to 100x faster than most embedded FLASH</li> </ul> </li> <li>• FLASH easily used for data EEPROM             <ul style="list-style-type: none"> <li>– 10K minimum write/erase cycles across temperature</li> <li>– Byte writeable</li> <li>– No restrictions or special instructions to access data in FLASH program memory</li> </ul> </li> <li>• Flexible block protection and security</li> </ul> | <ul style="list-style-type: none"> <li>• Cost-effective programming changes and field software upgrades via in-application programmability and reprogrammability</li> <li>• Virtually eliminates scrap, costly rework and cost of socket</li> <li>• The benefits of FLASH at competitive OTP prices</li> <li>• Helps to reduce production programming costs through ultra-fast programming</li> <li>• Helps to reduce power and speed application when writing non-volatile data is required</li> <li>• Virtually eliminates the need and cost for external serial data EEPROM</li> <li>• Easily performs table lookup and data manipulation without slow and cumbersome special table instructions</li> <li>• Helps to protect code from unauthorized reading</li> <li>• Guards against unintentional erasing/writing of user-programmable segments of code</li> </ul> |
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#### INTERNAL CLOCK OSCILLATOR

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| <ul style="list-style-type: none"> <li>• 3.2 MHz nominal bus frequency</li> <li>• +/- 25 percent trimmable</li> <li>• +/- 5 percent accurate to 105°C</li> </ul> | <ul style="list-style-type: none"> <li>• Can eliminate the cost of all external clock components</li> <li>• Helps to reduce board space</li> <li>• Can eliminate EMI generated from external clocks</li> <li>• Allows option of external RC, external clock or external crystal/resonator</li> </ul> |
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#### FLEXIBLE I/O

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| <ul style="list-style-type: none"> <li>• Up to five bidirectional I/O and one input</li> <li>• High-current drive</li> <li>• Programmable pull-ups/keyboard interrupt</li> </ul> | <ul style="list-style-type: none"> <li>• High-current I/O allows direct drive of LED and other circuits to virtually eliminate external drivers and reduce system costs</li> <li>• Keyboard scan with programmable pull-ups virtually eliminates external glue logic when interfacing to simple keypads</li> </ul> |
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## A FLASH MCU SOLUTION

# 68HC908QT2

PART NUMBER	DESCRIPTION	RESALE*
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### EASY-TO-ORDER DEVELOPMENT TOOL KITS

KITMMEVS08QTQY (KITMMEVS08QTQY-E for Europe)	Cost-effective real-time, in-circuit emulator and debug kit. Includes MON08 Multilink.	\$1450
KITMMDS08QTQY (KITMMDS08QTQY-E for Europe)	High-performance real-time, in-circuit emulation and debug. Includes MON08 Multilink.	\$3950

### INDIVIDUAL DEVELOPMENT TOOL COMPONENTS

CodeWarrior™ Development Studio Special Edition for HC08	CodeWarrior IDE, QT/QY C compiler, assembler, linker, debugger, full-chip simulation, FLASH programming and automatic C code generation for on-chip peripherals with Processor Expert™.	Free
M68DEMO908QT4 Demonstration Board	Evaluation board with tutorial, demonstration code and CodeWarrior	\$25
M68MULTILINK08 (M68MULTILINK08-EUR for Europe)	Fast in-circuit programming and debug. Utilizes HC08 monitor mode and on-chip breakpoint.	\$168
M68CYCLONE08 (M68CYCLONE08-EUR for Europe)	All capabilities of MON08 Multilink, plus functions as standalone programmer.	\$399
M68EML08QTQY	Emulation module daughter board	\$495
M68CBL05A	Low-noise flex cable	\$120
M68TA08QTP8	8-pin DIP and SOIC target head adapter	\$100
M68DIP8SOIC	8-pin DIP to SOIC adapter	\$50

## FEATURES

## BENEFITS

### 8-BIT ANALOG-TO-DIGITAL CONVERTER

- Four channels
- Fast conversion in 17 µsec
- Easy interface to analog inputs like sensors

### TWO PROGRAMMABLE 16-BIT TIMER CHANNELS

- 125 nsec resolution at 8 MHz
- Free-running counter or modulo up-counter
- Each channel independently programmable for input capture, output compare or unbuffered PWM
- Pairing timer channels provides a buffered PWM function

### SYSTEM PROTECTION

- COP watchdog timer with auto-wakeup 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 wakeup to check external sensors or perform periodic servicing
- Designed to improve reliability by resetting the MCU when voltage drops below trip point

## APPLICATION NOTES/DATA SHEET

### APPLICATION NOTES

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

### DATA SHEET

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

MC68HC908QY4SM/D Data Sheet Summary for QY4/QY2/QY1/QT4/QT2/QT1

## PACKAGE OPTIONS\*\*

PART NUMBER	PACKAGE	TEMPERATURE RANGE
MC68HC908QT4CP	8 DIP	-40 to 85°C
MC68HC908QT4CDW	8 SOIC	-40 to 85°C
SAMPLE PACKS	PACKAGE	TEMPERATURE RANGE
KMC908QT4CP	8 DIP	-40 to 85°C
KMC908QT4CDW	8 SOIC	-40 to 85°C

8-Lead DIP



8-Lead SOIC



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68HC908QT2PB/D  
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\* All prices are manufacturer's suggested resale for North America.

\*\* Contact your sales representative for extended temperature availability.