icrocontrollers

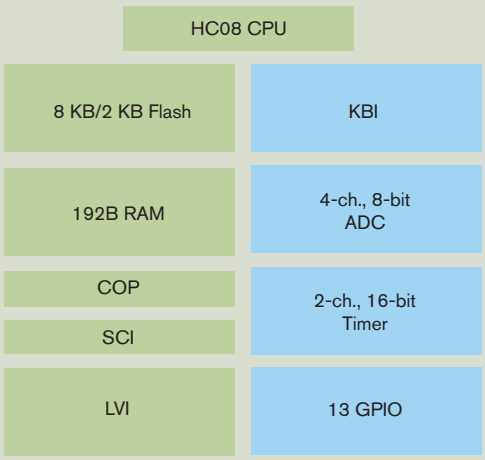
# MC68HC908KX8/2

### *Target Applications*

> Networked and control systems
> Home and industrial security systems
> Building control systems
> Interconnected home appliances
> Fluorescent light ballasts

### *Overview*

The MC68HC908KX8 and the MC68HC908KX2 maximize efficiency and reduce system costs with an internal clock generator, which eliminates the need for an external clock source. Other valuable features include a serial communications interface (SCI) enabling high-speed communication, an analog-to-digital converter (ADC) and a timebase module (TBM) for more cost-effective processing.




| Features | Benefits |
|---|---|
| **High-Performance 68HC08 CPU Core** | |
| > 8 MHz bus operation at 5V operation for 125 ns minimum instruction cycle time | > Object code compatible with the 68HC05 |
| > 4 MHz bus operation at 3V for 250 ns minimum instruction cycle time | > Easy to learn and use architecture |
| > Efficient instruction set, including multiply and divide | > C-optimized architecture provides compact code |
| > 16 flexible addressing modes, including stack relative with 16-bit stack pointer | |
| > Fully static, low-voltage, low-power design with wait and stop modes | |
| **Integrated Second-Generation Flash Memory** | |
| > In-application reprogrammable | > Cost-effective programming changes and field software upgrades via in-application programmability and reprogrammability |
| > Extremely fast programming, encoding 64B in as fast as 2 ms | > Reduces production programming costs through ultra-fast programming |
| > Flash programming across the 68HC08's full operating supply voltage with no extra programming voltage | > Allows reprogrammable battery-powered applications |
| > 10K write/erase cycles minimum over temperature | > Byte-writable for data as well as program memory |
| > Flexible block protection and security | > Protects code from unauthorized reading and guards against unintentional writing/erasing of user-programmable segments of code |
| **Internal Clock Generator** | |
| > Software-selectable bus frequencies | > Eliminates the need and cost for an external clock source |
| > Two percent accurate with trim capability | > Improved accuracy across temperature and voltage |
| > Clock monitor | |
| > Option to allow use of external clock source or external crystal/ceramic resonator | |
| **8-bit Analog-to-Digital Converter (ADC)** | |
| > Four channels | > Fast, easy conversion from analog inputs, such as temperature, pressure and fluid levels, to digital values for CPU processing |
| > Single conversion in 17 µs | |
| **Two Programmable 16-bit Timer Channels** | |
| > 125 ns resolution at 8 MHz bus | > 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 |

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| Features | Benefits |
|---|---|
| **Serial Communications Interface (SCI)** | |
| > UART asynchronous communications system | > Asynchronous communication between the MCU and a terminal, computer or a network of microncontrollers |
| > Flexible baud rate generator | |
| > Double-buffered transmit and receive | |
| > Optional hardware parity checking and generation | |
| **Computer Operating Properly (COP) Watchdog Timer** | |
| | > Provides system protection in the event of runaway code by resetting the MCU to a known state |
| **Selectable Trip Point Low-Voltage Inhibit (LVI)** | |
| | > 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 |
| | > Integration reduces system cost |
| **13 Bidirectional Input/Output (I/O) Lines** | |
| > 10 mA sink/source capability on all I/O pins | > High-current I/O allows direct drive of LED and other circuits to eliminate external drivers and reduce system costs |
| > 15 mA sink capability on five I/O pins | |
| > Keyboard scan with selectable interrupts on five I/O pins | > Keyboard scan with programmable pull-ups eliminates external glue logic when interfacing to simple keypads |
| > Software programmable pull-ups on five I/O pins | |

## *Application Notes and Engineering Bulletins*

| | |
|---|---|
| AN1853 | Embedding Microcontrollers in Domestic Refrigeration Appliances |
| AN1831 | Using MC68HC908 On-Chip Flash Programming Routines |
| AN1843 | Vacuum Cleaner Reference Platform |
| AN2093 | Creating Efficient C Code for the MC68HC08 |
| AN1219 | M68HC08 Integer Math Routines |
| AN1218 | HC05 to HC08 Optimization |
| AN1837 | Non-Volatile Memory Technology Review |
| AN1752 | Data Structures for 8-bit MCUs |
| AN1259 | System Design and Layout Techniques for Noise Reduction in MCU-Based Systems |
| AN1263 | Designing for Electromagnetic Compatibility with Single-Chip Microcontrollers |
| AN1050 | Designing for Electromagnetic Compatibility (EMC) with HCMOS Microcontrollers |
| AN1705 | Noise Reduction Techniques for Microcontroller-Based Systems |
| EB369 | In-Circuit Programming of 68HC908KX Flash Memory |

And many more—see our Web site at **www.freescale.com/mcu**.

## *Cost-Effective Development Tools*

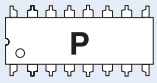
For more information on development tools, please refer to the Freescale Development Tool Selector Guide (SG1011).

| | |
|---|---|
| **FSICEKITKX** *$2,195* | Complete FSICE high-performance emulator kit; includes emulator module, cables, head adapters and programming adapters |
| **M68EML08KX** *$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 |

## *Package Options*

| Part Number | Package | Flash Size | Temp. Range |
|---|---|---|---|
| MC68HC908KX8CP | 16 DIP | 8 KB | -40°C to +85°C |
| MC68HC908KX8CDW | 16 SOIC | 8 KB | -40°C to +85°C |
| MC68HC908KX2CP | 16 DIP | 2 KB | -40°C to +85°C |
| MC68HC908KX2CDW | 16 SOIC | 2 KB | -40°C to +85°C |
| MC68HC908KX8VP | 16 DIP | 8 KB | -40°C to +105°C |
| MC68HC908KX8VDW | 16 SOIC | 8 KB | -40°C to +105°C |
| MC68HC908KX2VP | 16 DIP | 2 KB | -40°C to +105°C |
| MC68HC908KX2VDW | 16 SOIC | 2 KB | -40°C to +105°C |
| MC68HC908KX8MP | 16 DIP | 8 KB | -40°C to +125°C |
| MC68HC908KX8MDW | 16 SOIC | 8 KB | -40°C to +125°C |
| MC68HC908KX2MP | 16 DIP | 2 KB | -40°C to +125°C |
| MC68HC908KX2MDW | 16 SOIC | 2 KB | -40°C to +125°C |

16-Pin Plastic DIP




16-Lead SOIC


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



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