

## A FLASH MCU SOLUTION

# 68HC908JB8

## 8-bit Microcontroller

### TARGET APPLICATIONS

- PC peripherals (keyboard, mouse, joystick)
- RF wireless receivers
- USB converters
- USB security keys for e-commerce
- Game pads
- Set-top box peripherals

This 8-bit 68HC908JB8 is an upwardly compatible, versatile migration from Motorola's groundbreaking 68HC05 universal serial bus (USB) Family. The innovative design features an on-chip USB module for faster, more reliable PC peripheral applications. An energy-saving, low-power solution, the 68HC908JB8 is embedded with Motorola's second-generation embedded FLASH technology to enable in-system programmability.

### FEATURES

### BENEFITS

#### HIGH-PERFORMANCE 68HC08 CPU CORE

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• 3 MHz bus operation at 3V for 333 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> <li>• Fully static low-voltage, low-power design with wait and stop modes</li> </ul> | <ul style="list-style-type: none"> <li>• Object code compatible with the 68HC05</li> <li>• Easy to learn and use architecture</li> <li>• C optimized architecture provides compact code</li> </ul> |
|--|--|

#### INTEGRATED SECOND GENERATION FLASH MEMORY

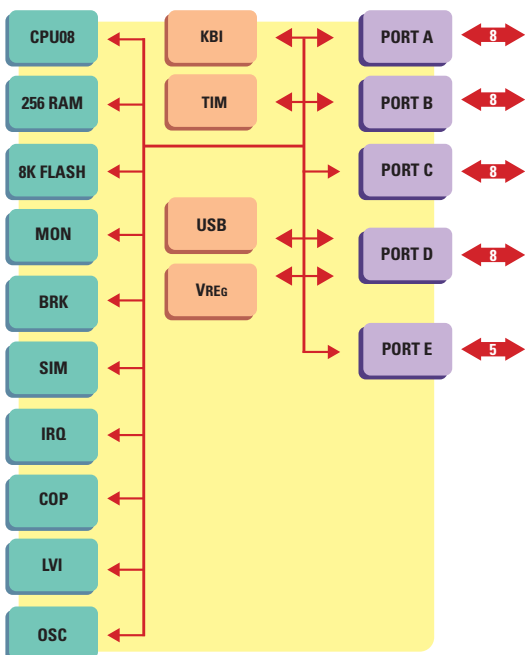
- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• In-application re-programmable</li> <li>• Extremely fast programming, encoding 64 bytes in as fast as 2 msec</li> <li>• FLASH programming across the 68HC08's full operating supply voltage with no extra programming voltage</li> <li>• 10K write/erase cycles minimum over temperature</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 re-programmability</li> <li>• Reduces production programming costs through ultra-fast programming</li> <li>• Allows re-programmable battery-powered applications</li> <li>• Byte-writable for data as well as program memory</li> <li>• Protects code from unauthorized reading and to guard against unintentional erasing/writing of user-programmable segments of code</li> </ul> |
|--|--|

#### FULL USB 1.1 SPECIFICATION LOW-SPEED FUNCTIONS

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• 1.5 Mbps data rate</li> <li>• On-chip 3.3V regulator</li> <li>• Endpoint 0 with 8-byte transmit buffer and 8-byte receive buffer</li> <li>• Endpoint 1 with 8-byte transmit buffer</li> <li>• Endpoint 2 with 8-byte transmit buffer and 8-byte receive buffer</li> </ul> | <ul style="list-style-type: none"> <li>• Designed to serve as a low-speed (LS) USB device, in accordance with the Universal Serial Bus Specification Rev. 1.1</li> <li>• Integrated 3.3V regulator reduces system cost</li> </ul> |
|--|---|

#### MULTIPLE CLOCK OPTIONS

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• Crystal oscillator</li> <li>• Ceramic oscillator</li> <li>• External clock</li> <li>• RC oscillator</li> </ul> | <ul style="list-style-type: none"> <li>• Flexible clock options optimize timing accuracy with system cost</li> </ul> |
|---|--|



**For More Information On This Product,  
Go to: [www.freescale.com](http://www.freescale.com)**

# 68HC908JB8

PART NUMBER	DESCRIPTION	RESALE*
<b>EASY-TO-ORDER DEVELOPMENT TOOL KITS</b>		
M68ICS08JB	68HC908JB8 Programmer/in-circuit debug kit	\$295
KITMMEVS08JB	Cost-effective real-time in-circuit emulator	\$1450
KITMMDS08JB	High-performance real-time in-circuit emulator kit	\$3950
<b>INDIVIDUAL DEVELOPMENT TOOL COMPONENTS</b>		
M68MMDS0508	High-performance emulator	\$2950
M68MMPF0508	MMEVS platform board	\$395
M68EM08JB8	Emulation module daughter board	\$495
M68CBL05C	Low-noise flex cable	\$120
M68CBL05B	Low-noise flex cable	\$120
M68TC08JB8P20	20-pin DIP target head adapter	\$100
M68TC08JB8FB44	44-pin QFP target head adapter	\$250
M68DIP20SOIC	20-pin SOIC-DW target head adapter	\$50
M68DIP28SOIC	28-pin SOIC-DW target head adapter	\$50
M68TQS044SAG1	44-pin TQ socket with guides	\$50
M68TQP044SAM01	44-pin TQPACK	\$70

FEATURES	BENEFITS
<b>TWO PROGRAMMABLE 16-BIT TIMER CHANNELS</b>	
<ul style="list-style-type: none"> <li>333 nsec resolution at 3 MHz bus</li> <li>Free-running counter or modulo up-counter</li> </ul>	<ul style="list-style-type: none"> <li>Each channel independently programmable for input capture, output compare or unbuffered PWM</li> <li>Pairing timer channels provides a buffered PWM function</li> </ul>
<b>COMPUTER OPERATING PROPERLY WATCHDOG TIMER</b>	
	<ul style="list-style-type: none"> <li>Provides system protection in the event of runaway code by resetting the MCU to a known state</li> </ul>
<b>LOW-VOLTAGE INHIBIT</b>	
	<ul style="list-style-type: none"> <li>Improves reliability by resetting the MCU when voltage drops below trip point</li> <li>Integration reduces system cost</li> </ul>
<b>UP TO 37 BIDIRECTIONAL INPUT/OUTPUT (I/O) LINES</b>	
<ul style="list-style-type: none"> <li>High sink/source capability on all I/O pins</li> <li>25 mA sink capability on two I/O pins</li> <li>Keyboard scan with selectable interrupts on eight I/O pins</li> </ul>	<ul style="list-style-type: none"> <li>High-current capable I/O allows direct drive of LED and other circuits to eliminate external drivers and reduce system costs</li> <li>Keyboard scan with programmable pullups eliminate external glue logic when interfacing to simple keypads</li> </ul>

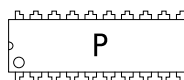
## APPLICATION NOTES

- AN1831/D Using MC68HC908 On-Chip Programming Routines
  - AN2093/D Creating Efficient C Code for the MC68HC08
  - AN1219/D M68HC08 Integer Math Routines
  - AN1218/D HC05 to HC08 Optimization
  - AN1837/D Non-Volatile Memory Technology Review
  - AN1752/D Data Structures for 8-bit MCUs
  - AN1705/D Noise Reduction Techniques for MCU-Based Systems
  - AN1259/D System Design and Layout Techniques for Noise Reduction in MCU-Based Systems
  - AN1263/D Designing for Electromagnetic Compatibility with Single-Chip Microcontrollers
  - AN1050/D Designing for Electromagnetic Compatibility (EMC) with HCMOS Microcontrollers
  - AN1705/D Noise Reduction Techniques for Microcontroller-Based Systems
- And many more—see our Web site at <http://www.motorola.com/mcu>

## PACKAGE OPTIONS

PART NUMBER	PACKAGE	TEMPERATURE RANGE
MC68HC908JB8JP	20 DIP	0 to 70°C
MC68HC908JB8ADW	28 SOIC	0 to 70°C
MC68HC908JB8FB	44 QFP	0 to 70°C
MC68HC908JB8JDW	20 SOIC	0 to 70°C
<b>SAMPLE PACKS</b>		
KMC908JB8ADW	28 SOIC	0 to 70°C
KMC908JB8FB	44 QFP	0 to 70°C

20-Pin Plastic DIP



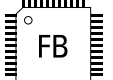
28-Lead SOIC



20-Lead SOIC



44-Lead QFP



**MOTOROLA**

Motorola and the stylized M Logo are registered in the U.S. Patent and Trademark Office. All other product or service names are the property of their respective owners.  
© Motorola, Inc. 2002