MC68HC908JW32

**Overview**
The 68HC908JW32 is a member of the family of USB microcontrollers from Freescale Semiconductor. The innovative design features an on-chip, full-speed USB 2.0 module for fast human interface device (HID) applications. An energy-saving, low-power solution, the 68HC908JW32 is embedded with 32 KB of Freescale’s second-generation Flash technology to enable system programmability.

**Target Applications**
- PC peripherals (keyboard, mouse)
- USB converters
- USB security keys for e-commerce
- Set-top box peripherals

**Features & Benefits**

### High-Performance 68HC08 CPU Core
- 8 MHz bus operation from 3.5V to 5V operation for 125 ns minimum instruction cycle time
- Efficient instruction set, including multiply and divide
- 16 flexible addressing modes, including multiply and divide
- Fully static, low-voltage, low-power design with wait and stop modes

### Integrated Second-Generation Flash Memory
- In-application reprogrammable
- Extremely fast programming, encoding 64B in as fast as 2 ms
- Flash programming across the 68HC08’s full operating supply voltage with no extra programming voltage
- 10K write/erase cycles minimum over temperature
- 100K write/erase typical
- Flexible block protection and security
- Pre-installed in-circuit programming and emulated EEPROM software routines in ROM

### USB 2.0 Specification Full-Speed Functions
- 12 Mbps data rate
- On-chip 3.3V regulator
- Endpoint 0 with 8B transmit buffer and 8B receive buffer
- 64B endpoint buffer to share among endpoints 1–4

### Two-Channel, 16-bit Programmable Timer
- 125 ns resolution at 8 MHz bus
- Free-running counter or module up-counter

### Internal Bus
- HCS08 CPU
- 32 KB Flash
- 1 KB RAM
- 2-ch., 16-bit Timer
- Timebase Module
- SPI
- PS2 Clock Generator
- 29 GPIO
- KBI
- COP
- LVI
- USB 2.0 Full-Speed
### Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>PS2 Clock Generator</td>
<td>&gt; 12.5 kHz PS2 output clock &gt; Integration reduces system cost</td>
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<td>Timebase Module</td>
<td>&gt; Eight user-selectable periodic real-time interrupts &gt; Optionally operates in low-power stop mode</td>
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<td>&gt; Provides autowake-up from low-power stop mode to maintain real-time clock or check external device status, such as sensors</td>
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<td>Computer Operating Properly (COP)</td>
<td>&gt; Provides system protection</td>
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<td>Low-Voltage Inhibit (LVI)</td>
<td>&gt; Improves reliability by resetting the MCU when voltage drops below trip point &gt; Integration reduces system cost</td>
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<td>Serial Peripheral Interface (SPI)</td>
<td>&gt; Full-duplex, three-wire synchronous transfers &gt; High-speed synchronous communication between multiple MCUs or between MCU and serial peripherals &gt; Cost-effective serial peripheral expansion to EEPROM, high-precision analog-to-digital and digital-to-analog converters, etc.</td>
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<td>Up to 29 Bidirectional Input/Output (I/O) Lines</td>
<td>&gt; 10 mA direct drive capability on three I/O pins &gt; High-current capable I/O allows direct drive of LED and other circuits to eliminate external drivers and reduce system costs &gt; Keyboard scan with programmable pull-ups eliminate external glue logic when interfacing to simple keypads</td>
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### Application Notes

- AN1218 68HC0S to 68HC08 Optimization
- AN1831 Using the MC68HC908 On-Chip Flash Programming Routines
- AN1837 Non-Volatile Memory Technology Overview
- AN2093 Creating Efficient C Code for the MC68HC08
- AN1752 Data Structures for 8-bit MCUs
- AN1219 M68HC08 Integer Math Routines
- AN1705 Noise Reduction Techniques for Microcontroller-Based Systems
- 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
- AN2321 Designing for Board Level Electromagnetic Compatibility

### Cost-Effective Development Tools

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

- **FSICEKITJW32** $1,495 Complete FSICE high-performance emulator kit; includes emulator module, cables, head adapters and programming adapters
- **M68EM08JW32** $495 Emulation module for FSICE system
- **M68CYNCLONEPRO** $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
- **CWX-H08-SE** Free CodeWarrior™ Special Edition for HC(S)08 MCUs; includes IDE, linker, debugger, unlimited assembler, Processor Expert™ auto-code generator, full-chip simulation and 16 KB C compiler

### Data Sheet

**MC68HC908JW32**

**Package Options**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
<th>Temp. Range</th>
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<tbody>
<tr>
<td>MC68HC908JW32FC</td>
<td>48 QFN</td>
<td>0 to +70°C</td>
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48-Pin QFN
50 mil/1.27 mm Pitch
7 mm x 7 mm Body