**Overview**

The MC68HC908JB16 is an upwardly compatible, versatile migration from Freescale Semiconductor's MC68HC908JB8 Universal Serial Bus (USB) microcontroller unit (MCU). The innovative design features an on-chip USB module for fast, reliable PC peripheral applications and dual 27 MHz clock generators. An energy-saving, low-power solution, the MC68HC908JB16 is embedded with 16 KB of Freescale's second-generation Flash technology to enable in-system programmability.

**Target Applications**

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

**Features vs. Benefits**

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
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<tbody>
<tr>
<td><strong>High-Performance 68HC08 CPU Core</strong></td>
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</table>
| > 6 MHz bus operation at 4V to 5.5V operation for 167 ns minimum instruction cycle time | > Object code compatible with the 68HC05
| > Efficient instruction set, including multiply and divide | > Easy to learn and use architecture
| > 16 flexible addressing modes, including stack relative with 16-bit stack pointer | > C-optimized architecture provides compact code
| > Fully static, low-voltage, low-power design with wait and stop modes | |
| **16 KB 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 32 µs per byte | > Helps to reduce production programming costs through ultra-fast programming
| > Flash programming across the 68HC08 device's full operating supply voltage with no extra programming voltage | > Byte-writable for data as well as program memory
| > 10K write/erase cycles minimum over temperature | > Protects code from unauthorized reading and guards against unintentional writing/erasing of user-programmable segments of code
| > Flexible block protection and security | |
| **USB 2.0 Specification Low-Speed Functions** | |
| > 1.5 Mbps data rate | > Designed to serve as low-speed (LS) USB device, in accordance with Universal Serial Bus Specification Rev. 2.0 Low-Speed Functions
| > On-chip 3.3V regulator | > Integrated 3.3V regulator helps to reduce system cost
| > Endpoint 0 with 8B transmit buffer and 8B receive buffer | |
| > Endpoint 1 with 8B transmit buffer | |
| > Endpoint 2 with 8B transmit buffer and 8B receive buffer | |
| **Dual 27 MHz Phase-Lock Loops (PLL)** | > Provides two independent, high-performance 27 MHz clocks for RF applications
| > Two programmable 27 MHz PLLs | |
| > Reference frequency from MCU input clock: 12 MHz crystal | |
| **Two Programmable 16-bit Timers, Each with Two Channels** | > Each channel independently programmable for input capture, output compare or unbuffered pulse-width modulation (PWM)
| > 167 ns resolution at 6 MHz bus | > Pairing timer channels designed for a buffered PWM function
| > Free-running counter or modulo up-counter | |
| > External clock input option | |
| **Serial Communications Interface (SCI)** | > Designed to enable asynchronous serial communications with peripheral devices
| > UART asynchronous communications system | |
| > Flexible baud rate generator | |
| > Double-buffered transmit and receive | |
| > Optional hardware parity checking and generation | |
Features | Benefits
--- | ---
Computer Operating Properly (COP) Watchdog Timer | > Issues reset in the event of runaway code
Selectable Trip Point Low-Voltage Inhibit (LVI) | > Improves reliability by resetting the MCU when voltage drops below trip point
Up to 21 Bidirectional Input/Output (I/O) Lines | > High current I/O designed to allow direct drive of LED and other circuits to eliminate external drivers and help to reduce system costs
> Keyboard scan with programmable pull-ups virtually eliminates external glue logic when interfacing to simple keypads
> 10 mA high-current drive for PS/2 connection on two pins (with USB module disabled)
> One dedicated I/O pin with 25 mA direct drive for infrared LED (32-pin package)
> Six dedicated I/O pins with 25 mA direct drive for infrared LED on two pins and 10 mA direct drive for normal LED on four pins (28-pin package)
> Keyboard scan with selectable interrupts on eight I/O pins

Application Notes
- AN2093 Creating Efficient C Code for the HC08
- AN1219 M68HC08 Integer Math Routines
- AN1218 HC05 to HC08 Optimization
- AN1837 Non-Volatile Memory Technology Overview
- AN1752 Data Structures for 8-bit MCUs
- AN1705 Noise Reduction Techniques for Microcontroller-Based Systems

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).

- FSICEKITJBJG Complete FSICE high-performance emulator kit; includes emulator module, cables, head adapters and programming adapters
  - $2,495
- M68EM08JBJG Emulation module for FSICE system
  - $495
- M68CYCLONEPRO HC08/HCS08/HC12/HCS12 stand-alone Flash programmer or in-circuit emulator, debugger, Flash programmer; USB, serial or Ethernet interface options
  - $499
- USBMULTILINK08 Universal HC08 in-circuit debugger and Flash programmer; USB PC interface
  - $99
- M68CPA08QF324448 Programming adapter for MON08 cables and single MCU: 32-pin 0.8 mm QFP packages, 44-pin 0.8 mm QFP packages and 48-pin 0.5 mm QFP packages
  - $199
- M68CPA08W1628T20 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
  - $149
- CWX-H08-SE CodeWarrior™ Special Edition for HCS08 MCUs; includes integrated development environment (IDE), linker, debugger, unlimited assembler, Processor Expert™ auto-code generator, full-chip simulation and 16 KB C compiler
  - Free

Package Options

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
<th>Temp. Range</th>
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<tbody>
<tr>
<td>MC68HC908JB16FA</td>
<td>32 LQFP</td>
<td>0°C to +70°C</td>
</tr>
<tr>
<td>MC68HC908JB16DW</td>
<td>28 SOIC</td>
<td>0°C to +70°C</td>
</tr>
<tr>
<td>MC68HC908JB16JDW</td>
<td>20 SOIC</td>
<td>0°C to +70°C</td>
</tr>
</tbody>
</table>

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