

MC9S08JS16/8

8-bit USB microcontroller

Target Applications

- PC peripherals
- Wireless Keyboard/Mouse Receiver
- Wireless adapter
- USB dongle
- SD card reader
- RS-232 to USB bridge
- Remote Control
- UPS

Overview

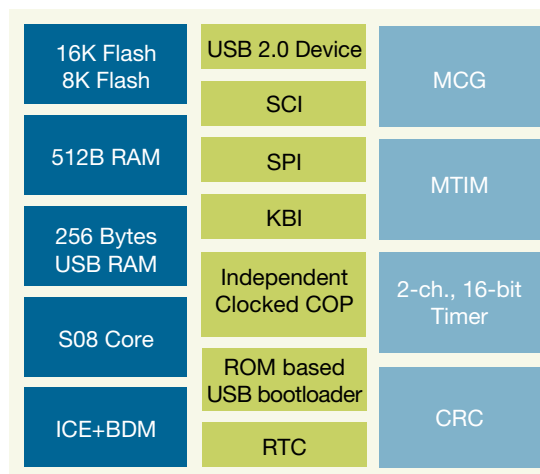
An entry-level 8-bit USB MCU designed for affordable wireless PC peripherals; the MC9S08JS16 (JS16) meets the market demand for cost-effective devices by enabling reduced design time and lower system costs.

The JS16 extends Freescale’s entry-level 8-bit embedded USB controller family with up to 16 KB of flash memory and a full-speed USB 2.0 device controller. The JS16 also has several features for system protection, such as low voltage detection and a Computer Operating Properly (COP) module. The JS16 device is ideal for a variety of industrial control applications and consumer devices, including PC peripherals and remote controls.

The JS16 devices are supported by Freescale USB-LITE Stack by CMX and USB-MINI Stack with HID and CDC classes. These stacks are complimentary and are supplied with source code.

The JS16 is software compatible with other devices in the Controller Continuum, providing a direct migration path to higher performing USB microcontrollers.

JS16/8 Block Diagram



Features	Benefits
8-Bit HCS08 Central Processing Unit (CPU)	
<ul style="list-style-type: none"> • Up to 24MHz internal bus (48MHz HCS08 Core) frequency offering 2.7V to 5.5V across temperature range of -40°C to 85°C 	<ul style="list-style-type: none"> • Offers reliable performance throughout the entire voltage range
On-Chip Memory	
<ul style="list-style-type: none"> • Up to 16K flash read/program/erase over entire operating voltage and temperature ranges 	<ul style="list-style-type: none"> • Allows user to take full advantage of in-application, re-programmability benefits in virtually any environment
<ul style="list-style-type: none"> • Up to 512 bytes random access memory (RAM) 	<ul style="list-style-type: none"> • Offers a security circuitry to help prevent unauthorized access to RAM • Flash contents help to reduce system power consumption
<ul style="list-style-type: none"> • 256 byte USB RAM 	<ul style="list-style-type: none"> • Provides data buffering to improve data transfer rate
Power-Saving Modes	
<ul style="list-style-type: none"> • Wait plus two stop modes 	<ul style="list-style-type: none"> • Allows uninterrupted sampling application in a reduced power state which reduces overall system power consumption
Clock Source Options	
<ul style="list-style-type: none"> • Clock source options include crystal, resonator and external clock • Multi-purpose clock generator (MCG)—PLL and FLL; • Internal reference clock with trim adjustment • Option to drive USB module with 32.768 kHz crystal 	<ul style="list-style-type: none"> • Optimizes power consumption and provides flexibility to user • Multiple clock options provide design feasibility.



Features

Benefits

Peripherals

- | | |
|--|---|
| <ul style="list-style-type: none"> • USB device module | <ul style="list-style-type: none"> • Full-speed USB 2.0 (12 Mbps) module with dedicated on-chip 3.3V regulator • Supports control, interrupt, isochronous and bulk transfer |
| <ul style="list-style-type: none"> • Serial Communications Interface (SCI) module with optional 13 bit break. | <ul style="list-style-type: none"> • Provides standard UART communications peripheral • Allows full-duplex, asynchronous, NRZ serial communication between MCU and remote devices |
| <ul style="list-style-type: none"> • Serial Peripheral Interface (SPI) - A single 8-bit or 16-bit module with receive data buffer (RDB) hardware match function | <ul style="list-style-type: none"> • Delivers fast communication to and from peripheral devices. |
| <ul style="list-style-type: none"> • TPM — Up to 2-channel 16-bit timer/pulse-width modulator (TPM) module | <ul style="list-style-type: none"> • Allows selectable input capture, output compare, and edge-aligned PWM capability on each channel • Can be configured for buffered, centered PWM (CPWM) on all channels |
| <ul style="list-style-type: none"> • RTC—(Real-time counter) 8-bit modulus counter with binary or decimal based prescaler | <ul style="list-style-type: none"> • Improves task-scheduling for applications requiring Time of Day calendar functions. Frees up timers for other activities. |

Input/Output

- | | |
|--|--|
| <ul style="list-style-type: none"> • 8 interrupt pins with selectable polarity | <ul style="list-style-type: none"> • Offers flexibility by interfacing to a large number of pins that are capable of generating interrupts. |
| <ul style="list-style-type: none"> • 12 general purpose input/output (GPIO) pins and 2 output only pins | <ul style="list-style-type: none"> • Results in a large number of flexible I/O pins |

System Protection

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| <ul style="list-style-type: none"> • A watchdog Computer Operating Properly (COP) module that can be reset with option to run from dedicated 1-kHz internal clock source or bus clock | <ul style="list-style-type: none"> • Provides system protection using backup oscillator by resetting the MCU to a known state. |
| <ul style="list-style-type: none"> • Low-voltage detection with reset or interrupt; selectable trip points | <ul style="list-style-type: none"> • Built in system protection to help secure data and warn of possible voltage loss conditions. |
| <ul style="list-style-type: none"> • Illegal opcode detection with reset | <ul style="list-style-type: none"> • Allows the device to recognize erroneous code and resets the processor to help avoid lock-up states |
| <ul style="list-style-type: none"> • Illegal address detection with reset | <ul style="list-style-type: none"> • Resets the MCU to a known state due to inadvertent access to unimplemented or reserved address space. |
| <ul style="list-style-type: none"> • Flash block protection | <ul style="list-style-type: none"> • Helps provide security by protecting code from unauthorized reading and guards against unintentional write/erase of user-code/data. |

Development Support

- | | |
|--|---|
| <ul style="list-style-type: none"> • ROM based USB boot loader | <ul style="list-style-type: none"> • Program/erase flash array without using additional development tools |
| <ul style="list-style-type: none"> • Single-wire background debug interface | <ul style="list-style-type: none"> • Allows developers to use the same interface for multiple platforms |
| <ul style="list-style-type: none"> • On-chip in-circuit emulator (ICE) debug with real time bus capture | <ul style="list-style-type: none"> • Grants full access to built-in chip emulation without the added expense of traditional emulator hardware • Reduces development time by enabling real-time, on-chip emulation |

Package Options

Part Number	Temperature Ranges	Package
MC9S08JS16CFK	-40°C to + 85°C	24 QFN
MC9S08JS16CWJ	-40°C to + 85°C	20 SOIC
MC9S08JS8CFK	-40°C to + 85°C	24 QFN
MC9S08JS8CWJ	-40°C to + 85°C	20 SOIC

Cost-effective Development Tools

DEMO9S08JS16

\$79*

This cost-effective demonstration kit features the JS16 daughter card and getting-started DVD, complete with necessary software, documents and resources. The kit provides support for USB full speed device function. Built-in USB-BDM circuitry is available for debugging and programming, serial communication, and simple logic analyzer.

DC9S08JS16

\$10*

The JS16 daughter card can also be ordered independently for use on the DEMOJM demonstration kit.

CodeWarrior® Development Studio for Microcontrollers 6.2

Special Edition (Complimentary**)

CodeWarrior Development Studio for Microcontrollers is an integrated tool suite that supports software development for Freescale's microcontrollers.

Freescale ROM Based USB Boot Loader

A comprehensive USB bootloader in ROM is provided to upgrade the firmware in flash via USB interface. Using Freescale PC GUI, the update process is quick and reliable.

Freescale USB Stack (Complimentary**)

Freescale provides two comprehensive USB stacks:

- The USB-LITE Stack by CMX
- The USB-MINI Stack by Freescale
- The two stacks enable USB device modes of operation and support several HID and CDC classes.

*Prices indicated are MSRP

**Subject to license agreement

Learn More:

For more information about the JS family, please visit www.freescale.com/usb.