

8-bit HCS08 Embedded Controllers

# DEMO9S08JS16

Entry-level USB MCU designed  
for affordable PC peripherals

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# Get to Know the DEMO9S08JS16 Board

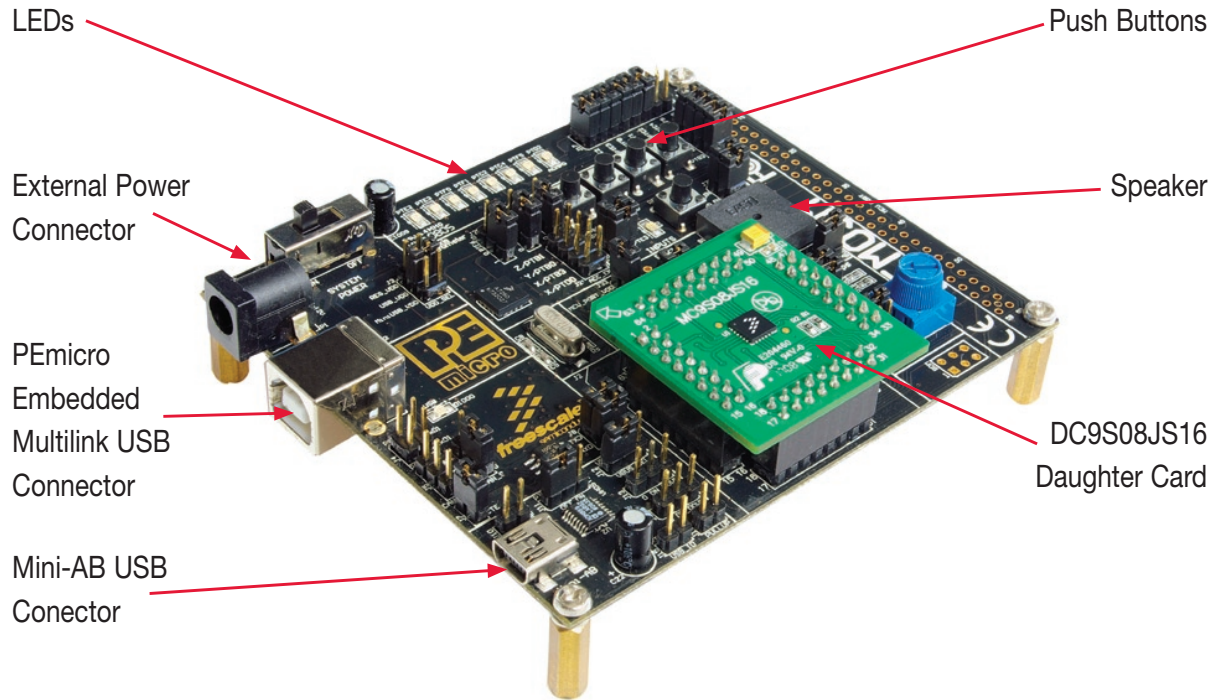


Figure 1. DEMOJM baseboard with DC9S08JS16 daughter card

# Introduction

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DEMO9S08JS16, with a DEMOJM baseboard and a DC9S08JS16 daughter card, is a cost-effective kit targeting quick MC9S08JS16 evaluation.

It can be used to demonstrate the features of the MC9S08JS16 device, starting with the on-chip USB 2.0 full-speed device controller and transceiver. The USB features are supported in hardware through a dedicated USB mini-AB connector and in software through the included complimentary USB stack.

This quick start guide is designed to get you ready to develop your next USB application using the MC9S08JS16 within minutes. Please take a look at the DEMO9S08JS16 Labs document (DEMO9S08JS16LAB) included in the “Training” section of the DVD to learn more about the key USB benefits that JS16 gives your application.

# Step-by-Step Installation Instructions

## USB Bootloader

A comprehensive USB bootloader solution is provided for MC9S08JS16. The boot ROM holds the code for upgrading the firmware in flash via USB interface. Freescale provides a friendly PC GUI that can communicate with the bootloader in ROM. The PC GUI works with the code in boot ROM to complete the firmware update. The update process is quick and reliable.

## USB-MINI stack

Freescale provides a comprehensive USB software solution through a complimentary USB stack. The Freescale USB-MINI stack enables USB device modes of operation. The USB stack supports several HID and CDC to UART projects. The complimentary stack also interfaces with CodeWarrior™ Development Studio, providing a productive, comprehensive development environment for designing embedded applications.

## Virtual Serial Port

The DEMO9S08JS16 board has the capability to implement a virtual serial port on the PC, allowing the PC to send and receive serial data via the USB and SCI interfaces of MC9S08JS16. Using jumper J4, this virtual serial port may be configured to connect to the serial port of P&E Embedded Multilink.



## Install CodeWarrior Development Studio for Microcontrollers

CodeWarrior is a powerful tool designed to help you minimize your time to market. CodeWarrior Service Pack will install the appropriate support files for the MC9S08JS16 to the existing CodeWarrior installation. CodeWarrior installation is a one-time required step before connecting the board to your computer.

1. Insert the provided DVD into the computer. A menu will appear.
2. Select the appropriate board and click “Install CodeWarrior.”
3. Follow the on-screen instructions until installation is complete.

Once the installation is complete, you can take advantage of several CodeWarrior tutorials that will walk you through various development tool features, such as “C Programming,” “Assembly Programming,” “Using Processor Expert™” and more. Simply open CodeWarrior using the path “Programs>Freescale CodeWarrior>CW for Microcontroller V6.x>CodeWarrior IDE.exe.” Click “Run Getting Started Tutorial” from the startup dialog, select a tutorial and follow the on-screen instructions.



## Install CodeWarrior for Microcontroller 6.2.1 Patch and MC9S08JS16 Service Pack

To make the CodeWarrior capable of creating and compiling the MC9S08JS16 project, the CodeWarrior 6.2.1 patch and JS16 service pack need to be installed. The CodeWarrior 6.2.1 patch and JS16 service pack installation are a one-time required step before connecting the board to your computer.

1. Insert the provided DVD into the computer. A menu will appear.
2. Select the appropriate board and click “Install CodeWarrior Development Studio for Microcontroller 6.2.1 patch.”
3. Follow the on-screen instructions until installation is complete.
4. Select the appropriate board and click “Install MS9S08JS16 Service Pack”
5. Follow the on-screen instructions until installation is complete.

After the CodeWarrior 6.2.1 patch and JS16 service pack are installed, the MC9S08JS16 silicon can be selected when creating the application, and the JS16 project can be compiled correctly.

### STEP 3

## Install Bootloader GUI

MC9S08JS16 supports a USB bootloader. The user’s application code can be downloaded (updated) using the USB bootloader or BDM debug port. If the USB bootloader is adopted, a friendly PC GUI must be installed. This GUI works with the USB bootloader located in boot ROM to transfer and program the firmware (s19 code) to MC9S08JS16’s flash memory. The installation of a PC GUI is a one-time step before the USB bootloader is used.

1. Insert the provided DVD into the computer. A menu will appear.
2. Select the appropriate board and click on “Install Bootloader GUI.”
3. Follow the on-screen instructions until installation is complete.

The CodeWarrior compiles and links the MC9S08JS16 project to generate the s19 code. The s19 code can be selected by the bootloader GUI and programmed to the MC9S08JS16 flash. For more information about USB bootloader, please refer to “MC9S08JS16 USB bootloader GUI user guide” in the DEMO9S08JS16 DVD.

### STEP 4

## Install DEMO Code (based on USB-MINI stack) for MC9S08JS16

Freescale USB-MINI stack for MC9S08JS16 is a complimentary stack with the appropriate JS16 USB Device mode low-level drivers and top-level HID class and CDC class examples. To exercise the various USB examples packaged with the stack, follow the step-by-step DEMO9S08JS16 Labs document (DEMO9S08JS16LAB) included in the “Training” section of the DVD. Stack installation is a one-time required step before developing applications with this software.

1. Insert the provided DVD into the computer. A menu will appear.
2. Click “Install JS16 USB Demo.” This will launch the stack installer.
3. Follow on-screen instructions until installation is complete.

### STEP 5

## Install PEmicro Demo Board Toolkit

PEmicro Embedded Multilink Toolkit includes graphical utilities that run on your computer and help speed up your application development. These utilities take development beyond the hardware and interact with the target microcontroller over the same USB multilink reference design on the board that allows you to debug using CodeWarrior. Best of all, you can debug your microcontroller in CodeWarrior while simultaneously using one of the following utilities: Logic Analyzer, Serial Grapher and Terminal Window. PEmicro Embedded Multilink Toolkit installation is a one-time required step.



1. Insert the provided DVD into the computer. A menu will appear.
2. Click “Install PEmicro Toolkit.” This will launch the toolkit installer.
3. Follow the on-screen instructions to complete the installation.

For more information on the PEmicro Embedded Multilink Toolkit read the DEMO9S08JS16 User Manual (DEMO9S08JS16 UM.pdf) included in the “Documentation” section of the DVD.

For new and upgraded utilities to the PEmicro Embedded Multilink Toolkit, visit [www.pemicro.com](http://www.pemicro.com).



## Connect Board to Computer

USB driver installation is a one-time required step, to be completed after CodeWarrior installation.

1. Remove DEMOJM baseboard and DC9S08JS16 daughter card from anti-static bags.
2. Plug in the MC9S08JS16 daughter card to DEMOJM baseboard, aligning pin 1 arrows.
3. Connect the provided A to B gray USB cable from a free USB port on your computer to the USB connector on the board.
4. The operating system will recognize your board as new hardware and will prompt you to install the USB drivers. Choose the recommended option to install the software automatically. USB drivers for your board were pre-loaded in the CodeWarrior installation.
5. Follow on-screen instructions until all USB driver installations are complete. The green USB LED on the board should illuminate.



## Test Board by Running Quick Start Application

Now that you have successfully completed the software and hardware setup, test your board by running the Quick Start Application pre-loaded in the microcontroller’s on-chip flash memory. The programmed application is the HID mouse software included in the complimentary USB stack for MC9S08JS16. In this example, the demo board will work as a mouse.

1. Remove the jumpers on J4.
2. Turn the SYSTEM POWER switch to the “on” position. The red “Power” LED will illuminate and the application will start.
3. Connect the provided A to mini-B black USB cable from a free USB port on your computer to the mini-AB USB connector on the board.



4. Your computer will recognize the MC9S08JS16 as a HID mouse device and begin installation (no user interaction needed). When hardware installation is complete, the MC9S08JS16 will work as a mouse device. If the “Reset” button is pressed and held, the PTG1 button works as the left mouse button. If the Reset button is released, the PTG1 button acts as the right mouse button. Similarly, the PTG2 and PTG3 buttons can move the mouse left and up if the Reset button his held down. When the Reset button is released, these two buttons can move the mouse right and down.
5. Now that your board is functional, try out the labs discussed in the DEMO9S08JS16 Labs document (DEMO9S08JS16LAB) included in the “Training” section of the DVD. These labs will guide you step by step through all the HID, CDC class and USB bootloader examples included in the complimentary USB stack for MC9S08JS16.





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