



Ultra-Low-Power 8-bit Microcontroller

# DEMO9S08QE32

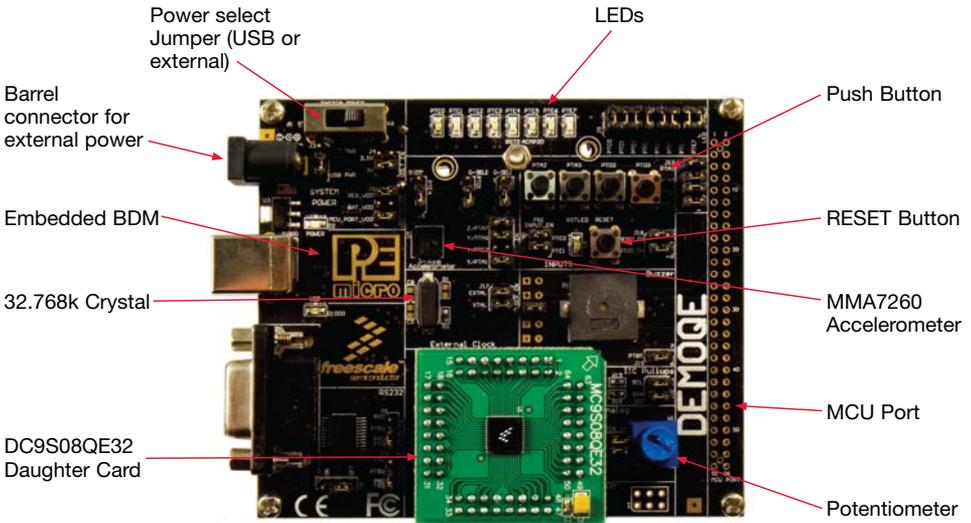
Taking the Lead  
in Low Power



- Quick Start Guide
- Lab Tutorials
- CodeWarrior® Manual
- Getting Started DVD



# Get to Know the DEMO9S08QE32 Board



**Figure 1.** DEMOQE baseboard with DC9S08QE32 daughter card.

# Introduction

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DEMO9S08QE32 is a cost-effective board targeting quick microcontroller evaluation.

The board includes a DEMOQE baseboard and a DC9S08QE32 daughter card. In combination, they can be used to highlight the key features on the MC9S08QE32 device. The board also includes a power terminal to measure the ultra-low power consumption of the MC9S08QE32 device.

This quick start guide is designed to get you ready to develop your application on the QE32 within minutes. Please take a look at the DEMO9S08QE32 Labs document (DEMO9S08QE32LAB) to learn more about the key benefits that QE32 gives your application.

# Step-by-Step Installation Instructions

## Accelerometer Demo Application

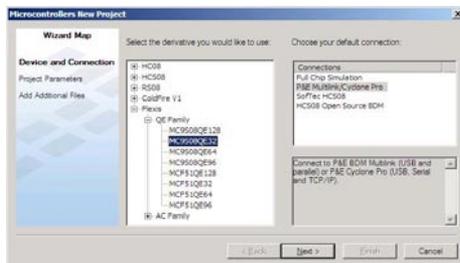
This graphing application will graph data from the serial port or virtual serial port on the DEMOQE board.

The state of the on-board three-axis accelerometer is sampled by the microcontroller-based serial accelerometer demonstration code using on-chip A/D converter channels. This data is converted into ASCII characters and sent out the serial port of the DEMOQE board. The data is then graphed by the PC-based graphing application for the user to view. This application may be used to graph any data as long as the data is formatted properly.

Both the MCU-based demonstration code and the PC-based graphing application may be downloaded from [www.pemicro.com/fixedlinks/demoQEtoolkit.html](http://www.pemicro.com/fixedlinks/demoQEtoolkit.html).

## Virtual Serial Port

The DEMO9S08QE32 board also has the capability of implementing a virtual serial port on the PC. This allows the PC to send and receive serial data via the serial communication pins of P&E's Embedded Multilink design. Using jumpers J6 and J7, this virtual serial port may be configured to connect to the SCI port on the QE32 processor.



## Install CodeWarrior® for Microcontrollers

CodeWarrior is a powerful tool designed to help you maximize your time to market. CodeWarrior installation is a one-time required step before connecting the board to your computer.

1. Insert provided DVD into computer and a menu will appear.
2. Click on the appropriate board and "Install CodeWarrior."
3. Follow the on-screen instructions until installation is complete.

Once installation is complete, 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 via the "Programs > Freescale CodeWarrior > CW for Microcontroller V6.x > CodeWarrior IDE.exe" path. Click "Run Getting Started Tutorial" from the startup dialog, select a tutorial and follow the on-screen instructions.

STEP  
2

## Install DEMOQE Toolkit

DEMOQE Toolkit install is a one-time required step. The DEMOQE Toolkit includes graphical utilities that run on your computer and help speed up your 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, Terminal Window and Accelerometer Demo Grapher.

1. Insert provided Getting Started DVD into computer and a menu will appear.
2. Click on “DEMO9S08QE32,” then click on “Install DEMOQE Toolkit.” This will launch the P&E DEMOQE Toolkit Installer.
3. Follow the on-screen instructions to complete installation.

For more information on DEMOQE Toolkit, read the board user manual (DEMO9S08QE32UM.pdf) included in the DVD under “DEMO9S08QE32 > DEMO9S08QE32 User Manual.”

For new and upgraded utilities to “DEMOQE Toolkit,” visit [www.pemicro.com/fixedlinks/demoQEt toolkit.html](http://www.pemicro.com/fixedlinks/demoQEt toolkit.html).

### Additional DEMOQE Toolkit Applications

In addition to the Quick Start Application and Logic Analyzer Utility, the DEMOQE Resources on the Getting Started DVD-ROM features other toolkit applications which work with the DEMO9S08QE32 board.

- Accelerometer Demo
- Logic Analyzer
- Serial Grapher
- Terminal Window
- Unsecure Utility

### STEP 3

## Connect Board to Computer

USB driver installation is a one-time required step that requires CodeWarrior installation first.

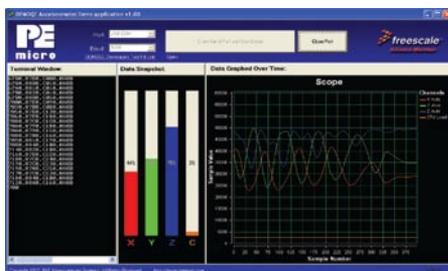
1. Remove board from anti-static pouch.  
The green 8-bit MC9S08QE32 daughter card will be mounted on the base board.
2. Connect provided USB cable from a free USB port on your computer to the USB connector on the board.
3. Operating system will recognize your board as new hardware and will prompt you to install the USB drivers. Choose recommended option to install the software automatically. USB drivers for your board were pre-loaded in CodeWarrior installation.
4. Follow on-screen instructions until all USB driver installations are complete. The green USB LED on-board should illuminate.

### STEP 4

## 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 samples the microcontroller's general-purpose input pins connected to push buttons to perform two actions. The first action is to illuminate



Accelerometer Demo

LED with a general-purpose output pin. The second action is to play a tone per push button on the speaker using a pulse-width modulated signal programmed at different frequencies. Last, the application samples the potentiometer using the microcontroller's analog-to-digital converter and uses the result to vary the light intensity of an LED by changing their pulse-width modulated signal's duty cycle.

1. Turn the SYSTEM POWER switch to the ON position. The red POWER LED will illuminate and application will start.
2. Press push buttons labeled PTA2, PTA3. A tone will be emitted from speaker when each push button is pressed, and the LED labeled PTC0 will illuminate, while LEDs labeled PTC[2:3] and PTC[4:5] turn off respectively.
3. Rotate potentiometer to vary light intensity of the LED labeled PTC1.
4. Now that your board is functional, try out the provided labs in the DEMO9S08QE32 Labs document to learn more about the ultra-low power MC9S08QE32 microcontroller and other features included with your board.

**Learn More:** For more information about  
Freescale products, please visit  
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