MC9S08GW64

LCD segment MCU for flow meters
and energy metering applications

freescale
semiconductor

Get to Know the TWR-S08GW64

MC9S08GW64

Tamper Switch (SW4)

User Switch (SW3)

User Switch (SW5)

Reset Switch

IRQ Switch

USB Connector

Primary Connector

RS232 Port

Potentiometer to Control the Vrms

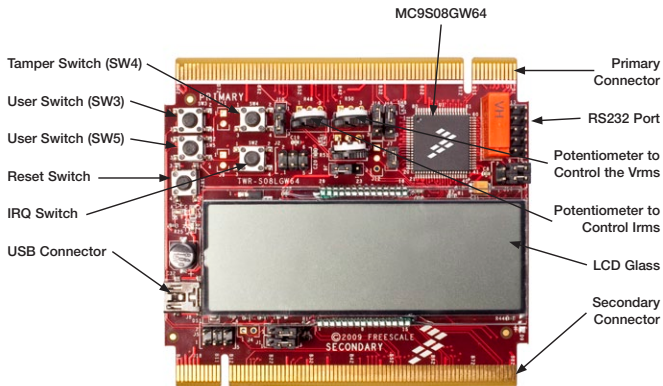Potentiometer to Control Irms

LCD Glass

Secondary Connector

Figure 1: TWR-S08GW64

TWR-S08GW64-KIT
Freescale Tower System

The TWR-S08GW64 module is part of the Freescale Tower System, a modular development platform that enables rapid prototyping and tool re-use through reconfigurable hardware. Take your design to the next level and begin constructing your Tower System today. The TWR-S08GW64-KIT comes with two elevator modules (TWR-ELEV) and a prototype module (TWR-PROTO).

Introduction

Freescale provides free lab diagnostic code to provide hands-on experience and demonstrate the capabilities of the MC9S08GW64 on TWR-S08GW64.
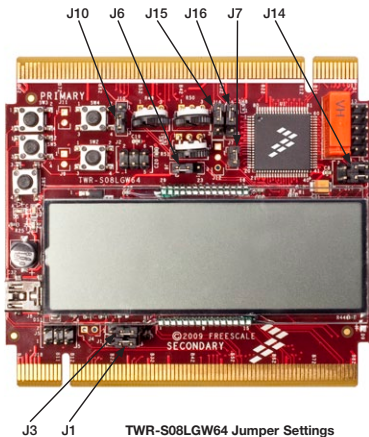
Included:

Lab 1:

- Displays the current, voltage, energy and power factor
- Displays the clock, calendar and tampers registered
- The value of the current, voltage and power factor can be varied using the potentiometer
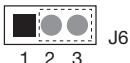- The value of the tampers registered can be varied using a switch

Lab 2:

- LCD all segment ON for connectivity check
- LCD blink modes demonstration
- LCD charge pump and resistor bias mode
- LCD prescalar options

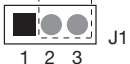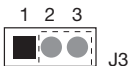**Please follow the jumper settings below before running the Lab tutorial.**
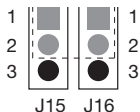

J6

Connect between 2 and 3 in J6 to get power from the regulator.

J7

Connect J7 to power up the MCU from the output of J6.

J3

J1

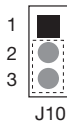Connect between 2 and 3 in both J1 and J3 to connect the debugger interface to GW64.

J10 J6 J15 J16 J7 J14

J3 J1 **TWR-S08LGW64 Jumper Settings**

Connect between 1 and 2 for both J15 and J16 to connect the output of QE8 to ADC1 and ADC2 for signal simulation input.
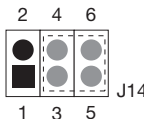
Connect between 4 and 6 and between 3 and 5 for J14 to connect the GW64 serial data to RS232.

Connect between 2 and 3 for J10 to connect Switch 4 as the tamper 1 input.

Step-by-Step Guide

STEP 1 — Open CodeWarrior and the Project

1. Complete the setup instructions in the Quick Start Guide. Be sure CodeWarrior v10.0 is installed.

2. Open CodeWarrior for microcontrollers. From the Windows start menu, you can locate it using "Programs > Freescale CodeWarrior > CW for MCU v10.0> CodeWarrior."

3. Choose the "Start Using CodeWarrior" button.

4. Download the project Demo_Board_Application_Software.zip(LAB1) and LCD LAB.zip(LAB2).

   Unzip and save the folders Demo_Board_Application_Software and LCD LAB on the desktop.

5. Using CodeWarrior, click File > Open and browse to Desktop/Demo_Board_Application_Software /demo_board.mcp for LAB1
   Desktop/LCD LAB/build/mwerks/evb/LAB_LCD.mcp for LAB2

STEP 2 — Install the GW64 Service Pack

1. Open the CodeWarrior window.

2. Go to the "Help" menu.

3. Select "Install New Software" in the drop down menu.

4. Ensure the link below is in your "Work With" textbox -
   http://freescale.com/lgfiles/updates/Eclipse/MCU/com.freescale.mcu.updatesite

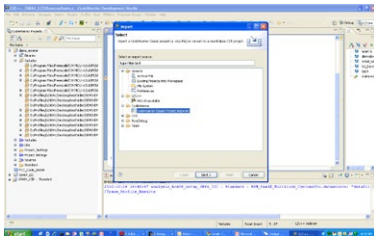5. Select the check box for "MCU 10.0 Service Pack for MC9S08GW64 and MC9S08GW32"

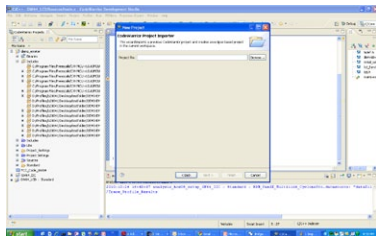**STEP 3**

Open the Source Code
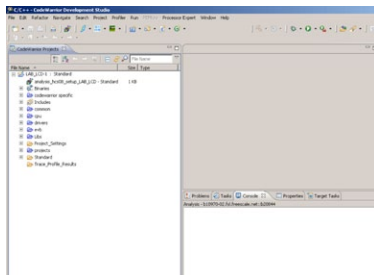
1. In the "File" menu go to "Import" as shown.
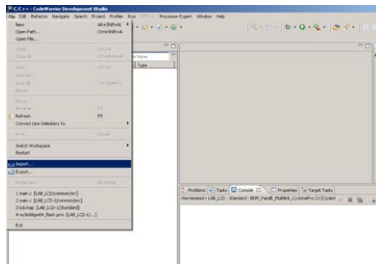
2. Expand "General" and select "CodeWarrior Classic Project Importer" as shown. Click "Next."

3. Browse to the folder where the code is stored and select the .mcp file and click "Finish."

4. The project directory structure will be visible as shown.

In the CodeWarrior window, double click on MC9S08GW64.h in the Libs folder and paste the following line in the file: #pragma OPTION ADD S08CFv1Compatible "-BfaGapLimitBits4294967295"

Set Up the TWR-9S08GW64 Module

Basic steps for the Tower System hardware installation

For the LCD LAB, the following cards of the Tower System are required:

1. Tower System Primary Elevator
2. Tower System Secondary Elevator
3. Tower System Serial Module
4. Tower System GW64 Controller Module

How to Connect:

1. There are four slots each on Primary and Secondary Elevator card. All four slots are identical to each other.
2. Take the GW64 Controller card and insert the PRIMARY connector side in the Primary Elevator, matching the "B" marking of the Elevator card and the controller card in any of the four slots.
3. Take the Serial Module and insert the PRIMARY connector side in the Primary Elevator, matching the "B" marking of the Elevator card and the Serial Module in any of the three remaining slots.
4. Take the Secondary Elevator card and fit it on the other side of the GW64 Controller and the Serial Module card, again matching the "B" marking so that it forms a Tower-like structure.

The Tower System is now in place.
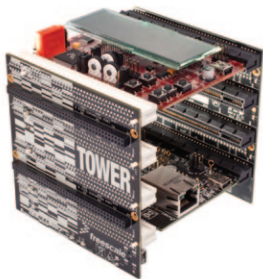
1. Power up the Tower System by plugging the USB cable between the PC (USB Type-A Female connector) and the Primary Elevator card connector J5 (Mini USB Type-B connector) and then switch ON the toggle switch (PWR SW) on the Primary Elevator.

2. Connect the debugger for downloading the code from the PC by connecting the USB Cable from the PC (USB Type-A Female connector) to the USB Multilink Interface (USB Type-B Female connector) and connect the other end of the USB Multilink Interface to the J2 of the GW64 Controller Card.

Note: The red wire should match Pin 1 of J2.
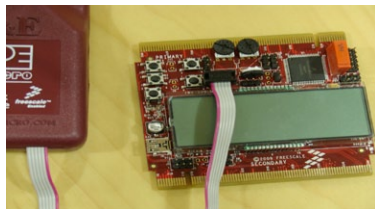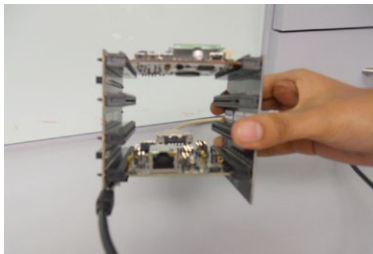
3. Configure the HyperTerminal to use the DEMO9S08GW64 Lab as follows:

1. Connect the serial cable between your PC and the serial module.

2. Open the HyperTerminal application and create a new connection on the COM port that connects to the UART on the board, as shown.

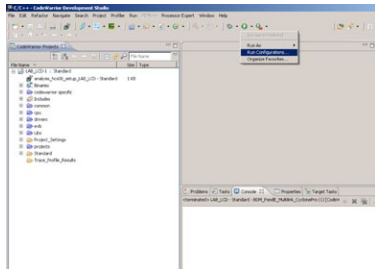3. Configure the HyperTerminal with the following settings, as shown.
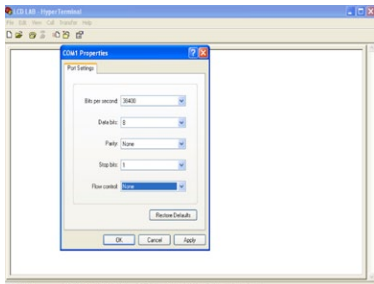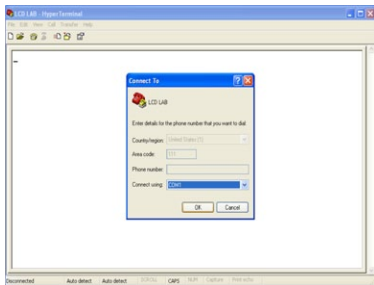
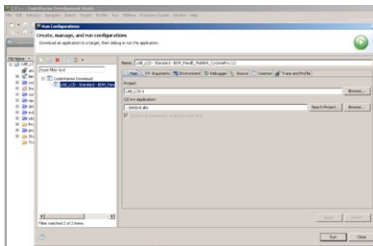## STEP 5 Start the P&E Toolkit Application and Enter the Programmer/Debugger

Steps to load the code

Using CodeWarrior, compile and program the MC9S08GW64 microcontroller with the application by clicking on "RUN button drop down" as shown.

1. Click on Run Configuration.

2. Select LCD_LAB-Standard-BDM_ PandE_Multilink_CyclonePro(1) as shown and click the "RUN" button.

Lab 1: Demo

- The welcome message "GW64 DEMO" appears on the LCD.

- By pressing switch "SW3," the display scrolls between the main menus as shown:
  "GW64 DEMO" > "E METER" > "RTC DEMO" > "LCD DEMO" > "GW64 DEMO"

- By pressing SW5, the user can access the sub menus of the main menus as follows:

  ○ "E METER"
    Keep pressing SW5 to scroll through the following:
    RMS current > RMS voltage > Active power > Apparent power > Power factor > Energy accumulated > RMS current

  ○ "RTC DEMO"
    Keep pressing SW5 to scroll through the following:
    Date > Time > Tampers detected > Date

  ○ "LCD DEMO"
    Press SW5: LCD Blinks

SW3 SW5 SW4   POT 1   POT 2   POT 3
            (Tamper) for IRMS   for IRMS   for phase
                                            difference

You can further interact with the board in the following ways:

• POT1: To change the value of Irms displayed

• POT2: To change the value of Vrms displayed

• POT3: To change the PF (power factor) displayed

• SW4: To increase the tamper count

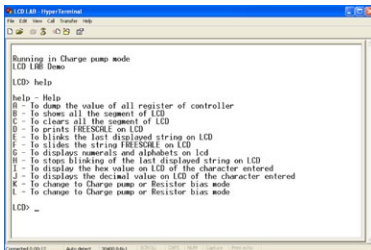• In order to set the date, hold SW5 for a few seconds when the date is being displayed. Then set the date using the combination of SW3 and SW5. Hold SW5 again for a few seconds to exit out of the date setting mode.
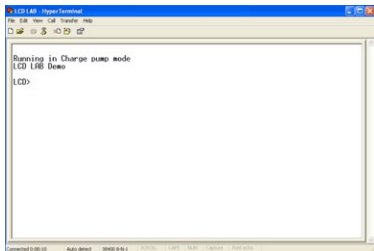
• The time can be set in the same way that the date is set.

Lab 2. LCD

The Lab 2 diagnostic takes commands through the HyperTerminal via the UART port, so make sure the UART cable is connected from board to the computer. Now the board is able to communicate to the DEMO9S08GW64 via the UART, as shown.
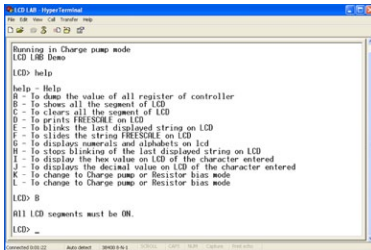
1. Type "help" to see the command help.

2. Type the commands and see the results on the board as shown.

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