



Ultra-Low-Power Microcontrollers

# DEMO9S08QE32 Lab Tutorials



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## MCU Port Connector Pinout

The following is the pinout for the MCU port connector on the DEMOQE board. No connects (n/c) for 48 QFN apply to DC9S08QE32 daughter card.

VDD	1	2	PTA5/IRQ/TPM1CLK /RESET
VSS	3	4	PTA5/IRQ/TPM1CLK/RESET
PTB1/KBI1P5/TxD1/ADP5	5	6	PTA4/ACMP10/BKGD/MS
PTB0/KBI1P4/RxD1/ADP4	7	8	PTE7/TPM3CLK
PTA2/KBI1P2/SDA1/ADP2	9	10	VREFH
PTA3/KBI1P3/SCL1/ADP3	11	12	VREFL
PTC0/TPM3CH0	13	14	PTA0/KBI1P0/TPM1CHO/ADPO/ACMP1+
PTC1/TPM3CH1	15	16	PTA1/KBI1P1/TPM2CHO/ADP1/ACMP1-
PTB3/KBI1P7/MOSI1/ADP7	17	18	PTF0/ADP10 (n/c for 48 QFN)
PTB4/TPM2CH1/MISO1	19	20	PTF1/ADP11 (n/c for 48 QFN)
PTB2/KBI1P6/SPSCK1/ADP6	21	22	PTA6/TPM1CH2/ADP8
PTB5/TPM1CH1/SS1	23	24	PTA7/TPM2CH2/ADP9
PTD1/KBI2P1/MOSI2	25	26	PTH6/SCL2 (n/c for 48 QFN)
PTD2/KBI2P2/MISO2	27	28	PTH7/SDA2 (n/c for 48 QFN)

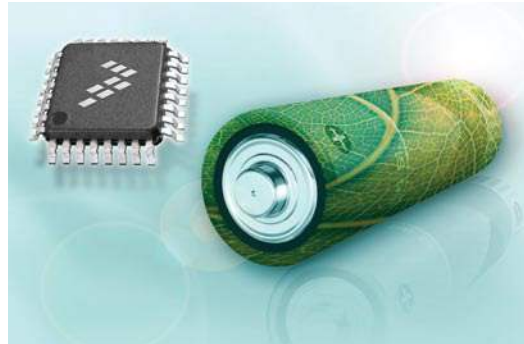
PTD0/KBI2P0/SPSCK2	29	30	PTD4/KBI2P4
PTD3/KBI2P3/SS2	31	32	PTD5/KBI2P5
PTC2/TPM3CH2	33	34	PTD6/KBI2P6
PTC3/TPM3CH3	35	36	PTD7/KBI2P7
PTC4/TPM3CH4/RST0	37	38	PTC7/TxD2/ACMP2-
PTC5/TPM3CH5/ACMP0	39	40	PTC6/RxD2/ACMP2+
(n/c for 48 QFN) PTF2/ADP12	41	42	PTB7/SCL1/EXTAL
(n/c for 48 QFN) PTF3/ADP13	43	44	PTB6/SDA1/XTAL
(n/c for 48 QFN) PTF4/ADP14	45	46	PTG0 (n/c for 48 QFN)
(n/c for 48 QFN) PTF5/ADP15	47	48	PTG1 (n/c for 48 QFN)
(n/c for 48 QFN) PTF6/ADP16	49	50	PTH0 (n/c for 48 QFN)
(n/c for 48 QFN) PTF7/ADP17	51	52	PTH1 (n/c for 48 QFN)
(n/c for 48 QFN) PTG2/ADP18	53	54	PTE6
(n/c for 48 QFN) PTG3/ADP19	55	56	NC

## Default Jumper Settings

The following is a list of default jumper settings for DEMOQE board. The settings listed indicate the “on” (or installed) position.

Jumper	Installed Settings	Jumper	Installed Settings
J3	2&3	J14	2&3
J4	3&4	J15	2&3
J5	1&2	J16	1&2, 3&4, 7&8
J6	2&3	J17	1&2, 3&4
J7	2&3	J18	1&2, 3&4
J8	2&3	J19	1&2
J9	1&2, 3&4, 5&6, 7&8, 9&10, 11&12, 13&14, 15&16	J20	1&2, 3&4
J11	1&2, 3&4	J21	1&2, 3&4
J12	1&2, 3&4, 5&6, 7&8	J24	1&2
J13	2&3		

# Taking the Lead in Low Power



**LAB 1**

## Learn How to Use DEMOQE Toolkit Utilities

This lab will show you how to use one of several graphical utilities in the DEMOQE Toolkit included with your board. Instructions to download these utilities to your computer are provided in Step 2 of the Quick Start Guide (DEMOS08QE32QSG.pdf).




Running the Quick Start Application that came pre-loaded in the microcontroller's on-chip flash memory, we will now use the DEMOQE Logic Analyzer utility. This PC-based utility graphs the IN0 and IN1 signals on the board. For convenience, if both J11 jumpers are installed, IN0 graphs PTC0 activity and IN1 graphs PTC1 activity. To graph other microcontroller signals, use wire jumpers from IN0 and IN1 to the respective signals on the board's MCU PORT.

1. Make sure that the Quick Start Application is running.
2. Launch DEMOQE Logic Analyzer utility from the start menu (Programs > P&E DemoQE Toolkit > Utilities > Logic Analyzer Utility). \*See DEMO9S08QE32 User Manual for details on the Logic Analyzer Utility.
3. In utility, click on the "Open DEMOQE and Graph Pins" button to begin graphing IN0 and IN1. These signals will be continually graphed at a sampling rate of 10 kHz.
4. Click button labeled "PTA2." This will cause a fixed duty cycle pulse width modulation signal to be output on the PTC0 pin. The PTC0 waveform is shown on analyzer channel IN0.
5. Rotate the potentiometer W1. This will change the duty cycle of the variable pulse width modulation signal output on the PTC1 pin. The PTC1 waveform is shown on analyzer channel IN1.
6. Click on "Close Port" button when finished.

For more information on DEMOQE Toolkit, read the board user manual (DEMO9S08QE32UM.pdf) included on DVD under "DEMO9S08QE32 > DEMO9S08QE32 User Manual." For new and upgraded utilities to the DEMOQE Toolkit, visit [www.pemicro.com/fixlinks/demoQEtoolkit.html](http://www.pemicro.com/fixlinks/demoQEtoolkit.html)

## About DEMO9S08QE32 Labs

These labs will show you how to get the most out of your DEMOQE toolkit. Start each lab with the board powered ON. Make sure to use only one utility at a time, as they share the same USB source. Familiarize yourself with these buttons:

-  Start/Continue (F5) button
-  MCU Change Wizard button
-  Debug button

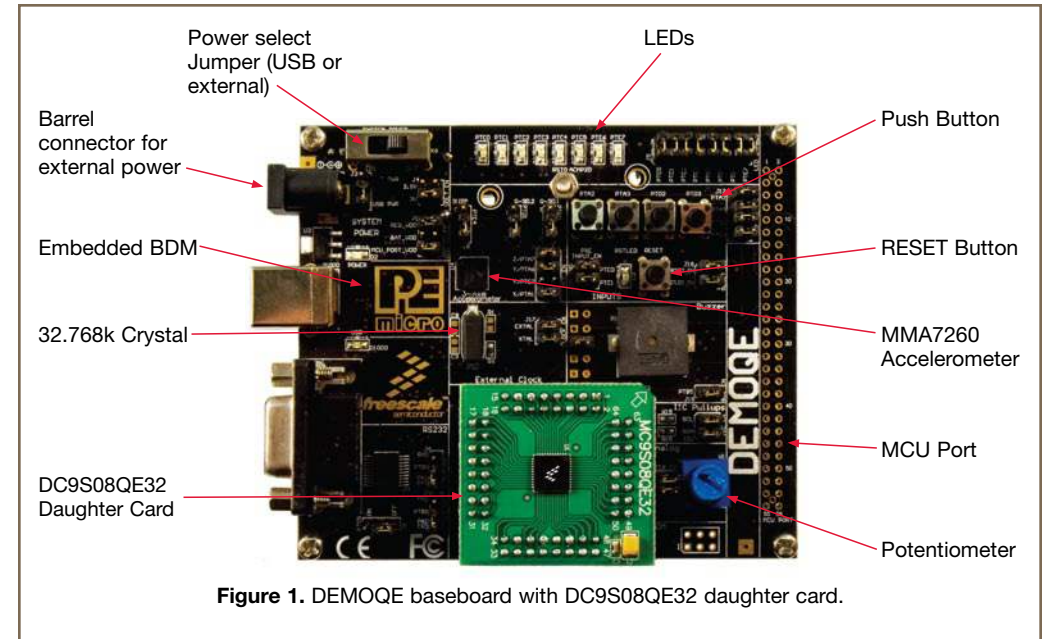


Figure 1. DEMOQE baseboard with DC9S08QE32 daughter card.



AccelerometerDemo running on MC9S08QE32 in data averaging mode. Bar graph 'C' highlights the bus cycles required to average the last 16 readings of the 3 axes. The value in the 4th column in the terminal window is the number of bus cycles in hex.

