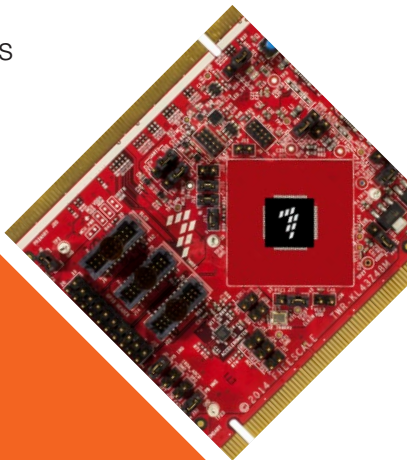




# TWR-KL43Z48M Quick Start Guide

Development Kit for Kinetis  
KL43/33/27/17 MCU Families

Tower System



# Get to Know the TWR-KL43Z48M

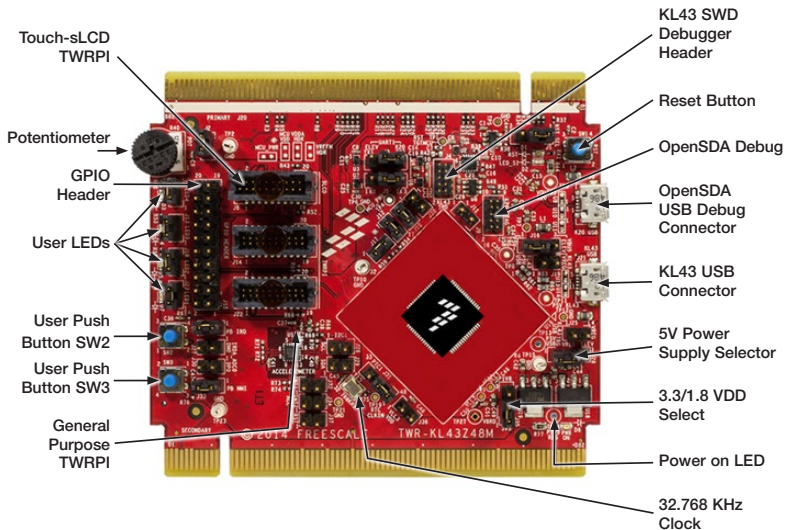


Figure 1: Front side of TWR-KL43Z48M module (TWRPI device not attached)

## Get to Know the TWR-KL43Z48M (cont.)



Figure 2: Back side of TWR-KL43Z48M module



### TWR-KL43Z48M Freescale Tower System

The TWR-KL43Z48M MCU module is designed to work either in standalone mode or as 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 by visiting [freescale.com/Tower](http://freescale.com/Tower) for additional Tower System MCU modules and compatible peripherals.

## TWR-KL43Z48M Features

- Tower System-compatible MCU module
- TWR-KL43Z48M MCU (48 MHz, 256 KB flash, 32 KB RAM, 16K ROM (KIBBLE), low power, sLCD controller, 64 LQFP package)
- Segment LCD module (TWRPI-SLCD)
- Dual role USB interface with Micro-AB USB connector
- Touch Tower plug-in socket (with TSS only)
- General-purpose Tower plug-in (TWRPI) socket
- On-board debug circuit MK20D50 OpenSDA with virtual serial port
- 6-Axis Xtrinsic Sensor with Integrated Linear Accelerometer and Magnetometer (FXOS8700)
- Four (4) user-controllable LEDs
- Two (2) user push buttons switch
- Infrared transmit and receive
- Potentiometer
- General-purpose pin header to directly access MCU signals

### Tools

- IAR EWARM 7.10 or higher
- Keil uVision v5.2 or higher

# Step-by-Step Installation Instructions

## 1 Download Software and Tools

Download installation software and documentation under **“Jump Start Your Design”** at [freescale.com/TWR-KL43Z48M](http://freescale.com/TWR-KL43Z48M).



## 2 Install Software and Tools

Install the OpenSDA Tower Toolkit to install the OpenSDA and USB to-serial drivers.

## 3 Configure the Hardware

Connect one end of the USB cable to the PC and the other end to the Power/OpenSDA micro-AB connector (J8) on the TWR-KL43Z48M module. Allow the PC to automatically configure the USB drivers if needed. TWR-KL43Z48M comes with USB

CDC Serial Port. Determine the symbolic name assigned to the TWR-KL43Z48M virtual serial port. In Windows open Device Manager and look for the COM port named ‘OpenSDA – CDC Serial Port.’ Open the serial terminal emulation program of your choice (configuration: baudrate 9600, 8 data bits, no parity, 1 stop bit).

## 4 LEDs

All LEDs are blinking in order. The message is sent over OpenSDA CDC serial to the PC. Press SW3 to move to the next mode (each time SW3 is pressed the message is sent).

## 5 Tilt the Board

Tilt the board right/left and the LEDs are switched on/off according to the accelerometer data (one axis only). Press SW3 to move to the next mode.

## 6 Serial Communication

Open PC terminal (or other application for serial communication). All characters sent to TWR-KL43Z48M are echoed back to the terminal. Press SW3 to move to the next mode.

## 7 SLCD

Jumpers J7 and J13 must be open (LEDs D3, D4 pins are shared with sLCD pins). Connect TWRPI-SLCD daughter board. The text “LCd” is blinking. Press SW3 to move to the next mode.

## 8 RTC

The LCD displays min:sec using RTC module. Press SW3 to move to the next mode.

## 9 ADC

Move the potentiometer, and the 8-bit ADC data are displayed on the LCD. Press SW3 to move to the next mode.

## 10 TPM/PWM

Move the potentiometer again, and LEDs D5 and D7 change the brightness in opposite meaning. Press SW3 to move to the next mode.

## 11 Low Power

Press SW2 to enter VLLS1 mode for 10s. After 10s, the MCU will wake up (from VLLS1 mode) and revert back to its original mode. For current measurement, J17 can be used. Press SW3 to roll over the modes again.

## 12 Explore Further

Explore Kinetis KL43 MCU ultra-low-power modes and USB communication by conducting the additional labs located at [freescale.com/TWR-KL43Z48M](http://freescale.com/TWR-KL43Z48M).

## TWR-KL43Z48M Jumper Options

The following is a list of all the jumper options. The default installed jumper settings are indicated by white text within the gray boxes or bold text in the “Signal” column.

Jumper	Position	Signal	KL43 Pin Name
J25	Open	BOARD POWER SELECTOR	
J28	1-2	<b>1-2 P5V_TRG_USB</b> 2-3 VBUS_ELEV	
J12	1-2	MCU_POWER	
J1	1-2	<b>Reset</b> 1-2 RESET_B 2-3 RST_TGTMCU_B	
J35	1-2	V_BRD Voltage Selection <b>1-2 3.3V</b> 2-3 1.8V	VREF
J38	Open	1-2 VREF to VDDA	
J17	1-2	V_BRD to MCU_POWER	
J10	1-2	VDDA_HDR to MCU_POWER enable	
J36	Open	VLL3 to VDD enable	VLL3
J11	Open	VOUT_3V3 to MCU_POWER	
J16	1-2	VREG_IN Selector <b>1-2 P5V_TRG_USB</b>	P5V_VREGIN_KL43
J19	Open	2-3 VBUS_ELEV	

## TWR-KL43Z48M Jumper Options (cont.)

Jumper	Position	Signal	KL43 Pin Name
J23	1-2	LED Green	PTA12
J18	1-2	LED Red	PTA13
J13	1-2	LED Green	PTB0
J7	1-2	LED Red	PTB19
J30	1-2 OFF	IR (Tx)	PTE20
J27	1-2 OFF	IR (Rx)	PTE21
J26	1-2	Accelerometer SCL Enable	PTE1 I2C1_SCL
J29	1-2	Accelerometer SDA Enable	PTE0 I2C1_SDA
J32	1-2	Accelerometer INT1 Enable	PTD6/ACC_INT1
J34	Open	Accelerometer INT2 Enable	PTD7/ACC_INT2
J3	2-3	2-3 UART2 Tx- OpenSDA 2-1 UART2 Tx Elevator	PTE22
J5	2-3	2-3 UART2 Rx- OpenSDA 2-1 UART2 Rx- Elevator	PTE23
J2	1-2	Potentiometer Enable	PTE29/POT_ADC0_SE4B



## TWR-KL43Z48M Jumper Options (cont.)

Jumper Function	Jumper	Default Position	Jumper Option	KL43 Pin Name
Reset Selection	J1	1-2	1-2 RESET_B 2-3 RST_TGTMCU_B	
RTC clock input	J31	1-2	1-2 RTC_CLKIN 2-3 ELEV_IRQ_C	PTC1
Switch button SW2	J24	1-2	Open - PTA4 isolated	PTA4
Switch button SW3	J33	1-2	Open - PTA5 isolated	PTA5
LED D7	J23	1-2	Open - LED Green PTA12 isolated	PTA12
LED D5	J18	1-2	Open - LED Red PTA13 isolated	PTA13
LED D4	J13	1-2	Open - LED Green PTB0 isolated	PTB0
LED D3	J7	1-2	Open - LED Red PTB19 isolated	PTB19
IRDA TX isolation	J30	Open	1-2 PTE20 to IRDA (Tx)	PTE20
IRDA RX isolation	J27	Open	1-2 TPE21 to IRDA (Rx)	PTE21
Accelerometer SCL isolation	J26	Open	1-2 PTE1 to ACCEL SCL Enable	PTE1 I2C1_SCL
Accelerometer SDA isolation	J29	Open	1-2 PTE0 to ACCEL SDA Enable	PTE0 I2C1_SDA

## TWR-KL43Z48M Jumper Options (cont.)

Jumper Function	Jumper	Default Position	Jumper Option	KL43 Pin Name
Accelerometer INT1 isolation	J32	Open	1-2 PTD6 to ACCEL INT1 Enable	PTD6/ACC_INT1
Accelerometer INT2 isolation	J34	Open	1-2 PTD7 to ACCEL INT2 Enable	PTD7/ACC_INT2
Accelerometer reset	J37	Open	1-2 ACCEL RST to P3V3_REG enable	
UART2 TX selection	J3	2-3	2-3 UART2 Tx- OpenSDA 2-1 UART2 Tx Elevator	PTE22
UART2 RX selection	J5	2-3	2-3 UART2 Rx- OpenSDA 2-1 UART2 Rx- Elevator	PTE23
Potentiometer isolation	J2	1-2	Open - PTE20 isolated from potentiometer	PTE29/POT_ADC0_SE4B



## Get Started

Download installation software and documentation under

**“Jump Start Your Design”** at [freescale.com/TWR-KL43Z48M](http://freescale.com/TWR-KL43Z48M).

## Expanded Software and Tools Now Available for Kinetis MCUs

Additional details regarding the Quick Start Demo are included as part of the Kinetis software development kit (SDK).

To take your design to the next level, leverage the Kinetis SDK and other online enablement software and tools for Kinetis MCUs, available for download at the relevant links listed here.

- Kinetis software development kit at [freescale.com/ksdk](http://freescale.com/ksdk)
- MQX™ RTOS at [freescale.com/mqx](http://freescale.com/mqx)
- Kinetis Design Studio IDE at [freescale.com/kds](http://freescale.com/kds)
- Bootloader for Kinetis MCUs at [freescale.com/kboot](http://freescale.com/kboot)



## Support

Visit [freescale.com/support](http://freescale.com/support) for a list of phone numbers within your region.

## Warranty

Visit [freescale.com/warranty](http://freescale.com/warranty) for complete warranty information.

For more information, visit

[freescale.com/TWR-KL43Z48M](http://freescale.com/TWR-KL43Z48M),  
[freescale.com/Kinetis](http://freescale.com/Kinetis) or [freescale.com/Tower](http://freescale.com/Tower)

Join the online Tower community at [towergeeks.org](http://towergeeks.org)

Freescale, the Freescale logo, and Kinetis are trademarks of Freescale Semiconductor, Inc., Reg. U.S. Pat. & Tm. Off. Tower is a trademark of Freescale Semiconductor, Inc. All other product or service names are the property of their respective owners. ARM and Cortex are registered trademarks of ARM Limited. © 2012–2014 Freescale Semiconductor, Inc.

