



# Quick Start Guide

**TWR-KL46Z48M**

Development Kit for Kinetis  
KL46/36/34/26/16 MCU Families



Energy  
Efficient Solutions  
optimized for low power



**TOWER SYSTEM**

# Step-by-Step Installation Instructions

In this quick start guide, you will learn how to set up the TWR-KL46Z48M module and run the included demonstrated software. For more detailed information, review the user manual at [freescale.com/TWR-KL46Z48M](http://freescale.com/TWR-KL46Z48M).

1

## Download Software and Tools

Download installation software and documentation under

**“Jump Start Your Design”**

at [freescale.com/TWR-KL46Z48M](http://freescale.com/TWR-KL46Z48M).



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 mini-B connector on the TWR-KL46Z48M module. Allow the PC to automatically configure the USB drivers if needed.

4

## Segment LCD

All segments are turned on for three seconds, then potentiometer readings are displayed.

5

## Touch Electrodes

When board is picked up, the four LEDs will toggle in the direction of the inclination. Toggling frequency will increase as the tilt angle increases.

6

## Move the Potentiometer

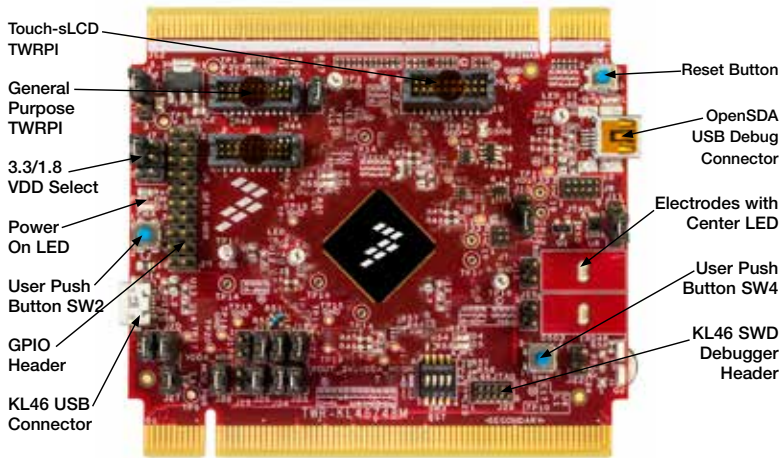
The TWRPI-SLCD shows the ADC reading.

7

## Explore Further

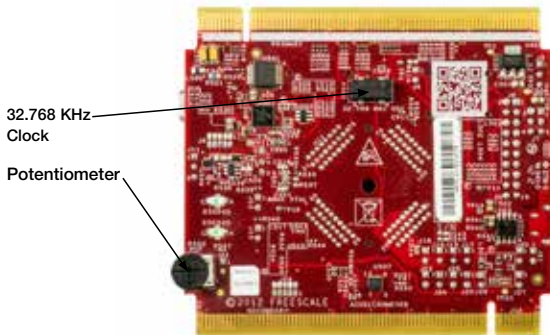
Explore Kinetis KL46 MCU ultra-low-power modes and USB communication by conducting the additional labs located at [freescale.com/TWR-KL46Z48M](http://freescale.com/TWR-KL46Z48M).

# Get to Know the TWR-KL46Z48M



**Figure 1:** Front side of TWR-KL46Z48M module  
(TWRPI device not attached)

# Get to Know the TWR-KL46Z48M (continued)



**Figure 2:** Back side of TWR-KL46Z48M module



## TWR-KL46Z48M Freescal Tower System

The TWR-KL46Z48M MCU module is designed to work either in standalone mode or as part of the Freescal 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 [freescal.com/Tower](http://freescal.com/Tower) for additional Tower System MCU modules and compatible peripherals.

# TWR-KL46Z48M Features

- Tower System-compatible MCU module
- MKL46Z256VLL4 MCU (48 MHz, 256 KB flash, 32 KB RAM, low power, sLCD controller, 100 LQFP package)
- Segment LCD module (TWRPI-SLCD)
- Dual role USB interface with Micro-AB USB connector
- Touch Tower plug-in socket
- General-purpose Tower plug-in (TWRPI) socket
- On-board debug circuit MK20D50 OpenSDA with virtual serial port
- Three axis accelerometer (MMA8451Q)
- Four (4) user-controllable LEDs
- Two (2) capacitive touch pads
- Two (2) user push buttons switch
- Infrared transmit and receive
- Potentiometer
- General-purpose pin header to directly access MCU signals

## Tools

- Freescale CodeWarrior Development Studio for Microcontrollers V10.4 (CW-MCU10)
- IAR EWARM V6.50.6 or higher
- Processor Expert with MQX™ Lite integration available for CodeWarrior or a standalone for integrating generated code into other IDEs

## TWR-KL46Z48M Jumper Options

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

| Jumper | Position | Signal   | KL46 Pin Name  |
|--------|----------|--|----------------|
| J3     | 1-2      | BOARD POWER<br>SELECTOR<br><b>1-2 P5V_TRG_USB</b><br>2-3 VBUS_ELEV |                |
| J19    | 1-2      | MCU_POWER  |                |
| J4     | 1-2      | <b>Reset</b><br>1-2 RESET_B<br>2-3 RST_TGTMCU_B                    |                |
| J7     | 1-3      | V_BRD Voltage Selection<br><b>1-3 3.3V</b><br>3-5 1.8V             |                |
| J27    | 1-2      | V_BRD to MCU_POWER   |                |
| J28    | 1-2      | VDDA_HDR to MCU_POWER<br>enable                                    |                |
| J17    | Open     | VLL3 to VDD enable   | VLL3           |
| J16    | Open     | VOUT_3V3 to MCU_POWER  |                |
| J18    | 1-2      | VREG_IN Selector<br><b>1-2 P5V_KL46_USB</b><br>2-3 VBUS_ELEV       | P5V_KL46_USB_L |

| Jumper | Position | Signal  | KL46 Pin Name                        |
|--------|----------|---|--------------------------------------|
| J21    | 1-2      | KL46_USB_FLGA                                   | PTE31/FTM0_CH4                       |
| J20    | 1-2      | KL46_USB_ENABLE                                 | PTB11/SPI1_SCK                       |
| SW3    | 1-8 ON   | LED Green                                       | PTA17                                |
| SW3    | 7-2 ON   | LED Red   | PTB8                                 |
| J13    | 1-2      | LED Orange                                      | PTE26/TPM0_CH5                       |
| J15    | 1-2      | LED Yellow                                      | PTA16                                |
| SW3    | 6-3 OFF  | IR (Tx)   | PTE22                                |
| SW3    | 5-4 OFF  | IR (Rx)   | PTE23                                |
| J24    | 1-2      | Accelerometer SCL Enable                        | PTC10 I2C1_SCL                       |
| J26    | 1-2      | Accelerometer SDA Enable                        | PTC11 I2C1_SDA                       |
| J23    | Open     | Accelerometer INT1 Enable                       | PTC5/LLWU_P9/SPI0_SCK/<br>CMPO_OUT   |
| J25    | Open     | Accelerometer INT2 Enable                       | PTC6/LLWU_P10/EXTRG_IN/<br>SPI0_MISO |
| J10    | 2-3      | 2-3 UART2 Tx- OpenSDA<br>2-1 UART2 Tx Elevator  | PTE16                                |
| J11    | 2-3      | 2-3 UART2 Rx- OpenSDA<br>2-1 UART2 Rx- Elevator | PTE17                                |
| J22    | 1-2      | Potentiometer Enable                            | PTE29/ADC0_SE4B                      |



## Get Started

Download installation software and documentation under  
“**Jump Start Your Design**” at **[freescale.com/TWR-KL46Z48M](http://freescale.com/TWR-KL46Z48M)**.

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

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