

Energy  
Efficient Solutions  
optimized for low power

## Quick Start Guide

**TWR-K60F120M**

High-Performance MCUs with  
Connectivity and Security



**TOWER SYSTEM**

## Get to Know the TWR-K60F120M

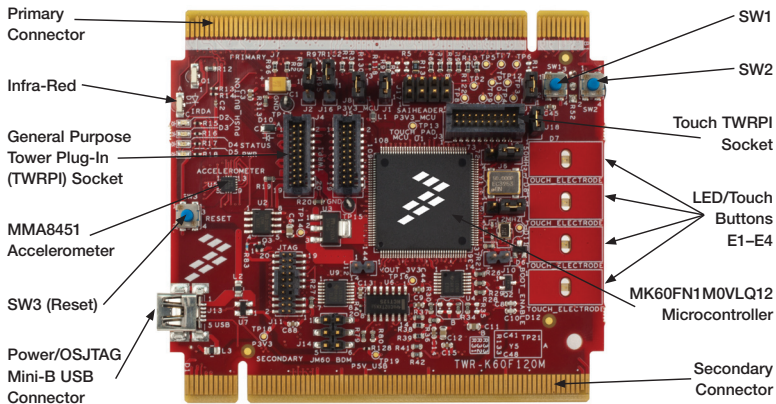
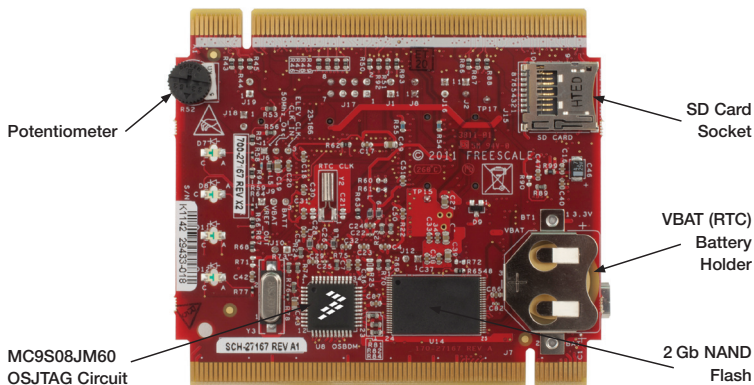


Figure 1: Front side of TWR-K60F120M module (TWRPI devices not shown).



**Figure 2:** Back side of TWR-K60F120M module.



## TWR-K60F120M

### Freescale Tower System

The TWR-K60F120M module is part of the Freescale Tower System, a modular development platform that enables rapid prototyping and tool re-use through reconfigurable hardware. The TWR-K60F120M can be used with a broad selection of Tower System peripheral modules.

## TWR-K60F120M Features

- MK60FN1M0VLQ12 MCU (120 MHz ARM® Cortex™-M4 core, floating point unit, 1 MB flash, Ethernet, USB OTG, tamper detection, encryption, NAND flash controller, 144 LQFP)
- MC9S08JM60 open source JTAG (OSJTAG) circuit
- Micron MT29F2G16ABAEAWP 2 Gb NAND flash
- Four user-controlled status LEDs
- Four capacitive touch pads and two mechanical push buttons
- General-purpose TWRPI socket (Tower plug-in module)
- TWRPI-TOUCH-STR socket (touch-sensing Tower plug-in)

## Step-by-Step Installation Instructions

### 1 Install the Software and Tools

Install the P&E Micro Kinetis Tower Toolkit. The Toolkit includes the OSJTAG and USB-to-serial drivers. These can be found on the DVD under Software.

### 2 Configure the Hardware

Install the included battery into the VBAT (RTC) battery holder. Then, connect one end of the USB cable to the PC and the other end to the power/OSJTAG mini-B connector on the TWR-K60F120M module. Allow the PC to automatically configure the USB drivers if needed.

### 3 Tilt the Board

Tilt the board side to side to see the LEDs on E1–E4 light up as it is tilted. While the board is held flat, touch the pads on E1–E4 to toggle the LEDs.

### 4 Play the Memory Game

Press SW2 to play a memory recall game using the touch pads E1–E4. A sequence will light up, then press the touch pads in the order flashed. If an incorrect sequence is touched or too much time has elapsed, the LEDs will blink rapidly and the game will reset.

Press SW1 to return to the accelerometer demo.

## 5 Download the TWR-K60F120M User Manual and Demonstration Labs

Go to [freescale.com/TWR-K60F120M](http://freescale.com/TWR-K60F120M) and download the TWR-K60F120M user manual and demonstration labs.

## 6 Download the Freescale CodeWarrior IDE and MQX™ RTOS

Download the Freescale CodeWarrior IDE and MQX RTOS by clicking on the relevant links on the Software tab of the Tower Kit DVD.

## TWR-K60F120M Jumper Options

The following is a list of all jumper options. The default installed jumper settings are shown in white text within the red boxes.

Jumper	Option	Setting	Description
J8	MCU Power Connection	ON	Connect on-board 3.3V supply to MCU
		OFF	Isolate MCU from power (connect an ammeter to measure current)
J9	VBAT Power Selection	1-2	Connect VBAT to on-board 3.3V supply
		2-3	Connect VBAT to the higher voltage between on-board 3.3V supply or coin-cell supply
J10	OSJTAG Bootloader Selection	ON	OSJTAG bootloader mode (OSJTAG firmware reprogramming)
		OFF	Debugger mode

## TWR-K60F120M Jumper Options (continued)

Jumper	Option	Setting	Description
J18	50 MHz Oscillator Power	<b>ON</b>	ON = on-board 50 MHz oscillator powered
		OFF	OFF = on-board 50 MHz oscillator not powered*
J6	Oscillator output enable	<b>OFF</b>	50 MHz oscillator output enabled
		ON	50 MHz oscillator output disabled
J12	JTAG Board Power Connection	ON	Connect on-board 5V supply to JTAG port (supports powering board from JTAG pod supporting 5V supply output)
		<b>OFF</b>	Disconnect on-board 5V supply to JTAG port
J2	IR Transmitter Connection	ON	Connect PTD7/CMT_IRO to IR transmitter (D507)
		<b>OFF</b>	Disconnect PTD7/CMT_IRO from IR transmitter (D507)
J16	IR Receiver Connection	ON	Connect PTC6/CMP0_IN0 to IR receiver
		<b>OFF</b>	Disconnect DAC1_OUT/CMP2_IN3 from IR receiver
J1	VREGIN Power Connection	<b>ON</b>	Connect USB0_VBUS from elevator to VREGIN
		OFF	Disconnect USB0_VBUS from elevator to VREGIN
J19	Potentiometer connection	<b>ON</b>	Connect ADC_DM1 to potentiometer
		OFF	Disconnect ADC_DM1 from potentiometer

\*NOTE: This option must be selected whenever a Tower System module card that provides a clock on primary elevator pin B24 is connected to the CPU module.



## Quick Start Guide

Visit [freescale.com/TWR-K60F120M](http://freescale.com/TWR-K60F120M), [freescale.com/K60](http://freescale.com/K60) or [freescale.com/Kinetis](http://freescale.com/Kinetis) for information on the TWR-K60F120M module, including:

- TWR-K60F120M user guide
- TWR-K60F120M schematics
- Tower System fact sheet

## 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)

Freescale, the Freescale logo and the Energy Efficient Solutions logo are trademarks of Freescale semiconductor, Inc., Reg. U.S. Pat. & Tm. Off. Kinetis is a trademark of Freescale Semiconductor, Inc. ARM is a registered trademark of ARM Limited. Cortex-M4 is a trademark of ARM Limited. All other product or service names are the property of their respective owners. © 2012 Freescale Semiconductor, Inc.

Doc Number: TWRK60F120MQSG REV 1  
Agile Number: 926-78653 REV C

