freescale™

Kinetis

TWR-K60F120M
Quick Start Guide

High-Performance MCUs with
Connectivity and Security

Tower System
Development Board
Platform

Energy
Efficient Solutions
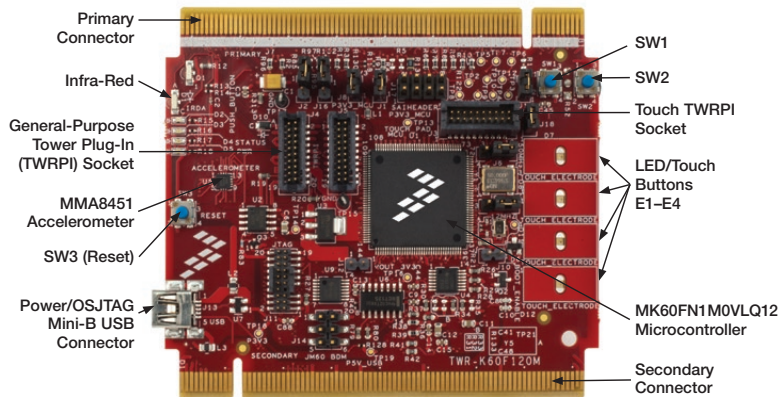by Freescale

Get to Know the TWR-K60F120M Board

Primary Connector

Infra-Red

General-Purpose Tower Plug-In (TWRPI) Socket

MMA8451 Accelerometer

SW3 (Reset)

Power/OSJTAG Mini-B USB Connector

SW1

SW2

Touch TWRPI Socket

LED/Touch Buttons E1–E4

MK60FN1M0VLQ12 Microcontroller

Secondary Connector

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

Potentiometer

MC9S08JM60 OSJTAG Circuit

SD Card Socket

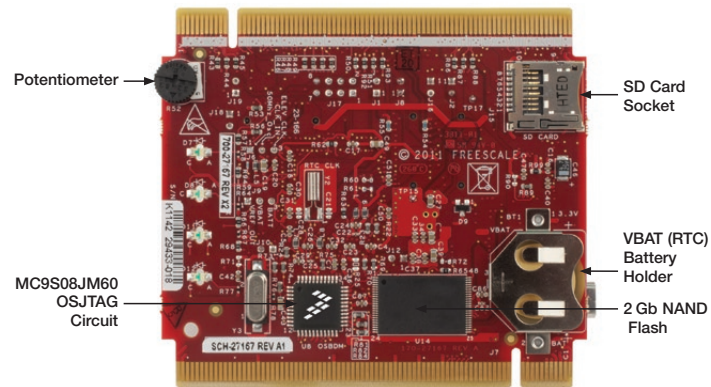VBAT (RTC) Battery Holder

2 Gb NAND Flash

Figure 2: Back side of TWR-K60F120M board

TWR-K60F120M Freescale Tower System Development Board Platform

The TWR-K60F120M board is part of the Freescale Tower System, a modular development board 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 boards.

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 touchpads and two mechanical pushbuttons
- 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 board. 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** 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 shaded boxes.

Jumper	Option	Setting	Description
J8	MCU Power Connection	ON	Connect onboard 3.3 V supply to MCU
		OFF	Isolate MCU from power (connect an ammeter to measure current)
J9	VBAT Power Selection	1-2	Connect VBAT to onboard 3.3 V supply
		2-3	Connect VBAT to the higher voltage between on-board 3.3 V supply or coin-cell supply
J10	OSJTAG Bootloader Selection	ON	OSJTAG bootloader mode (OSJTAG firmware reprogramming)
		OFF	Debugger mode
J18	50 MHz Oscillator Power	ON	ON = onboard 50 MHz oscillator powered
		OFF	OFF = onboard 50 MHz oscillator not powered*
J6	Oscillator output enable	OFF	50 MHz oscillator output enabled
		ON	50 MHz oscillator output disabled

*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.

Jumper	Option	Setting	Description
J12	JTAG Board Power Connection	ON	Connect onboard 5 V supply to JTAG port (supports powering board from JTAG pod supporting 5 V supply output)
		OFF	Disconnect onboard 5 V supply to JTAG port
J2	IR Transmitter Connection	ON	Connect PTD7/CMT_IRO to IR transmitter (D507)
		OFF	Disconnect PTD7/CMT_IRO from IR transmitter (D507)
J16	IR Receiver Connection	ON	Connect PTC6/CMP0_IN0 to IR receiver
		OFF	Disconnect DAC1_OUT/CMP2_IN3 from IR receiver
J1	VREGIN Power Connection	ON	Connect USB0_VBUS from elevator to VREGIN
		OFF	Disconnect USB0_VBUS from elevator to VREGIN
J19	Potentiometer connection	ON	Connect ADC_DM1 to potentiometer
		OFF	Disconnect ADC_DM1 from potentiometer

Visit **freescale.com/TWR-K60F120M**, **freescale.com/K60** or **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** for a list of phone numbers within your region.

Warranty

Visit **freescale.com/warranty** for complete warranty information.

For more information, visit freescale.com/Tower

Join the online Tower community at towergeeks.org