Energy Efficient Solutions optimized for low power

# Quick Start Guide

## TWR-K60F120M

High-Performance MCUs with Connectivity and Security

freescale™

TOWER SYSTEM

# Get to Know the TWR-K60F120M

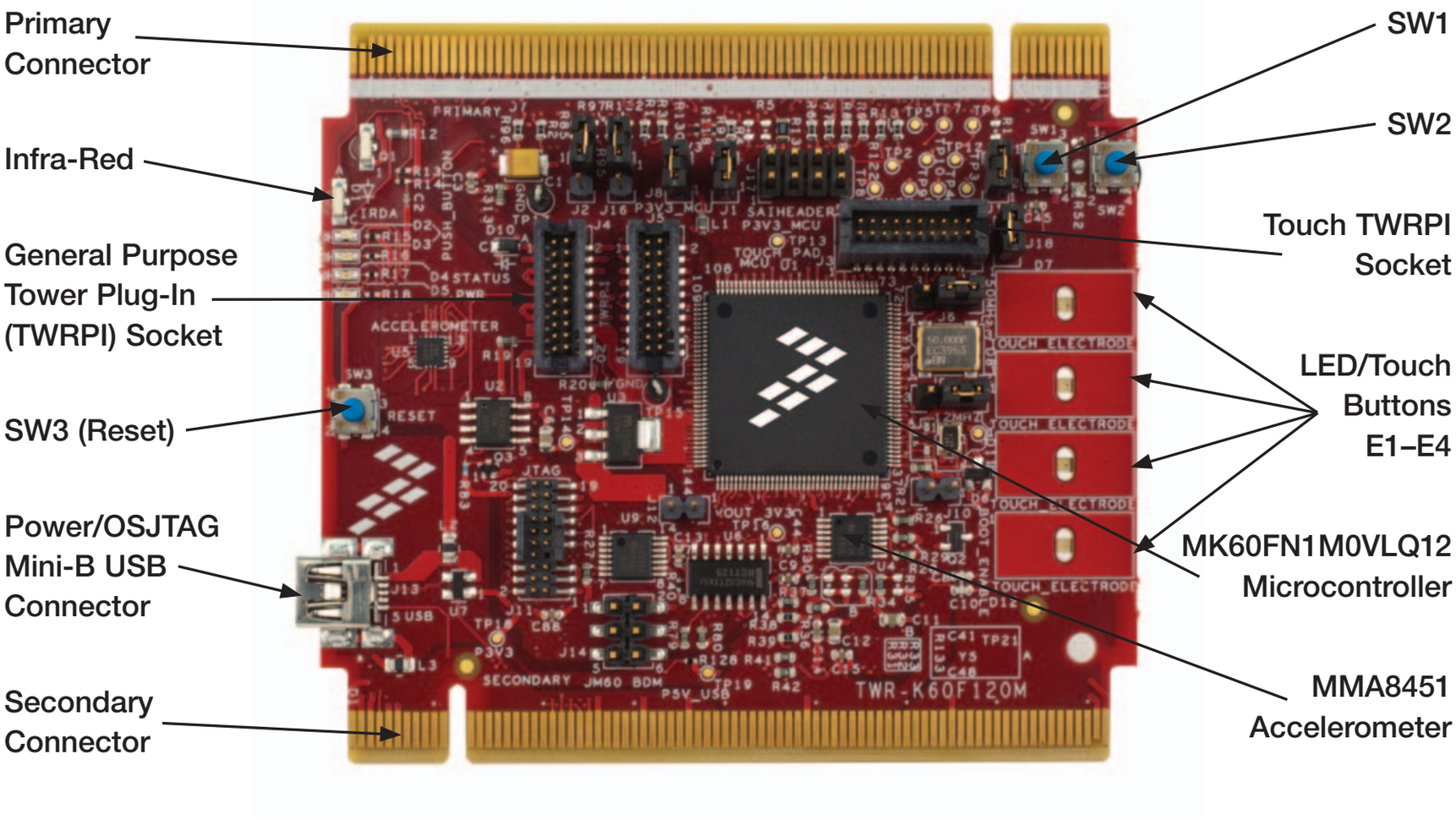



**Figure 1:** Front side of TWR-K60F120M module (TWRPI devices not shown).

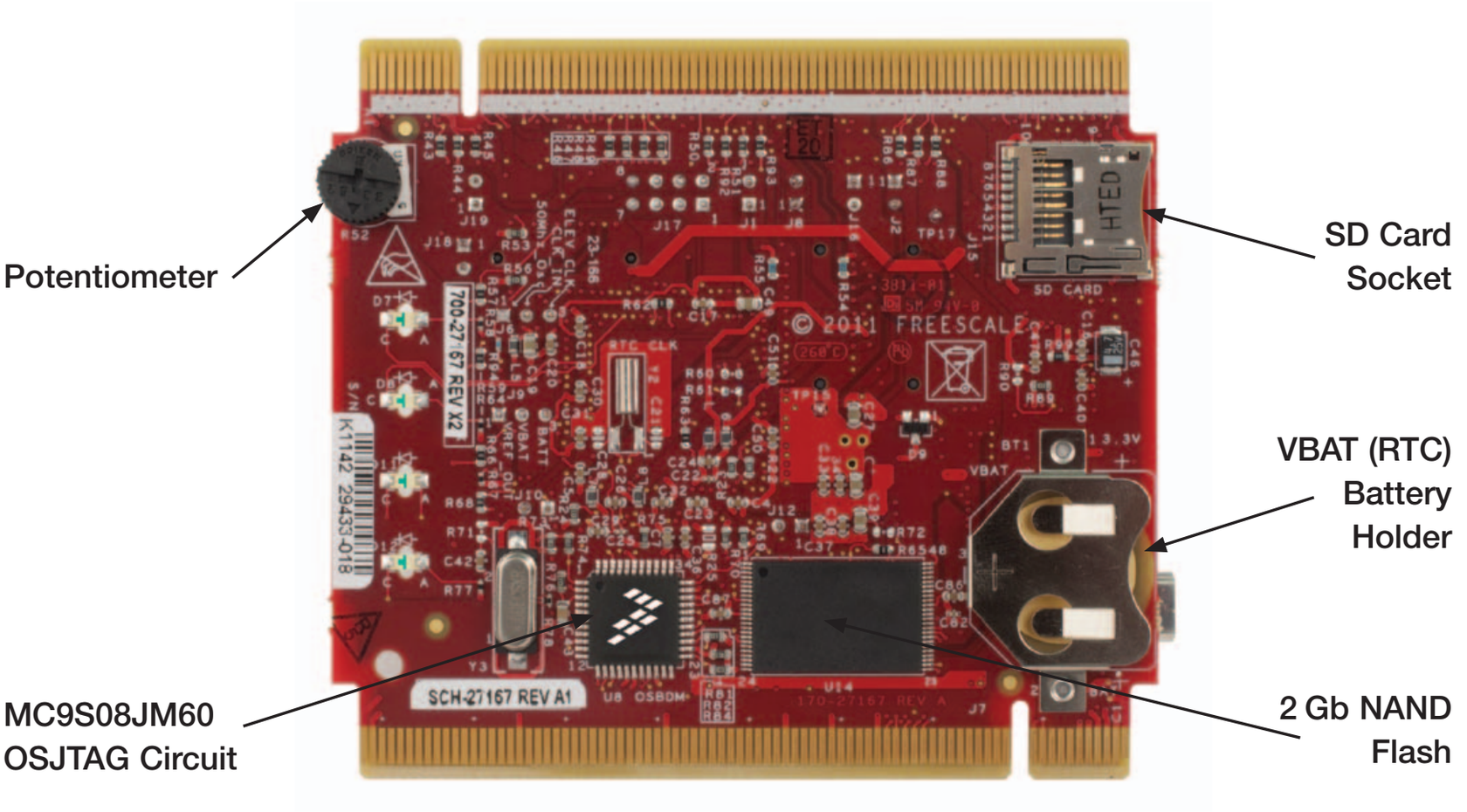
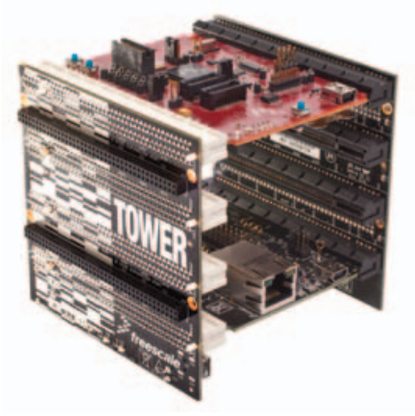



**Figure 2:** Back side of TWR-K60F120M module.




# 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** 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 |

# TWR-K60F120M Jumper Options (continued)

| Jumper | Option | Setting | Description |
|---|---|---|---|
| J10 | OSJTAG Bootloader Selection | ON | OSJTAG bootloader mode (OSJTAG firmware reprogramming) |
| | | **OFF** | Debugger mode |
| J18 | 50 MHz clock disable | **ON** | ON = on-board 50 MHz oscillator is powered and sources an input clock to the processor |
| | | OFF | OFF = on-board 50 MHz oscillator is not powered* |
| J12 | JTAG Board Power Connection | ON | Connect on-board 5V supply to JTAG port (supports powering board from JTAG pod supporting 5V supply output) |
| | | **OFF** | Disconnect on-board 5V 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 |

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

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**



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Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
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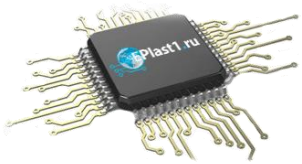
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.




**Как с нами связаться**

**Телефон:** 8 (812) 309 58 32 (многоканальный)
**Факс:** 8 (812) 320-02-42
**Электронная почта:** org@eplast1.ru
**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.