TWR-K21D50M Quick Start Guide

Low-Power 32-bit ARM® Cortex®-M4 MCUs with High-Precision Analog, Connectivity and Security

Tower System Development Board Platform

Get to Know the TWR-K21D50M Board

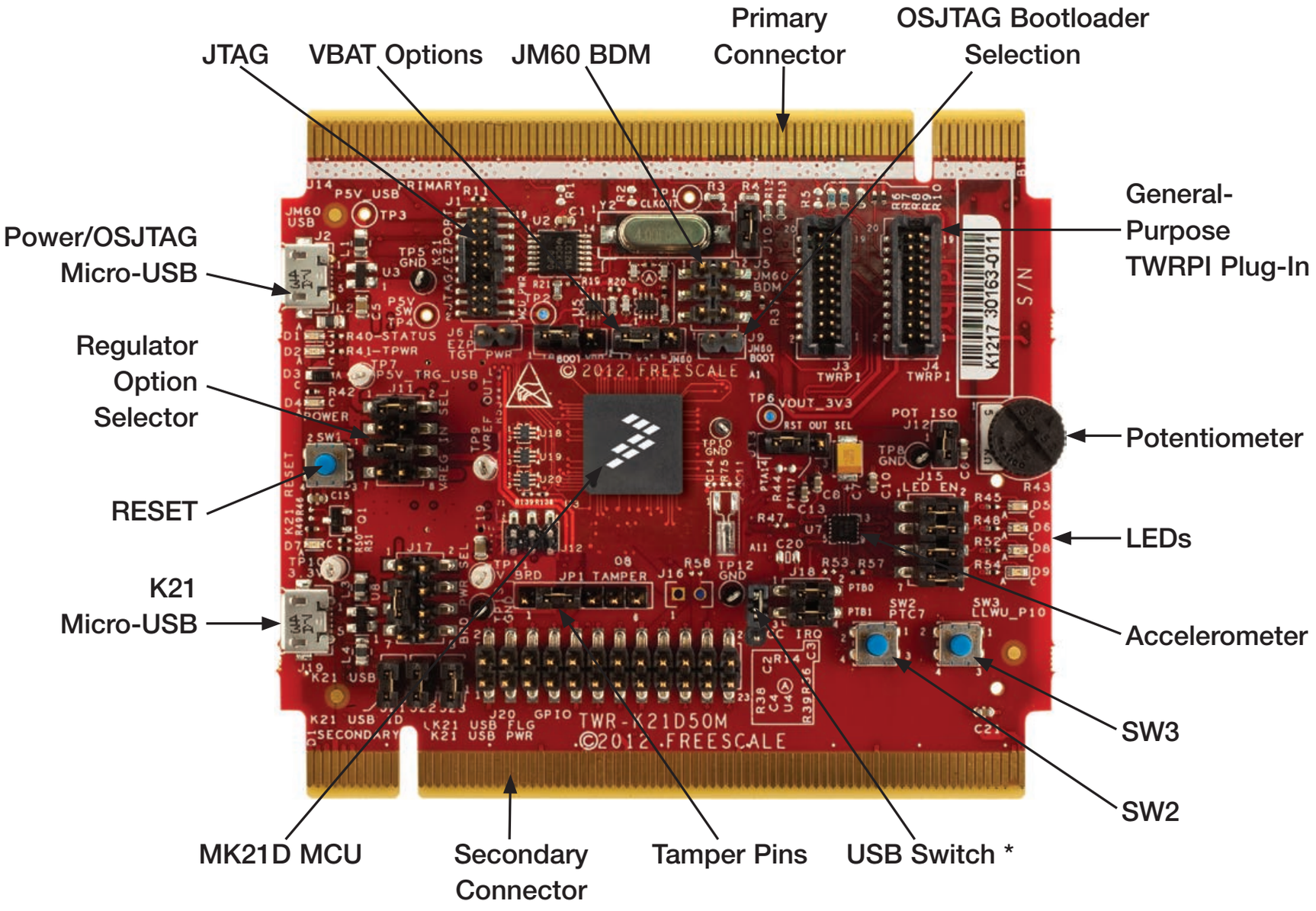
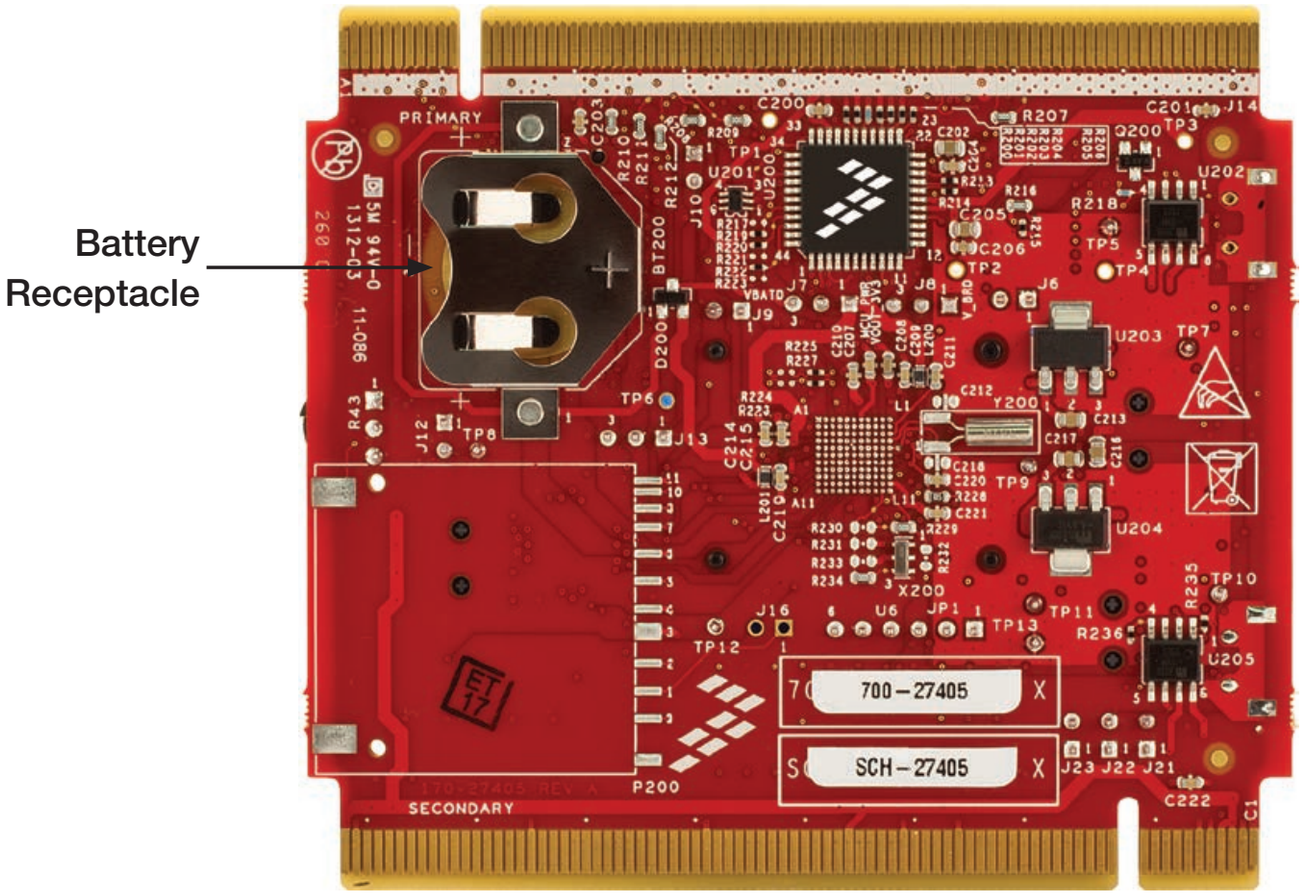


Figure 1: Front side of TWR-K21D50M module (TWRPI devices not shown).



TWR-K21D50M

Freescale Tower System

The TWR-K21D50M MCU module is designed to work either in stand-alone mode or as part of the Freescale Tower System, a modular development platform that enables rapid prototyping and tool re-use through reconfigurable hardware. Begin constructing your Tower System today by visiting **freescale.com/Tower** for additional Tower System MCU modules and compatible peripherals.

TWR-K21D50M Features

- MK21D MCU: MK21DN512AVMC5 or MK21DN512VMC5 (50 MHz, 512 KB Flash, 64 KB RAM, USB OTG, tamper detection, encryption, low power, 121 MAPBGA); part number will depend on the Tower board revision
- Dual-role USB interface with Micro-AB USB connector
- On-board open source JTAG (OSJTAG) circuit with virtual serial port
- General-purpose Tower plug-in (TWRPI) socket
- Three-axis accelerometer (MMA8451Q)
- Four user-controlled status LEDs
- Push buttons for GPIO interrupts and MCU reset
- Potentiometer
- Independent, battery-operated power supply for real-time clock and tamper detection modules

Step-by-Step Installation Instructions

In this quick start guide, you will learn how to set up the TWR-K21D50M module and run the included demonstrated software. For more detailed information, review the user manual at **freescale.com/TWR-K21D50M**.

1 Download Software and Tools

Download installation software and documentation under **"Jump Start Your Design"** at **freescale.com/TWR-K21D50M**.

2 Install the Software and Tools

Install the P&E Micro Kinetis Tower toolkit. The toolkit includes the OSJTAG and USB to serial drivers.

3 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 micro-B connector on the TWR-K21D50M module. Allow the PC to automatically configure the USB drivers if needed.

4 Download the TWR-K21D50M User Manual and Demonstration Labs

Download the TWR-K21D50M user manual and demonstration labs at **freescale.com/TWR-K21D50M**.

5 Download the Freescale CodeWarrior IDE and MQX™ RTOS

Download the Freescale CodeWarrior IDE and MQX RTOS by clicking the relevant links at **freescale.com/CodeWarrior** and **freescale.com/MQX**.

D50M 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.

Jumper	Option	Setting	Description
JP1	Tamper Connections	**2-3**	JP1-1 through JP1-6 are connected to the MCU Tamper pins TAMPER0 through TAMPER5, respectively, for active tamper detection
J6	JTAG Board Power Selection	ON	Connect OSJTAG 5 V output (P5V_TRG_USB) to JTAG port (supports powering board from JTAG pod supporting 5 V supply output)
		OFF	Disconnect OSJTAG 5 V output (P5V_TRG_USB) from JTAG port
J7	VBAT Power Source	**1-2**	Connect VBAT to on-board 3.3 V or 1.8 V supply
		2-3	Connect VBAT to the higher voltage between MCU supply (MCU_PWR) or coin cell supply (VBATD)
J8	MCU Power Connection	**1-2**	Connect on-board 3.3 V or 1.8 V supply (V_BRD) to MCU VDD
		2-3	Connect K21 USB regulator output to MCU VDD
J9	OSJTAG Bootloader Selection	ON	OSJTAG bootloader mode (OSJTAG firmware reprogramming)
		OFF	Debugger mode
J10	General Purpose TWRPI V_BRD Power Enable	**ON**	Connect on-board 1.8 V or 3.3 V supply (V_BRD) to TWRPI 3-V power (GPT_VBRD)
		OFF	Disconnect from-board 1.8 V or 3.3 V supply (V_BRD) to TWRPI 3-V power (GPT_VBRD)
J11	VREG IN Selector	**1-2**	OSJTAG 5V output (P5V_TRG_USB) connected to on-board regulator input (VREG_IN)
		5-6	VBUS signal on micro-USB connector J19 connects to K21_VREGIN to allow stand-alone USB operation
		6-8	VBUS signal from Tower Elevator connector connects to K21_VREGIN to allow USB operation with complete Tower System
J12	Potentiometer Connection	**ON**	Connect potentiometer to ADC0_SE12
		OFF	Disconnect potentiometer from ADC0_SE12
J13	GPIO RESET_OUT_B Connection	**1-2**	Connect PTA14 to RESET_OUT_B signal
		2-3	Connect PTA17 to RESET_OUT_B signal
		OFF	Leave RESET_OUT_B signal disconnected

D50M Jumper Options (continued)

Jumper	Option	Setting	Description
J15	LED Connections	**1-2**	Connect PTD4 to green LED (D5)
		3-4	Connect PTD5 to yellow LED (D6)
		5-6	Connect PTD6 to red LED (D8)
		7-8	Connect PTD7 to blue LED (D9)
		OFF	Disconnect PTD[4:7] from associated LED
J17	V_BRD Power Source (Board Power Selector)	1-2	Connect K21 USB regulator output (VOUT_3V3) to on-board supply (V_BRD)
		3-5	Connect 3.3 V on-board regulator output (P3V3) to on-board supply (V_BRD)
		5-7	Connect 1.8 V on-board regulator output (P1V8) to on-board supply (V_BRD)
J18	Accelerometer IRQ Connection	**1-2**	Connect PTB0 to INT1 pin of accelerometer
		3-4	Connect PTB1to INT2 pin of accelerometer
		OFF	Disconnect PTB0 and/or PTB1 from INT1 and/or INT2 of accelerometer
J21	USB ID Connection	**ON**	Connect PTD7 to USB ID pin
		OFF	Disconnect PTD7 from USB ID pin
J22	USB Power Enable	**ON**	Connect PTC9 to USB power enable on power switch MIC2026
		OFF	Disconnect PTC9 from USB power enable on power switch MIC2026
J23	USB Over-Current Flag	**ON**	Connect PTC8 to over-current flag on power switch MIC2026
		OFF	Disconnect PTC8 from over-current flag on power switch MIC2026
J24	USB Switch *	**1-2**	USB micro J19
		2-3	USB mini J14 on TWR-SER

* Some versions of the board may not have this option

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Download installation software and documentation under **“Jump Start Your Design”** at **freescale.com/TWR-K21D50M**.

Visit **freescale.com/TWR-K21D50M, freescale.com/K20** or **freescale.com/Kinetis** for information on the TWR-K21D50M module.

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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