TWR-K21F120M
Quick Start Guide

Low-Power 32-bit ARM® Cortex®-M4
Core-Based MCUs with Floating Point Unit,
USB Connectivity and Enhanced Security

Tower System
Development Board
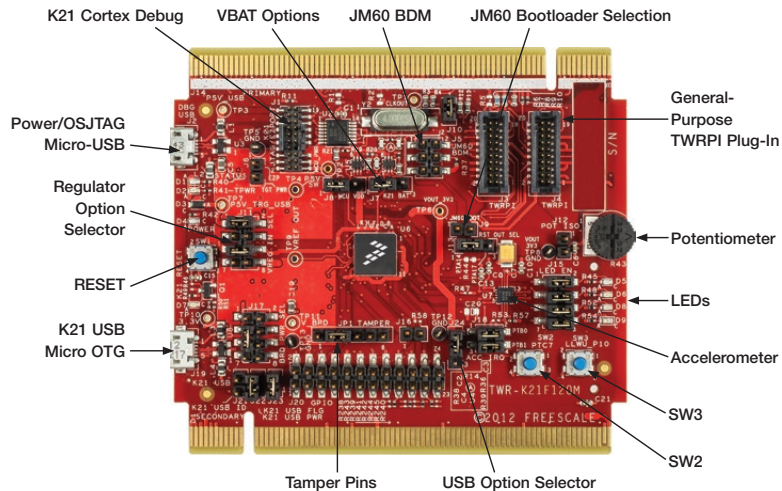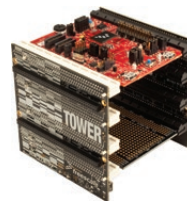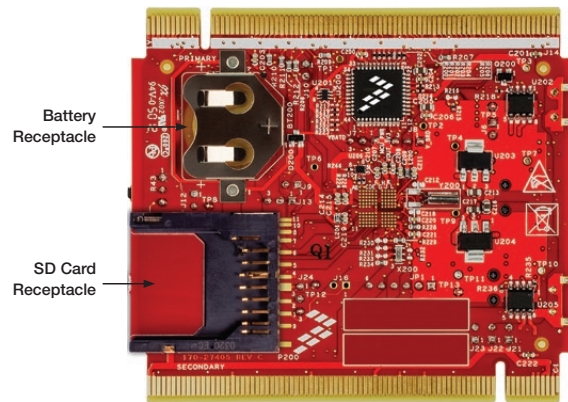Platform

Get to Know the TWR-K21F120M Board

K21 Cortex Debug   VBAT Options   JM60 BDM   JM60 Bootloader Selection

Power/OSJTAG
Micro-USB

Regulator
Option
Selector

RESET

K21 USB
Micro OTG

General-
Purpose
TWRPI Plug-In

Potentiometer

LEDs

Accelerometer

SW3

SW2

Tamper Pins   USB Option Selector

Figure 1: Front side of TWR-K21F120M

Battery
Receptacle

SD Card
Receptacle

TWR-K21F120M Freescale Tower System Development Board Platform

The TWR-K21F120M board is designed to work either in standalone mode or as part of the Freescale Tower System, a modular development board platform that enables rapid prototyping and tool re-use through reconfigurable hardware. Begin constructing your Tower System evaluation board platform today by visiting **freescale.com/Tower** for additional Tower System boards and compatible peripherals.

TWR-K21F120M Features

- MK21FN1M0VMC12 MCU (120 MHz, 1 MB flash, 128 KB RAM, FPU, USB OTG, tamper detection, encryption, low power, 121 MBGA)
- Dual-role USB interface with Micro-AB USB connector
- Onboard 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
- Pushbuttons for GPIO interrupts and MCU reset
- Potentiometer, SD card socket and coin cell battery holder
- 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-K21F120M board and run the included demonstration software. For more detailed information, review the user manual at **freescale.com/TWR-K21F120M**.

1 Download Software and Tools

Download installation software and documentation under **"Jump Start Your Design"** at **freescale.com/TWR-K21F120M**.

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 battery receptacle to power the RTC. Then use the provided USB cable to connect the PC to the Power/OSJTAG USB Micro-B connector (J2). Allow the PC to automatically configure the USB drivers if needed.

4 Tilt the Board

Tilt the board side to side to see the LEDs on D5, D6, D8 and D9 light up as it is tilted. While the board is held flat, press **SW2** and **SW3** to toggle LEDs D5 and D9, respectively.

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**.

F120M Jumper Options

The following is a list of all jumper options on the TWR-K21F120M. The default installed jumper settings are indicated in the shaded boxes.

Jumper	Option	Setting	Description
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 onboard 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 onboard 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 onboard 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 5 V output (P5V_TRG_USB) connected to onboard regulator input (VREG_IN)
		5-6	VBUS signal on micro-USB connector J19 connects to K21_VREGIN to allow standalone 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

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
J16	SDHC Card	OFF	10K pulldown resistor is disconnected from CD/DATA3 line
		ON	10K pulldown resistor is connected to CD/DATA3 line to allow card detection
J17	V_BRD Power Source (Board Power Selector)	1-2	Connect K21 USB regulator output (VOUT_3V3) to onboard supply (V_BRD)
		3-5	Connect 3.3 V onboard regulator output (P3V3) to onboard supply (V_BRD)
		5-7	Connect 1.8 V onboard regulator output (P1V8) to onboard supply (V_BRD)
J18	Accelerometer IRQ Connection	1-2	Connect PTB0 to INT1 pin of accelerometer
		3-4	Connect PTB1 to 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 overcurrent flag on power switch MIC2026
		OFF	Disconnect PTC8 from overcurrent flag on power switch MIC2026
J24	USB Connection	1-2	USB micro J19
		2-3	USB mini J14 on TWR-SER
JP1	Tamper Connections	2-3	JP1-1 through JP1-6 are connected to the MCU Tamper pins TAMPER0 through TAMPER5, respectively

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Download installation software and documentation under
"Jump Start Your Design" at **freescale.com/TWR-K21F120M**.

Visit **freescale.com/TWR-K21F120M**,
freescale.com/K20 or **freescale.com/Kinetis**
for more information on the TWR-K21F board.

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