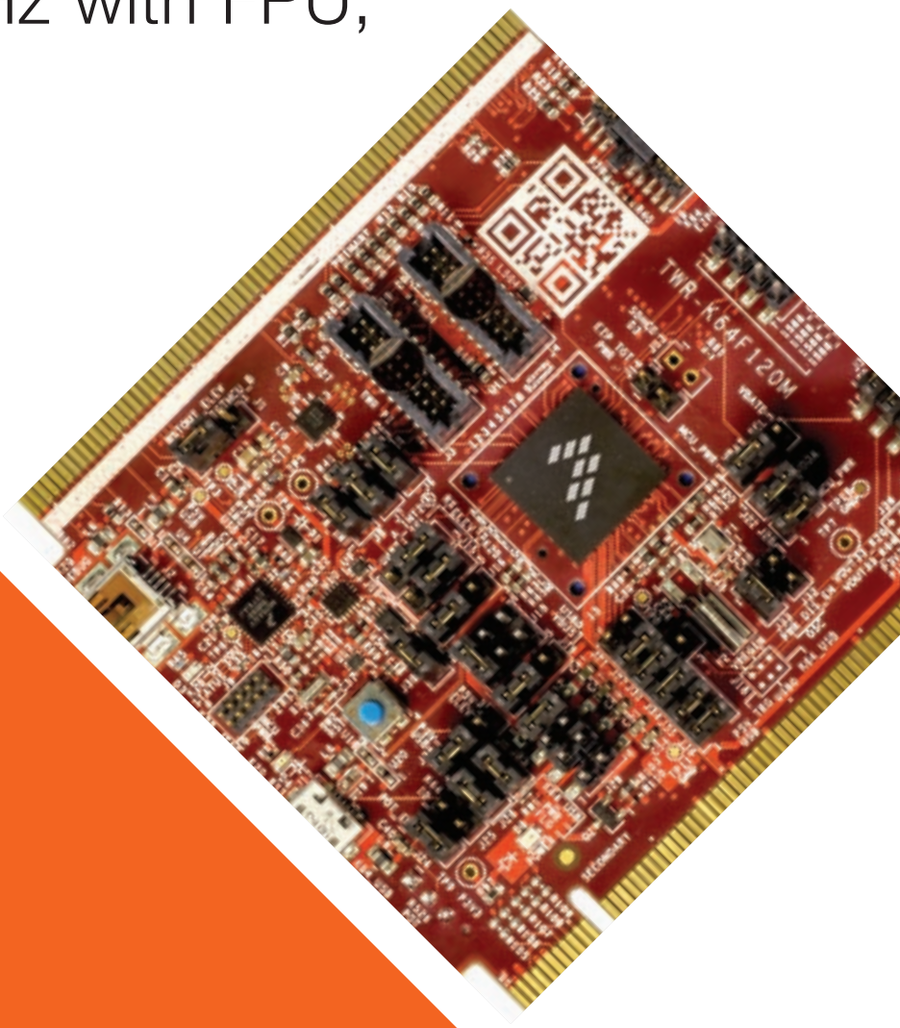
TWR-K64F120M Quick Start Guide

Low-power MCUs at 120 MHz with FPU, up to 1 MB Flash and up to 256 KB SRAM

Tower System Development Board Platform



Get to Know the K64F120M Board

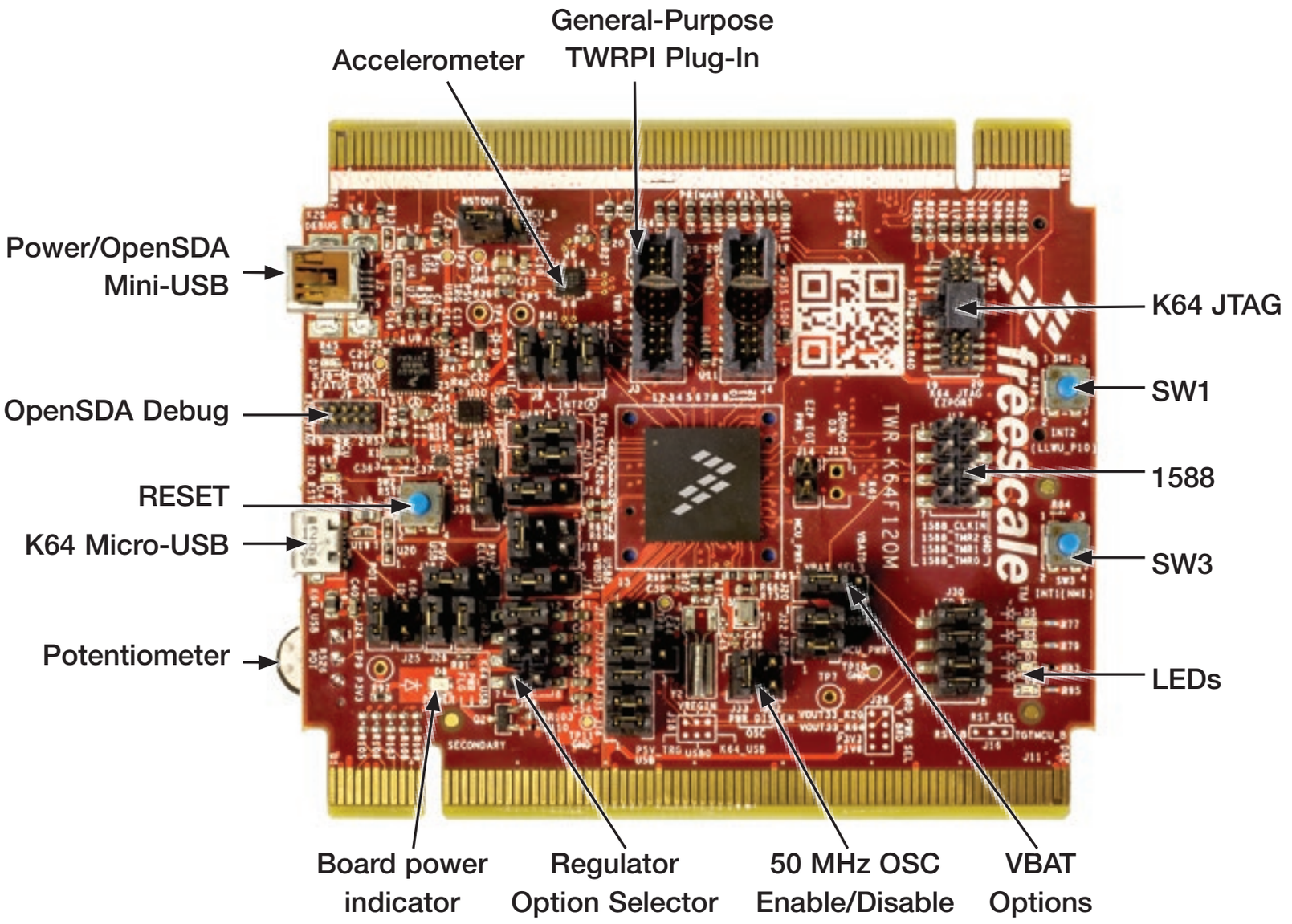
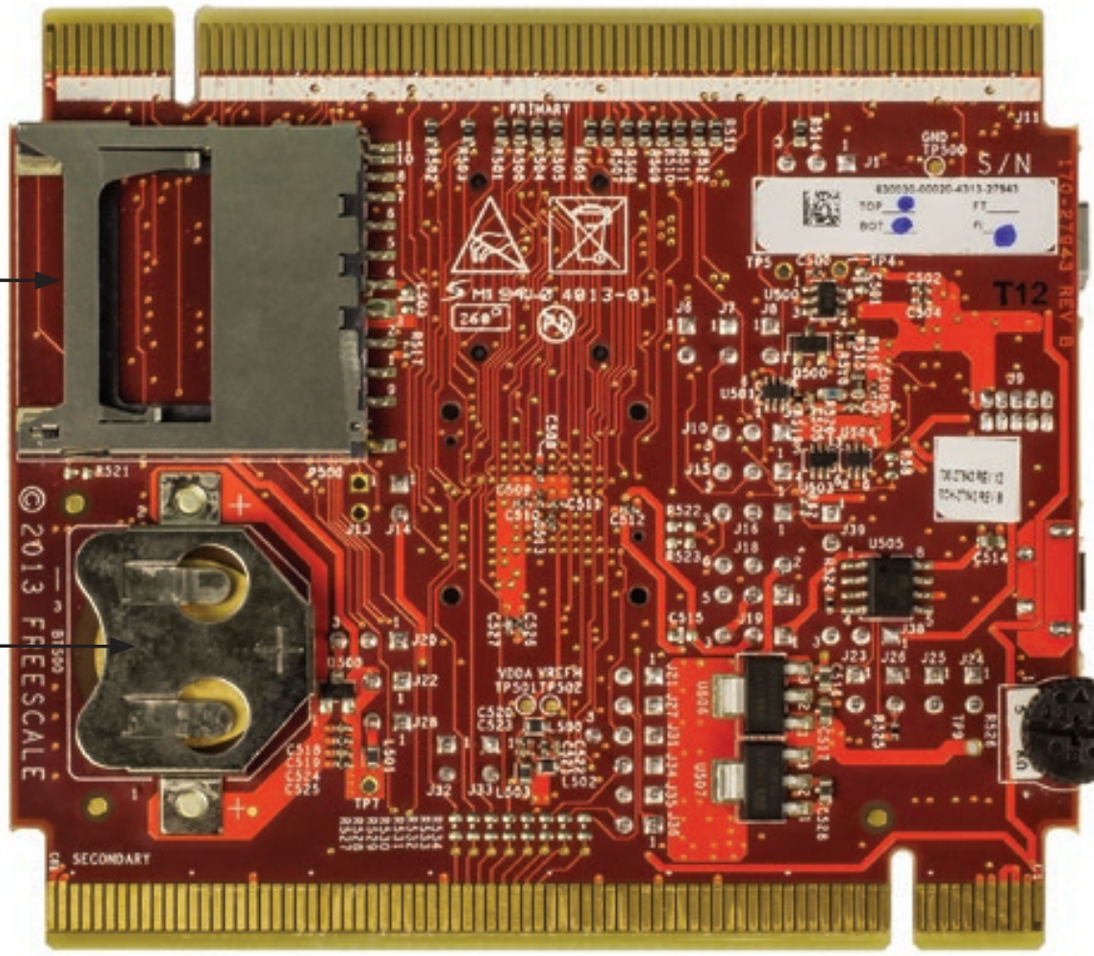


Figure 1: Front side of TWR-K64F120M





TWR-K64F120M Freescale Tower System Development Board Platform

The TWR-K64F120M 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 platform today by visiting **freescale.com/Tower** for additional Tower System boards and compatible peripherals.

TWR-K64F120M Features

- MK64FN1M0VMD12 (120 MHz, 1 MB Flash, 256 KB RAM, FPU, USB, encryption, low power, 144 MAPBGA)
- Dual-role USB interface with Micro-AB USB connector
- Onboard open-standard serial and debug adaptor (OpenSDA)
- 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-K64F120M board and run the included demonstrated software. For more detailed information, review the user manual at **freescale.com/TWR-K64F120M**.

1 Download Software and Tools

Download installation software and documentation under **"Jump Start Your Design"** at **freescale.com/TWR-K64F120M**.



2 Install the Software and Tools

Install the P&E Micro Kinetis Tower toolkit. The toolkit includes the OpenSDA 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/OpenSDA micro-B connector on the TWR-K64F120M module. 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, D7 and D9 light up as it is tilted. While the board is held flat, press **SW2** and **SW3** to toggle LEDs D5 and D6, 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**.

TWR-K64F120M Jumper Options

The following is a list of all jumper options on the TWR-K64F120M. The default installed jumper settings are indicated in the shaded boxes.

Jumper	Option	Setting	Description
50 MHz Clock OSC Power	J33	**1–2**	Enable V_BRD power supply to 50 MHz OSC
	J32	1–2	Disable V_BRD power supply to 50 MHz OSC
JTAG Board Power Selection	J14	ON	Connect 5 V output (P5V_TRG_USB) to JTAG port (supports powering board from JTAG pod supporting 5 V supply output)
		OFF	Disconnect JTAG 5 V output (P5V_TRG_USB) from JTAG port
UART4_TX	J36	**ON**	Connect PTE24 as UART4_TX to Secondary TWR_ELEV
		OFF	Disconnect PTE24 as UART4_TX to Secondary TWR_ELEV
UART4_RX	J27	**ON**	Connect PTE25 as UART4_RX to Secondary TWR_ELEV
		OFF	Disconnect PTE25 as UART4_RX to Secondary TWR_ELEV
SDHC_WP / UART4_RTS_B	J34	**ON**	Connect PTE27 as UART4_RTS_B to Secondary TWR_ELEV or as SDHC_WP to SD card slot as write protect signal
		OFF	Disconnect PTE27 as UART4_RTS_B to Secondary TWR_ELEV or as SDHC_WP to SD card slot as write protect signal
GPIO3_ELEV	J35	**ON**	Connect PTE28 as General-Purpose I/O to TWR_ELEV
		OFF	Disconnect PTE28 as General-Purpose I/O to TWR_ELEV
UART_CTS / RTC_CLKOUT/ 1588_CLKIN	J31	**ON**	Connect PTE26 as UART_CTS to Secondary TWR_ELEV or as RTC_CLKOUT to primary TWR_ELEV or as Clock input for 1588
		OFF	Disconnect PTE26 as UART_CTS to Secondary TWR_ELEV or as RTC_CLKOUT to primary TWR_ELEV or as Clock input for 1588
TAMPER0	J21	ON	
		OFF	

Jumper	Option	Setting	Description
K64 VREG IN Selector	J19	**1–2**	VBUS Signal on micro USB connector J17 connects to K64_VREGIN to allow standalone USB operation
		2–3	VBUS signal from TWR ELEV connector connects to K64_VREGIN to allow USB operation with complete Tower System
3.3 V Voltage Regulator Input Selector	J18	**1–2**	Output of USB power switch controlled by the VTRG_EN signal from the K20 MCU. Provides input to 3.3 V regulator.
		3–4	Output of USB power from primary elevator Pin A57 to 3.3 V regulator
		5–6	Output of USB power from K64 VREGIN to 3.3 V regulator
Board Power Selector	J29	**1–2**	Connect K20 USB regulator output (VOUT_3V3) to onboard supply (V_BRD)
		3–4	Connect K64 USB regulator output (VOUT_3V3) to onboard supply (V_BRD)
		5–6	Connect 3.3 V onboard regulator output (P3V3) to onboard supply (V_BRD)
		7–8	Connect 1.8 V onboard regulator output (P1V8) to onboard supply (V_BRD)
MCU Power Connection	J28	**ON**	Connect onboard 3.3 V or 1.8 V supply (V_BRD) to MCU VDD
		OFF	Disconnect onboard 3.3 V or 1.8 V supply (V_BRD) to MCU VDD
MCU Power VDDA for Current Measurement	J22	**ON**	Connect MCU_PWR (3.3 V or 1.8 V) to VDDA and VREFH
		OFF	Disconnect MCU_PWR (3.3 V or 1.8 V) to VDDA and VREFH
VBAT Power Source	J20	**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)

FRDM-K64F120M Jumper Options (cont.)

Jumper	Option	Setting	Description
Accelerometer IRQ Connection	J7	**ON**	Connect PTA8 to INT2 pin of accelerometer
	J8	**ON**	Connect PTA6 to INT1 pin of accelerometer
		OFF	Disconnect PTA6 and/or PTA8 from INT1 and/or INT2 of accelerometer
External Pulldown on SDHC D3	J13	ON	External 10 K ohm Pulldown on SDHC_D3
		OFF	No pull down on SDHC_D3
LED connections	J30	**1–2**	Connect PTE6 to Yellow/Green LED (D5)
		3–4	Connect PTE7 to Yellow LED (D6)
		5–6	Connect PTE8 to Orange LED (D7)
		7–8	Connect PTE9 to Blue LED (D8)
5 V power selection	J38	**1–2**	Connect 5 V power from OpenSDA (mini-USB) to power switch MIC2026
		2–3	Connect 5 V power from Elevator to power switch MIC2026
Micro USB power enable	J26	**ON**	Connect PTC9 to USB power enable on power switch MIC2026
		OFF	Disconnect PTC9 from USB power enable on power switch MIC2026
Micro USB Overcurrent Flag	J23	**ON**	Connect PTC8 to overcurrent flag on power switch MIC2026
		OFF	Disconnect PTC8 from overcurrent flag on power switch MIC2026
Micro USB ID Selection	J25	ON	USB Host / Device ID selection is controlled by PTE12
		OFF	No ID selection USB Host/Device
Potentiometer Connection	J24	**ON**	Connect potentiometer to ADC1_SE18
		OFF	Disconnect potentiometer from ADC1_SE18

Jumper	Option	Setting	Description
General-Purpose TWRPI V_BRD Power Enable	J6	**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)
GPIO RESET_OUT_B Connection	J1	**1–2**	Connect PTB7 to RESET_OUT_B signal
		2–3	RESET_OUT_B signal resets the target MCU
Target MCU UART1_RX Output Selection	J10	1–2	Connect MCU's UART1_RX to OpenSDA virtual COM RX port
		2–3	Connect MCU's UART1_RX to primary Elevator (A41) UART0_RX
Target MCU UART1_TX Output Selection	J15	1–2	Connect MCU's UART1_TX to OpenSDA virtual COM TX port
		2–3	Connect MCU's UART1_RX to primary Elevator (A42) UART0_RX
SWD_CLK_ TGTMCU Output Selection	J39	**ON**	Enable the SWD_CLK_TGTMCU connection between the OpenSDA and target MCU
		OFF	Isolate the SWD_CLK_TGTMCU connection between the OpenSDA and target MCU
Reset Selection for SW2 Reset Button	J16	**1–2**	Connect the reset button to target MCU before level shifter
		2–3	Connect the reset button to target MCU without passing through level shifter

et Started

Download installation software and documentation under **“Jump Start Your Design”** at **freescale.com/TWR-K64F120M**.

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/TWR-K64F120M, freescale.com/Kinetis or freescale.com/Tower

Join the online Tower community at towergeeks.org

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