

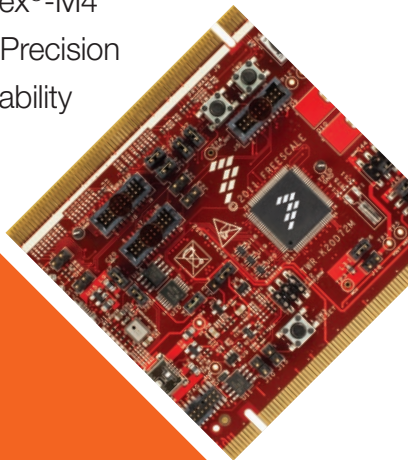


TWR-K20D72M

Quick Start Guide

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

Tower System
Development Board
Platform



Get to know the TWR-K20D72M Board

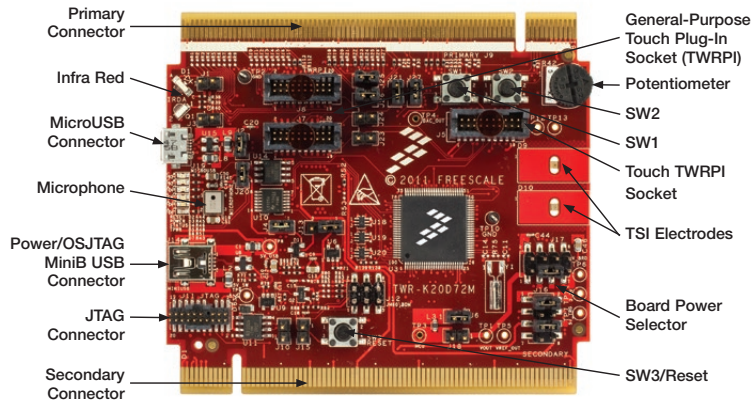


Figure 1: Front side of TWR-K20D72M board

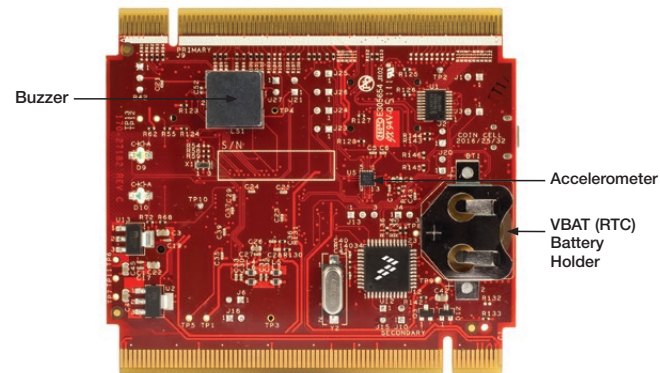
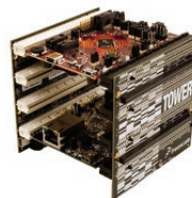


Figure 2: Back side of TWR-K20D72M board



TWR-K20D72M Freescale Tower System Development Board Platform

The TWR-K20D72M 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 MCU boards and compatible peripherals.

TWR-K20D72M Features

- MK20DX256VLL7 MCU (72 MHz, 256 KB flash, 64 KB RAM, 32 KB FlexNVM, low power, 100 LQFP package)
- USB support with MicroUSB connector onboard, no KIT needed for dual role USB feature evaluation
- Two capacitive touchpads
- Socket for capacitive touchpad daughter board (Touch TWRPI)
- Socket for Tower plug-in (TWRPI, e.g. sensor board)
- Three-axis digital accelerometer (MMA8451Q)
- Potentiometer, four LEDs, pushbuttons, infrared port and battery holder
- Microphone and buzzer
- Onboard debug circuit MC9S08JM60
- Open source JTAG (OSJTAG) with virtual serial port

Step-by-Step Installation Instructions

1 Install the Software and Tools

Install the P&E Micro Kinetis Tower toolkit to install the OSJTAG and USB-to-Serial drivers. These can be found on the DVD under "Software."

2 Configure the Hardware

Connect one end of the USB cable to the PC and the other end to the Power/OSJTAG mini-B connector on the TWR-K20D72M board. Allow the PC to automatically configure the USB drivers if needed.

3 Press Touch Electrodes

A different tone will beep when either electrode1 or electrode2 is pressed and the associated LED will turn on.

4 Tilt the Board

The board will generate a different tone depending on the tilt angle.

5 Whistle into the Microphone

The board will respond with a tone.

6 Learn More about the Kinetis 72 MHz Family

Find more bare-metal labs and software for the Kinetis K20 MCUs at **freescale.com/TWR-K20D72M**.

D72M Jumper Options

The following is a list of all the jumper options. The default installed jumper settings are shown in the shaded boxes.

Jumper	Option	Setting	Description
J6	MCU power connection	ON	Connect on-board 3.3 V or 1.8 V supply to MCU
		OFF	Isolate MCU from power (connect an ammeter to measure current)
J13	VBAT power selection	1-2	Connect VBAT to onboard 3.3 V or 1.8 V supply
		2-3	Connect VBAT to the higher voltage between onboard supply or coin cell supply
J18	3.3V VOUT selection	ON	Connect USB 3.3 V regulator output to MCU_PWR
		OFF	Disconnect USB 3.3 V regulator output to MCU_PWR
J10	JTAG board power selection	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
J15	OSJTAG bootloader selection	ON	OSJTAG bootloader mode (OSJTAG firmware reprogramming)
		OFF	Debugger mode
J16	VREG IN selection	1-2	Regulator powered by OSJTAG 5V output
		5-6	VBUS signal on Micro-USB connector J19 connects to VREGIN to allow standalone USB operation
		6-8	VBUS signal from elevator connector connects to VREGIN to allow USB operation with complete tower kit
J17	Board power selection	1-2	K20 USB regulator 3.3 V output powers VBRD (MCU_PWR)
		3-5	3.3 V from onboard regulator powers VBRD (MCU_PWR)
		5-7	1.8 V from onboard regulator powers VBRD (MCU_PWR)

Jumper	Option	Setting	Description
J2	USB power enable	ON	Connect PTC9 to USB power enable on power switch MIC2026
		OFF	Disconnect PTC9 to USB power enable on power switch MIC2026
J20	USB overcurrent flag	ON	Connect PTC8 to overcurrent flag on power switch MIC2026
		OFF	Disconnect PTC8 to overcurrent flag on power switch MIC2026
J1	Infrared transmitter connection	ON	Connect CMT_IRO (PTD7) to infrared transmitter D1
		OFF	Disconnect CMT_IRO (PTD7) to infrared transmitter D1
J3	Infrared receiver connection	ON	Connect CMP0_IN1 (PTC7) to infrared receiver Q1
		OFF	Disconnect CMP0_IN1 (PTC7) to infrared receiver Q1
J25	Accelerometer I ² C connection	ON	Connect PTB2 to SCL pin of accelerometer
		OFF	Disconnect PTB2 to SCL pin of accelerometer
J26	Accelerometer I ² C connection	ON	Connect PTB3 to SDA pin of accelerometer
		OFF	Disconnect PTB3 to SDA pin of accelerometer
J24	Accelerometer IRQ connection	ON	Connect PTB0 to INT1 pin of accelerometer
		OFF	Disconnect PTB0 to INT1 pin of accelerometer
J23	Accelerometer IRQ connection	ON	Connect PTB1 to INT2 pin of accelerometer
		OFF	Disconnect PTB1 to INT2 pin of accelerometer
J27	Potentiometer connection	ON	Connect potentiometer to ADC1_DM0
		OFF	Disconnect potentiometer to ADC1_DM0
J4	Microphone connection	ON	Connect microphone input to PTB0 (ADC0_SE8)
		OFF	Disconnect microphone input to PTB0 (ADC0_SE8)
J21	Buzzer connection	ON	Connect FTM0_CH3 (PTC4) to buzzer
		OFF	Disconnect FTM0_CH3 (PTC4) to buzzer



Visit **freescale.com/TWR-K20D72M** or **freescale.com/Kinetis** for the latest information on the TWR-K20D72M module, including:

- Bare metal labs
- Software
- Technical documentation

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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