Get Started

Download the installation software and documentation under “Jump Start Your Design” at **freescale.com/TWR-K20D50M**.

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

Doc Number: TWRK20D50MQSG REV 0 Agile Number: 926-27272 REV A

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Quick Start Guide

TWR-K20D50M

Development Kit for Kinetis 50 MHz K20 Family

freescale™

TOWER SYSTEM

Step-by-Step Installation Instructions

1 Download Software and Tools

Get the installation software and documentation under "Jump Start Your Design" at **freescale.com/TWR-K20D50M**.

2 Install Software and Tools

Install the OSBDM/OSJTAG Tower Toolkit to install the OSJTAG and USB-to-Serial drivers.

3 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-K20D50M module. Allow the PC to automatically configure the USB drivers if needed.

4 Press Switches and Touch Electrodes

A tone will beep when SW2 or SW3 are pushed, touch the pads on E1-E2 and LEDs will turn on.

5 Tilt the Board

Sound can be heard through the board buzzer depending on inclination angle.

6 Clap or Whistle Near the Board Microphone

Your TWR-K20D50M will respond with a tone.

7 Explore Further

Explore Kinetis 50 MHz devices ultra-low power modes and USB communication by conducting the additional Labs located at **freescale.com/TWR-K20D50M**

Get to Know the TWR-K20D50M

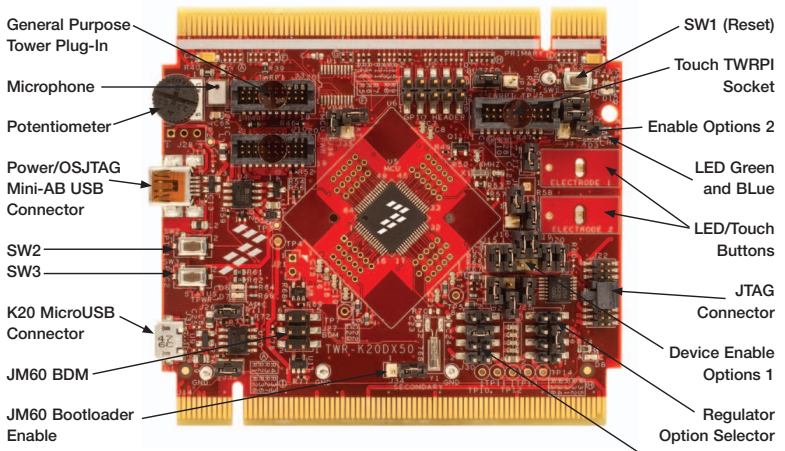


Figure 1: Front side of TWR-K20D50M module (TWRPI devices not shown).

Get to Know the TWR-K20D50M (continued)

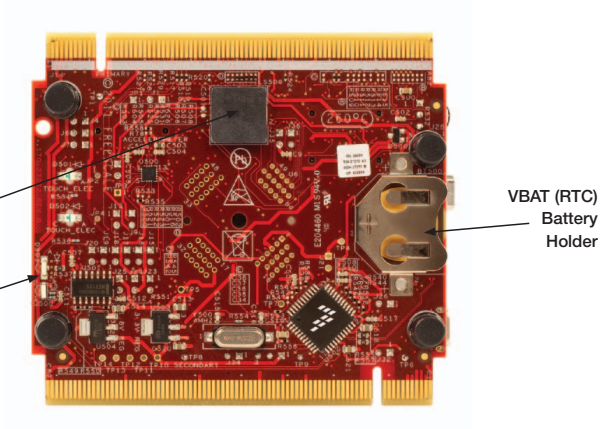
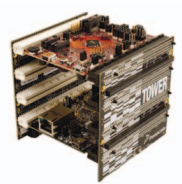


Figure 2: Back side of TWR-K20D50M module.



TWR-K20D50M

Freescale Tower System

The TWR-K20D50M microcontroller 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. Take your design to the next level and begin constructing your Tower System today by visiting **freescale.com/tower** for additional Tower System microcontroller modules and compatible peripherals.

TWR-K20D50M Features

- Tower compatible microcontroller module
- MK20DX128VLH5 MCU (50 MHz, 128KB Flash, 16 KB RAM, 32 KB FlexNVM, Low power, 64LQFP package
- Dual role USB interface with Micro-AB USB connector
- Touch Tower Plug-in Socket
- General purpose Tower Plug-in (TWRPI) socket
- On-board debug circuit MC9S08JM60 open source JTAG (OSJTAG) with virtual serial port
- Three axis accelerometer (MMA8451Q)
- Four (4) user-controllable LEDs
- Two (2) capacitive touch pads
- Two (2) user pushbutton switch
- Infrared transmit and receive
- Potentiometer
- Microphone (ADC)
- Buzzer
- Battery backup for RTC

Tools

- Freescale's CodeWarrior Development Studio for Microcontrollers v10.1 (CW-MCU10)
- IAR EWARM V6.30

TWR-K20D50M Jumper Options

The following is a list of all the jumper options. The default installed jumper settings are shown in white text within the red boxes.

Jumper	Jumper Designator	Signal	Jumper Option
V_BRD	J25	V_BRD	**DEF: 1-2 VBRD to MCU_PWR**
	J23	VDDA_HDR	**DEF: 1-2 VDDA to MCU_PWR**
VBAT	J35	VBATD Enable VBAT	**DEF: 1-2**
	J36	VBATD Enable MCU_PWR	DEF: 1-2
PSV_TRG_USB	J24	PSV_TRG_USB	open
JM60 Bootloader	J34	JM60 BOOTLOAD EN	**open OSJTAG mode** 1-2 JM60 bootloader mode
VREG IN SELECTOR	J30	VREG IN SELECTOR	**DEF: 1-2 Regulator powered by OSJTAG USB** 5-6 K20 USB power power the K20 Regulator 8-6 TWR-USB power up the K20 Regulator
BOARD POWER SELECTION	J29	BOARD POWER SELECTION	**DEF: 3-5 P3.3V_REG powers VBRD(MCU_PWR)** 7-5 1.8V powers VBRD(MCU_PWR) 1-2 K20 3.3 Reg Output powers VBRD (MCU_PWR)

Module	Jumper Designator	Name	Options	K20 pin name
USB	J26	K20 USB ENA	DEF: 1-2	PTC9_EBI_AD6
	J32	K20 USB FLGA	DEF: 1-2	PTC8_EBI_AD7/SSI0_CLK
IRDA	J9	IRDAJ	open	PTD7_CMT_IRO
	J7	CMP0_IN0	open	PTC7_EBI_AD8/CMP0_IN1
Microphone	J16	Microphone Enable	DEF: 1-2	ADC0_DP3
Potentiometer	J15	Potentiometer Enable	DEF: 1-2	ADC0_DM3
Buzzer	J1	Buzzer Enable	DEF: 1-2	PTC4
Accelerometer	J19	SDA Accelerometer Enable	DEF: 1-2	PTB3_I2C0_SDA/ADC0_SE13/TSI0_CH8
	J20	SCL Accelerometer Enable	DEF: 1-2	PTB2_I2C0_SCL/ADC0_SE12/TSI0_CH7
	J18	ACCELEROMETER INT1	**DEF: OPEN**	**PTB0/ADC0_SE8/TSI0_CH0**
	J17	ACCELEROMETER INT2	**DEF: OPEN**	**PTB1/ADC0_SE9/TSI0_CH6**
GPIO Header	J2	1	SAI0_RX_FS	PTC10_EBI_AD5/SSI0_RX_FS
		2	SAI0_TX_FS	PTB19/SSI0_TX_FS/TSI0_CH12
		3	SAI0_RXD0	PTC5
		4	SAI0_TXD0	PTC1/UART_RTS/FTM0_CH0/TSI0_CH14
		5	SAI0_RXD1	PTC11_LLWU_SSI0_RXD1
		6	SAI0_TXD1	PTC0/SSI0_TXD/TSI0_CH13
		7	SAI0_RX_BCLK	PTC6
		8	SAI0_TX_BCLK	PTB18/SSI0_TX_BCLK/TSI0_CH11
		9	SAI0_MCLK	PTC8_EBI_AD7/SSI0_CLK
		10	GND	GND
LEDs	J13	LED orange Enable	DEF: 1-2	PTC10
	J11	LED Yellow Enable	DEF: 1-2	PTC9
	J4	LED Green Enable	DEF: 1-2	PTC7
	J6	LED Blue	DEF: 1-2	PTC8
PTA12 - Header	J28	PTA12	1 MCU_PWR 2 PTA12 3 GND	This header can be used to power up an external circuit/sensor
Push Buttons	SW2	Pushbutton1	PTC1	PTC1/UART_RTS/FTM0_CH0/TSI0_CH14
	SW3	Pushbutton0	PTC2	PTC2/UART_CTS/FTM0_CH1/TSI0_CH15
TSI Electrodes	Elec1	Electrode1	TSI0_CH0	PTB0/ADC0_SE8/TSI0_CH0
	Elec2	Electrode2	TSI0_CH6	PTB1/ADC0_SE9/TSI0_CH6

Default Configuration, Board powered by OSJTAG USB, RTC powered by PWR_MCU