TWR-K53N512
Quick Start Guide

Low-Power MCU with Analog,
USB and Segment LCD

Tower System
Development Board
Platform

Energy
Efficient Solutions ™
optimized for low power

Get to Know the TWR-K53N512

- Primary Connector
- Infrared
- General-Purpose Tower Plug-In (TWRPI) Socket
- SW3 (Reset)
- Power/OSJTAG Mini-B USB Connector
- Secondary Connector
- SW1
- SW2
- Touch/SLCD TWRPI Socket
- LED/Touch Buttons E1–E2
- PK53N512CMD100 Microcontroller
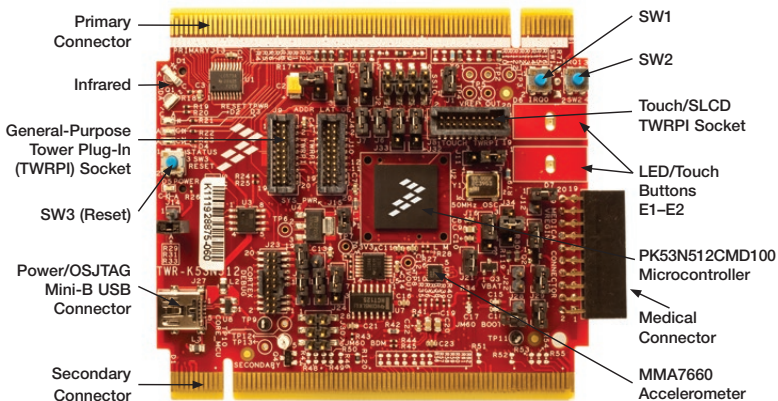- Medical Connector
- MMA7660 Accelerometer

Figure 1: Front Side of TWR-K53N512 Board Not Including TWRPI

TWR-K53N512
Freescale Tower System Development Board Platform

The TWR-K53N512 board is part of the Freescale Tower System, a modular development board 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 evaluation board platform today by visiting **freescale.com/Tower** for additional Tower System boards and compatible peripherals.
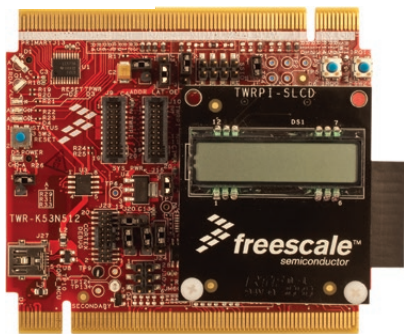
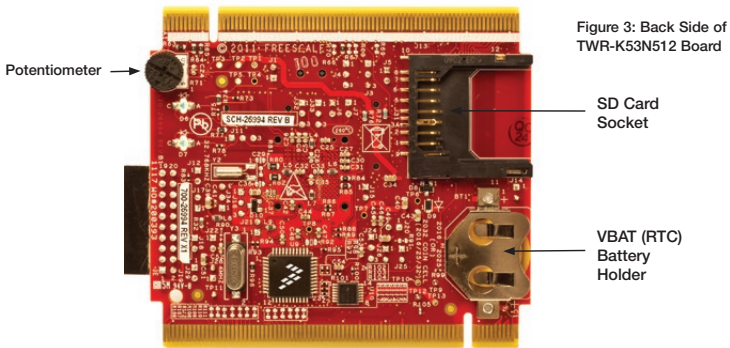Figure 2: Front Side of TWR-K53N512 Board with TWRPI-SLCD Attached

Figure 3: Back Side of TWR-K53N512 Board

Potentiometer

SD Card Socket

VBAT (RTC) Battery Holder

Step-by-Step
Installation Instructions

In this Quick Start Guide, you will learn how to set up the TWR-K53N512 board and run the default demonstration.

1 Install the Software and Tools

Install the "P&E OSBDM OSJTAG Virtual Serial Toolkit" found under "Getting Started" on the Overview page of the DVD or at **pemicro.com/osbdm**.

This installs drivers that are required for the OSJTAG debugger and the USB-to-serial interface.

2 Configure the Hardware

Install the included battery into the VBAT (RTC) battery holder. Then, plug the included segment LCD Tower plug-in (TWRPI-SLCD) into the touch/SLCD TWRPI socket. Finally, connect one end of the USB cable to the PC and the other end to the power/OSJTAG mini-B connector on the TWR-K53N512 module. Allow the PC to automatically configure the USB drivers if needed.

3 Tilt the Board

Tilt the board side to side to see the LEDs on E1–E2 light up as it is tilted.

Step-by-Step Installation Instructions (cont.)

4 Navigate the Segment LCD

The segment LCD toggles all segments on and off. Press **SW2** to cycle between viewing the seconds, hours and minutes, potentiometer percent and temperature.

5 Explore Further

Explore the full features and source code of the pre-programmed demos by following the TWR-K53N512 Quick Start Demo Lab Guide found under "Getting Started" on the Overview page of the DVD or at **freescale.com/TWR-K53N512**.

6 Learn More About the Kinetis K50 Microcontrollers

Find application notes, example code, reference designs, development tools, data sheet and reference manual at **freescale.com/K50** and **freescale.com/TWR-K53N512**.

TWR-K65N512 Jumper Options

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

Jumper	Option	Setting	Description
J1	ADC1_DM1 Input Selection	**ON**	ADC1_DM1 reads POTENTIOMETER
		OFF	ADC1_DM1 reads MEDICAL CONNECTOR
J3	FlexBus Address Latch Selection	**2–3**	Enable FlexBus address latch
		1–2	Disable FlexBus address latch
J4	Medical Connector J19 Pin3 Selection	**1–2**	Select I2C1_SCL connection to MEDICAL CONNECTOR
		2–3	Select FTM2_CH1 connection to MEDICAL CONNECTOR
J5	IR Transmitter Connection	**OFF**	Disconnect PTD7/CMT_IRO from IR transmitter circuit (IRDA)
		ON	Connect PTD7/CMT_IRO to IR transmitter circuit (IRDA)
J6	FlexBus or SSIO Selection	**ON**	Use PTE7 for FlexBus
		OFF	Use PTE7 for SSIO

TWR-K65N512 Jumper Options (cont.)

Jumper	Option	Setting	Description
J7	Ethernet/TOUCH PAD TWRPI Selection	ON	Use PTB1 for Ethernet
		OFF	Use PTB1 for TOUCH PAD TWRPI
J11	Clock Input Source Selection	1–2	Connect main EXTAL to onboard 50 MHz clock
		2–3	Connect EXTAL to the CLKIN0 signal on the elevator connector
J12	SD Card/TOUCH PAD TWRPI Selection	OFF	Use PTE2 for SD card reader (SD/MMC SKT)
		ON	Use PTE2 for TOUCH PAD TWRPI
J14	IR Transmitter Filter Selection	OFF	IR input to CMP0_IN0 is not low-pass filtered by a 0.1 uF cap
		ON	IR input to CMP0_IN0 is low-pass filtered by a 0.1 uF cap
J15	MCU Power Connection	ON	Connect onboard 3.3 V supply to MCU
		OFF	Isolate MCU from power (connect an ammeter to measure current)

TWR-K65N512 Jumper Options (cont.)

Jumper	Option	Setting	Description
J16	VBAT Power Connection	**1–2**	Connect VBAT to onboard 3.3 V supply
		2–3	Connect VBAT to the higher voltage between onboard 3.3 V supply or coin-cell supply
J17	Onboard 50 MHz Power Connection	**ON**	Connect onboard 3.3 V supply to onboard 50 MHz OSC
		OFF	Disconnect onboard 3.3 V supply to onboard 50 MHz OSC
J18	VREGIN Power Connection	**ON**	Connect USB0_VBUS from elevator to VREGIN
		OFF	Disconnect USB0_VBUS from elevator to VREGIN
J20	SD Card/ GENERAL PURPOSE TWRPI Selection	**OFF**	Use PTE1 for SD card reader (SD/MMC SKT)
		ON	Use PTE1 for GENERAL PURPOSE TWRPI

TWR-K53N512 Jumper Options (cont.)

Jumper	Option	Setting	Description
J21	Accelerometer Power Connection	**ON**	Connect accelerometer to onboard 3.3 V supply
		OFF	Disconnect accelerometer from onboard 3.3 V supply
J22	Offboard Power Input	**Always OFF**	J22 pin 1 can be connected to an offboard external power source. This board is only tested with 3.3 V. Care should be taken not to connect to a voltage that is out of the component's specification.
		Always OFF	J22 pin 2 can be connected to the ground of the offboard external power source
J24	Off- or Onboard Power Input Selection	**1–2**	Board SYS_PWR is powered from onboard 3.3 V regulator
		2–3	Board SYS_PWR is powered from offboard supply from J22 pin 2
J25	JTAG Board Power Connection	**OFF**	Disconnect onboard 5 V supply to JTAG port
		ON	Connect onboard 5 V supply to JTAG port (supports powering board from JTAG pod supporting 5 V supply output)

TWR-K65N512 Jumper Options (cont.)

Jumper	Option	Setting	Description
J26	SD Card/ GENERAL PURPOSE TWRPI Selection	OFF	Use PTE0 for SD card reader (SD/MMC SKT)
		ON	Use PTE0 for GENERAL PURPOSE TWRPI
J28	OSJTAG Bootloader Selection	OFF	Debugger mode
		ON	OSJTAG bootloader mode (OSJTAG firmware reprogramming)
J29	Ethernet/TOUCH PAD TWRPI Selection	ON	Use PTB0 for Ethernet
		OFF	Use PTB0 for TOUCH PAD TWRPI
J32	TOUCH PAD/ SLCD TWRPI Selection	1-2	PTB10_LCD_P10 pin is connected to J8 pin 3 for SLCD TWRPI
		2–3	PTB0_TSI0_CH0 pin is connected to J8 pin 3 for TOUCH PAD TWRPI. Ensure J29 and J7 are off to avoid conflict with Ethernet

TWR-K53N512 Jumper Options (cont.)

Jumper	Option	Setting	Description
J33	TOUCH PAD/ SLCD TWRPI Selection	1–2	PTB11_LCD_P11 pin is connected to J8 pin 5 for SLCD TWRPI
		2–3	PTB1_TSI0_CH6 pin is connected to J8 pin 5 for TOUCH PAD TWRPI. Ensure J29 and J7 are off to avoid conflict with Ethernet.
J34	Onboard 50 MHz Enable Source	OFF	Onboard 50 MHz osc is enabled if J17 jumper is on. No need to have any jumper on J34
		1-2	Onboard 50 MHz osc is enabled if J17 jumper is on
		2-3	Onboard 50 MHz osc enable by GPIO PTA19 allowing MCU to turn off clock for lower power consumption

Visit **freescale.com/TWR-K53N512** or **freescale.com/Kinetis** for the latest information on the TWR-K53N512 board, including:

- User guide
- Schematics
- Tower System fact sheet

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