IAR KickStart Kit™
For the Freescale Kinetis K60
family of microcontrollers

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SYSTEMS

Get to Know the TWR-K60N512-IAR

Primary Connector

Infra-Red

General Purpose Tower Plug-In (TWRPI) Socket

SW3 (Reset)

Power/OSJTAG Mini-B USB Connector

Secondary Connector

SW1

SW2

Touch TWRPI Socket

LED/Touch Buttons E1–E4

MK60N512 VMD100 Microcontroller
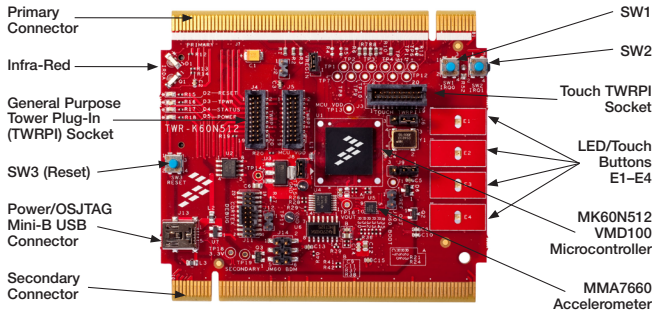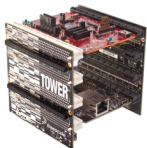
MMA7660 Accelerometer

Figure 1: Front Side of TWR-K60N512 Module Not Including TWRPI.

TWR-K60N512

The TWR-K60N512 microcontroller module is 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**.

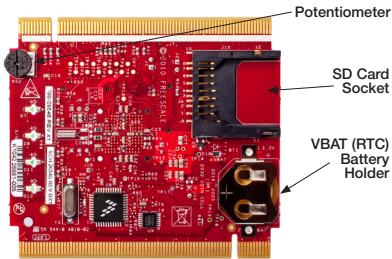Potentiometer

SD Card Socket

VBAT (RTC) Battery Holder

Figure 2: Back Side of TWR-K60N512 Module.

Features of the Kinetis K60N512 Kit

This guide briefly describes how to get started using IAR Embedded Workbench® with IAR J-Link (Lite), USB-JTAG/SWD debug probe for Cortex-M to run an example application on the Freescale Kinetis K60N512 board.

For more detailed information, see the IAR Embedded Workbench IDE User Guide, and the C-SPY hardware debugger documentation, which can be found on the Help menu in the IAR Embedded Workbench IDE.

Tower MCU module (TWR-K60N512)

• Kinetis K60N512 device (Cortex™-M4)

• Capacitive touch pads

• Integrated, open-source JTAG

• SD card slot, MMA7660 3-axis accelerometer

• Tower plug-in (TWRPI) socket for expansion (sensors)

• Touch TWRPI socket adds support for various capacitive touch boards (key pads, rotary dials and sliders)

• Tower connectivity for access to USB, Ethernet, RS232/RS485, CAN, SPI, I²C, flexbus

• Potentiometer, four LEDs, two pushbuttons, infrared port

Tower Serial module (TWR-SER)

• USB host, device and OTG with mini-AB connector

• RS232 and RS485 transceiver and single DB9 connector

• 10/100 Ethernet PHY with MII and RMII interface

• Eithernet connector with integrated magnetics

• CAN transceiver with 3-pin header

Tower Elevator module (TWR-ELEV)

• Power regulation circuitry, standardized signal assignments

• Common serial and expansion bus signals and side-mounting board

• RoHS, FCC/CE certifications

Install Software Tools and BSP

The installation DVD contains all the software and documentation you need to start building and running embedded applications on the Freescale Kinetis K60N512 kit. We recommend that you follow the installation instructions on the DVD and use the default directories for installation.

STEP 1 — Install the Software Tools and Updates

a. Insert the DVD, install IAR Embedded Workbench for ARM® (Kickstart edition recommended) and software updates. You'll be directed to an online product registration page to get your license number and key.

b. Connect your PC and IAR J-Link Lite using the supplied USB mini cable. Choose "Install from a specific location" and browse to \Program Files\IAR Systems\Embedded Workbench 6.0 Kickstart\arm\drivers\JLink\ directory to locate the USB driver.

c. Install the P&E Micro Kinetis Tower Toolkit from the DVD to install the OSJTAG and USB-to-Serial drivers under Software.

STEP 2 — Set Up the K60N512 Board

a. You may set up the K60N512 board in standalone mode or in Tower System mode together with other Tower Systems modules, such as TWR-SER (follow assembly instructions found in the TWR-ELEV module).

b. Connect the IAR J-Link Lite debug probe to the cortex debug connector on the K60N512 board with the 19-pin ribbon cable, then connect your PC and IAR J-Link with the supplied USB mini cable.

c. Supply power by either applying a jumper shunt on J12 to allow the J-Link to supply power (for use with TWR-K60N512 in stand-alone mode only, or connecting your PC to the Power/OSJTAG mini-B USB connector using the supplied USB cable (for use with TWR-K60N512 in Tower System mode).

STEP 3 — Run Example Project

a. Start IAR Embedded Workbench and click "EXAMPLE PROJECTS" in IAR Information Center.

b. Select Freescale > Freescale Kinetis > K60 > Freescale TWR-K60 board, then click button to open the project. Choose a destination folder to save a copy of this project.

c. Click button to build the project, then click button to download to the K60N512 board (via J-Link Lite). Click button to run the program, the D16 LED will blink.

d. To stop C-SPY, click button. To exit C-SPY, click button.

STEP 4 — Run RTOS BSP

a. Follow the links on the Getting Started DVD to download RTOS BSPs.

b. Set up the board or Tower System according to the user guide included in the BSP and run the example

STEP 5 — Learn More

a. Find more example projects and information on the K60 microcontrollers at **freescale.com/TWR-K60N512**

b. Download the latest software updates at **iar.com/kit_updates**

c. Watch video recordings about IAR Embedded Workbench and power debugging at **iar.com/video**

Jumper Options

The following is a list of all the jumper options for the TWR-K60N512 module.
The **default** installed jumper settings are shown in **bold**.

Jumper	Option	Setting	Description
J8	MCU Power Connection	**ON**	Connect on-board 3.3V supply to MCU
		OFF	Isolate MCU from power (connect an ammeter to measure current)
J9	VBAT Power Selection	**1-2**	Connect VBAT to on-board 3.3V supply
		2-3	Connect VBAT to the higher voltage between on-board 3.3V supply or coin-cell supply
J6	Clock Input Source Selection	**1-2**	Connect main EXTAL to on-board 50 MHz clock
		2-3	Connect EXTAL to the CLKIN0 signal on the elevator connector
J10	OSJTAG Bootloader Selection	ON	OSJTAG bootloader mode (OSJTAG firmware reprogramming)
		OFF	Debugger mode

Jumper	Option	Setting	Description
J12	JTAG Board Power Connection	ON	Connect on-board 5V supply to JTAG port (supports powering board from JTAG pod supporting 5V supply output)
		OFF	Disconnect on-board 5V supply to JTAG port
J2	IR Transmitter Connection	ON	Connect PTD7/CMT_IRO to IR Transmitter (D1)
		OFF	Disconnect PTD7/CMT_IRO from IR Transmitter (D1)
J1	VREGIN Power Connection	**ON**	Connect USB0_VBUS from Elevator to VREGIN
		OFF	Disconnect USB0_VBUS from Elevator to VREGIN

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Troubleshooting: If you are unable to find the cause of a problem, try resetting the evaluation board by using the reset button on the board. Then restart the C-SPY Debugger in the IAR Embedded Workbench IDE. You can also try disconnecting and reconnecting the power to the evaluation board, pressing the reset button and then restarting C-SPY.

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