

Quick Start Guide for FRDM-KL46Z

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www.freescale.com/FRDM-KL46Z



Quick Start Package Overview

These documents are available as part of the Quick Start Package:

Name	Type	Description
Quick Start Guide	PDF	This document
OpenSDA Applications	Folder	OpenSDA Applications for the FRDM-KL46Z
Precompiled Examples	Folder	S-record images of example projects for use with the MSD Flash Programmer

Additional reference documents are available on freescale.com/FRDM-KL46Z:

Name	Description
FRDM-KL46Z Quick Start Package	Quick Start Guide and supporting files for getting started with the FRDM-KL46Z.
FRDM-KL46Z User's Manual	This document—overview and detailed information for the FRDM-KL46Z hardware.
FRDM-KL46Z Pinout	Spreadsheet of pin connections for all MCU pins. Includes pinout for the I/O headers, Arduino R3 compatibility chart, and OpenSDA MCU pinout
FRDM-KL46Z Schematics	PDF schematics for the FRDM-KL46Z hardware
FRDM-KL46Z Design Package	Zip file containing all design source files for the FRDM-KL46Z hardware
OpenSDA User's Guide	Overview and instructions for use of the OpenSDA embedded debug circuit.

Get to Know the FRDM-KL46Z

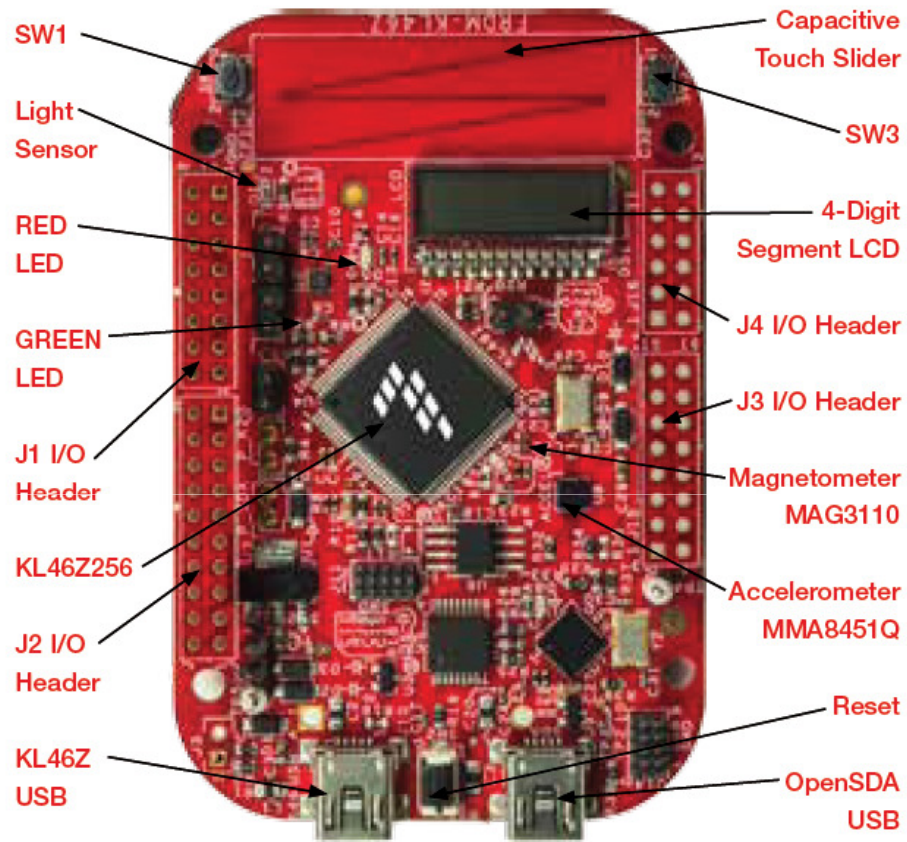


Figure 1: FRDM-KL46Z Callouts

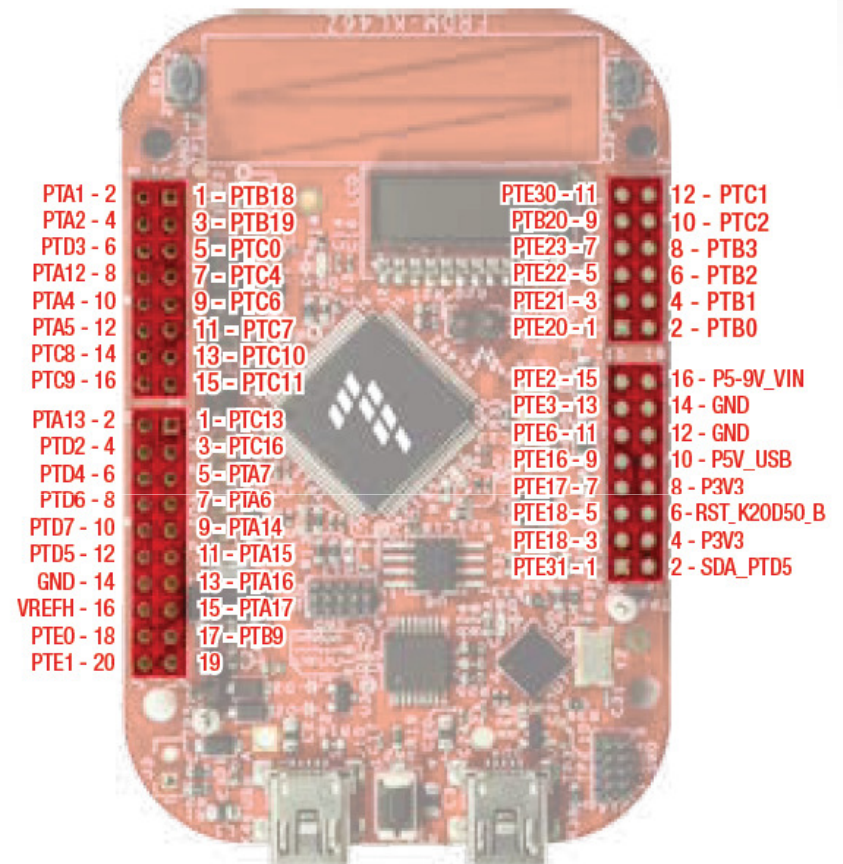


Figure 2: FRDM-KL46Z Pin-Out

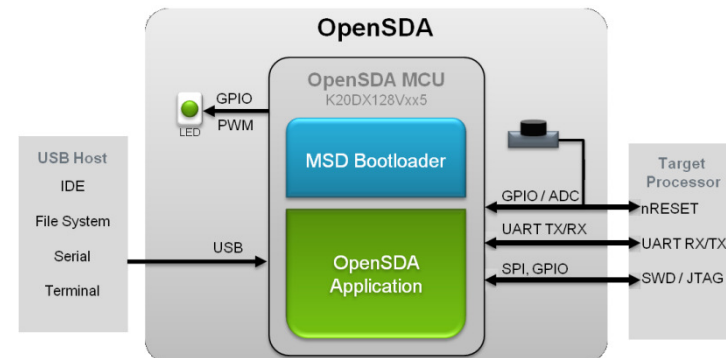
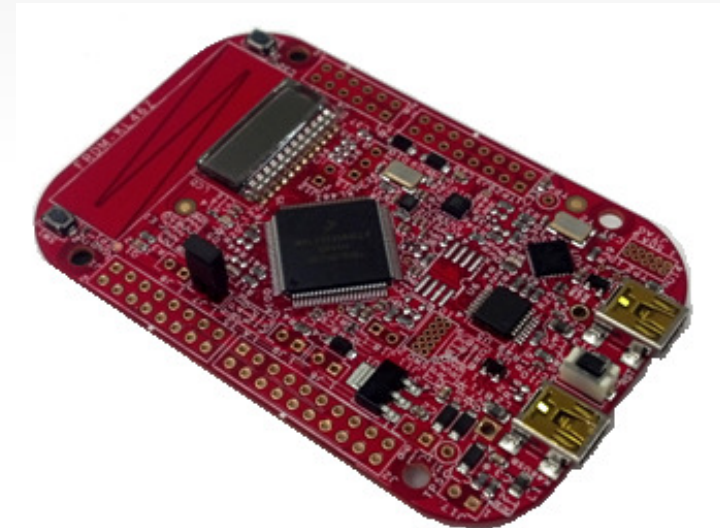
Get to Know the FRDM-KL46Z

2 of 2

The Freescale Freedom development platform is a set of software and hardware tools for evaluation and development. It is ideal for rapid prototyping of microcontroller-based applications. The Freescale Freedom KL46Z hardware, FRDM-KL46Z, is a simple, yet sophisticated design featuring a Kinetis L Series microcontroller, the industry's first microcontroller built on the ARM® Cortex™-M0+ core.

Features:

- MKL46Z256VLL4MCU – 48MHz, 256KB Flash, 32KB SRAM, segment LCD, USB OTG (FS), 100 LQFP
- Capacitive touch slider, MMA8451Q accelerometer, MAG310 magnetometer.
- Flexible power supply options – USB, coin cell battery, external source
- Easy access to MCU I/O
- Battery-ready, power-measurement access points
- Form factor compatible with Arduino™ R3 pin layout
- OpenSDA debug interface
- Mass storage device flash programming interface (default) – no tool installation required to evaluate demo apps
- P&E Debug interface provides run-control debugging and compatibility with IDE tools
- CMSIS-DAP interface: new ARM standard for embedded debug interface Refer to the *FRDM-KL46Z User's Manual and OpenSDA User's Guide for more information*.



Getting Started Out of the Box

Installing Drivers and Running the Out of Box Demo

0 **Optional: Download and Install the P&E OpenSDA USB Drivers found at www.pemicro.com/opensda.**

1 Plug in a USB cable (not included) from a USB host to the OpenSDA mini-B USB connector. The FRDM-KL46Z will be powered by this USB connection.

FRDM-KL46Z comes with the mass-storage device (MSD) Flash Programmer OpenSDA Application preinstalled. It will appear as a removable storage drive with a volume label of FRDM-KL46Z

The MSD Flash Programmer also includes a USB virtual serial port which requires an .INF file for proper installation in Windows. The necessary .INF file is available in the P&E OpenSDA USB Drivers (Step 0) and also on the FRDM-KL46Z removable drive.

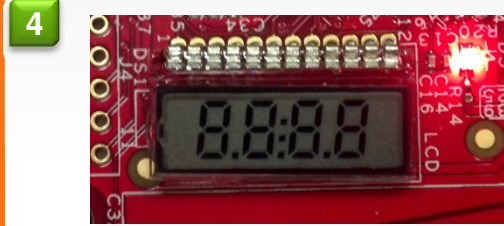
If the USB CDC Serial Port fails to automatically install in Windows, follow the instructions in Step 2. Otherwise, skip to Step 3.

2

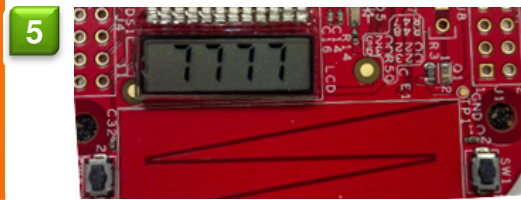
- a. [Open Device Manager](#)
- b. Locate and right-click on “OpenSDA – CDC Serial Port”
- c. Select “Update Driver Software”
- d. “Browse” and select the FRDM-KL46Z drive
- e. Click “Next” to complete the installation

3 The pre-installed demo running on the KL46 MCU shows different features of the board including segment LCD, and also shows an implementation of e-compass functions based on board accelerometer and magnetometer as indicated on steps 4 to 7.

Running the Out of Box Demo

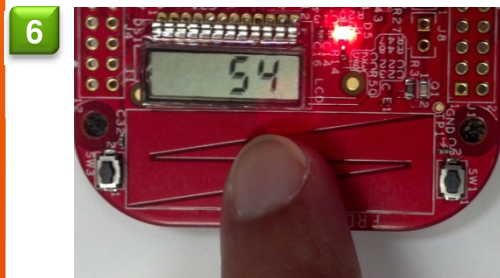


4 Segment LCD self-test
All segments are turned on for 3 seconds.



5 Up counting.
All digits increase by one periodically.

Press SW1 to change to slider mode

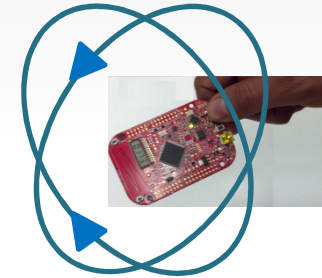


6 Slider
Touch electrodes, relative position is displayed.

Press SW1 to change to eCompass mode

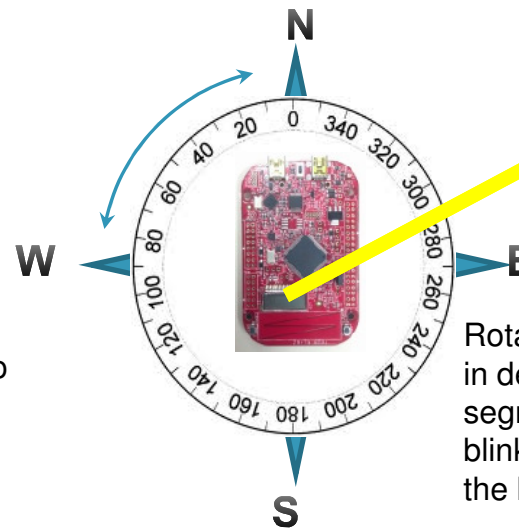
7 eCompass

Calibration



Move FRDM-KL46Z in all directions until count reach 100.

Running



Rotate FRDM-KL46Z, direction in degrees is shown on segment LCD screen. Leds will blink faster when pointing to the North.

Press SW1 to change to Up-counting mode.

OpenSDA is an open-standard serial and debug adapter. It bridges serial and debug communications between a USB host and an embedded target processor. OpenSDA software includes a flash-resident USB mass-storage device (MSD) bootloader and a collection of OpenSDA Applications. FRDM-KL46Z comes with the MSD Flash Programmer OpenSDA Application preinstalled. Follow these instructions to run the OpenSDA Bootloader and update or change the installed OpenSDA Application.

Enter OpenSDA Bootloader Mode

- 1 Unplug the USB cable if attached.
- 2 Press and hold the Reset button (SW1).
- 3 Plug in a USB cable (not included) between a USB host and the OpenSDA USB connector (labeled "SDA").
- 4 Release the Reset button

A removable drive should now be visible in the host file system with a volume label of BOOTLOADER. You are now in OpenSDA Bootloader mode.

Load an OpenSDA Application

- 1 While in OpenSDA Bootloader mode, double-click SDA_INFO.HTML in the BOOTLOADER drive. A web browser will open the OpenSDA homepage containing the name and version of the installed Application. This information can also be read as text directly from SDA_INFO.HTML.
- 2 Locate the OpenSDA Applications folder in the FRDM-KL46Z Quick Start Package.
- 3 Copy & paste or drag & drop the MSD Flash Programmer Application (MSD-FRDM KL46Z48M_Pemicro_v109.SDA) to the *BOOTLOADER* drive.
- 4 Unplug the USB cable and plug it in again. The new OpenSDA Application should now be running and a FRDM-KL46Z drive should be visible in the host file system.

You are now running the latest version of the MSD Flash Programmer. Use this same procedure to load other OpenSDA Applications

The MSD Flash Programmer is a composite USB application that provides a virtual serial port and an easy and convenient way to program applications into the KL46Z MCU. It emulates a FAT16 file system, appearing as a removable drive in the host file system with a volume label of FRDM-K20D50. Raw binary and Motorola S-record files that are copied to the drive are programmed directly into the flash of the MK20DX128 and executed automatically. The virtual serial port enumerates as a standard serial port device that can be opened with standard serial terminal applications.

Using the MSD Flash Programmer

- 1 Locate the Precompiled Examples folder in the FRDM-KL46Z Quick Start Package.
- 2 Copy & paste or drag & drop one of the .srec files to the FRDM-KL46Z drive.

The new application should now be running on the FRDM-KL46Z drive.

Program FRDMKL46_Demo_freedom.srec example to replace the out-of-box demo on your FRDM-KL46Z drive.

Using the Virtual Serial Port

- 1 Determine the symbolic name assigned to the FRDM-KL46Z virtual serial port. In Windows [open Device Manager](#) and look for the COM port named “PEMicro/Freescale – CDC Serial Port”.

- 2 Open the serial terminal emulation program of your choice. Examples for Windows include [Tera Term](#), [PuTTY](#), and HyperTerminal.
- 3 Program one of the “serial test” applications from the Precompiled Examples folder using the MSD Flash Programmer.
- 4 Configure the terminal program. Most embedded examples use 8 data bits, no parity bits, and one stop bit (8-N-1). Match the baud rate to the selected serial test application and open the port.
- 5 Press and release the Reset button (SW1) at anytime to restart the example application. Resetting the embedded application will not affect the connection of the virtual serial port to the terminal program.

NOTE: Refer to the *OpenSDA User's Guide for a description of a known Windows issue when disconnecting a virtual serial port while the COM port is in use.*

Explore Further



Now that you are familiar with the FRDM-KL46Z and OpenSDA, it's time to explore the additional software and lab guides available on www.freescale.com/FRDM-KL46Z. Select your next path from the links in the **Jump Start Your Design section**.

How to Reach Us:

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