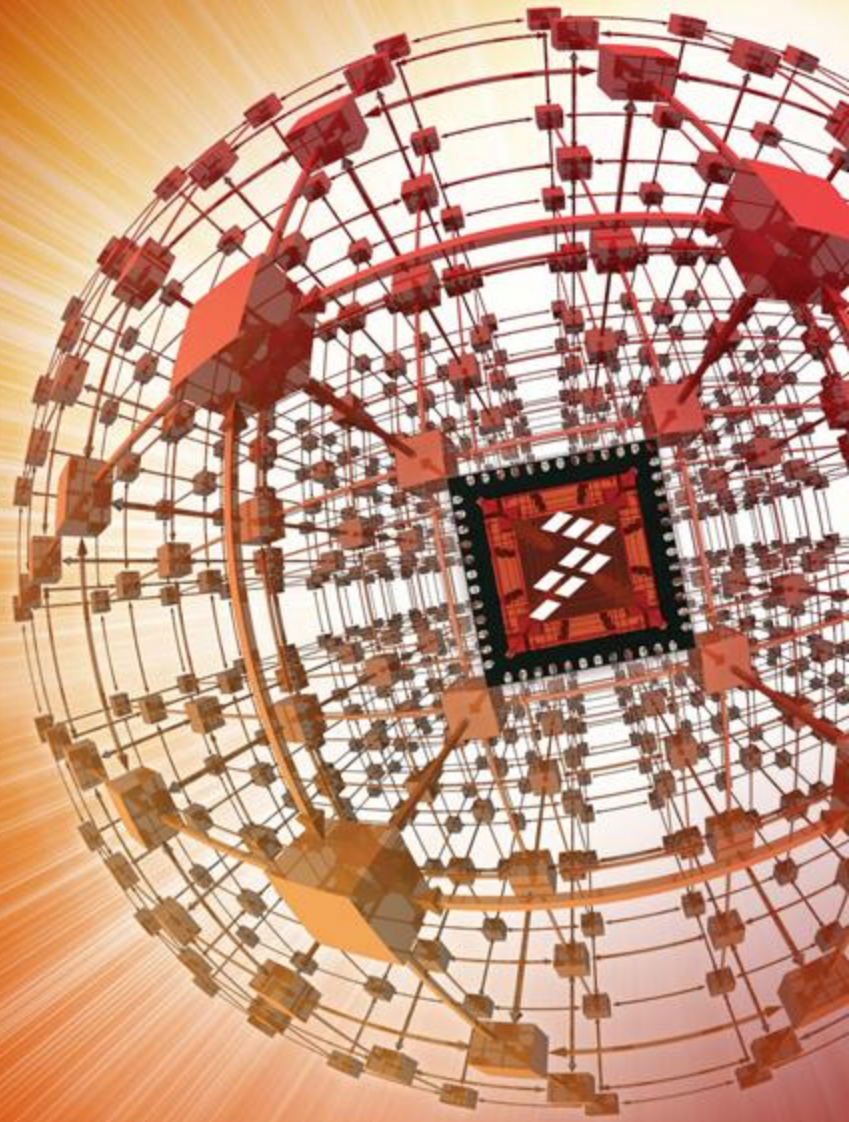
Quick Start Guide for the Freescale Freedom Development Platform FRDM-K64F



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freescale.com/FRDM-K64F

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Quick Start Package Overview

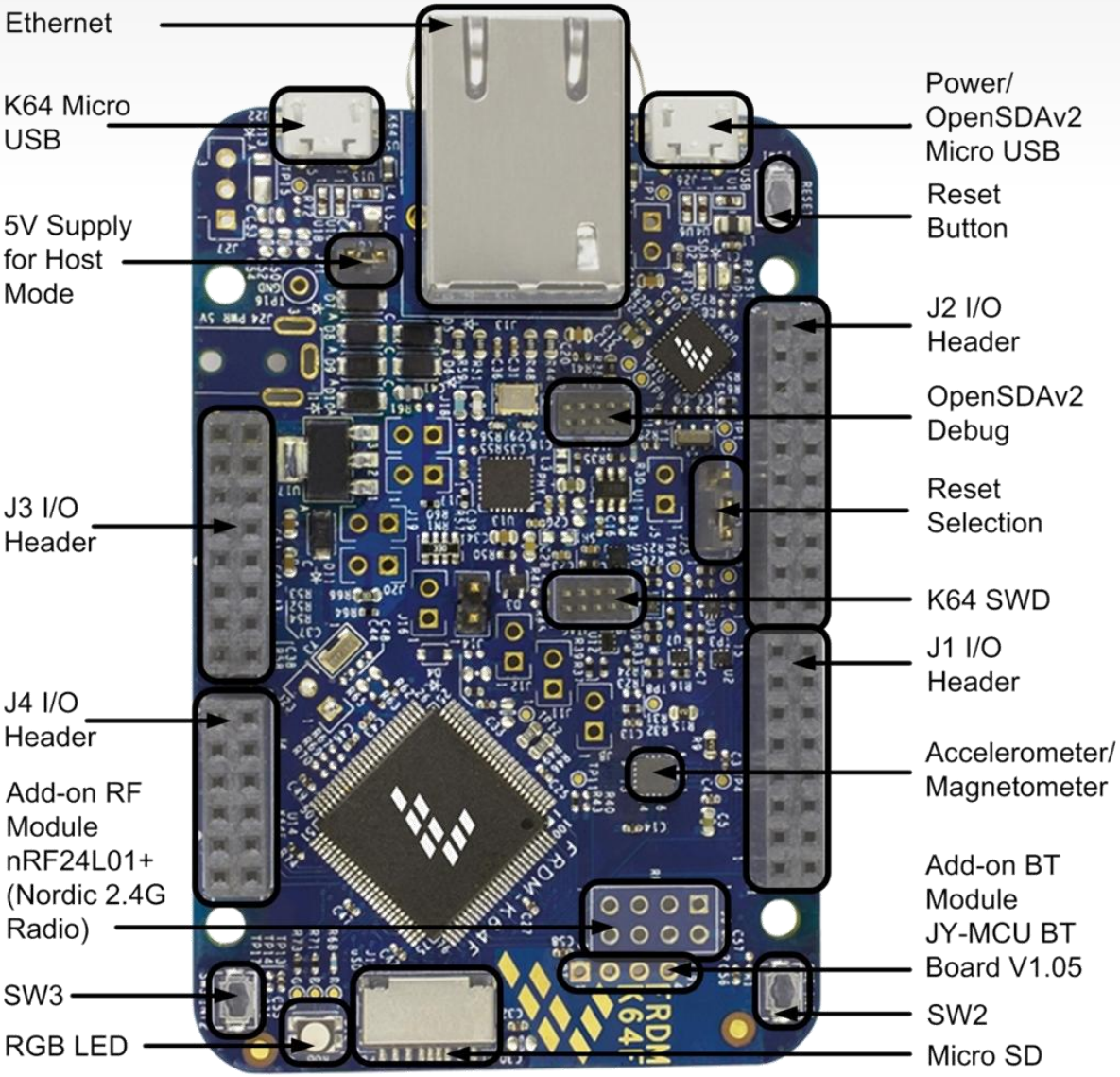
These documents are available as part of the Quick Start Package:

Name	Type	Description
Quick Start Guide	PDF	This document
OpenSDAv2 Applications	Folder	OpenSDAv2 Applications for the FRDM-K64F
Precompiled Examples	Folder	Binary images of example projects for use with the MSD Flash Programmer

Additional reference documents are available at freescale.com/FRDM-K64F

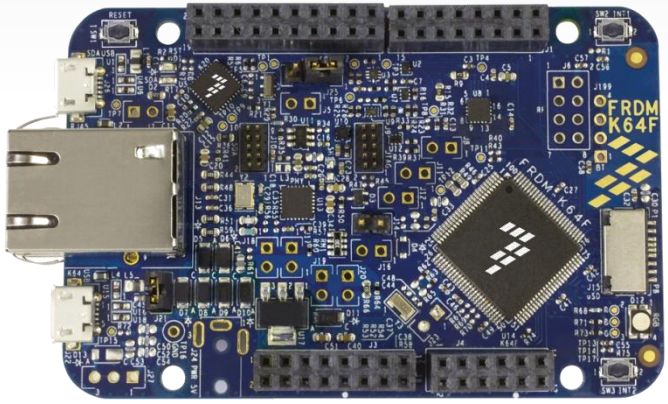
Name	Description
FRDM-K64F Quick Start Package	Quick Start Guide and supporting files for getting started with the FRDM-K64F
FRDM-K64F User's Guide	Overview and detailed information for the FRDM-K64F hardware
FRDM-K64F Pin-outs	Spreadsheet of pin connections for all MCU pins. Includes pinout for the I/O headers, Arduino R3 compatibility chart, and OpenSDAv2 MCU pinout.
FRDM-K64F Schematics	PDF schematics for the FRDM-K64F hardware
FRDM-K64F Design Package	Zip file containing all design source files for the FRDM-K64F hardware

Get to Know the FRDM-K64F



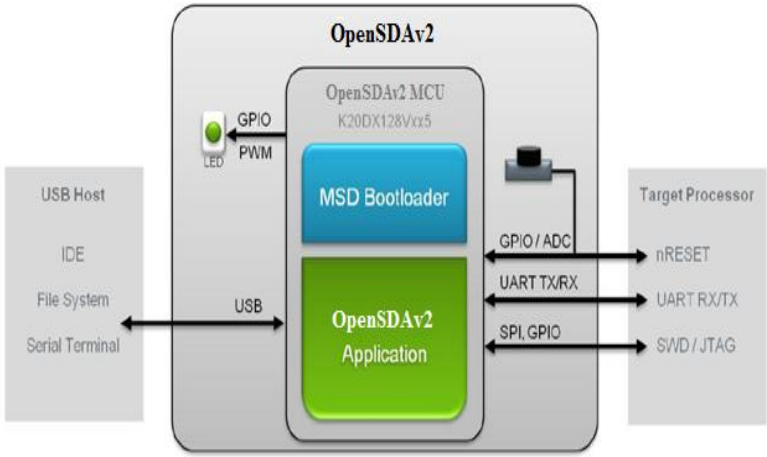
Get to Know the FRDM-K64F

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 FRDM-K64F development platform is a simple, yet sophisticated design featuring a Kinetis K series MCU, built on the ARM® Cortex®-M4 core.



Features:

- MK64FN1M0VLL12 MCU – 120MHz, 1024KB Flash, 256KB SRAM, FPU, DSP, Crystal-less USB (USB device), 100 LQFP
- FXOS8700CQ accelerometer and magnetometer
- RGB LED
- Flexible power supply options – USB, external source
- Easy access to MCU I/O
- Ethernet, SDHC, USB
- Add-on Module: RF24L01+ (RF) and JY-MCU (BT)
- Form factor compatible with Arduino™ R3 pin layout
- New, OpenSDAv2 serial and debug interface
    - Open-source hardware design
    - Open-source bootloader and firmware
    - Virtual serial port interface
    - Mass storage device (MSD) flash programming interface – no tool installation required to evaluate demo apps
    - CMSIS-DAP interface: new ARM standard for embedded debug interface



Getting Started Out of the Box

Installing Drivers and Running the Out of Box Demo

1. Download and Install the mbed OpenSDAv2 USB Drivers found at http://mbed.org/handbook/Windows-serial-configuration.
2. Plug in a USB cable (not included) from a USB host to the OpenSDAv2 micro-B USB connector. The FRDM-K64F will be powered by this USB connection.

FRDM-K64F comes with the mass-storage device (MSD) Flash Programmer OpenSDAv2 Application preinstalled. It will appear as a removable storage drive with a volume label of `MBED`.

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 mbed OpenSDAv2 USB Drivers (Step 1).

3. The pre-installed out-of-box demo running on the K64 MCU will cycle through several colors on the RGB LED
4. After Step 3 completes, press SW3 twice and tilt the board. The RGB LED will change from RED to GREEN based on the accelerometer data.
5. After Step 4 completes, press SW3 six times. Place a metal material over the board or tilt the board. The RGB LED will change based on the accelerometer and magnetometer data. The stronger magnetism on the magnetometer component, the brighter RGB LED emitted.

Introduction to OpenSDAv2

OpenSDAv2 is an open-standard serial and debug adapter. It bridges serial and debug communications between a USB host and an embedded target processor. OpenSDAv2 software includes a flash-resident open-source USB mass-storage device (MSD) bootloader and a collection of OpenSDAv2 Applications. FRDM-K64F comes with the MSD Flash Programmer OpenSDAv2 Application preinstalled. Follow these instructions to run the OpenSDAv2 Bootloader and update or change the installed OpenSDAv2 Application.

Enter OpenSDAv2 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 OpenSDAv2 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 OpenSDAv2 Bootloader mode.

IMPORTANT NOTE: Follow the "How to load an OpenSDAv2 Application" instructions to update the MSD Flash Programmer on your FRDM-K64F to the latest version. It is likely that the version provided in this package is newer than what was preprogrammed on your FRDM-K64F.

How to load an OpenSDAv2 Application

1. While in OpenSDAv2 Bootloader mode, double-click `bootload.HTML` in the `BOOTLOADER` drive. A web browser will open the mbed homepage. Navigate the page to "Firmwareupdate". Download `mbed_if_v#.#_frdm_k64f binary or s19` file.
2. Or, Locate the `OpenSDAv2 Applications` folder in the FRDM-K64F Quick Start Package.
3. Copy & paste or drag & drop the MSD Flash Programmer Application (`k20dx128_k64f_if_mbed.bin or k20dx128_k64f_if_mbed.s19 or mbed_if_v#.#_frdm_k64.bin`) to the `BOOTLOADER` drive.
4. Unplug the USB cable and plug it in again. The new OpenSDAv2 Application should now be running and a `MBED` 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 OpenSDAv2 Applications.

Introduction to OpenSDAv2

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 K64 MCU. It emulates a FAT file system, appearing as a removable drive in the host file system with a volume label of `MBED`. Raw binary or Motorola S-record files that are copied to the drive are programmed directly into the flash of the K64 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-K64F Quick Start Package.
2. Copy & paste or drag & drop one of the `.bin` files to the `MBED` drive.

The new application should now be running on the FRDM-K64F. Starting with the MSD Flash Programmer, you can program repeatedly without the need to unplug and re-attach the USB cable before reprogramming.

Program rtc_demo.bin example to replace the out-of-box demo on your FRDM-K64F.

Using the Virtual Serial Port

1. Determine the symbolic name assigned to the FRDM-K64F virtual serial port. In Windows open Device Manager and look for the COM port named “mbed 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 “shell_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). Set the baud rate to 115200 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: Flash programming with the MSD Flash Programmer is currently only supported on Windows operating systems. However, the virtual serial port has been successfully tested on Windows, Linux and Mac operating systems.

Explore Further

Now that you are familiar with the FRDM-K64F development platform and OpenSDAv2, it's time to explore the additional software and lab guides available at http://www.freescale.com/FRDM-K64F. Select your next path from the links in the **Jump Start Your Design** section.

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