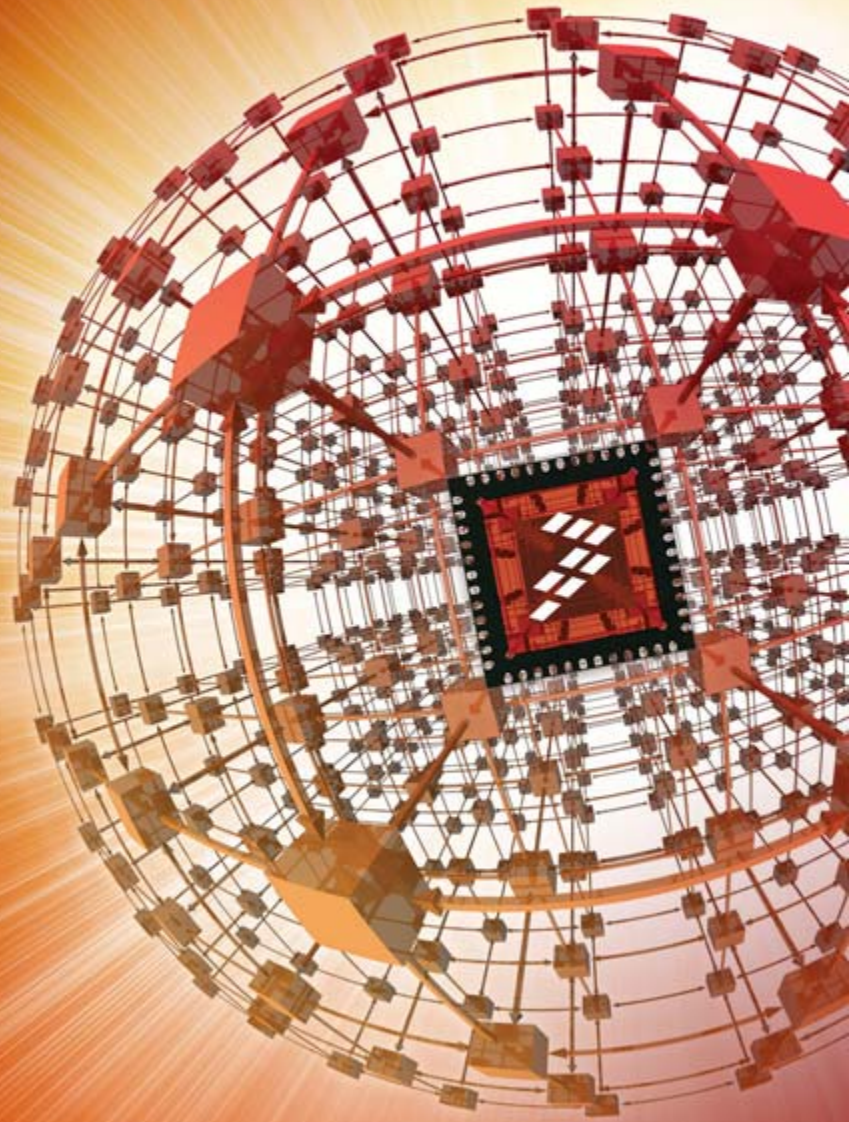
Quick Start Guide for the Freescale Freedom Development Platform FRDM-K22F



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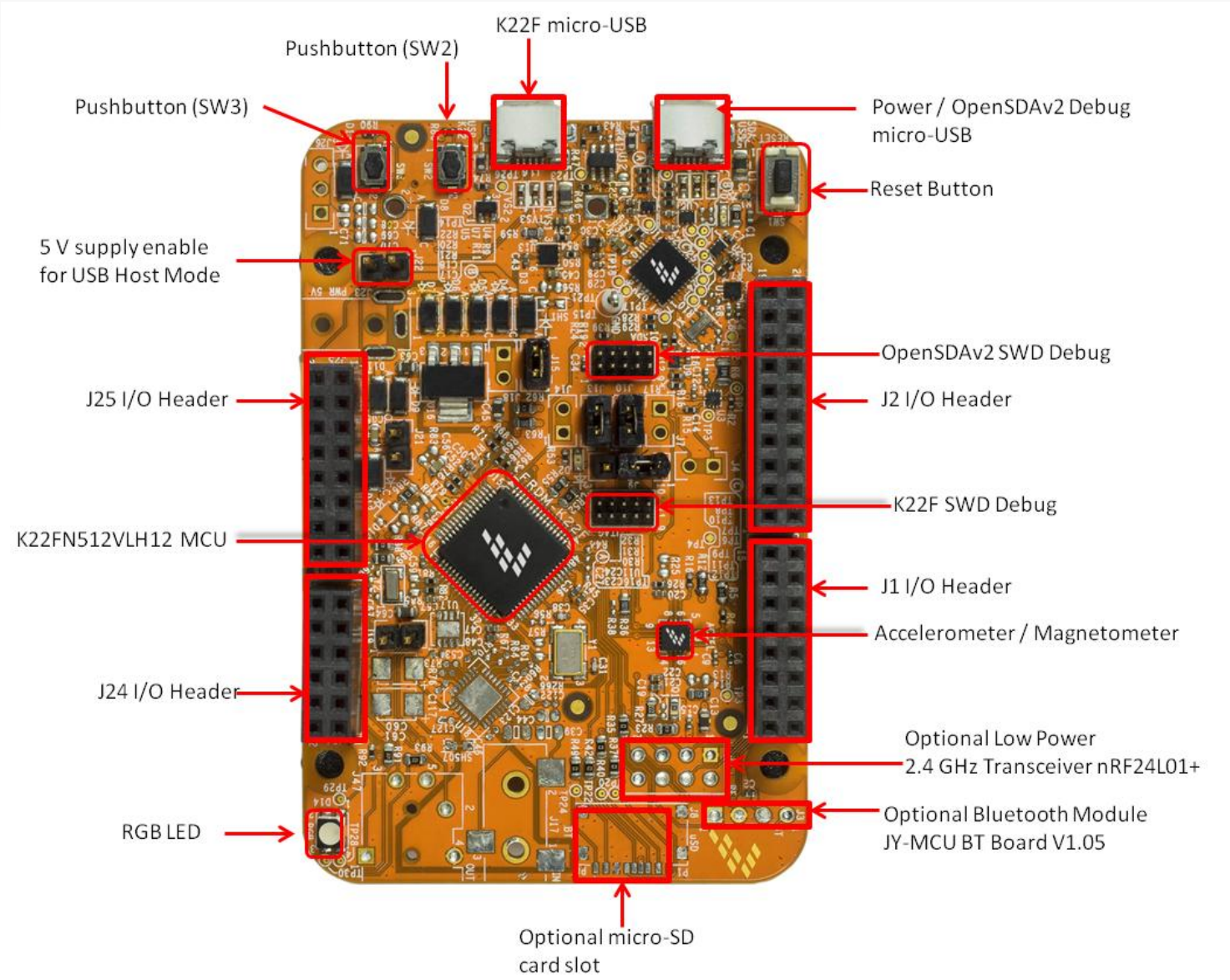
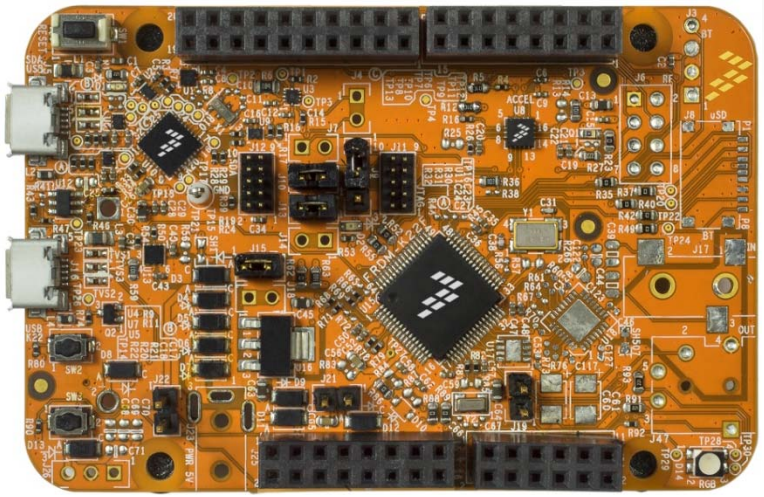


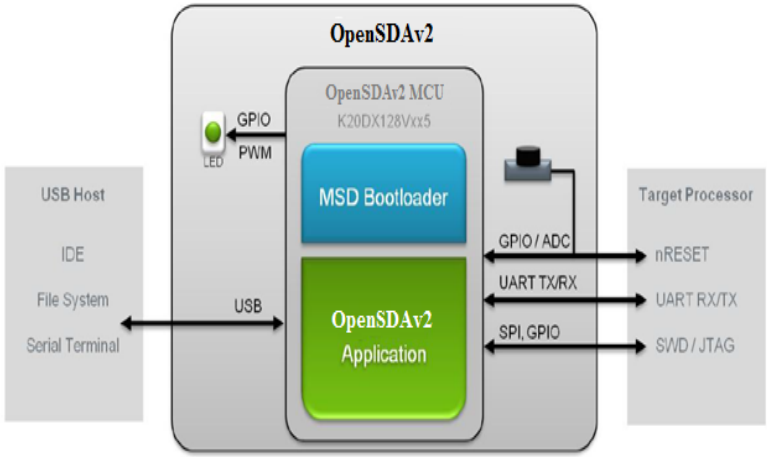
Get to Know the FRDM-K22F Development Platform

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-K22F development platform is a simple, yet sophisticated design featuring a Kinetis K series MCU built on the ARM® Cortex®-M4 core with a floating point unit and USB connectivity with crystal-less operation.



Features:

- MK22FN512VLH12 MCU – 120 MHz, 512 KB Flash, 128 KB SRAM, FPU, DSP, crystal-less USB (USB device), 64 LQFP
- FXOS8700CQ accelerometer and magnetometer
- RGB LED
- Flexible power supply options – USB, external source
- Easy access to MCU I/O
- Optional add-on modules: microSD card (over SPI), RF24L01+ (RF) and JY-MCU (Bluetooth)
- 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-AB USB connector (J5). The FRDM-K22F will be powered by this USB connection.

FRDM-K22F 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`. For more information, see page 8.

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 Determine the symbolic name assigned to the FRDM-K22F virtual serial port. To do this in Windows, open Device Manager and look for the COM port named “mbed Serial Port.”

4 Open the serial terminal emulation program of your choice. Examples for Windows include Tera Term, PuTTY, and HyperTerminal.

5 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. Press the any key or the SW3 pushbutton on the board to display the following message:

Select from the following menu:

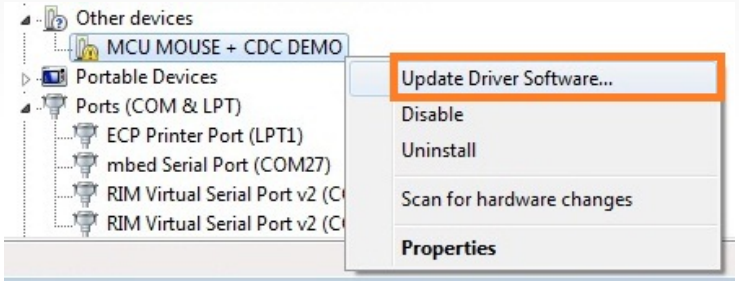
1. **Bubble level** – Single axis level using the red and green LEDs to indicate when the board is unlevel.
2. **eCompass demo** – Compass using the combined magnetometer and accelerometer to indicate the heading of board in reference to magnetic north.
3. **USB CDC demo** – Second serial terminal. (For additional details on the driver installation, refer to the instructions on the next page.)
4. **Metal Detector demo** – Metal detector demo that indicates the direction and distance to a foreign metal object using the variable LED brightness as the indicator.
5. **Stopwatch demo** – Uses the real-time counter (RTC) to implement a stopwatch with 1/100th of a second precision.
6. **Air mouse demo** – USB mouse using the accelerometer to determine where/how to move the cursor

Enter a number key (1–6) on the keyboard to run each option from the Quick Start Demo. Further information will be displayed on the terminal as the demo runs.

How to install CDC driver for USB CDC demo

Below are the steps to install the CDC driver on Windows 7, while on Windows XP the similar will apply.

1 Under the Device Manager, click “Update Driver Software…”

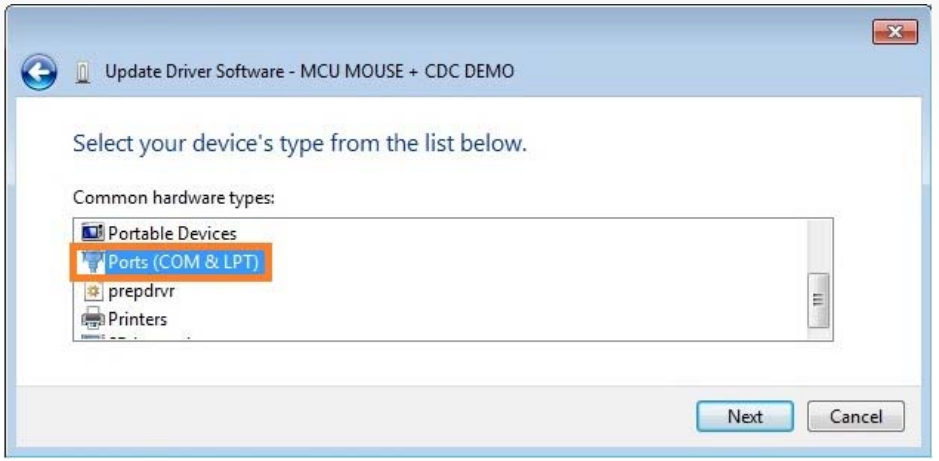


2 On the Update Driver Software window, choose “Browse my computer for driver software”

3 Choose “Let me pick from a list of device drivers on my computer”

How to install CDC driver for USB CDC demo cont'd

4 Select "Ports (COM & LPT)" as the device's type and click "Next"



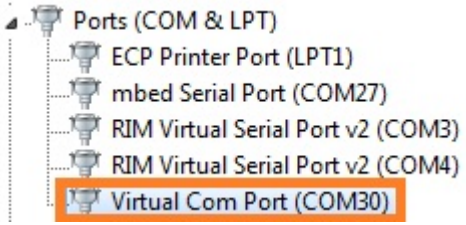
5 Extract the CDC driver from the Quick Start Package to your computer and click on "Have Disk…", then navigate to its location by clicking on "Browse…":
<install_dir>\fsl_ucwxp.inf

How to install CDC driver for USB CDC demo cont'd

6 Click on the "Next" button

7 When prompted, select "Yes"

8 Now, the CDC driver will have installed successfully and will be listed in the Device Manager under Ports (COM & LPT)



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 K22F 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 K22F 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 Virtual Serial Port

1. Determine the symbolic name assigned to the FRDM-K22F virtual serial port. To do this 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. 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.
4. 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-K22F and OpenSDAv2, it's time to explore additional information including details regarding the SDK-enabled Out-of-Box Demo and resources such as design files and schematics located at freescale.com/FRDM-K22F.

Leverage the Kinetis SDK and other online enablement software and tools for Kinetis MCUs, available for download at the following links:

- Kinetis software development kit (SDK): **freescale.com/ksdk**
- MQX™ RTOS: **freescale.com/mqx**
- Kinetis Design Studio IDE: **freescale.com/kds**
- Bootloader for Kinetis MCUs: **freescale.com/kboot**

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