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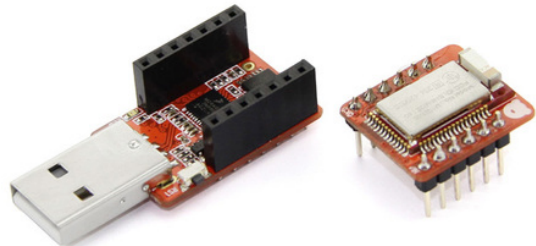
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BLE Nano & MK20 USB Board



Features

- Smallest BLE development board, only 18.5mm x 21.0mm
- [Nordic nRF51822 SoC](#) supports both BLE Central and BLE Peripheral roles
- Ultra low power consumption
- Support voltage from 1.8V to 3.3V
- Software development using mbed.org, GCC, Keil or Arduino
- Lots of libraries and examples available
- Easy firmware deployment with our MK20 USB board or Over-the-Air download

(available soon)

- Work with our free [Android App](#) and [iOS App](#)
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Description

BLE Nano is the smallest Bluetooth 4.1 Low Energy (BLE) development board in the market. The core is Nordic nRF51822 (an ARM Cortex-M0 SoC plus BLE capability) running at 16MHz with ultra low power consumption.

Developing a Bluetooth Smart enabled 'appcessory' (accessory device + companion application) is easier than ever. You can quickly produce prototypes and demos target for Internet of Things (IoT) and other interesting projects. BLE Nano could operate under 1.8V to 3.3V, therefore it works with a lot of electronic components.

Current supported BLE central devices:

iOS 7 or 8

- iPhone 4s
- iPhone 5/6 (all models)
- iPod touch 5
- iPad 3/4/mini/Air

Android 4.3 or above (4.4 recommended for stability) with Bluetooth 4.0 hardware support

- Nexus 4
- Nexus 5
- Nexus 7
- [other compatible Android devices reported by our users](#)
(please report any other Android devices supported)

Windows Phone 8.1

- Nokia Lumia 630
- (please report any other Windows Phone devices supported)

Windows 8.1 with built-in Bluetooth 4.0 or USB dongle

Mac OSX 10.9.2 with built-in Bluetooth 4.0 or USB dongle

Linux with BlueZ 5.1 with built-in Bluetooth 4.0 or USB dongle

Programming

There are three options to program your BLE Nano with MK20 USB Board.

Nordic nRF51822 BLE SDK

If you want the full power of nRF51822, you should use [Nordic nRF51822 BLE SDK](#), we provide a product key for all registered users* of our BLE Nano to download the SDK.

We have prepared a guide "[Firmware Development with nRF51822 SDK](#)" to show you how to use the SDK with ARM GCC.

mbed's Bluetooth Low Energy API

The [mbed platform](#), developed by [ARM](#), provides free software libraries and online tools for professional rapid prototyping of products based on ARM microcontrollers. Their Bluetooth Low Energy Development Team has released the [mbed BLE API together with 10+ samples](#). Our "[Getting Started with nRF51822](#)" guide shows you how to start programming with mbed.

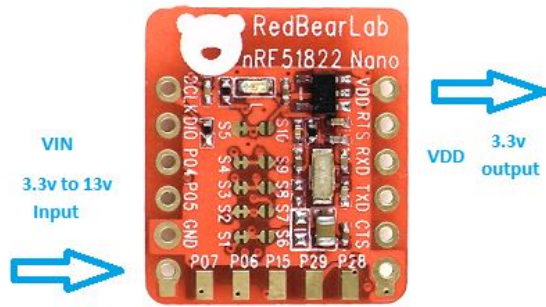
Arduino Library for nRF51822

We have developed an Arduino library for nRF51822 which will be open-sourced and publicly available in the future; it is still at pre-release stage but we invite all interested registered users* of our BLE Nano to access the pre-release library and sample sketches including BLE Controller, Beacon, Heart Rate Monitor etc. Please refer to our "[Getting Started with nRF51822](#)" guide for more details.

* You will find a product registration card inside the BLE Nano box with the instruction on how to register.

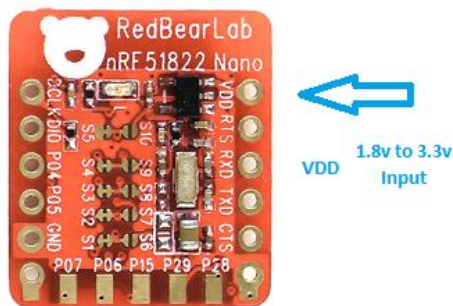
Power Supply

VIN



The BLE Nano can accept 3.3V to 13V from the VIN pin, voltage will be regulated to 3.3V via the onboard LDO as the nRF51822 chip operates at 3.3V. Thus, you can connect a rechargeable battery to it directly. Also, if you have another component to work with the BLE Nano, you can get 3.3V from the VDD as power supply to your component.

VDD

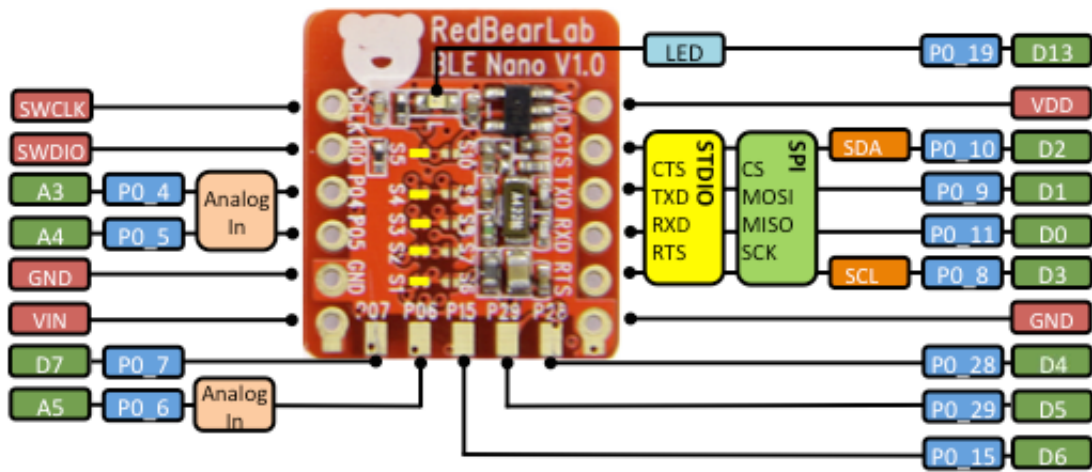


VDD can accept 1.8V to 3.3V only, if you have another MCU to work with the BLE Nano and that can supply 1.8V to 3.3V output, you should connect it to VDD of the BLE Nano. This would allow your BLE Nano to work components below 3.3V (e.g. 1.8V).

*Caution

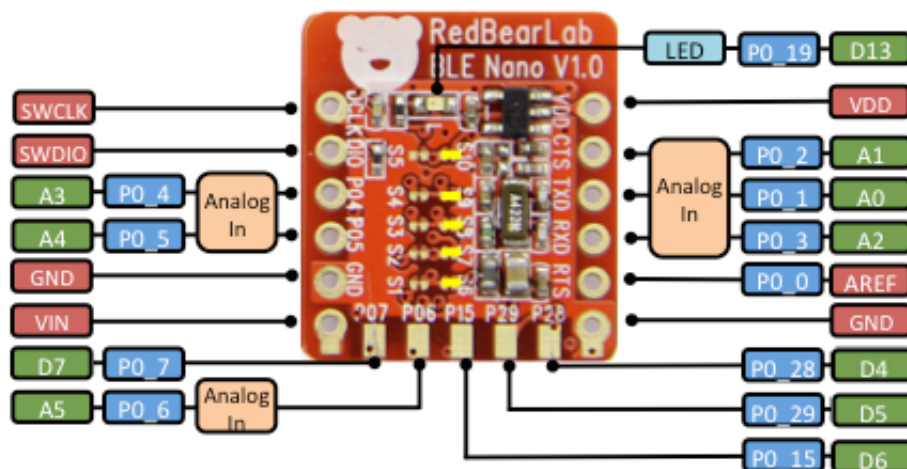
- DO NOT supply power from both VIN and VDD, it will damage the BLE Nano
- DO NOT supply higher than 3.3V to VDD, it will damage the BLE Nano
- DO NOT supply higher than 13V to VIN, it will damage the BLE Nano

BLE Nano Pinout



default (ex-factory) settings

S1 Short and S6 Open	RTS > P0_8
S2 Short and S7 Open	RXD > P0_11
S3 Short and S8 Open	TXD > P0_9
S4 Short and S9 Open	CTS > P0_10
S5 Short and S10 Open	P0_30 > GND



user configurable settings

S1 Open and S6 Short	RTS > P0_0
S2 Open and S7 Short	RXD > P0_3
S3 Open and S8 Short	TXD > P0_1
S4 Open and S9 Short	CTS > P0_2
S5 Open and S10 Short	P0_30 > VDD

*** Do not short S5 and S10 at the same time, this will damage the BLE Nano**

The on-board LED is connected to Pin 19 (P0_19).

Pin 30 (P0_30) is used as a signal pin. If short switch S5 but leave switch S10 open, pin 30 will be GND (low); if short S10 but leave S5 open, pin 30 will be VDD (high). Developer can make appropriate decision in the firmware according to the state of pin 30; some Nordic's firmware detect this to decide which pins to be used as Serial (UART) pins.

Switches S1 to S4 and S6 to S9 are used to select which pins to be used as UART connections (RTS, RXD, TXD and CTS). By default they are wired to p8 to p11, most Nordic's firmware use this settings, for example their Packet Sniffer firmware. If you want to have more analog pins for your project, you could consider routing the serial interface to p0 to p3.

BLE Nano Specification

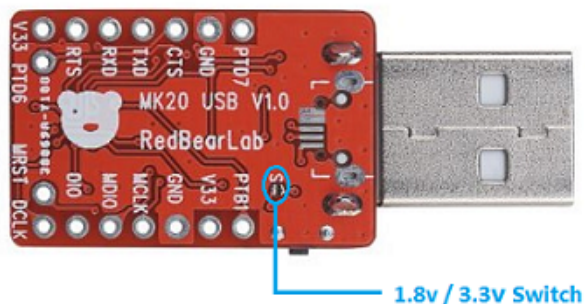
Microcontroller	Nordic nRF51822
CMSIS-DAP Chip	Freescale MK20
Operating Voltage	1.8V to 3.3V
Input Voltage	1.8V-3.3V (VDD)
	3.3V-13V (VIN)
	Caution: Use either one power source at a time, otherwise you will damage the board.
Clock Speed	16MHz
Connectivity	Bluetooth 4.0 Low Energy
	Serial (TX/RX)
	I2C
	SPI
Flash Memory	256KB

SRAM	16KB
Dimensions	18.5 x 21.0mm
I/O Pins	11

MK20 USB Board

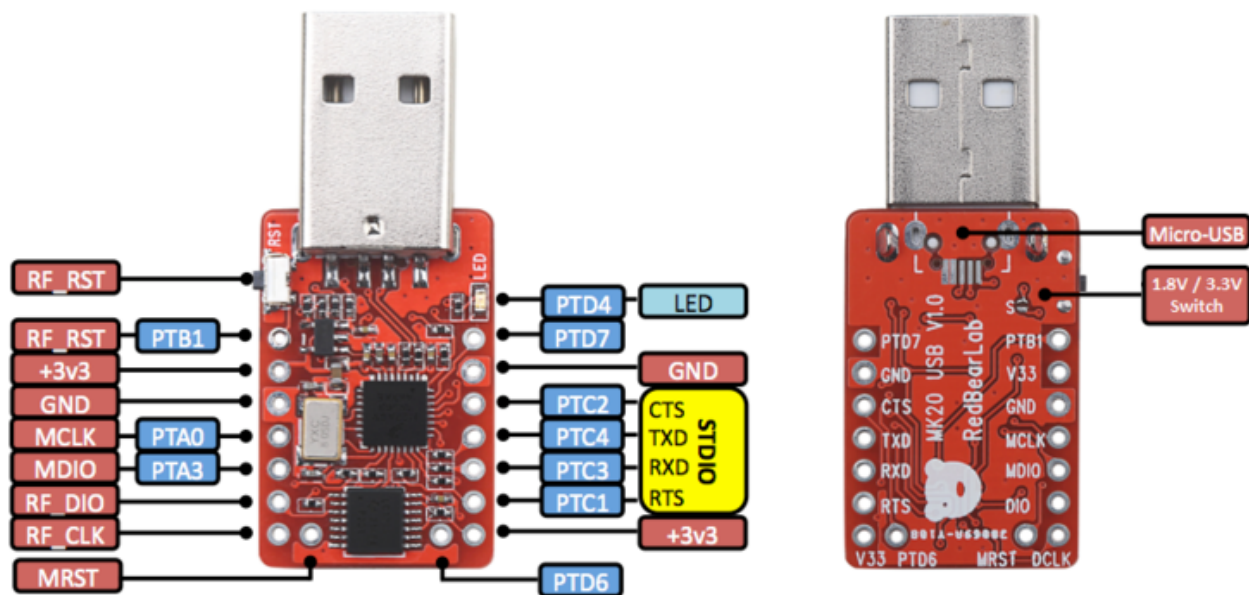


The MK20 (Freescale MK20DX128VFM5) USB board acts as a dongle, it accepts 5V from USB port and regulates to 3.3V via the onboard LDO which can be used to power BLE Nano. It appears on your computer as both a serial port and a removable mass storage disk. Please refer to the guide [Getting Started with BLE Nano](#) to learn how to deploy firmware using MK20 USB board.



Since the BLE Nano can work as low as 1.8V, we have designed the MK20 USB board to run

at 1.8V as well, simply short the switch S, then the regulator will output 1.8V instead. This would allow your BLE Nano to work with 1.8V components.



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