Bluno M0 Mainboard SKU: DFR0416

Bluno M0 is the only ARM Cortex-M0 Arduino Microcontroller that supports 5V standard logic level. With built-in Bluetooth chip, Bluno M0 supports multi-functions such as Bluetooth communication, wireless programming.

Have you tried to make projects with traditional Arduino board? Although these boards have better compatibility, but when you want to make volume production, you'll find that these boards are lacking of pins, low-performance or not compatible with 5V operating voltage. And most of them are very expensive. Luckily, Bluno M0 is a great soul solves all.

Bluno M0 selects 32-bit high-performance Nuvoton SCM (Single Chip Micyoco) as the core. Besides built-in ARM Cortex M0 infrastructure, Bluno M0 supports 5V Logic level, equipped with 1 USB port and 2 serial ports, providing 31 digital pins (parts AFIO) and 6 analog pins, offering more IO resources. Moreover, Bluno M0 is compatible with Arduino Leonardo package/encapsulation and the clock speed is 72MHz.

Additionally, Bluno M0 supplies another IIS interface, supporting play &record wav files. Once put Bluno M0 with advanced IIS chip, professional HIFI audio is available.

Features

- Arduino IDE Compatible
- 32-Bit 72MHz Cortex-M0
- Supports 5V reference voltage
- Supports standard IIS audio interface
- Support USB and dual physical hardware serial port
- Compatible with Leonardo pin packages
- Support wireless programming upload code
- Support Windows /Linux /Mac

Specification

- Microcontrollers: Nuvoton NUC123ZD4AN0 (Cortex M0)
- Clock Speed: 72MHz
- Operating Voltage: 5V
- Recommended Input Voltage: 7-12V
- Limited input voltage: 6-20V
- Digital I/O Pins: 31
- Analog input Pins: 6
- External Interrupt: 2 (D2, D3)
- SRAM: 20K
- Flash: 68K (of which 12 KB used by bootloader, 55K used by the user code area, 1K used by EEPROM)
- EEPROM: 1K
- SPI: 1 port (D14, D15, D16)
- IIC / I2C: 1 port (D2, D3)
- USB COM port: 1 (Serial)
- USB Serial port: 1 (USBSerial)
- BLuetooth Serial port: Serial (USB COM port, Bluetooth and Hardware Serial Port 1 share the same port: Serial)
- Hardware serial port: 2 (Serial, Serial2)
  Serial D0 (Rx1) and D1 (Tx1)
  Serial2 D24 (Rx2) and D25 (Tx2)
- Size: 68.5 * 53.4 mm/ 2.69 * 2.10 inches
- Weight: 30g

Board Overview
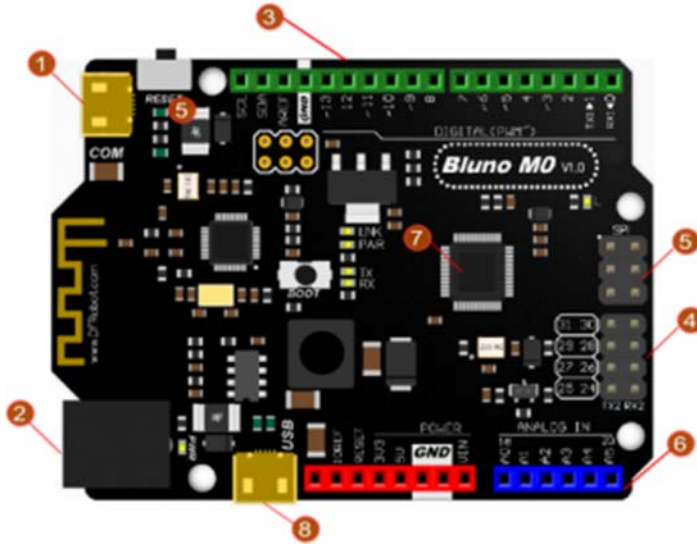
Bluno M0 Mainboard (Arduino Compatible)

Num	Label	Description
1	USB COM Port	USB Power; Program downloading port; Serial port (USB COM port, Bluetooth and Hardware Serial Port 1 share the same port: Serial)
2	Power Supply	DC 2.1 power supply port
3	Digital IO D0~D13	Digital IO D0~D13 (Leonardo Compatible)
4	Digital IO D24~D31	Digital IO D24~D31
5	SPI Interface	D14, D15, D16 (Pin Multiplexing)
6	Analog A0~A5	Analog A0~A5
7	MCU	NUC123LD4AN0
8	USB Serial Port	USB Power; USB Serial Port(called **USBSerial** in code)

⚠️ **NOTE: Bluno M0 can be charged by USB x 2 and DC 2.**

PinMap

Bluno M0 Pins	IC pin	Multiplex	Note
D0	PC4	RXD1	Serial-RX
D1	PC5	TXD1	Serial-TX
D2	PF2	SDA	INT0
D3	PF3	SCL	INT1
D4	PC0	I2S LRCLK	/
D5	PC3	PWM0	/
D6	PA13	PWM1	/
D7	PC2	I2S DI	/
D8	PC3	I2S DO	/
D9	PA14	PWM2	/
D10	PA15	PWM3	/
D11	PB8	PWM4	Software PWM
D12	PC1	I2S BCLK	/
D13	PB14	PWM5	Software PWM
D14	PA10	SPI MISO	/
D15	PA11	SPI SCK	/
D16	PC11	SPI MOSI	/
D17	PB6	RX LED	/
D18	PD0	A0	/
D19	PD1	A1	/
D20	PD2	A2	/
D21	PD3	A3	/
D22	PD4	A4	/
D23	PD5	A5	/
D24	PB4	RXD2	RX2
D25	PB5	TXD2	TX2
D26	PC10	NULL	/
D27	PC9	NULL	/
D28	PC13	NULL	/
D29	PC12	NULL	/
D30	PB9	NULL	/
D31	PB10	NULL	/
D32	PB7	TX LED	/

Tutorial

Requirements

- **Hardware**
  Bluno M0 x 1
  Micro USB Cable x1

- **Software**

Arduino IDE (Version requirements: V1.6.X and later), Click to Download Arduino IDE from Arduino®

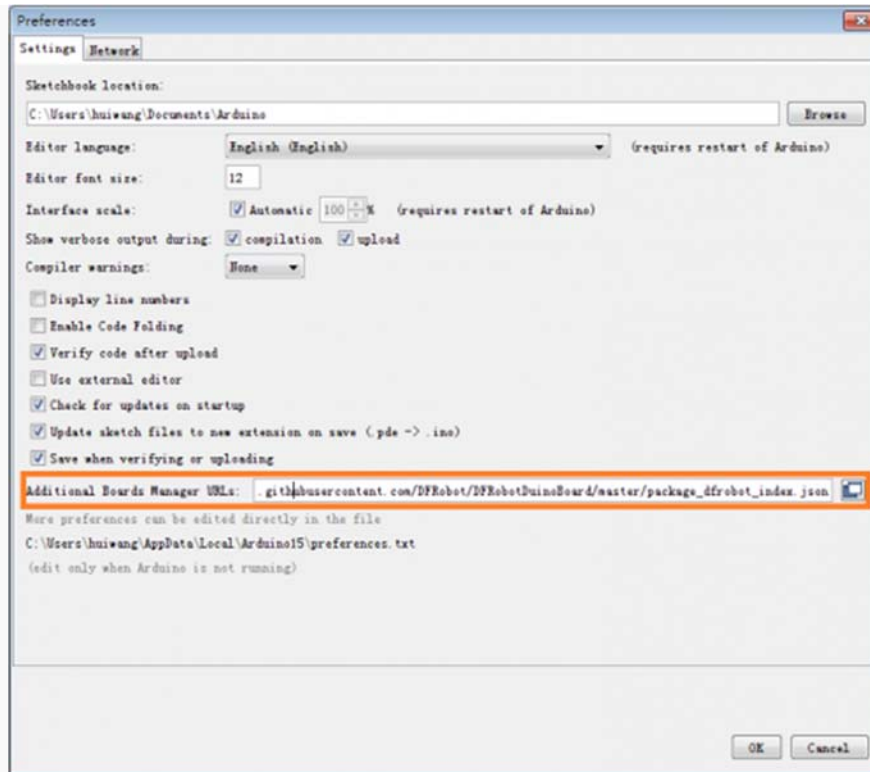https://www.arduino.cc/en/Main/Software

Setup Bluno M0 Software Development Environment

- Open Arduino IDE, **File->Preferences**, find **Additional Boards Manager URLs**, copy the below link, and paste in the blank.

  https://raw.githubusercontent.com/DFRobot/DFRobotDuinoBoard/master/package_dfrobot_m3_index.json
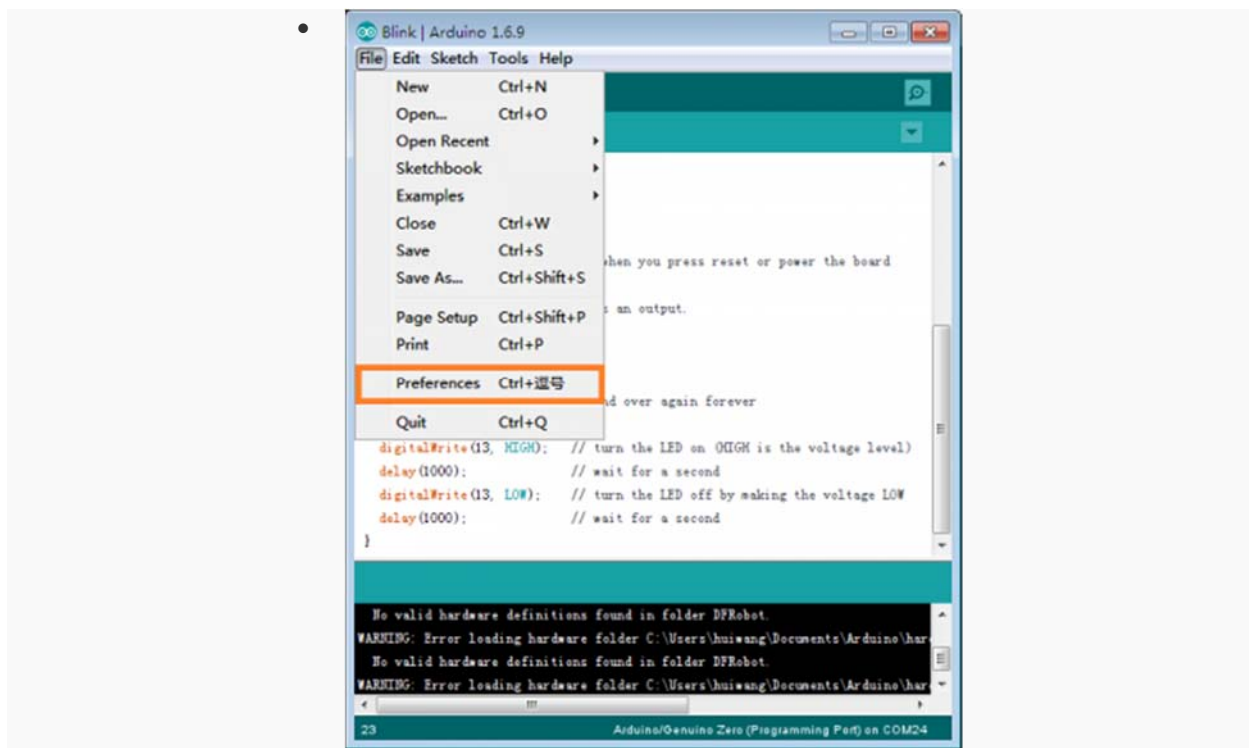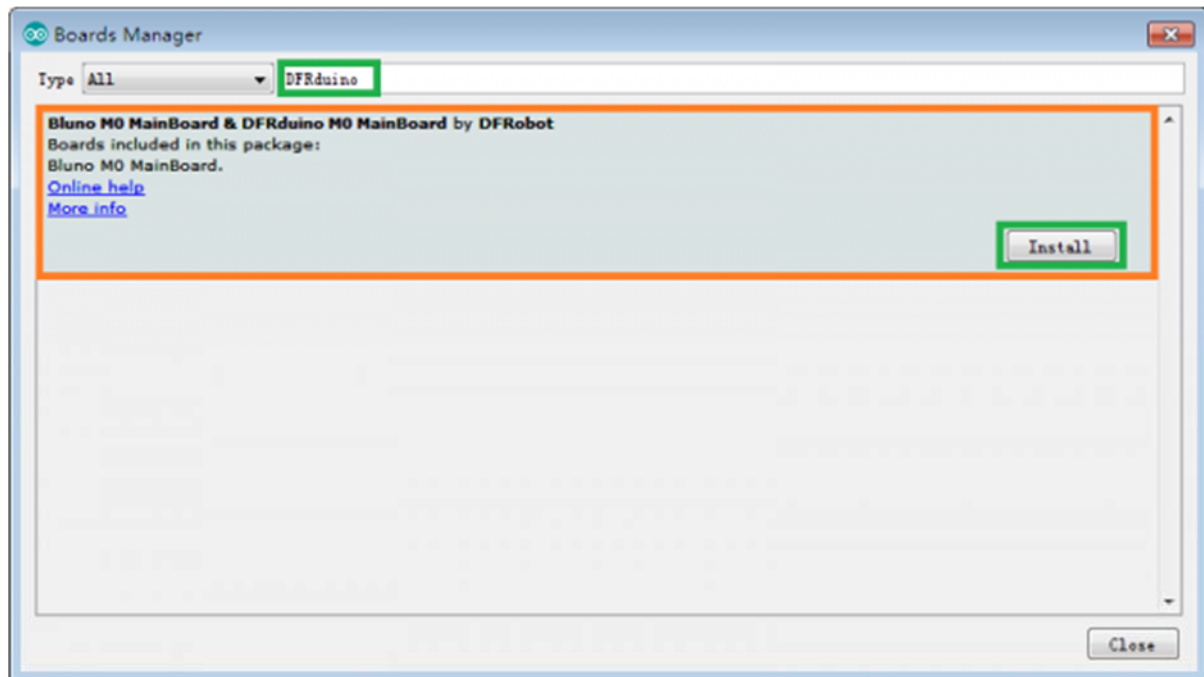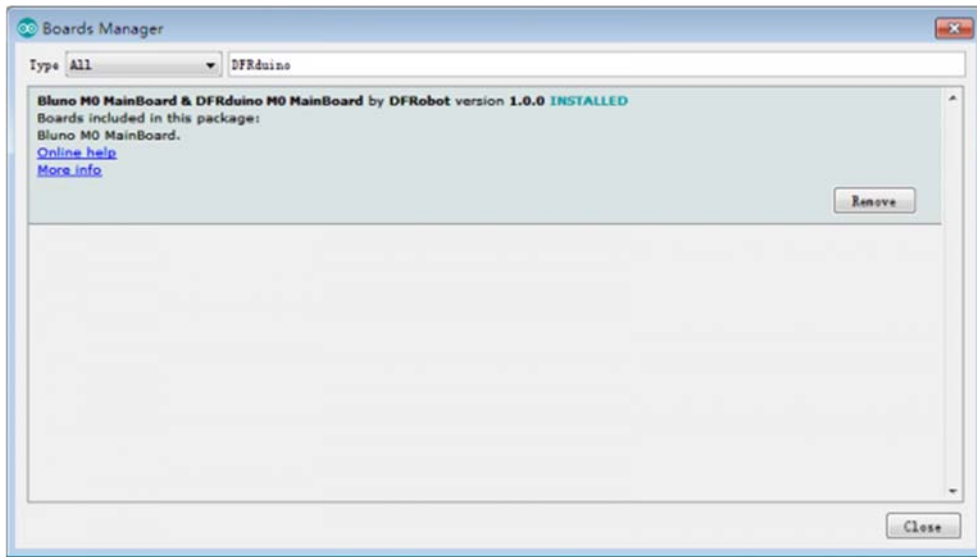

File->Preferences

paste url here

- Click **OK**
- Open **Tools->Board->Boards Manager**, enter Bluno in the search box, click **Install**
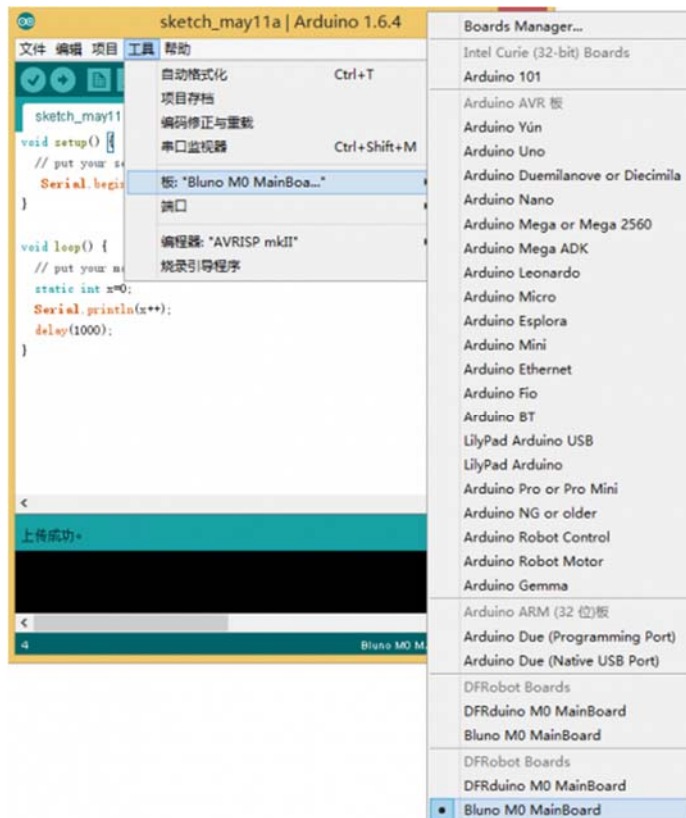

Found "Bluno M0"

Install Bluno M0 MainBoard

Now, the development environment has been installed, you can use it like a normal Arduino board.

Driver Installation

- Some Win10 systems will install driver automatically. Please open device manager to check whether the COM X is installed, if yes, you can just download the program.

- Connect M0 to your computer, and you will find an unknown device in the device manager.

- **Update Driver Software** --> **Browse my computer for driver software** .
- Generally, this driver is located in the SDK folder **C:\Users\yourUserName\AppData\Local\Arduino15\packages\nucDuino\hardware\nucDuino\1.0.0\driver**
- Or you can download it here directly: <u>Click to save</u>. Sometime you need disable the digital signature.

Bluetooth Instruction

Bluno M0 is consistent with Bluno series in Bluetooth. Please refers to Bluno SKU:DFR0267 for details.

Special Function

Hardware Serial port x2 & USB Serial Port x1

- Just like Arduino Leonardo, M0 has USB Serial Port and Hardware Serial Port. No like DFRduino M0, Bluno don't have Serial1. USB COM port, Bluetooth and Hardware Serial Port 1 share the same port: Serial.

USB Serial Port	Serial
Hardware Serial Port 1	Serial
Hardware Serial Port 2	Serial2

- **Sample Code1:** D0&D1 refers to Serial, serial2 refers to Serial2. Users can use USB serial transformer tools to check printing.

```
void setup() {  // put your setup code here, to run once:
    Serial.begin(115200);
    Serial2.begin(115200);
}
void loop() {   // put your main code here, to run repeatedly:
    Serial.println("I am Serial");
    Serial2.println("I am Serial 2");
    delay(1000);
}
```

- **Result1:** Use USB serial transforming board to receive data from Serial2 and you can check printing in correspond in PC.

- **Sample Code2:** Digital IO

```
int pin;
void setup() {  // put your setup code here, to run once:
    for(pin=24;pin<32;pin++){
        pinMode(pin,OUTPUT);
    }
}
void loop() {   // put your main code here, to run repeatedly:
    for(pin=24;pin<32;pin++){
        digitalWrite(pin,HIGH);
```

```
    }
    delay(500);
    for(pin=24;pin<32;pin++){
        digitalWrite(pin,LOW);
    }
    delay(500);


}
```

- **Sample Code3:** Play WAV in IIS

```
#include <SPI.h>
#include <Wire.h>
#include <SD.h>
#include <WAV.h>


// set up variables using the SD utility library functions:
Sd2Card card;


const int chipSelect = 4;
void setup()
{
  // Open serial communications and wait for port to open:
  Serial.begin(115200);
  while (!Serial) {
    ; // wait for serial port to connect. Needed for Leonardo only
  }


  Serial.print("\nInitializing SD card...");


  // we'll use the initialization code from the utility libraries
  // since we're just testing if the card is working!
  if (!card.init(SPI_HALF_SPEED, chipSelect)) {
```

```
      Serial.println("initialization failed. Things to check:");

      Serial.println("* is a card inserted?");

      Serial.println("* is your wiring correct?");

      Serial.println("* did you change the chipSelect pin to match your shie
ld or module?");

      return;

   } else {

      Serial.println("Wiring is correct and a card is present.");

   }

}


void loop()

{

   int ret=WAV_DECODING;

   wav.begin("test.wav");

   wav.play();

   while(ret == WAV_DECODING){

       ret = wav.decode();

   }

}
```

- **Tested Platform:**
  Windows: win7 32bit/64bit, win8 32bit/64bit, win10 32bit
  Linux: Ubuntu 12.04 32bit
  Mac book: OSX 10.11

FAQ

Q1. No permission under Linux system

> **A.** Input ʼ"sudo usermod -a -G USER NAME dialout"ʻ to add user into **dialout** group. Log out
> and log back in

Q2. Where is the missing driving file?

> **A.** In the category driver of sdk.