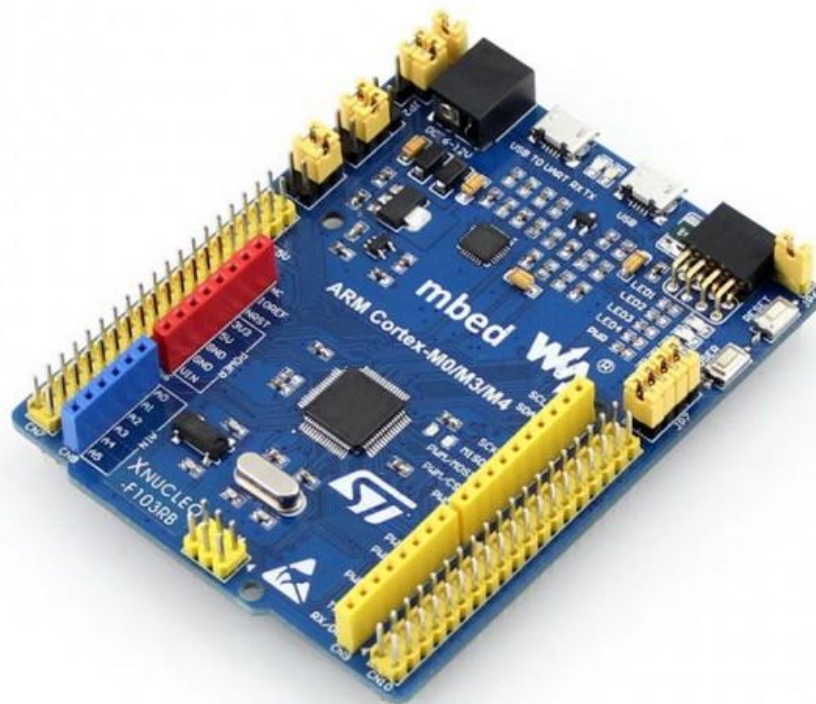


# XNUCLEO-F103RB, Improved STM32 NUCLEO Board



STM32 Development Board, Supports Arduino, Compatible with NUCLEO-F103RB

## XNUCLEO-F103RB Features

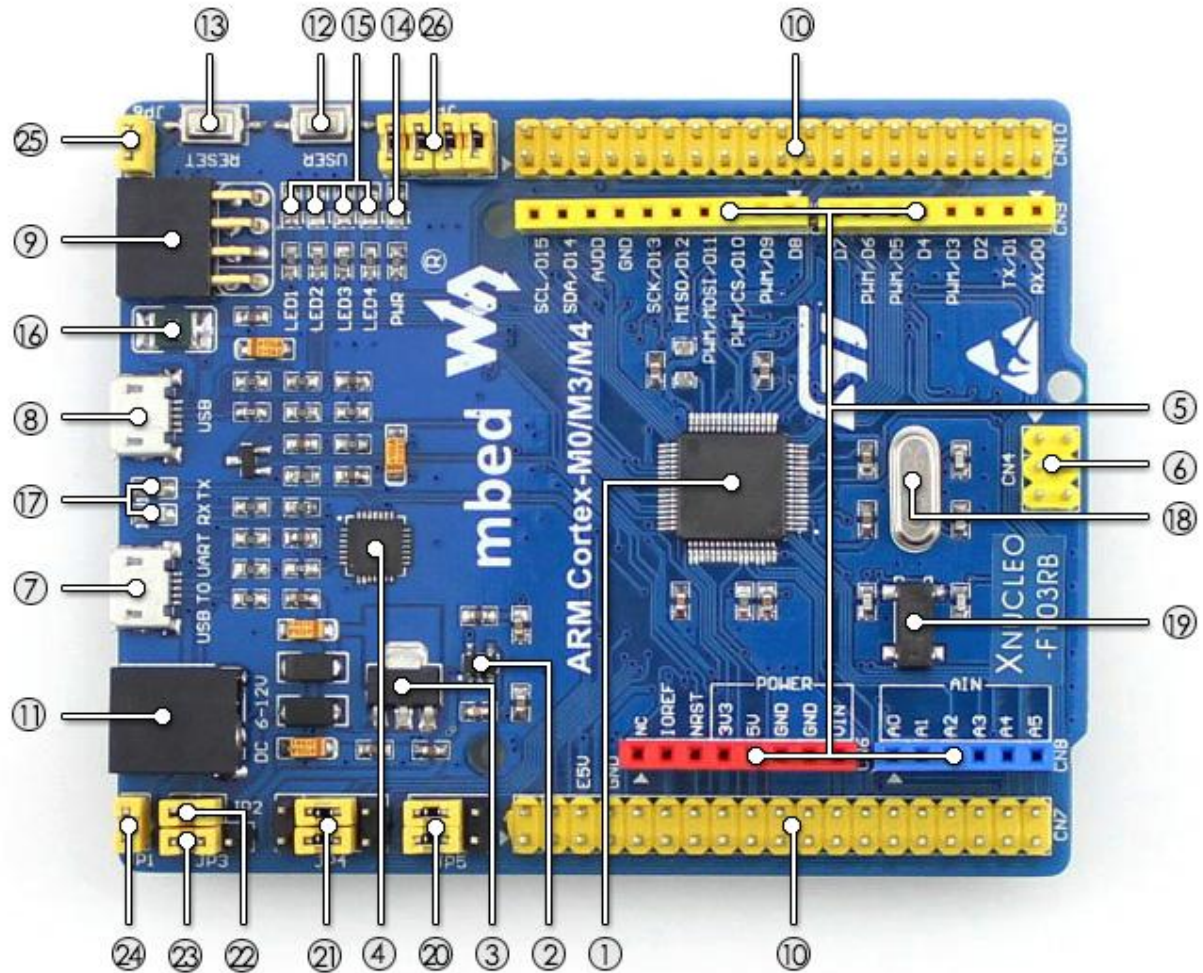
- Compatible with NUCLEO-F103RB, onboard Cortex-M3 microcontroller STM32F103RBT6
- Arduino connectivity support, easy to connect with various Arduino shields and access the massive Arduino resources
- ST Morpho headers provide full access to all STM32 I/Os, easy for peripheral expansion
- Supports mbed, build prototype quickly by mbed SDK and online tools
- Comprehensive free software HAL library including a variety of software examples
- Comes with a separated ST-LINK/V2 module

## Advantages

| Compare                             | XNUCLEO                              | NUCLEO                                   | Remarks  |
|-------------------------------------|--------------------------------------|--|--|
| Arduino compatibility               | UNO, Leonardo                        | UNO                                      | XNUCLEO can be configured by jumper to compatible with UNO (default) or Leonardo   |
| Arduino ICSP interface              | Yes                                  | None                                     | ICSP is required by certain kinds of shields   |
| USB connectivity                    | Yes                                  | None                                     | The USB connector of NUCLEO is for debugging ONLY, not available for USB connection  |
| USB connector                       | Micro USB                            | Mini USB                                 | Micro USB is the advanced USB standard   |
| Morpho headers mark                 | Most                                 | None                                     | Now you can check the PCB mark instead of datasheet  |
| Common interfaces are connected via | Jumpers                              | 0Ω resistors                             | Jumpers are much easier to use, need no soldering  |
| UART debugging                      | Available while in-circuit debugging | Not available while in-circuit debugging | The NUCLEO integrated ST-LINK/V2 functional chip can be simulated as serial port, however, it's not available while in-circuit debugging, whereas XNUCLEO features a stand-alone USB TO UART chip. |
| 8MHz crystal                        | Yes                                  | None                                     | Timer is more accurate when using external 8MHz crystal  |
| 32.768KHz crystal                   | Yes                                  | None                                     | Required for RTC   |
| USB fuse                            | Yes (500mA)                          | None                                     | The computer USB interface might be harmed without fuse  |
| LEDs                                | 4                                    | 1  | The more LEDs, the easier to monitor program running status  |
| UART indicator                      | Yes                                  | None                                     | Data communication is visible now  |
| DC input                            | Yes                                  | None                                     | A convenience  |
| Button position                     | Close to PCB edge                    | Close to Arduino connector               | The button won't be untouchable when connecting with an Arduino shield if it were close to the PCB edge  |
| ST-LINK                             | Separated                            | Integrated                               | ST-LINK can be used anywhere else  |

|                      |     |      |  |
|----------------------|-----|------|--|
| Comes with USB cable | Yes | None |  |
|----------------------|-----|------|--|

## What's on the XNUCLEO-F103RB



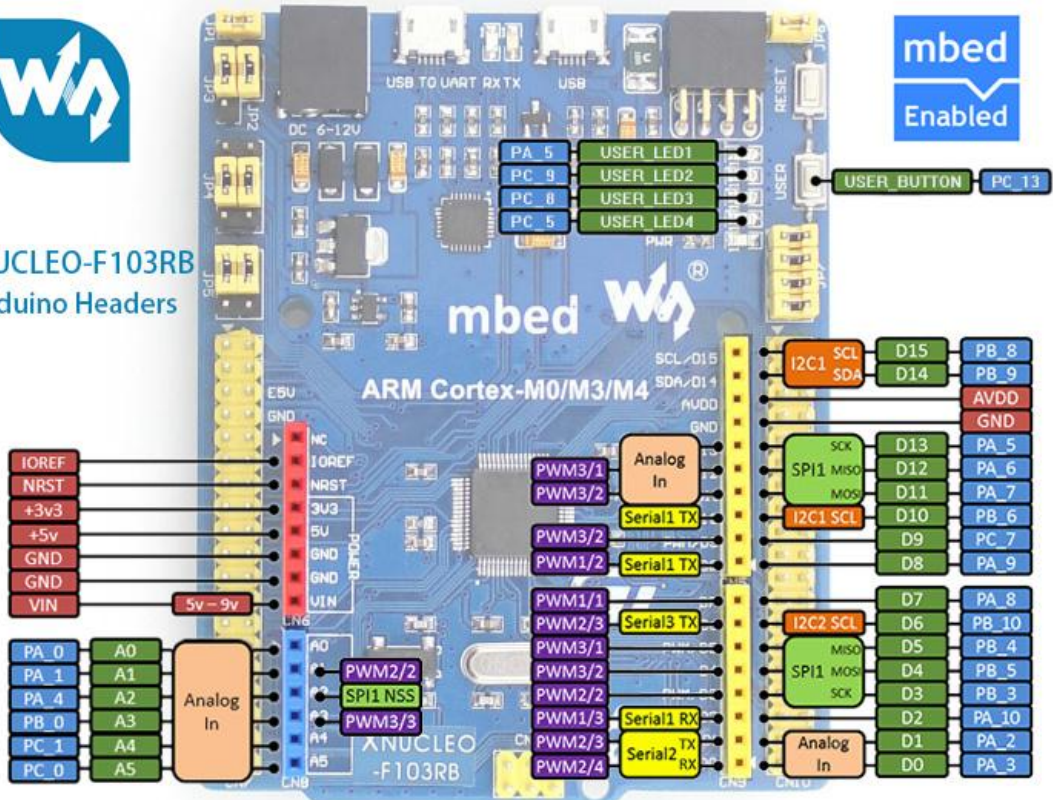
1. STM32F103RBT6
  - Core : ARM® 32-bit Cortex™-M3
  - Operating frequency : 72MHz
  - Operating voltage : 2.0V-3.6V
  - Package : LQFP64
  - Memories : 128kB Flash, 20kB SRAM
  - Interfaces : 2 x SPI, 3 x USART, 2 x I2C, 1 x CAN, 1 x USB
  - AD/DA : 2 x AD (12 bit, 16 channels)
2. SPX3819M5 : 3.3V voltage regulator
3. AMS1117-5.0 : 5.0V voltage regulator
4. CP2102 : USB to UART convertor
5. Arduino connector : for connecting Arduino shields
6. ICSP interface : Arduino ICSP
7. USB TO UART : for debugging
8. USB connector : USB communication interface
9. SWD interface : for programming and debugging
10. ST Morpho headers : access to VCC, GND and all the I/Os, easy for expansion
11. 6-12V DC input

12. User button
13. Reset button
14. Power indicator
15. User LED
16. 500mA fast self-recovery fuse
17. Serial port Rx/Tx indicator
18. 8MHz crystal
19. 32.768KHz crystal
20. ADC/I2C selection jumper
  - short A and B : Arduino A4, A5 is used as I2C
  - short B and C : Arduino A4, A5 is used as ADC
21. UART selection jumper
22. MCU current test jumper : for low power tests
23. Power selection jumper
  - short 5V and U5V : powered from USB connection
  - short 5V and E5V : powered from external power supply
24. USB enable jumper
  - short the jumper to enable
  - open the jumper to disable
25. User button jumper
  - short the jumper to connect to I/Os used in example code
  - open the jumper to connect to other custom pins via jumper wires
26. User LED jumper
  - short the jumper to connect to I/Os used in example code
  - open the jumper to connect to other custom pins via jumper wires

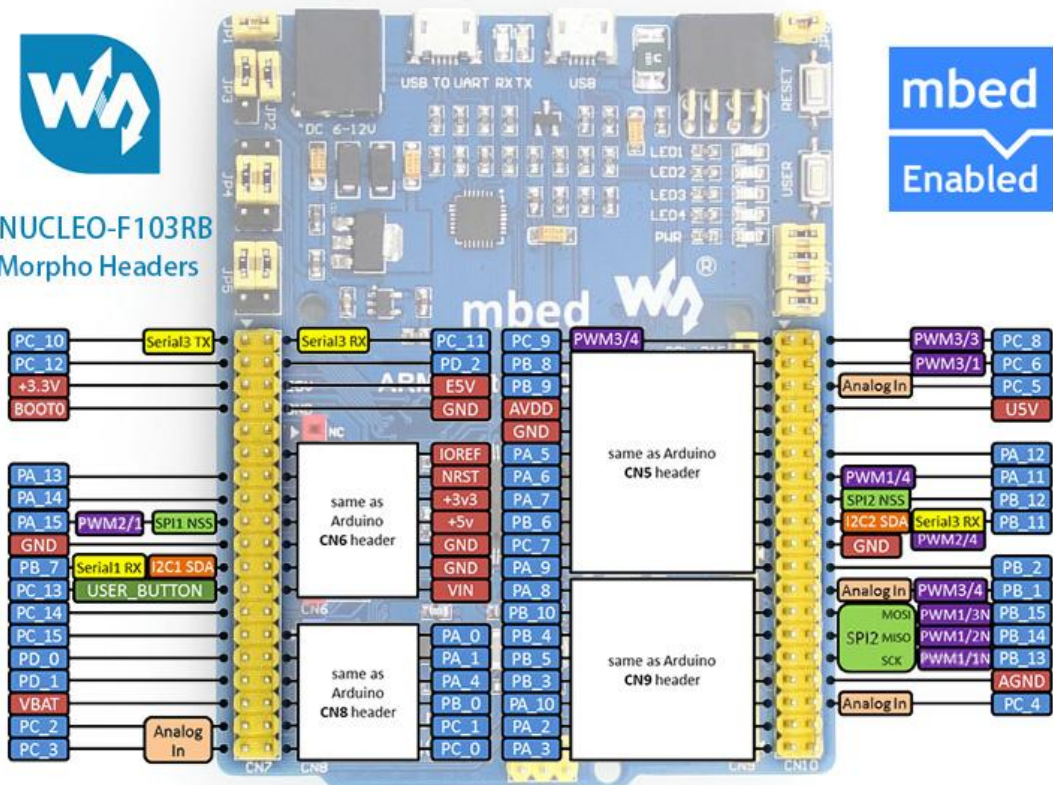
# XNUCLEO-F103RB Expansion Headers



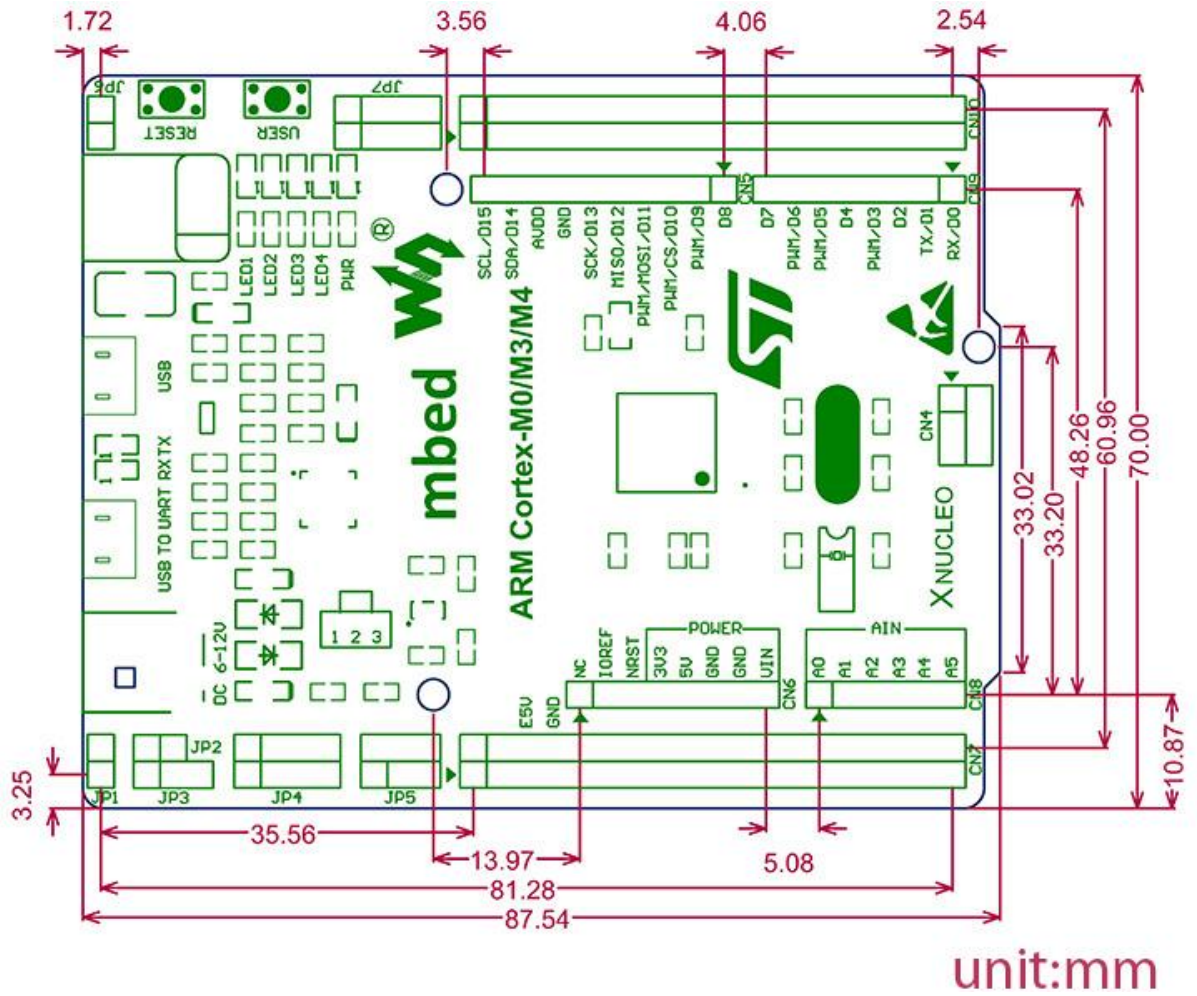
XNUCLEO-F103RB  
Arduino Headers



XNUCLEO-F103RB  
Morpho Headers



## XNUCLEO-F103RB Dimension



## Development Resources

Wiki : [www.waveshare.com/wiki/XNUCLEO-F103RB](http://www.waveshare.com/wiki/XNUCLEO-F103RB)