Cytron RFM LoRa Shield
SHIELD-LORA-RFM

User's Manual

V1.0

March 2017

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1.0 INTRODUCTION

RFM LoRa Shield is an Arduino shield which integrates RFM95W LoRa module and based on Open Source Library with any Arduino projects. It is compatible with Arduino Uno, Arduino Duemilanove, Arduino Mega2560, Arduino Leonardo and possibly other pin compatible main boards.

RFM Lora Shield allows users to send data and reach extremely long ranges at low data-rates. It provides ultra-long range spread spectrum communication and high interference immunity whilst minimising current consumption, and targets professional wireless sensor network applications such as irrigation systems, smart metering, smart cities, smartphone detection, building automation, etc.

Using LoRa^{TM} modulation technique, RFM Lora Shield can achieve a sensitivity of over -148dBm using a low cost crystal and bill of materials. The high sensitivity combined with the integrated +20 dBm power amplifier yields industry leading link budget making it optimal for any application requiring range or robustness. LoRa also provides significant advantages in both blocking and selectivity over conventional modulation techniques, solving the traditional design compromise between range, interference immunity and energy consumption.

Besides supporting high performance (G)FSK modes for systems including WMBus and IEEE802.15.4g, RFM Lora Shield also deliver exceptional phase noise, selectivity, receiver linearity and IIP3 for significantly lower current consumption than competing devices.

LoRa shield has stackable side headers which allows more Arduino-compatible shields to be stacked on top of it. It also has built in grove sensors connectors which allows users to integrate grove-based sensors into their application. It has also provided option for user to integrate OLED with this shield for visual display.

* This is LoRa Radio Shield, the shield itself does not contain LoRaWAN, the Arduino controller board (UNO, Mega, Leonardo, etc) will need to have LoRaWAN stack.

Features:
- Integrated with RFM95W LoRa module operating in the 915 MHz frequency band.
- High Receiver Sensitivity: down to -146 dBm.
- TX Power: adjustable up to +14 dBm high efficiency PA.
- FSK, GFSK, MSK, GMSK, LoRa^{TM} and OOK modulation.
- Low RX current of 10.3 mA, 200 nA register retention.
- The shield comes with:
    - 1 x SMA 90 deg antenna connector
    - 1 x U.FL SMD antenna connector
    - 1 x single through hole for wire antenna
- Interface via SPI with Arduino main board.
- 3 Grove connectors for sensors or other grove-compatible devices.
- Option for OLED installment
- Suitable for low power wireless sensor network applications such as irrigation systems, smart metering, smart cities, smartphone detection, building automation, etc.
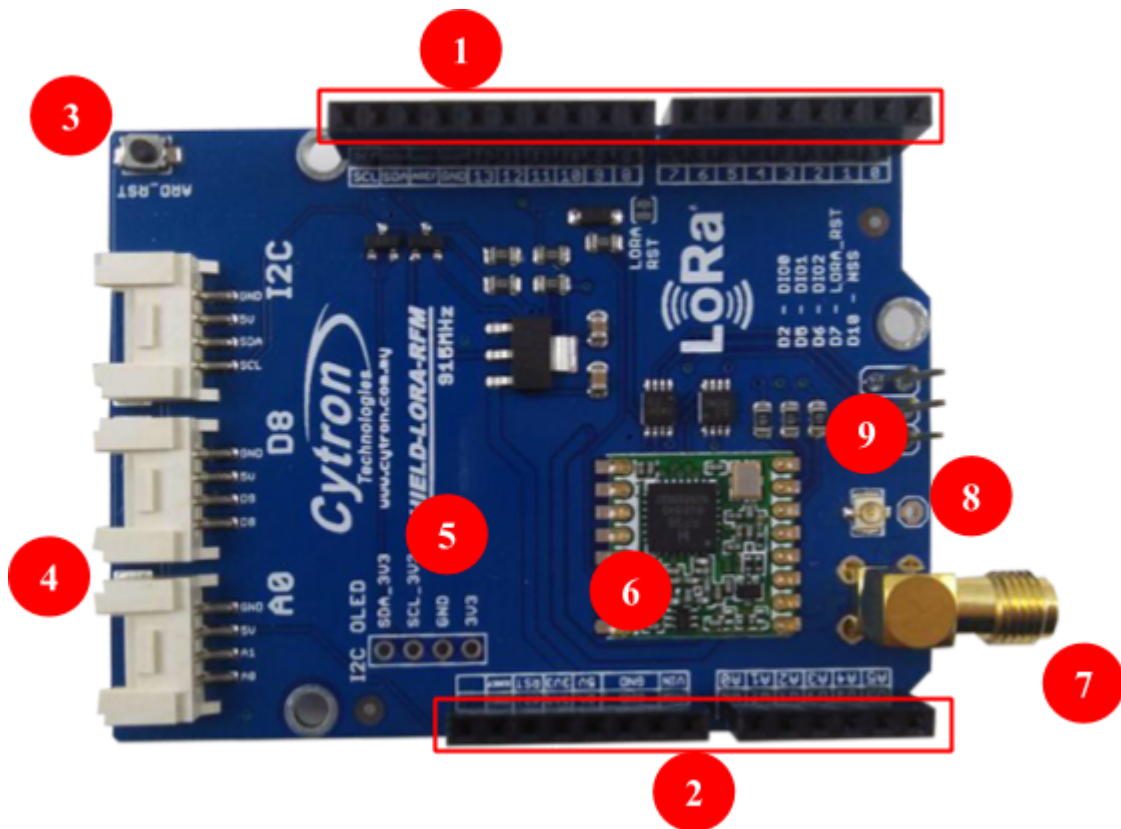
2.0 PACKING LIST

Please check the parts and components according to the packing lists. If there are any parts missing, please contact us at **sales@cytron.com.my** immediately.
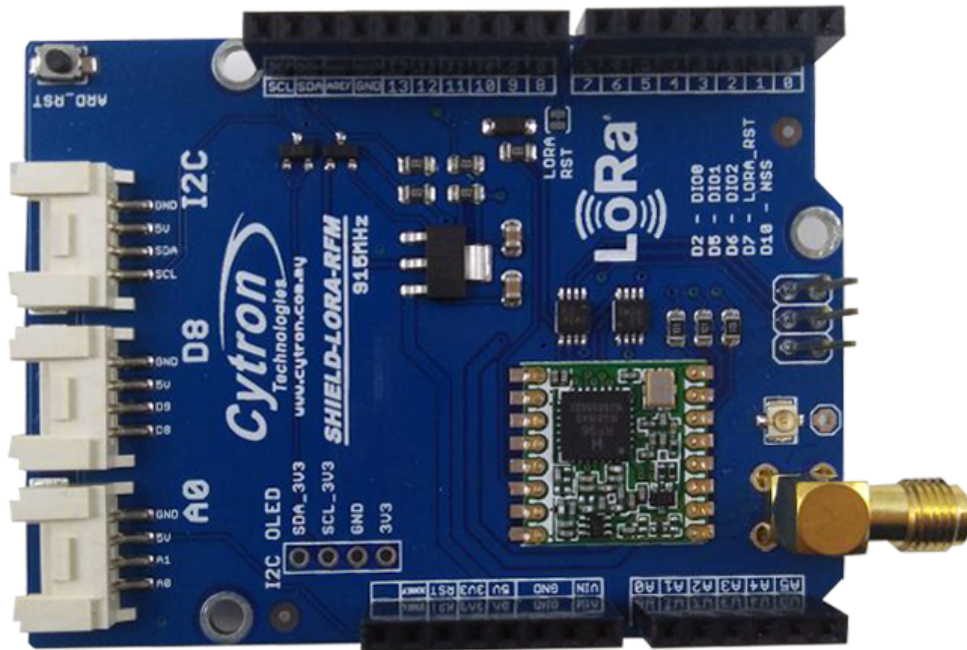
1. 1 x LoRa Shield

2. 1 x SMA antenna 915MHz 50ohm

3. 1 x pigtail for U.FL antenna

3.0 BOARD OR PRODUCT LAYOUT

1. Stackable Digital I/O header

This header pin is Digital I/O pin stacked to the Arduino main board. Other Arduino shield can be stacked on top of this stackable header.

2. Stackable Analog Input pin header

This header pin is Analog Input pin stacked to the Arduino main board. Other Arduino shield can be stacked on top of this stackable header.

3. Arduino Reset button

Reset button is for convenience of user to reset the Arduino main board.

4. Grove Connectors

Connectors for grove sensors or other grove-compatible devices. 1st grove (from bottom) are connected to A0 and A1, 2nd D8 and D9 and 3rd for I2C pins.

5. Slot for OLED installment

Optional slot for users to install OLED for visual display in their application.

6. RFM95W LoRa Module

Low-Power Long Range Transceiver operating in the 915 MHz frequency band. Complies with the LoRaWAN Class A protocol specifications, and integrates RF, a baseband controller, command Application Programming Interface (API) processor, making it a complete long range solution.

7. SMA 90 deg Antenna Connector

Connector for SMA Antenna. By default it comes with Antenna 915MHz 50ohm.
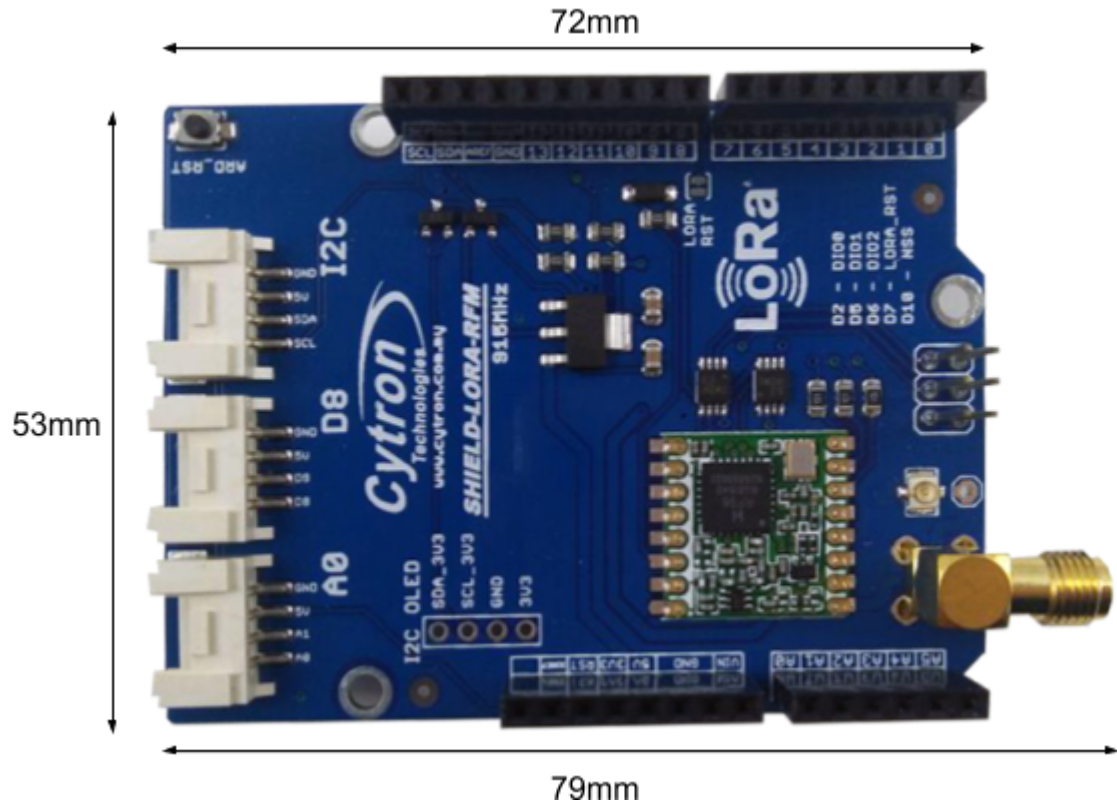
8. Through Hole Antenna Connector

A single through hole for wire antenna. User may choose to solder the hole with wire antenna.

9. U.FL SMD Antenna Connector

Connector for U.FL SMD Antenna. User may choose to connect it with pigtail and antenna.

4.0 DIMENSION

5.0 HARDWARE INSTALLATION

This section will show example installation of LoRa-RFM-Shield with Arduino Uno as a main controller. Besides Arduino Uno, other Arduino main boards such as Arduino Duemilanove, CT-UNO, Arduino Mega2560 , CIKU and CT-ARM are also compatible with this shield.

5.1 Arduino Uno

Arduino is an open-source physical computing platform based on a simple I/O board and a development environment that implements the Processing/Wiring language. LoRa Shield can be used together with Arduino Uno. Figure below shows example hardware connection between Arduino Uno and LoRa Shield; it is simply stacking up the shield onto the Arduino main board.

1. Stack LoRa Shield on Arduino Uno. Ensure that the pins alignment is correct.
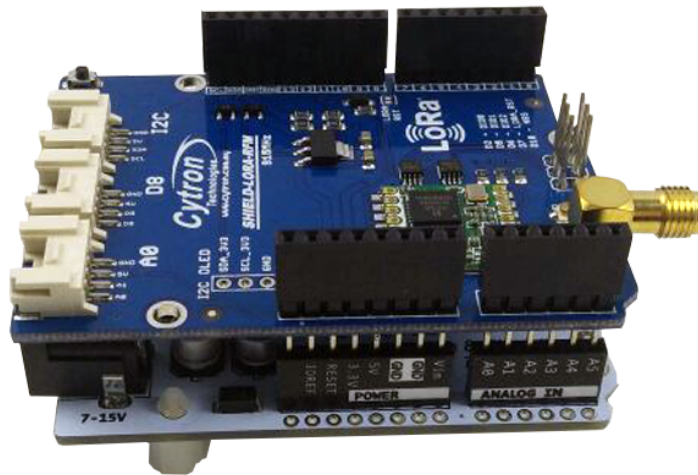
2. Install antenna as shown in the picture below.

6.0 GETTING STARTED

Please refer to our wiki page.

7.0 WARRANTY

- Product warranty is valid for 6 months.
- Warranty only applies to manufacturing defect.
- Damage caused by misuse is not covered under warranty
- Warranty does not cover freight cost for both ways.

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