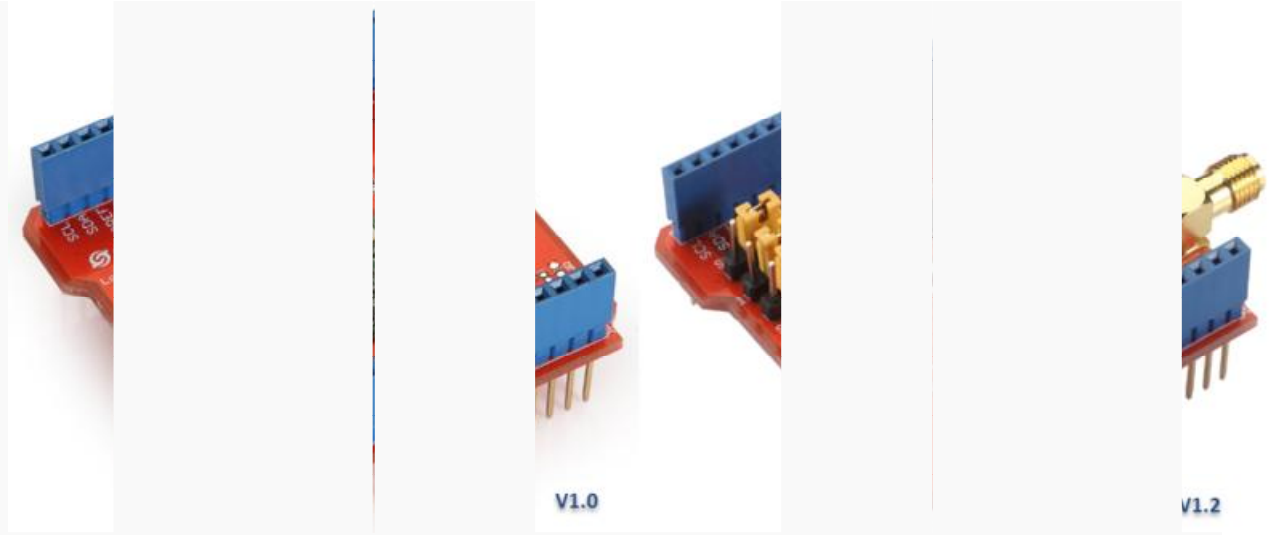
# Lora Shield

## INTRODUCTION




Dragino LoRa Shield

Dragino LoRa Shield v1.4

# What is the Dragino LoRa Shield

The Dragino LoRa Shield is a long range transceiver on a Arduino shield form factor and based on Open source library.The LoRa Shield allows the user 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.

The LoRa Shield based on SX1276/SX1278 targets professional wireless sensor network applications such as irrigation systems, smart metering, smart cities, smartphone detection, building automation, and so on.

Using Semtech's patented LoRa™ modulation technique the 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.

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

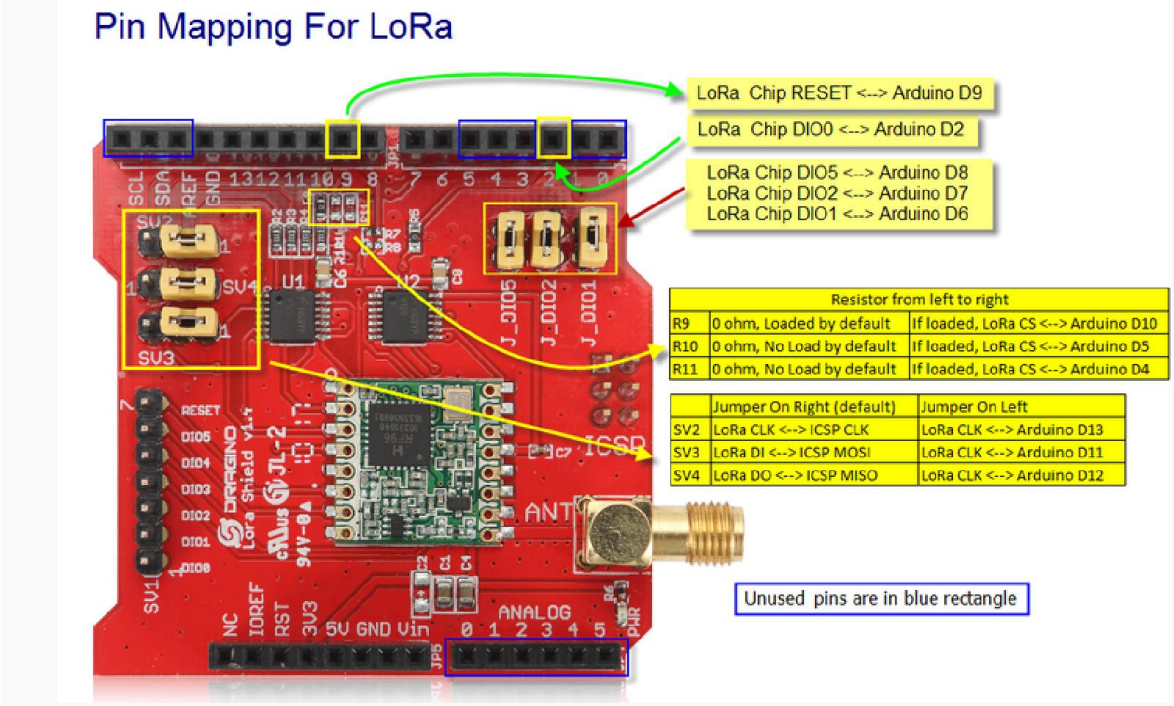
LoRa Shield with Leonado

## Hardware version info

Hardware Source is in: LoRa Shield hardware source.

- LoRa Shield v1.0: The first hardware release for the LoRa Shield.
- LoRa Shield v1.2: Connect the DIOs to Arduino IO. Change i-pex connector to SMA connector.
- LoRa Shield v1.3: Remove 5v to 3.3v LDO, use 3.3 directly from Arduino +3.3v pin.
- LoRa Shield v1.4: Add 3 resistors R9/R10/R11. Purpose is to provide possibility to change the Arduino pin connect to LoRa CS pin, so Arudino can easier to connect to multi SPI devices. by default, R9 is populated and R10/R11 is not populated. So LoRa CS is connected to Arduino D10.

## Pin Mapping and Unused Pins




LoRa Shield Pin Mapping

## Wireless Specifications of RFM95W

- 168 dB maximum link budget.
- +20 dBm - 100 mW constant RF output vs.
- +14 dBm high efficiency PA.
- Programmable bit rate up to 300 kbps.
- High sensitivity: down to -148 dBm.

- Bullet-proof front end: IIP3 = -12.5 dBm.
- Excellent blocking immunity.
- Low RX current of 10.3 mA, 200 nA register retention.
- Fully integrated synthesizer with a resolution of 61 Hz.
- FSK, GFSK, MSK, GMSK, LoRaTM and OOK modulation.
- Built-in bit synchronizer for clock recovery.
- Preamble detection.
- 127 dB Dynamic Range RSSI.
- Automatic RF Sense and CAD with ultra-fast AFC.
- Packet engine up to 256 bytes with CRC.
- Built-in temperature sensor and low battery indicator.

## Features

- Compatible with 3.3v or 5v I/O Arduino Board.
- Frequency Band: 915 MHZ/868 MHZ/433 MHZ (Pre-configure in factory)
- Low power consumption
- Compatible with **Arduino Leonardo, Uno, Mega, DUE**
- External Antenna via I-Pex connector

## Power Consumption

*Table 6 Power Consumption Specification*

| Symbol | Description | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| IDDSL | Supply current in Sleep mode | | - | 0.2 | 1 | uA |
| IDDIDLE | Supply current in Idle mode | RC oscillator enabled | - | 1.5 | - | uA |
| IDDST | Supply current in Standby mode | Crystal oscillator enabled | - | 1.6 | 1.8 | mA |
| IDDFS | Supply current in Synthesizer mode | FSRx | - | 5.8 | - | mA |
| IDDR | Supply current in Receive mode | *LnaBoost* Off, band 1<br>*LnaBoost* On, band 1<br>Bands 2&3 | -<br>-<br>- | 10.8<br>11.5<br>12.0 | -<br>-<br>- | mA |
| IDDT | Supply current in Transmit mode with impedance matching | RFOP = +20 dBm, on PA_BOOST<br>RFOP = +17 dBm, on PA_BOOST<br>RFOP = +13 dBm, on RFO_LF/HF pin<br>RFOP = + 7 dBm, on RFO_LF/HF pin | -<br>-<br>-<br>- | 120<br>87<br>29<br>20 | -<br>-<br>-<br>- | mA<br>mA<br>mA<br>mA |

Power Consumption

## Dimension

- Device Dimension: 62 x 43 x 23 mm
- Device Weight: 22g
- Package Dimension: 111 x 70 x 36 mm
- Package Weight: 53g