

## Arduino RF Shield

### General Description

The shield is built around the RF12B radio module from Hope RF, as simple and robust FSK solution used in many appliances and hobby robotics. The shield is supported by tested software libraries and programming model was simplified to hide the complexity of low level programming in order to make it more accessible for the beginners.

### Hardware Description

#### Power

The radio module is powered from the 5V or Vin power sourced from the main Arduino board, using a linear regulator to drop down the voltage to 3.3V necessary for the radio module. The Shield is not relying on the Arduino voltage regulators in any way and will not become a burden for the Arduino board. The current take by the board is max 50mA (with Tx on and all the subsystems active) and will get down to a fraction of a mA when the radio module is in sleep mode. Please pay attention not to exceed the power capability of the USB port when Arduino board and the shield are powered from the USB cable, and other shields are stacked.

#### Connections

All signals from/to Arduino are translated from 5V levels to 3.3V and vice versa in order to assure logic level compatibility.

The IO connection between the Arduino and the RF module is done over the SPI interface for configuring and writing/reading the data to be transmitted or received. The slave select active low pin (or CS) is routed via a jumper for selecting two choices, the main SS pin from MCU (pin 10 on Arduino) or an alternative PB1 (pin 9 on Arduino)

J9 Jumper	Position 1-2	Position 2-3
CS Radio	Pin 10 Arduino (SS)	Pin 9 Arduino (PB1)

#### Software Note:

The position of J9 jumper needs to match the software library used.

#### Hardware Note:

The SPI interface output signals on the slave devices (MISO) needs to be tri-stated (High Z) when the CS is high, this version of the shield is not tri-stating this signal, only boards with Rev B will tri-state MISO.

In addition to the SPI bus an interrupt signal generated from the radio module is routed via J10 jumper and will allow two different choices as follows:

J10 Jumper	Position 1-2	Position 2-3
Radio Interrupt	Pin 3 Arduino (PD3)	Pin 2 Arduino (PD2)

#### Software Note:

The position of the J10 jumper need to match the interrupt routine assigned in the software libs.

**Reset Button** – the shield has a reset button in parallel with the Arduino reset for easy access when the shield fitted on top of Arduino make the access impossible.

**Leds** – a bicolour led is provided, wired to PD4 and PD5 for general usage. These pins have to be driven HIGH for the Leds to be lit.

**Antenna** – An external omnidirectional antenna provided can be connected to the RP SMA connector soldered on the edge of the shield.

#### Hardware Note:

For better radio performance we do recommend the shield to be fitted on the top of shield stack away from motors or wires carrying large curenents.

#### Optional Hardware

##### Temperature & Humidity Sensor

The shield can be optionally populated with a SH11 Temperature Humidity Sensor from Sensirion turning this shield in a wireless temperature/humidity sensor. The connections between Arduino and the sensor are made using the I2C like interface (A4, A5 connection on Arduino)

The sensor is powered from 3.3V and IO connections were made with 5V to 3.3V bidirectional level shifters.

The sensor is supported by the Arduino libraries SHT11