Introduction LoRa & Module RFM95 / RFM95W Hoperf

by Jhon_Control

In this opportunity we will make a brief characterization about LoRa ™ and specifically Radio RFM95/96 manufactured by **Hoperf Electronics**. Since a couple of months ago, 2 modules arrived, initially I want to make an introduction on the subject that had been pending for a long time.

Website: Hoperf Electronics

Personally for a long time I wanted to do tests with LoRa, based on the tutorial Internet Of Things (IoT) Using NiceRf LoRa1276 of absolutelyautomation.com, we will talk a little about **LPWAN** networks (Low Power Wide Area Network) they allow low energy consumption in a wide coverage area, also known as long distance.

Let's first clarify that **LoRa** and **LoRaWAN** are not the same:

- **LoRa** is the physical layer or in simple words is the modulation, the modem or radio, the hardware.
- **LoRaWAN** is the network protocol or architecture that works on LoRa.

Complete Tutorials

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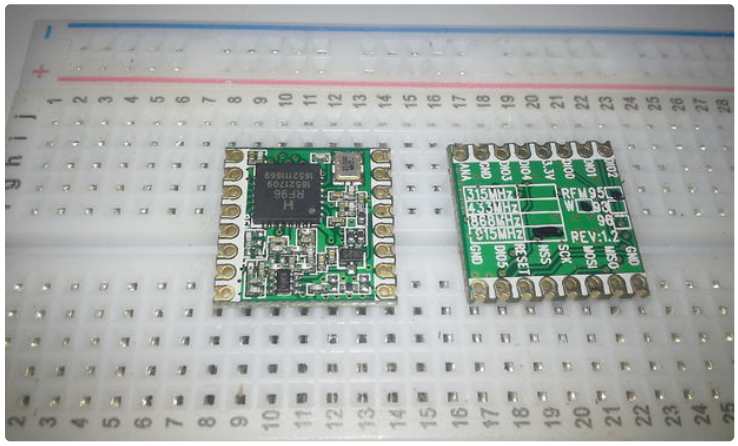
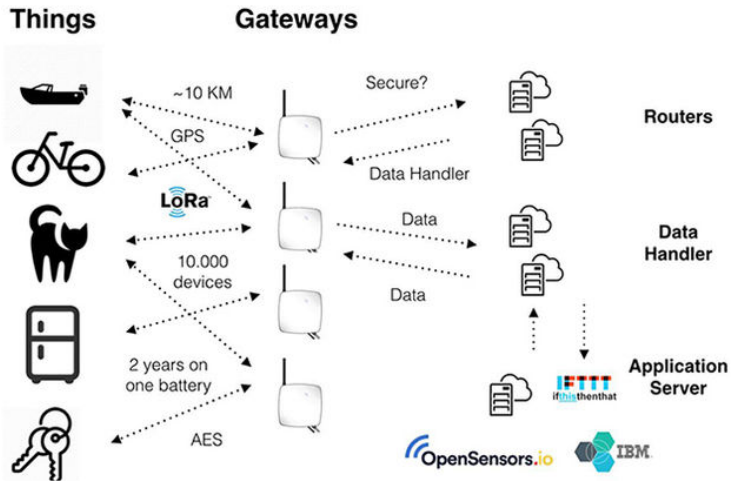


Step 1: What Is LoRa?

What is LoRa?

LoRa ™ is a long-range radio technology "**Lo** ng- **Ra** nge" its main features:

1. Its spread spectrum modulation allows a significantly greater scope to other technologies.
2. High sensitivity (-168dB) combined with high immunity to interference.
3. Low Consumption (up to 10 years with a battery, good depends on certain characteristics).
4. Low data transfer (up to 255 bytes).



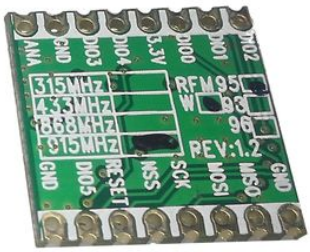
Step 2: Module RFM95 of Hoperf Electronics

I have chosen Radio-Modem RFM95 from Hoperf electronics, since I see that there are already integrations with the platforms already used such as **Arduino**, **ESP8266**, **Raspberry pi** and I suppose that with **ESP32**, they really are very popular.

In the market there are a variety of modules, to make a correct selection take into account the frequency spectrum of the region in which they are located, in my case in Colombia (South America) ISM is **915.0 MHz.**

- The RF95 module is for ***915.0 MHz***, factory marked on the back of the pcb.

- **ATTENTION:** Operating voltage 3.3V Recommended, MIN 1.8V - MAX 3.7V, Can be connected directly to the ESP8266 and arduino micro pro to 3.3v, for other platforms to 5v use voltage converters.
- The configuration and communication of the module is done via **4-wire SPI Bus**, technically implemented in all microcontrollers.
- It has 6 Gpio configurable by software, usually interruptions linked to the operation of the RFM95.
- Although it can be configured as a **LoRa TM modem**, it can also be configured as an FSK / OOK modem and the GFSK, MSK and GMSK standards.

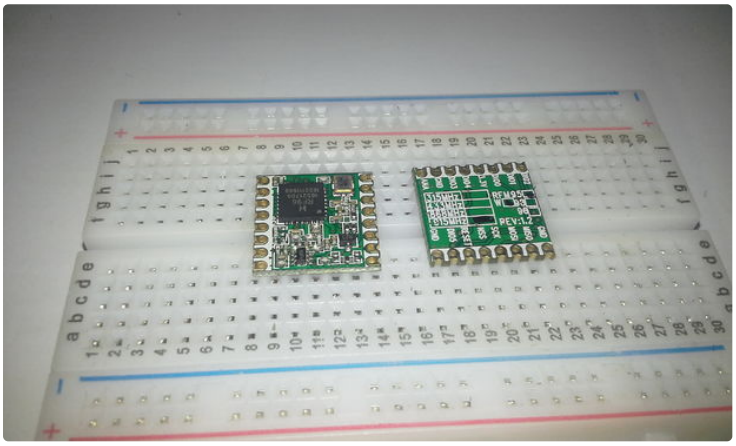


Step 3: Materials and Where to Buy Them Cheap !!!

Materials and where to buy them Cheap !!!

- 2 Module - Radio RFM95 aliexpress
- 2 white PCB adapters for ESP8266 12E/F.

Note: To carry out tests it is recommended to have**2 RFM95** radios, one only does not work.



Step 4: Introduction LoRa & Module RFM95 Hoperf Electronics

https://youtu.be/zWPpfzEpmfs

Step 5: Conclusions & and Complete Tutorial

Conclusions

You could say that LoRa is "You send few data but they will go further ...".

This technology has great applications in reading sensors / meters for sending data over long distances.

You could say that the LoRa radios come from the factory with a frequency or band pre-defined in my case **915MHz**, There are some radios that allow working in all bands, since the chip can make the change but the RC filters output the antenna are the drawback given that they are fixed values.

The maximum distances make me curious because they are under almost ideal circumstances according to the manufacturer, we will perform tests to verify and validate the maximum distance and power consumption of the RFM95 module .

In next Tutorials we will make the LoRa communication with **Esp8266** and / or **Arduino**, later we will test with **LoRaWAN** and the ***The Things Network*** platform.

Complete Tutorials and Recommendations

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