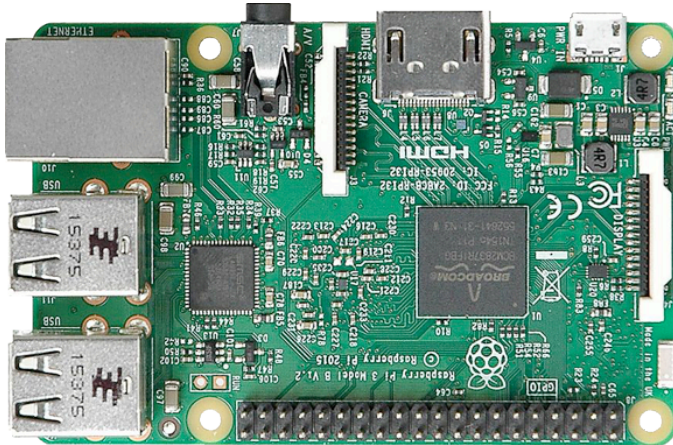


last update November 6th, 2016

TO BUILD THE GATEWAY

- Raspberry: take either the RPI2 or RPI3 (RPI3 better for WiFi and Bluetooth)



You also need an 8GB SD card

RPI3 has built-in WiFi and Bluetooth 4.0,

if you get or already have the RPI2 and want WiFi and Bluetooth, get dongles, but it is not mandatory. Dongles that have been tested successfully are:

WiFi: TP-LINK TL-WN725N

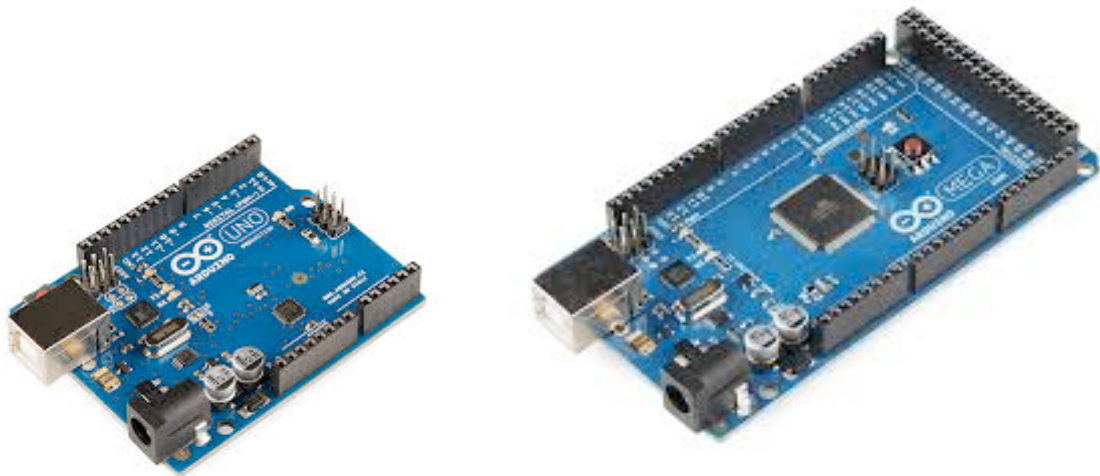


Bluetooth 4.0: CSR dongle or Konig dongle

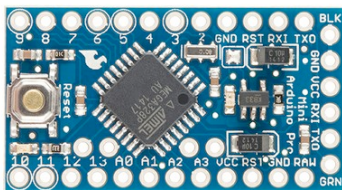


TO BUILD THE IOT DEVICE

- For prototyping and development tests Arduino Uno/MEGA2560



- For integration phase: Arduino Pro Mini (take the 3.3v, 8MHz version). Original version is from Sparkfun



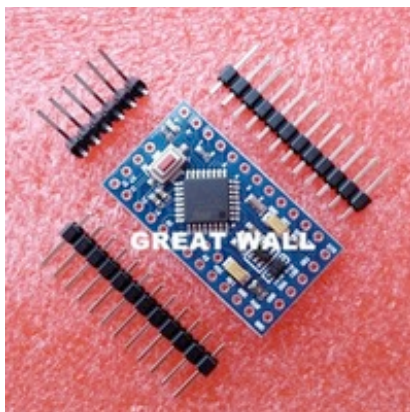
3.3v and 8MHz version

Can be bought as low as 1.5€ from Chinese manufacturers

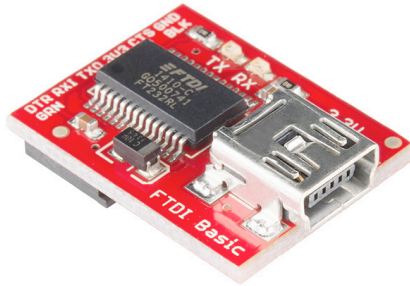
<http://www.aliexpress.com/popular/arduino-pro-mini-328.html>

We tested this one:

https://fr.aliexpress.com/store/product/Free-Shipping-1pcs-pro-mini-atmega328-Pro-Mini-328-Mini-ATMEGA328-3-3V-8MHz-for-Arduino/731260_32340942669.html?spm=2114.12010608.0.0.4LfFx2



You will also need the FTDI breakout (3.3v version) to program the board. You need only one to program all your boards. Original product from Sparkfun is here: <https://www.sparkfun.com/products/9873>



We tested this Chinese one that can be set either at 5v or 3.3v.

https://fr.aliexpress.com/store/product/Free-shipping-FT232RL-FT232-FTDI-USB-3-3V-5-5V-to-TTL-Serial-Adapter-Module-Mini/1735233_32648254875.html?spm=2114.12010608.0.0.PizHXM



LORA RADIO MODULES

- take the Modtronix inAir9 with 6mm pin header already soldered (see the available option on the modtronix web page); and the 868MHz whip antenna



<http://modtronix.com/inair9.html>

<http://modtronix.com/ant-f105-868.html>



Wireless SX1276 LoRa Module, 868MHz and 915MHz, 3.3V, SMA Connector

USD15.95

Header Type ⌵ 6.0mm Pin Header (+USD1.00)

See "Pin Headers" section below for details!

No Pin Header: inAir9
No headers are assembled.

Quantity 1

Loose 3, 4 or 6.0mm Pin Header (\$0 Extra - FREE):
Two loose(un soldered) pin headers with 3.0, 4.0 or 6.0mm long pins are included FOR FREE. Select option below(with fee) if headers should be soldered.

3, 4 & 6mm Pin Header:
Pin headers with 3.0, 4.0 and 6.0mm long pins are assembled.
Select 3.0mm if module is going to be soldered into place.
Select 4.0mm if module is going to be plugged into standard 8.5mm high Female Socket, or 4.0mm for low profile 5.7mm Female Sockets.

Round Swiss Pin Header:
Pin headers with Round (Swiss) style pins are assembled. Select to plug module into female Round (Swiss) Socket.

Press-Fit Header:
Pin headers with 3.0, 4.0 and 6.0mm long pins are assembled, and are with pads with 1.0mm drill (softsolder).

Press-Fit Headers:
Press-Fit Headers are assembled. Select if module is going to be pressed into pads with 1.0mm drill (softsolder), and with a standard SMA connector (for group 1) or a configured in software, and will typically be used for the 863-870MHz or 902-928MHz ISM bands. This module requires less supply current than the inAir9s, even when configured for the same output power (+14dBm or less). Choose this module if power consumption has to be kept to a minimum, and no more than +14dBm is required.

The SX1276 is a revolutionary new chip enabling wireless communications at distances up to 15km, using Semtech's LoRa(Long Range) technology. This chip also supports high performance (GFSK modes for systems including WBWb, IEEE802.15.4g.

This module can be used for **868 and 915MHz** communication. It is based on the Semtech SX1276RF1KA5 and SX1276RF1IA5 reference designs, which also use identical components for 868 and 915MHz. We have also confirmed with Semtech engineers that

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OTHER ALSO

1 Relay Module, 5V, 10A, Opto Isolated

USD4.95

1-Wire Interface Module with 12C bus, 3.0V-5.5V, Plugable TB

USD8.95

1x16 Pin Header, 4.0mm Pins

USD5.58

1x18 Pin Header, 4.0mm Pins

USD8.60

1x2 Pin Header, 4.0mm Pins

USD3.30

Description

Tags

Description

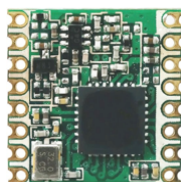
We will soon be releasing two new versions of our integrated(onboard) antenna.

The inAir9 is a 868 and 915MHz wireless module is part of our iMod product range. The frequency 902-928MHz ISM bands. This module is new where the inAir9 has a maximum of +20dBm. This module requires less supply current than the inAir9s, even when configured for the same output power (+14dBm or less). Choose this module if power consumption has to be kept to a minimum, and no more than +14dBm is required.

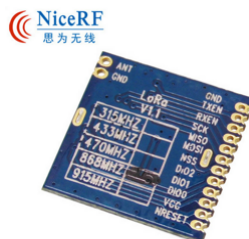
The SX1276 is a revolutionary new chip enabling wireless communications at distances up to 15km, using Semtech's LoRa(Long Range) technology. This chip also supports high performance (GFSK modes for systems including WBWb, IEEE802.15.4g.

This module can be used for **868 and 915MHz** communication. It is based on the Semtech SX1276RF1KA5 and SX1276RF1IA5 reference designs, which also use identical components for 868 and 915MHz. We have also confirmed with Semtech engineers that

- other radio modules are possible but require more soldering work



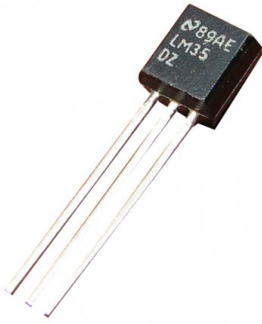
HopeRF
RFM92W/95W



LoRa1276
NiceRF LoRa1276

SIMPLE PHYSICAL SENSOR FOR TEST AND DEMONSTRATION

- Simple temperature sensor: take a simple LM35DZ



from electronic stores

WIRES, CASING, AND VARIOUS ADDITIONAL PARTS

- Breadboard cables: need both M-F and F-F



M-F



F-F

take those that are about 10cm to 20cm maximum.

- Out-door cases: electric out-door cases for instance



or any water-proof casing you can find suitable from your local hardware/electric stores

- 4-AA battery couplers for the IoT device



- Some standoffs/spacer and associated screws for the gateway



take 10mm to 20mm maximum

SOLDERING MATERIALS THAT ARE NOT MANDATORY BUT ARE ALWAYS GOOD TO HAVE!

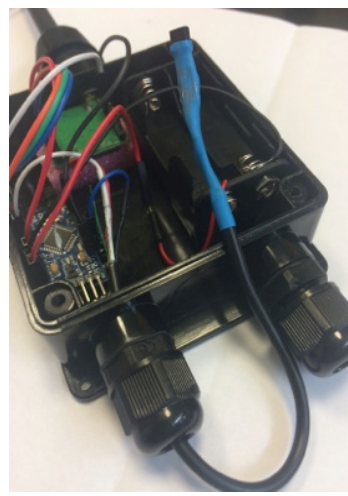
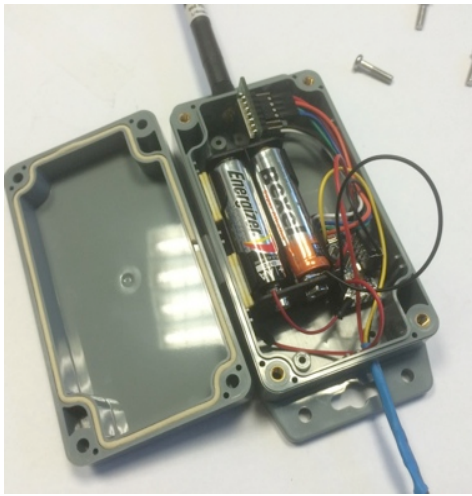
- A simple soldering station with not too thick solder wire



- A set of heat-shrink tubes to isolate wires / silicon for joints



RESULTS:



Enjoy!

C. Pham, University of Pau, France