Introduction to LoRa and the Internet of Things

Application to Ham Radio

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Logan, UT

What is LoRa

What is LoRa

Long Range – Low Power

Frequency modulated (FM) chirp

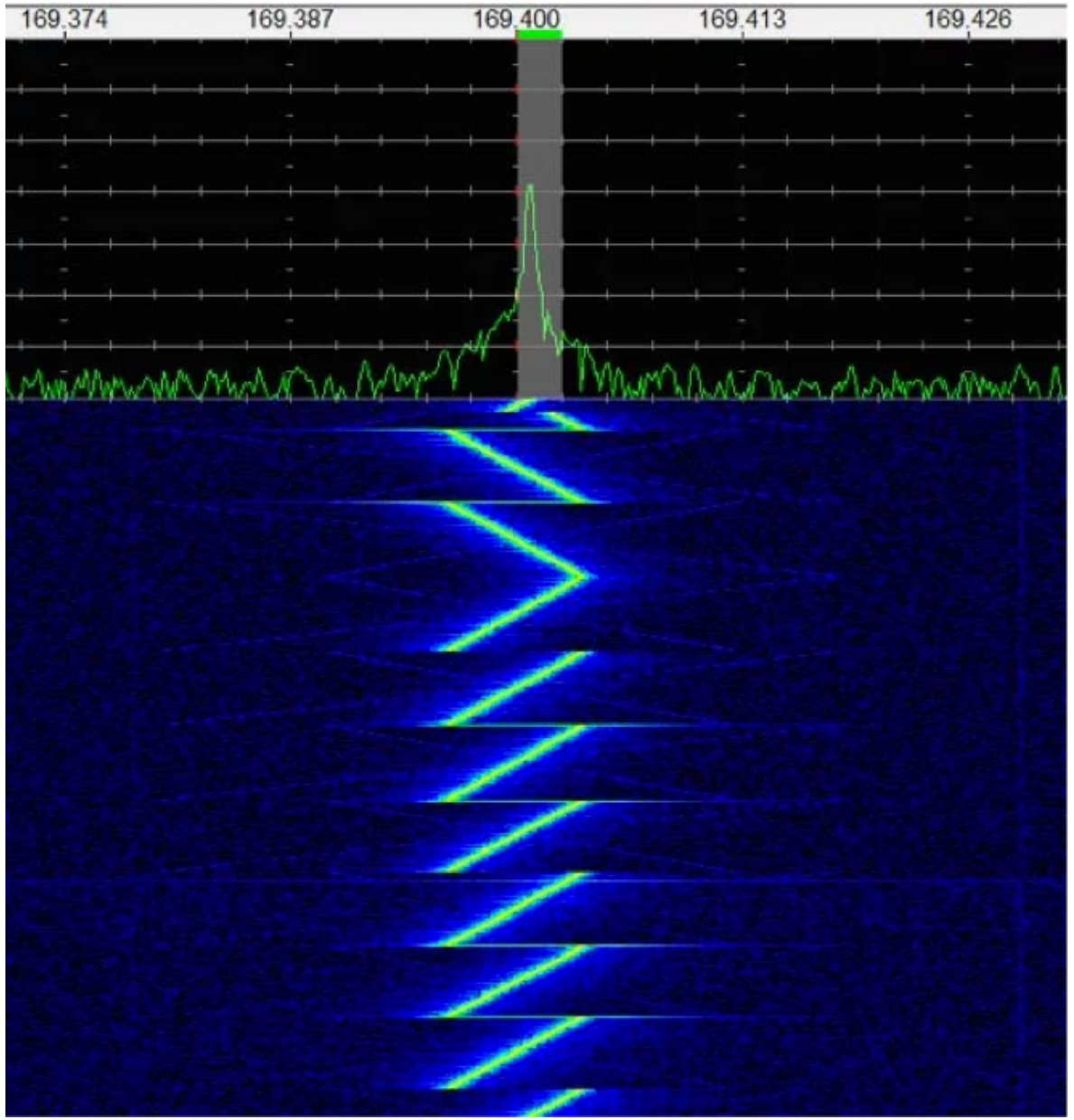
Frac-N phase lock loop (PLL)

915 MHz – USA

125 KHz Band Width
250 – 5470 bps

Typically less than 100mw

Range up to 13 miles LOS



Internet of Things

- **The Internet of Things (IoT)** is the network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment.

- Typically Wifi or Bluetooth connectivity.

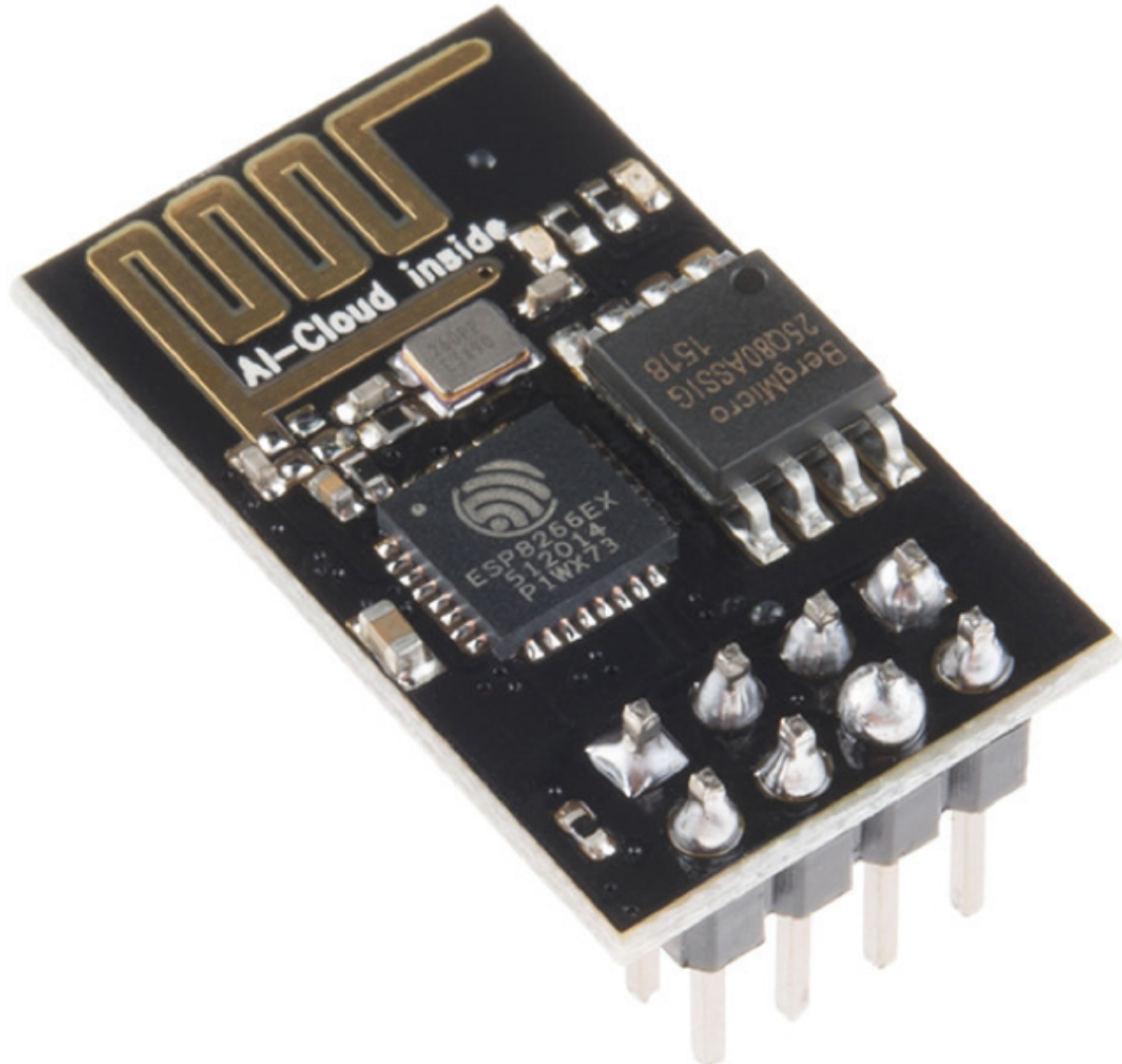
nest
65
HEATING
68

ring

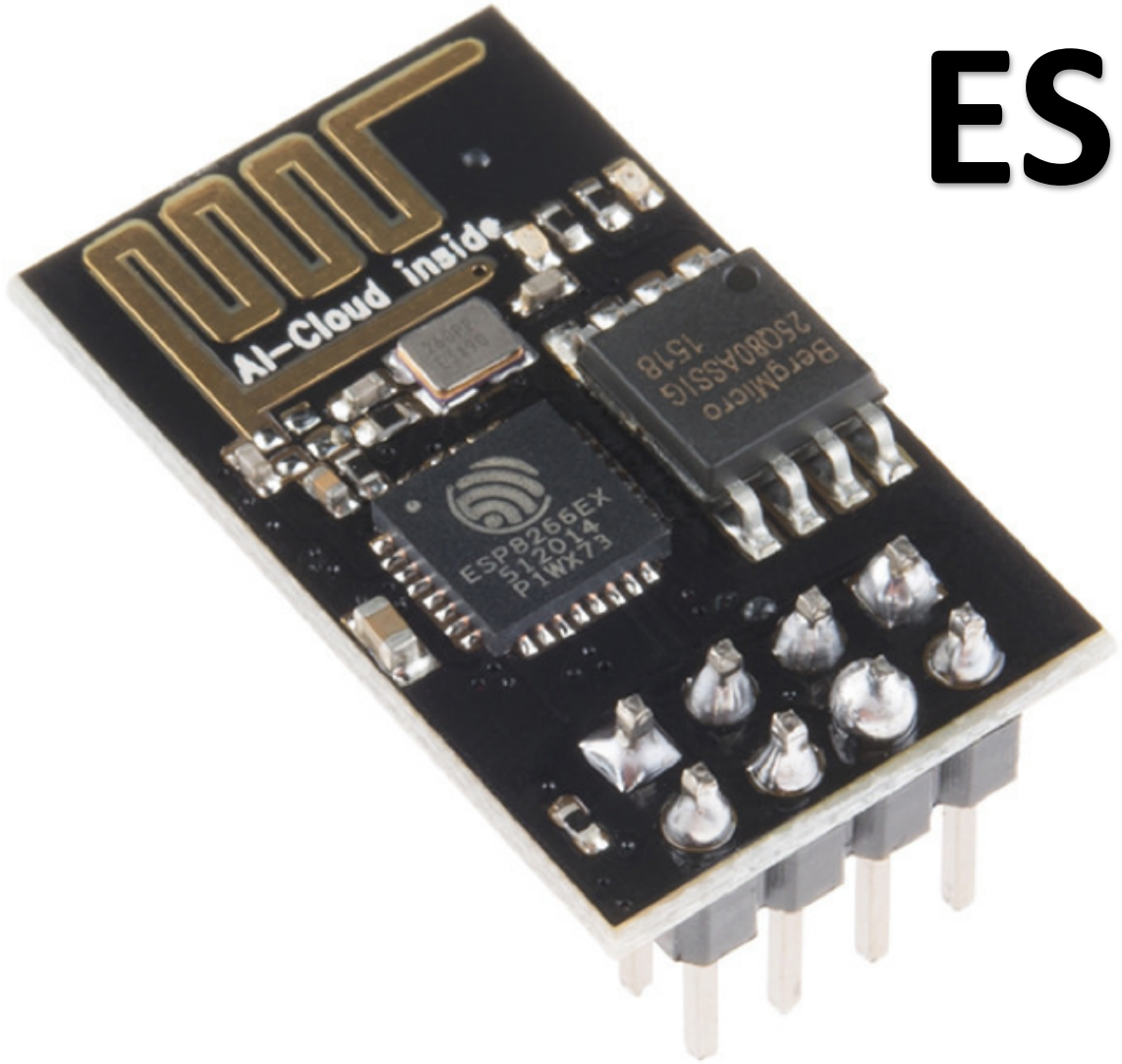
GENIUS
GENIUS

Good Afternoon
31
Hey Eve, Could you walk Jake tonight? Thanks
LEARN SOMETHING NEW TODAY
67°
Poltergeist
Events

1611
30°C
SAT, SEP 23
32°C


AI-Cloud inside
ESPB266EX
512014
P1WX73
BergMicro
25Q80ASSIG
1518

ESP8266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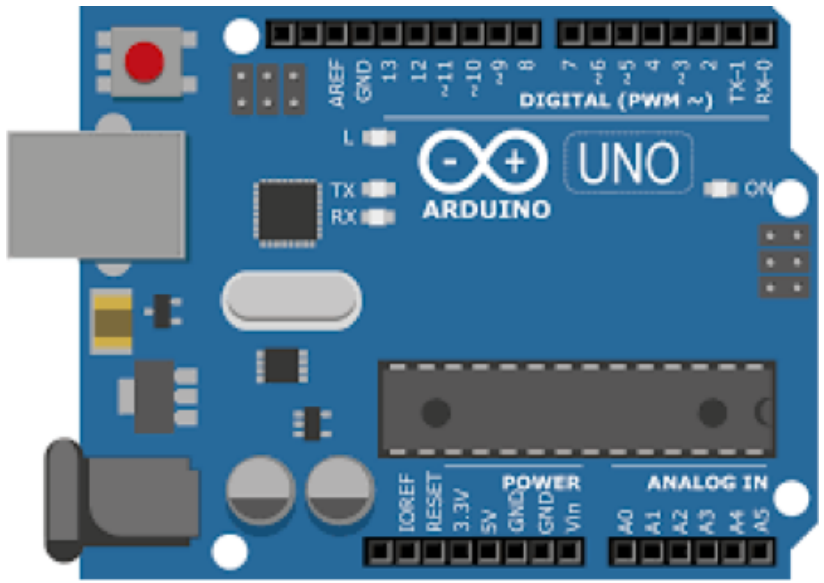
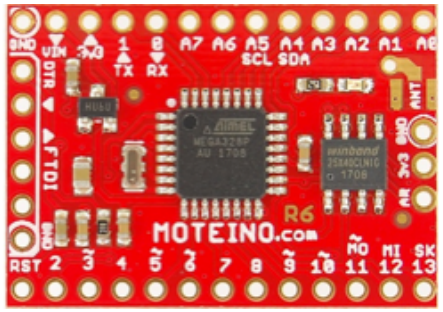
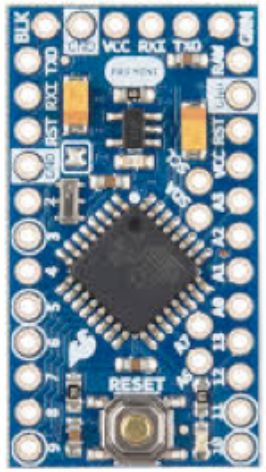
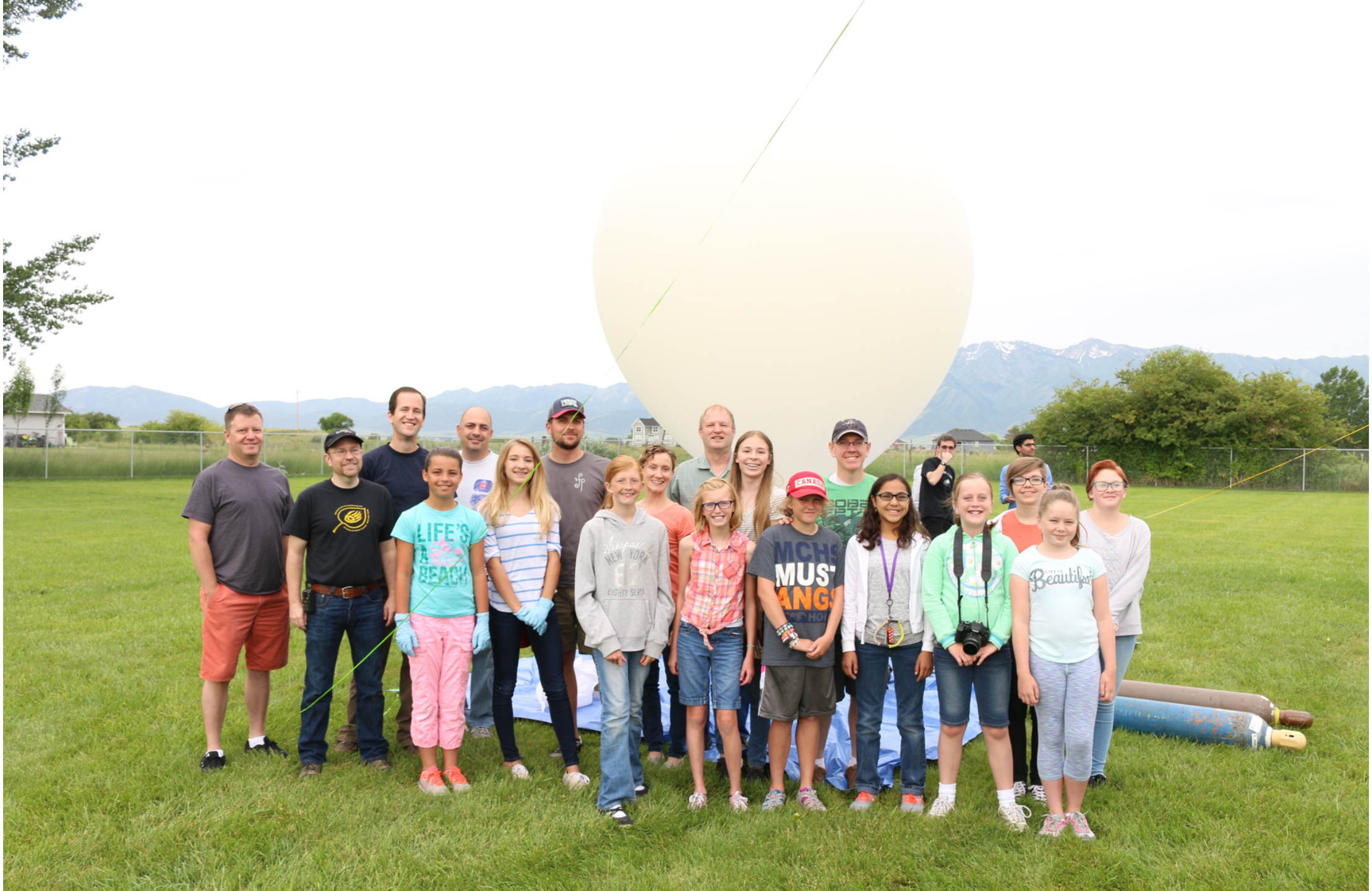

AREF
GND
13
12
~11
~10
~9
8
7
~6
~5
4
~3
2
TX-1
RX-0
DIGITAL (PWM ~)
L
TX
RX
UNO
ARDUINO
ON
IOREF
RESET
3.3V
5V
GND
GND
Vin
POWER
ANALOG IN
A0
A1
A2
A3
A4
A5


GND
VIN
3V3
1
0
A7
A6
A5
A4
A3
A2
A1
A0
SCL
SDA
TX
RX
DTR
FTDI
R6
MOTEINO.com
RST
2
3
4
5
6
7
8
9
10
11
12
13


BLK
VCC
RXI
TXD
RESET

How did I get started with LoRa?


LIFE'S A BEACH
MCHS
MUS-
ANGS
CANADA

Wireless Serial Modem – 900 MHz

- Require Handshaking
- Mesh mode for more than 2

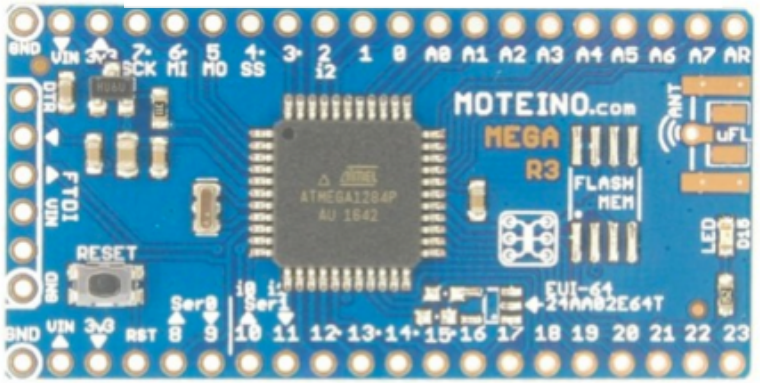
Loc: 42.09 -111.83
Alt:115527 Speed:9
Temp:51 Lum:7701
UV:0.57
12

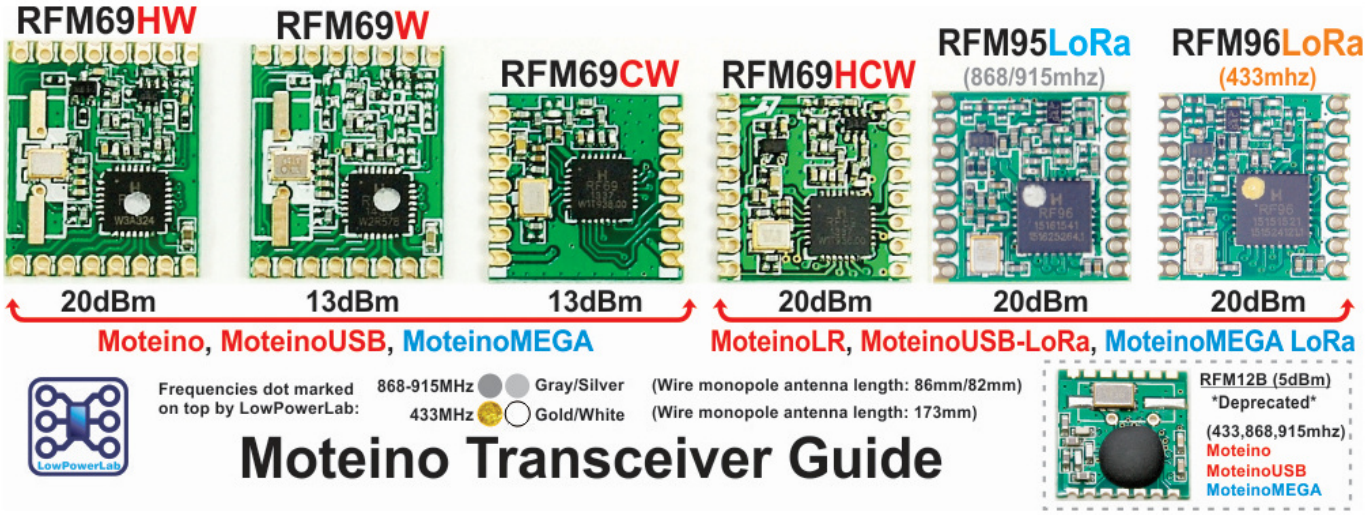
My Set-up

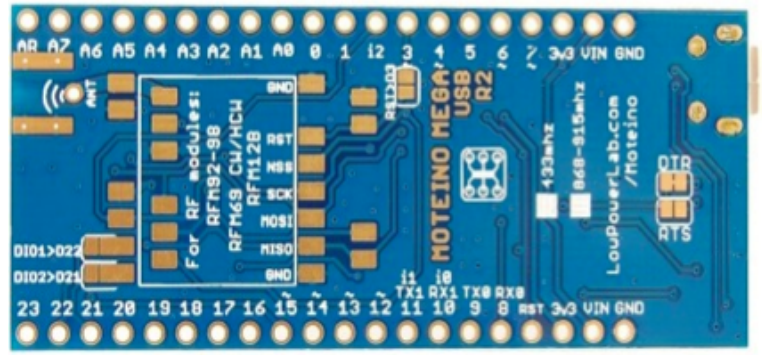
Moteino Mega - Arduino Mega

With RFM95LoRA chip

RADIOHEAD Library for Arduino







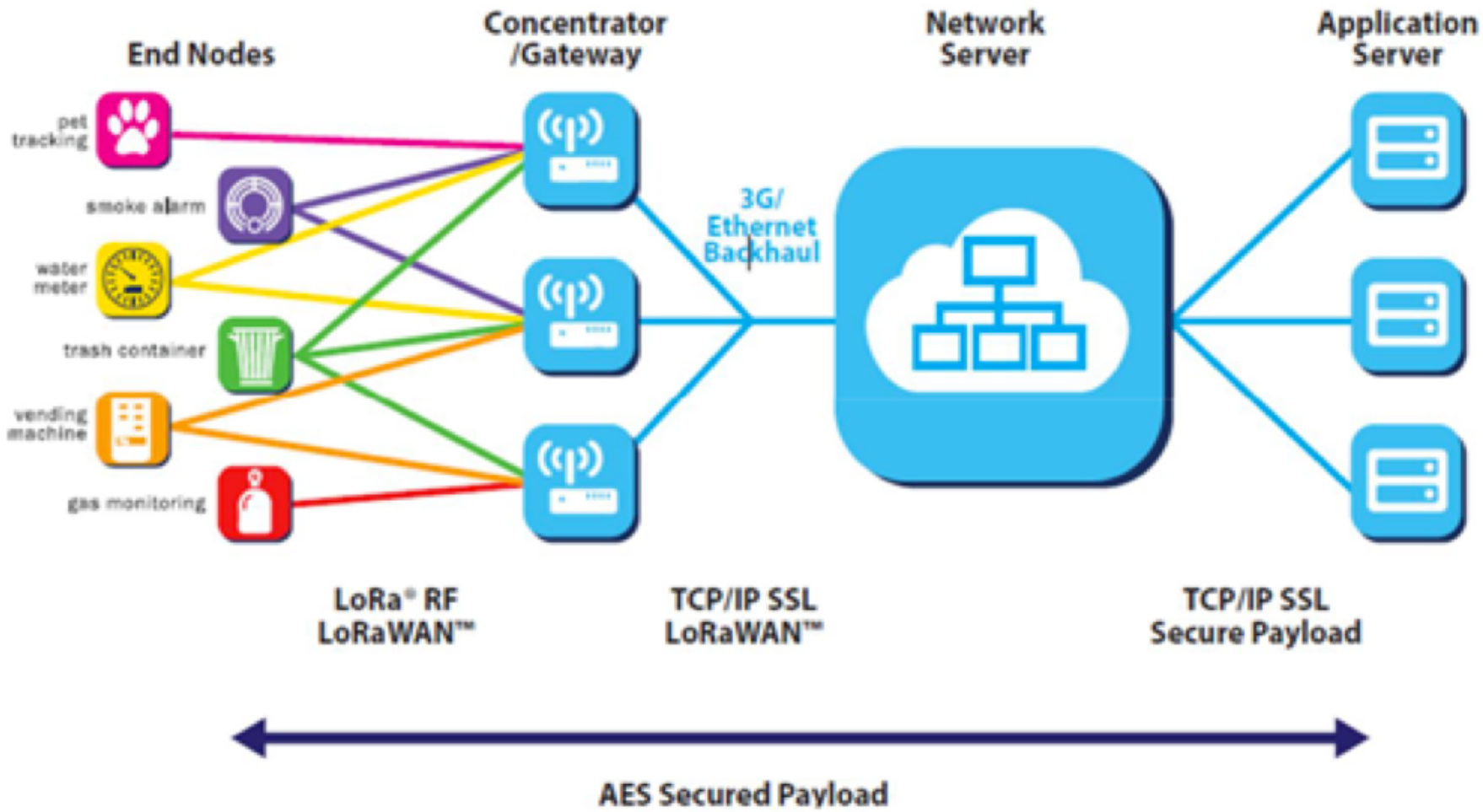
LoRaWAN

- **LoRaWAN™** is a Low Power Wide Area Network

Bi-directional communication

Nodes: Transmit data – sensors

Gateways: Receive data from nodes and feed it to central location/database.


End Nodes
Concentrator /Gateway
Network Server
Application Server
pet tracking
smoke alarm
water meter
trash container
vending machine
gas monitoring
3G/ Ethernet Backhaul
LoRa® RF LoRaWAN™
TCP/IP SSL LoRaWAN™
TCP/IP SSL Secure Payload
AES Secured Payload

THE THINGS
NETWORK

THE THINGS NETWORK

PRODUCTS

Long range, low power IOT connectivity.

LoRa Alliance Member