IAT 884

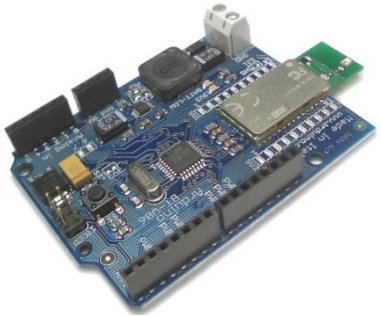
Lab 8

Wireless Communication

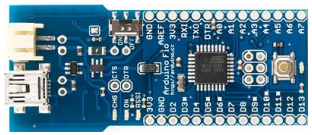
Wireless Communication

Options that work with the Arduino

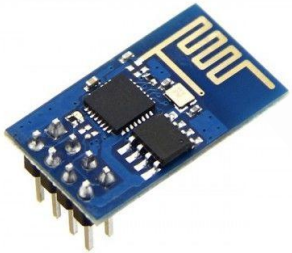
BlueTooth



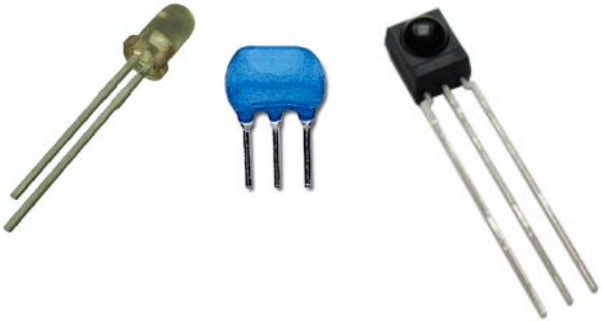
XBee



ESP8266



Infrared



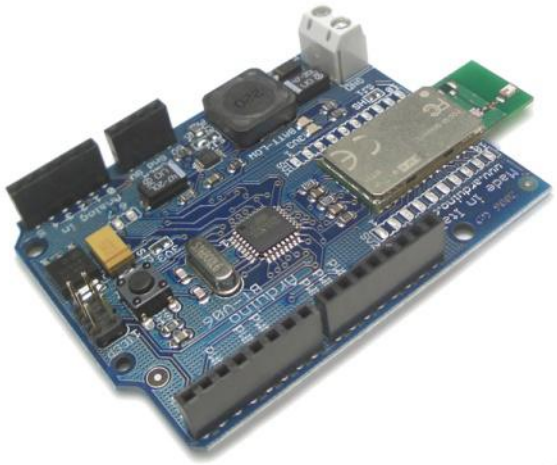
Wireless Communication

Bluetooth

Bluetooth was designed as a wireless cable replacement between two devices.

PROS:
Fairly simple setup
Built into the Bluetooth Arduino
Relatively universal

Cons:
Requires pairing devices using a PIN#
Can only connect 2 devices
Limited Range
Expensive
Size



Wireless Communication

Infrared

Commonly used in remote control units

PROS:
DIY (Do It Yourself)

CONS:
Directional – Must face receiver
Short Range
Assembly required
One Way

Wireless Communication

Infrared

How it works

An oscillator sets a specific frequency wave on which the serial data will travel. This is known as the *carrier wave*.

An IR LED is pulsed at a specific data rate. These pulses modulate the pulse sent by the carrier wave.

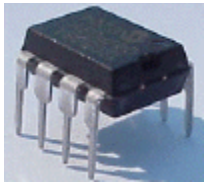
Any light not at the same frequency as the carrier wave will be filtered out by the receiver.

Wireless Communication

Infrared

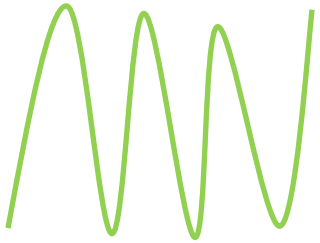
Construction: What you need

IR Transmitter



20MHz Resonator

IR LED



IR Receiver

Wireless Communication

XBee Radios

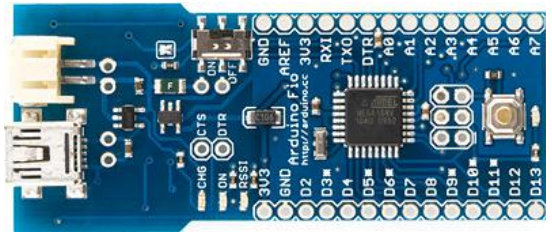
Use Peer to Peer / Mesh Networks

Pros

Multi-point networking
Mesh Networking capabilities
Greater Range

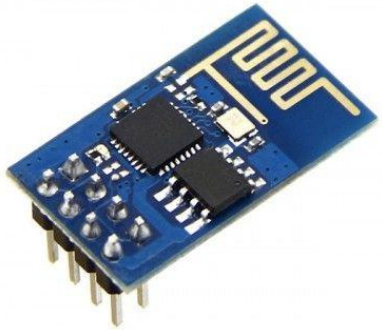
Cons

Energy Consumption
Configuration complexity



Wireless Communication

ESP 8266



Pros

Cost Effective

Uses WIFI

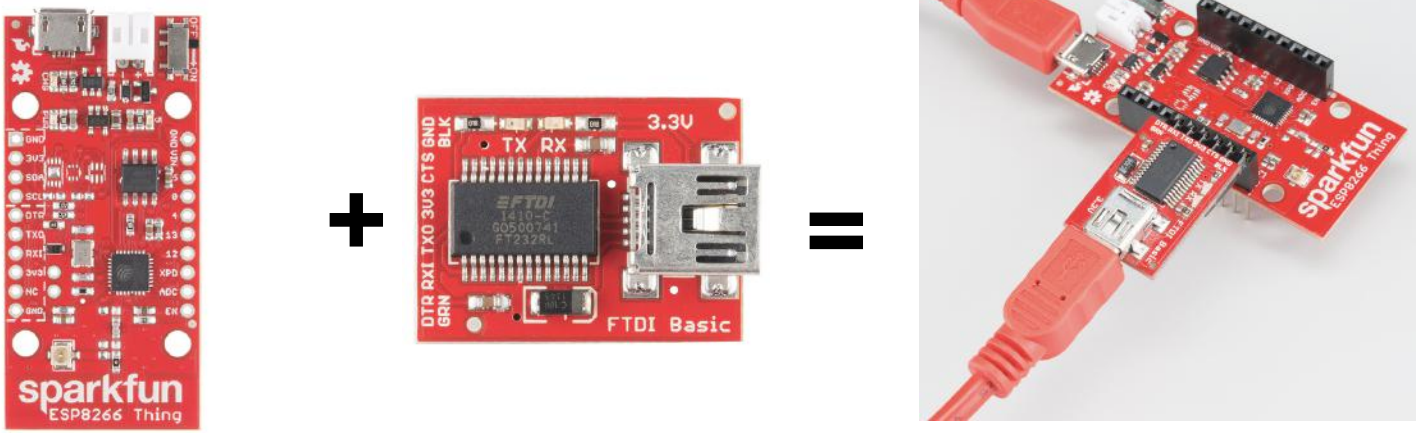
Cons

More complicated to get set up than a regular microcontroller

ESP866

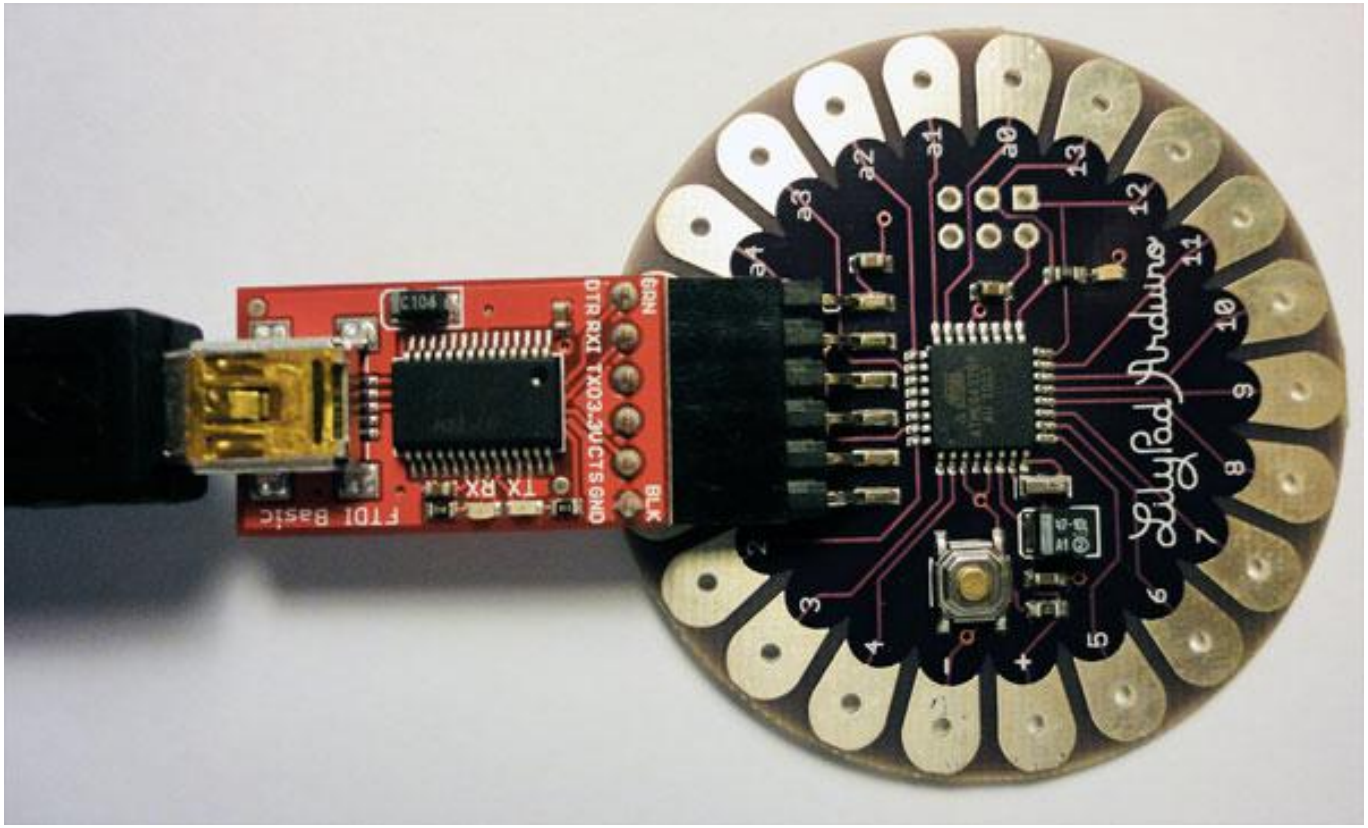
Getting Started

- You will need some way to connect it to a computer for programming (FTDI board)
- It can facilitate communication between a computer and an Arduino, or between two Arduinos..



ESP866
Getting Started

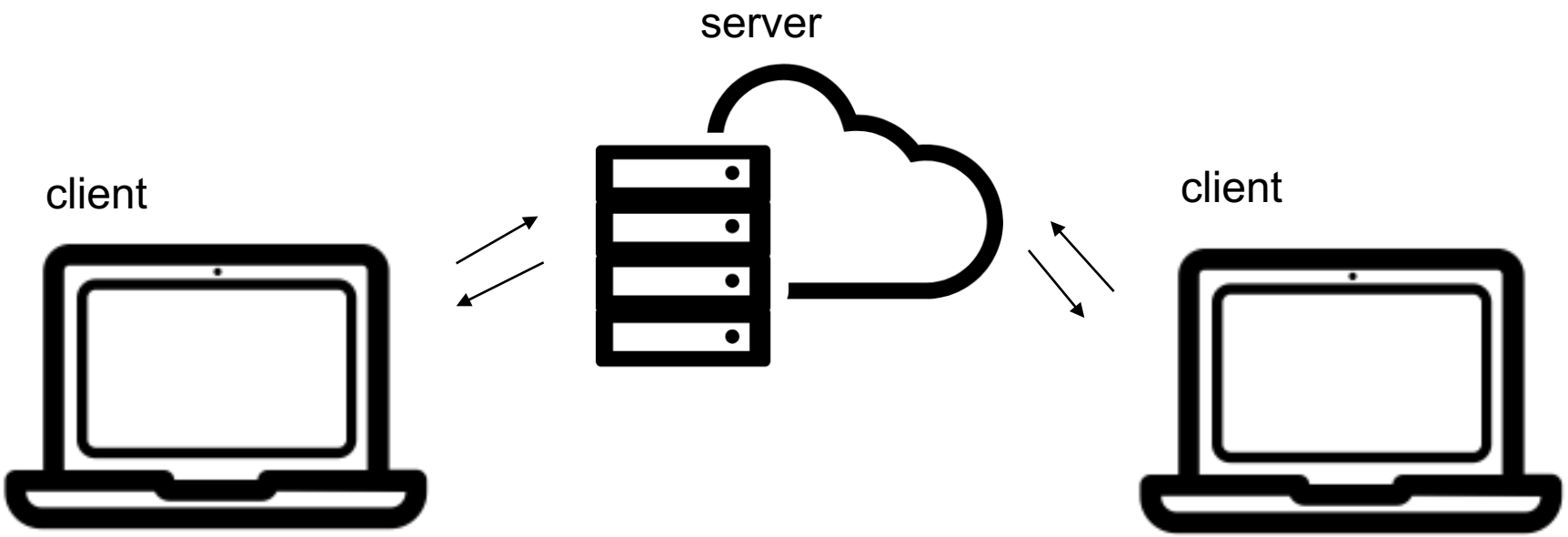
- You might have noticed other Arduinos need FTDI.



Wireless Communication

What about sending information from one computer to another with a normal Arduino

One option is to broadcast data via the internet using websockets



Wireless Communication

What about sending information from one computer to another with a normal Arduino

Set up a web server & send and receive packages of data.

Many popular server/websocket tools use javascript (ie: Node & Express / Socket.io)…. Your arduino can do this too.

Johnny-Five lets you program your Arduino using Javascript

Socket.io & P5.js example

https://secure-sierra-92770.herokuapp.com/

Socket.io & Johnny Five Example

https://damp-stream-42889.herokuapp.com/