

Placeholder

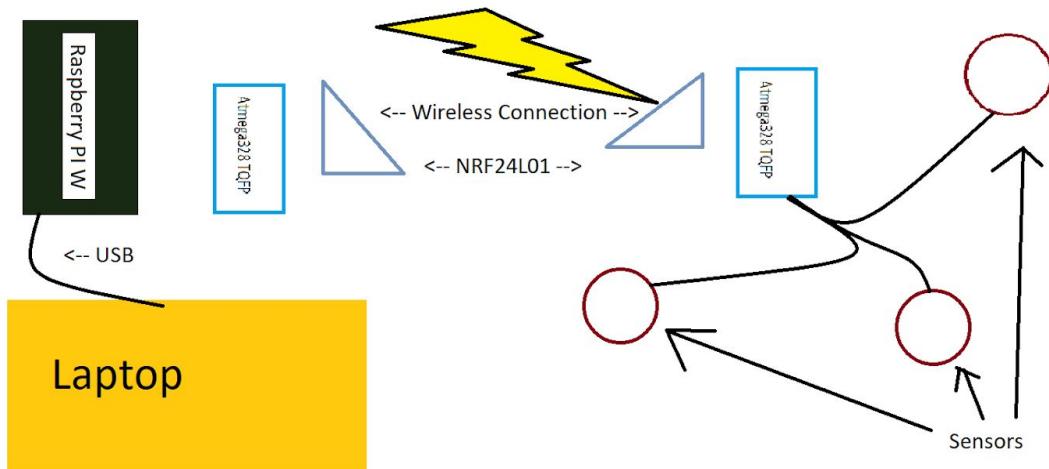
## Analysis phase

The initial plan is to create a device that is made for the sole purpose of a Preemptive Security system for People who work with Confidential/Private Information and need to work on potentially more public places where one cant Guarantee fully secure/discrete room.

My Approach to solving this is with a wireless computing node

That Takes Sensor data from a variety of senses. Then the Data from the Senses is taken then and processed to determine whether there is a security breach if so then it will Relay that info over to the Raspberry Pi W that then Emulates an HID (Human interface device) Using the P4wnP1\_alsa made by [mame82](#) to Execute a custom user-defined action that will be set via Apache server hosted of the Raspberry Pi W Communicating From a web interface back to the purchase server utilizing Ajax

Here is the Simplified planned layout For the hardware side of the project



This project is broken down into 5 Components these consisting off

1. Local web portal for Communicating to the Raspberry Pi W and Security Services to be Activated
2. Communication between Raspberry Pi W and The laptop (any windows or Linux pc)

3. Atmega328 TqFp to the Raspberry Pi W
4. Wireless MPTP Atmega328 TqFp Communication
  
5. Sensory data processing on Atmega328 TqFp.

(2.8 & 3.8 covers the whole project)

(2.5 & 3.5 for hardware)

(2.7 & 3.7 for software)

### List of Parts planned to be Used [eagle cad part names]

(This is only the initial lists likely to change) [see Google sheet for specifications about components go to components and power calculations ]

Ceramic capacitor 50V 20pF [20pf ceramic capacitor]  
1615 RGB LED [\*DIALIGHT\_598-8710-307F\*]  
10K resistor [\*10kOHM\*][Footprint Axial-0.3]  
HC-SR501 [MOTION-PIR-DYP-ME003]  
NRF24L01+PA+LNA [WIRELESS-NRF24L01-PA-EXT]  
[atmega328p-au tqfp 32](#) [atmega328p-au tqfp 32]  
16mhz CRYSTAL

The First Step I am taking with the Electronic design for this project is  
To remake the ArduinoToBreadboard from but This would have been all good if I was  
used a DIP version of the atmega328 but I will be using an atmega328 TQFP SMD

<https://www.arduino.cc/en/Tutorial/ArduinoToBreadboard>

<https://www.arduino.cc/en/Main/Standalone>

<https://www.instructables.com/id/Program-ATmega-328-Using-Arduino-Arduino-As-ISP/>

This Core of this project is based on the ATMega328

## Project management

This will be done in EAGLE Cad with Github for Version control

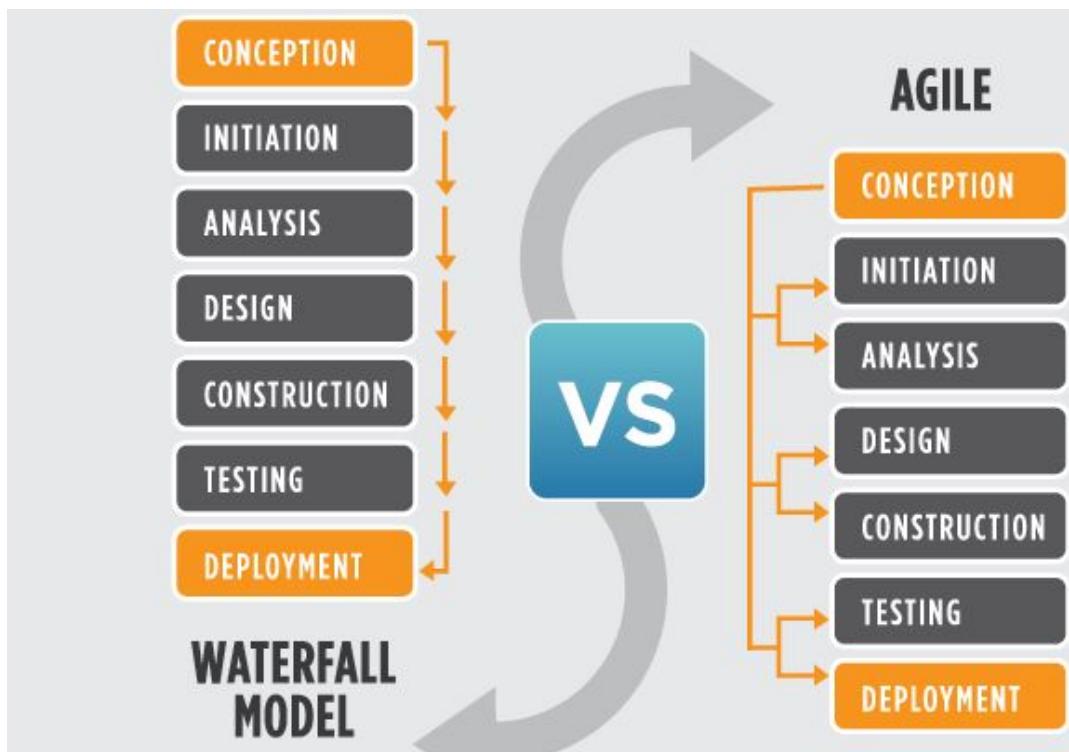
Heres Github for newbies (Able to put together my own custom document that can be located in this folder)

<https://towardsdatascience.com/getting-started-with-git-and-github-6fcd0f2d4ac6>

[https://www.youtube.com/watch?v=SWYqp7iY\\_Tc](https://www.youtube.com/watch?v=SWYqp7iY_Tc)

For Managing My project I will be utilizing an agile technique called a scrum, I went for this method of agile Project Management over something like kanban as fine myself Subconsciously using a Similar system it is also Most convenient to achieve requirements for The Iterative process for ncea. agile is all so Designed so that Progressive/progression can be easily seen and tends to be more robust as Your components are made to be Self-sufficient From other parts of the project

Sure yes I could maybe use A legacy project management or something like waterfall project management but the Waterfall system leaves little to no room to go back and redo parts of a project as rather then doing the working for just one Component at a time like you do with agile, here with Waterfall you would do the System design for the whole project One large hit then Say Next you Might go ahead and it meant that system design all your components If you want to go back and change something structure that you might be changing has already been set in stone and you're application might all rely on what you're about to change the risk



Scrum work by starting with a project vision.

Next Release planning happens, this is when the project is broken into smaller parts/ Components. Then the Components are put into a Backlog

*Sprint starts*

A **sprint** is a period of time that the team takes a small hand full of the most important items in the backlog and says that is we will be working for the next hand full of weeks and puts the item in the todo.

(Typical sprint within Scrums will last roughly 2 weeks but as I am developing by myself a sprint is going to be a flex able amount of time)

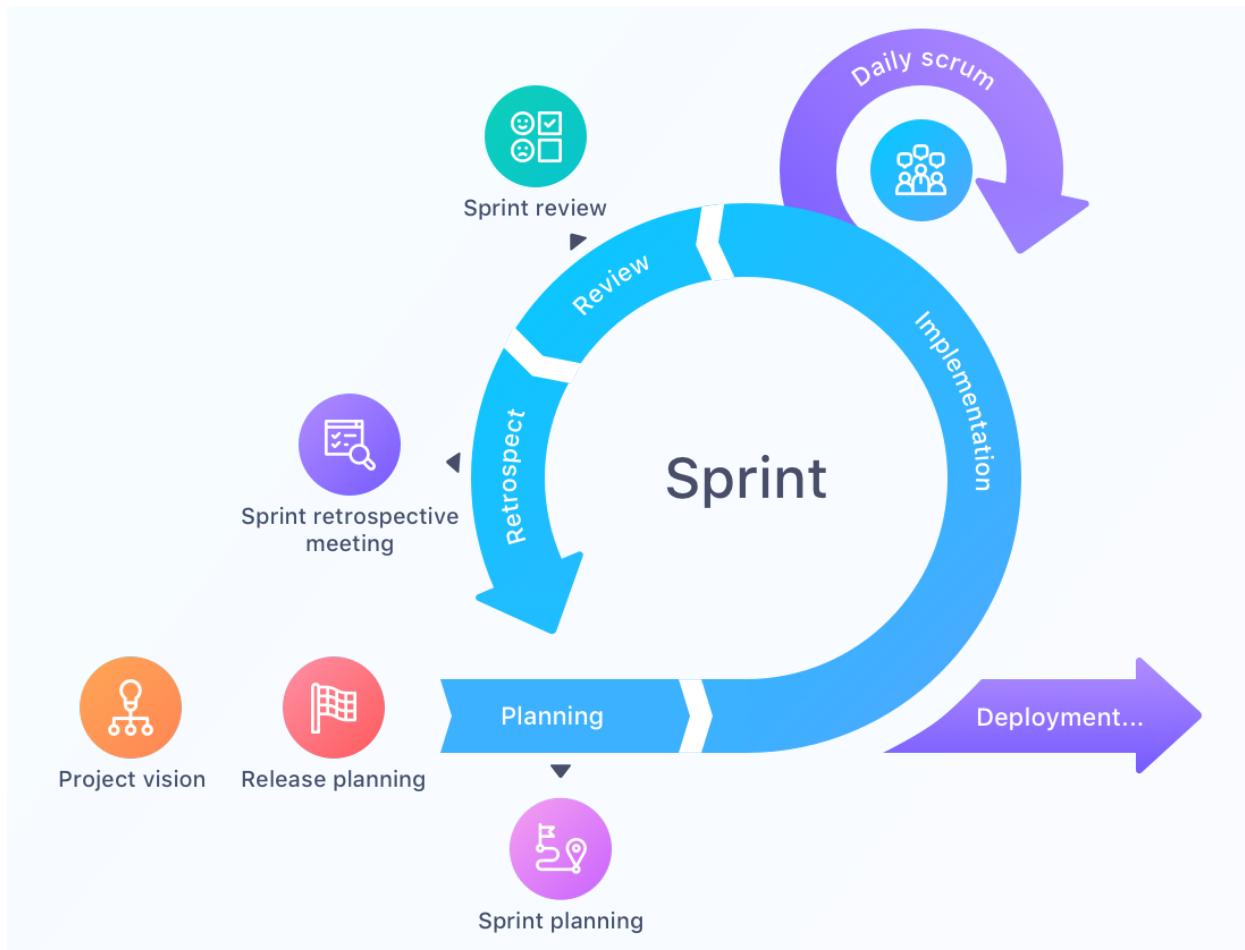
Next, the team will start to implementation of the components in the do to Column

At the end of a sprint, the team will review their work that has/or not been completed and Normally Includes a demonstration

Before starting the next Sprint can start the last sprint must be revised to see how things giving made more efficient/improved

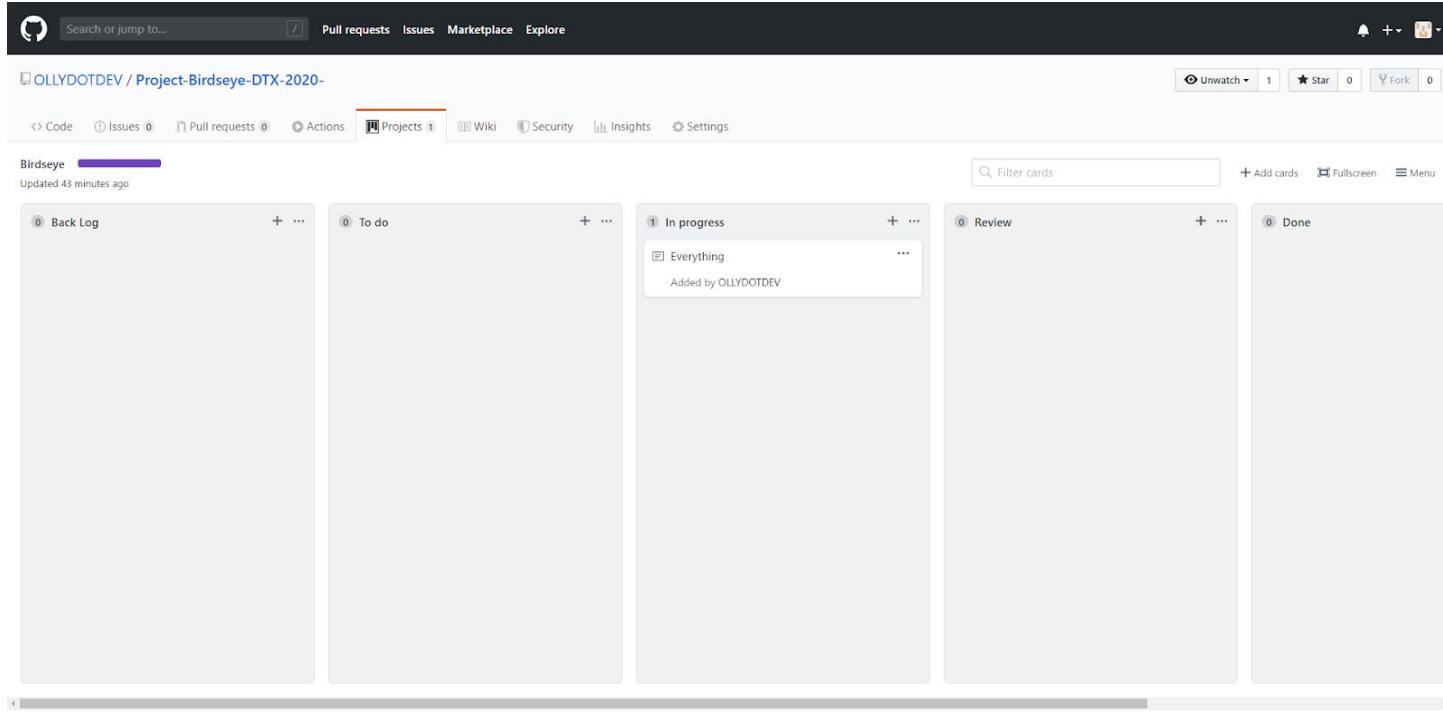
*Next Sprint starts*

If you're still confused here's a diagram



And as for the agile board, I will be using a one that is Happens to be integrated to GitHub What is the structure that I am already Utilising for this project

Heres what the board looks like



## Components

So As I said earlier there are five key components to the project that are Will be broken down into smaller more achievable in a smaller sprint. (For List of what components are completed + Alternative layout If this if is confusion see '2020 DTX For Oliver' and go to the Components tab)

>means that “X” is sending data/info to “Y”

1. Local web portal for Communicating to the Raspberry Pi W and Security Services to be Activated/Disabled/
  - a. Webpage >
  - b. Ajax >
  - c. Webserver >
  - d. User request/data processed >
  
2. Communication between Raspberry Pi W and The laptop (any windows or Linux pc)
  - a. As for the webserver (hosted on the Pi ), it will be using [HTTPS on port 433](#) to talk Back and forth between the pc and the Raspberry Pi Zero W
  
  - b. As for getting the Protecting whatever the sensitive information on the screen this will be done by Utilising framework call [P4wnP1 A.L.O.A. by MaMe82](#) is a framework which turns a Raspberry Pi Zero W into a flexible, low-cost platform for pentesting, red teaming and physical engagements ... or into "A Little Offensive Appliance". Sure at its core, this program can be used for Devious purposes but in this user case it is the keystone to this component to do the Inherent trust that computers give to keyboards, A.L.O.A Just happens to be Seen as a keyboard, or USB On pretty much every platform that it becomes attached to Whether it be Windows, Mac OS, Android, if you can Plug USB mouse/keyboard in I, am in business and this project will be compatible with the device. This is awesome as it means that I can program for a universal platform and I do not have to worry about writing individual code for different operating systems ([OS](#)) thus saving time. But the important part is that I can use this framework to Execute keystroke via Virtual HID Generated by A.L.O.A, in that case, it can be Programmed via the webserver by the user input. Eg there could be an input that lets the user pick what the Security protocol to use.

(on a Side note one of the Requirements for 3.7 is a to use a non-core framework so here it is ↑ )

### 3. Atmega328 TqFp to the Raspberry Pi W (Vice versa)

Still working at best way that this should be done

<https://tutorials-raspberrypi.com/how-to-arduino-raspberry-pi-communication/>

maybe

Manual 1&0 over GPOi pins ?????

(THIS NEED TO BE TESTED )

Or even straight to PI from ROM'S

### 4. Wireless MPTP Atmega328 TqFp Communication

This will be Achieved through NRF24L01 Combined with RF24 library will Allow me to dynamically communicate in half-duplex with all *R.O.M.S* (Remote Observation Monitor System)

[*R.O.M.S* are the remote nodes that process that's sensor data then send the data back to the Relay point] So *R.O.M.S* will talk to the relay and vice versa sending / Receiving data

### 5. Sensory data processing on *R.O.M.S*

I will be having a range of sensors as a single *R.O.M.S* will be designed to handle a range of Situations and Environments. E.g infrared distances sensor to use as an invisible tripwire or it could be put by a door and used to tell if a door is open/close. PIR for Detecting weather a person is in room / Somewhere where they could view private data and also be used to alert the user to this potential issue. Down to measuring the battery power level So that the user can ETA on how long will the *R.O.M.S* last be for needing to be charged. One of the other key parts of a *R.O.M.S* is the fact that it will be controlling What connected components Are provided power this it to Thus saving power when senses are not utilized in the user's current mode. How are these most determine you say well? The way that the data is processed is determined by a list of modes/options given on the webserver then the selected option is then part via the relay to the *R.O.M.S* which in turn will then switch there mode correspondingly so that I know how and what data to process.

(subsystem Determining How data should be Processed by from the user via a Questionnaire which determines the most appropriate way to process the data)

Processing mode

So with the general gist of the progress laid out, I proceed to import this to my scrum board on [GitHub](#)

## Agile Product Backlog

Backlog 101

<https://www.youtube.com/watch?v=DUYUlj1t10Q>

<https://www.youtube.com/watch?v=XPjR0OZPxeA>

<https://www.youtube.com/watch?v=XPjR0OZPxeA>

<https://www.youtube.com/watch?v=9TycLR0TqFA>

[https://www.youtube.com/watch?v=RaaBrPCo\\_Mw](https://www.youtube.com/watch?v=RaaBrPCo_Mw)

<https://www.mountaingoatsoftware.com/agile/new-to-agile-or-scrum>

<https://www.mountaingoatsoftware.com/blog/an-iterative-waterfall-isnt-agile>

<https://www.mountaingoatsoftware.com/agile/user-stories>

<https://www.youtube.com/watch?v=EDT0HMtDwYI>

Detail can be added to user stories in two ways:

- By splitting a user story into multiple, smaller user stories.
- By adding “conditions of satisfaction.”

Who...What...WHY

As a user \_\_\_\_\_  
I need \_\_\_\_\_  
So that \_\_\_\_\_

## Advanced component breakdown

Here the planned project is broken down into tasks that their independent components to complete in sprints.

Relay

ROMS

## Components

- Atmega 328p Circuit
- Power Regulations
- Battery
- PIR sensor
- IR Infrared Obstacle Avoidance Sensor
- Transceiver
- IO
- Physical board/layout

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## 2.5 & 3.5

For these Standards, I will be taking on the data Relay, R.O.M.S and the 3D printed Components of this project

### Relay

#### Overview

The middle man of the project

Forwarding data from rasp zero PI to R.O.M.S

And Forwarding data from R.O.M.S to rasp zero PI

#### Development

-

## R.O.M.S (Remote.Observation.Monitor.System)

### Overview /

This is the remote Device that links to the relay with a hypothetical range of 100m +.  
(untested yet)

This takes data from Connected Senses and calculates the perceived threats  
eminence, relative to the parameters is given

### Development

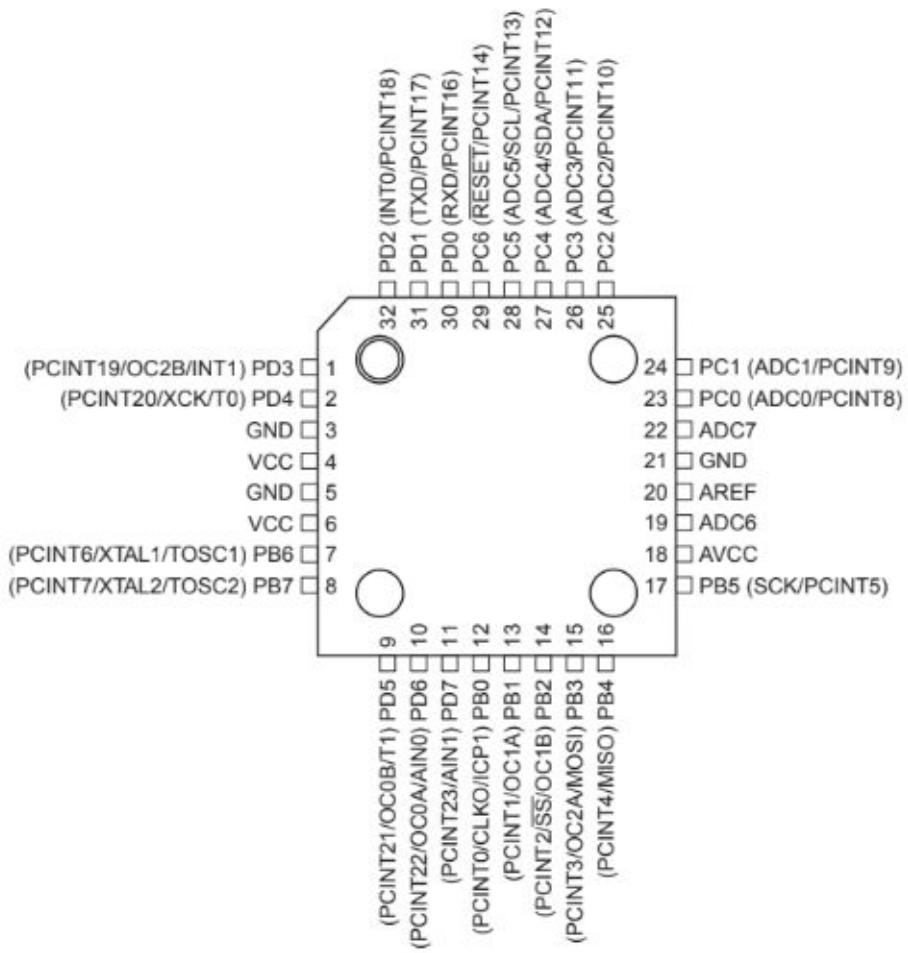
## Start 6/2/2020

Starting off to after I had worked out that I wanted to do for this project

I was faced with how I was going to approach this component of The Project. From main projects, I knew that I was going to tackle the designing of the PCB with eagle cad but as for the actual device itself I had initially thought I would go with something like a raspberry pi zero w But decided that for something that is going to be run on battery power I would rather have something that is more efficient Powerwise, So I turned to look at Arduino's and this was Looking around the promising option but the idea of having to buy A whole bunch of bunch sensors and also fit all compactly would have work but I was looking for something a little more flexible. I thought surely there is a better way to using Arduino, if Arduino was made from smaller Components surely I can do the same just have it more adapted to my project. So after further investigation, I have seen that The do we know Uno is based off the atmega328 DIP chip (Some clones use the TQFP version)

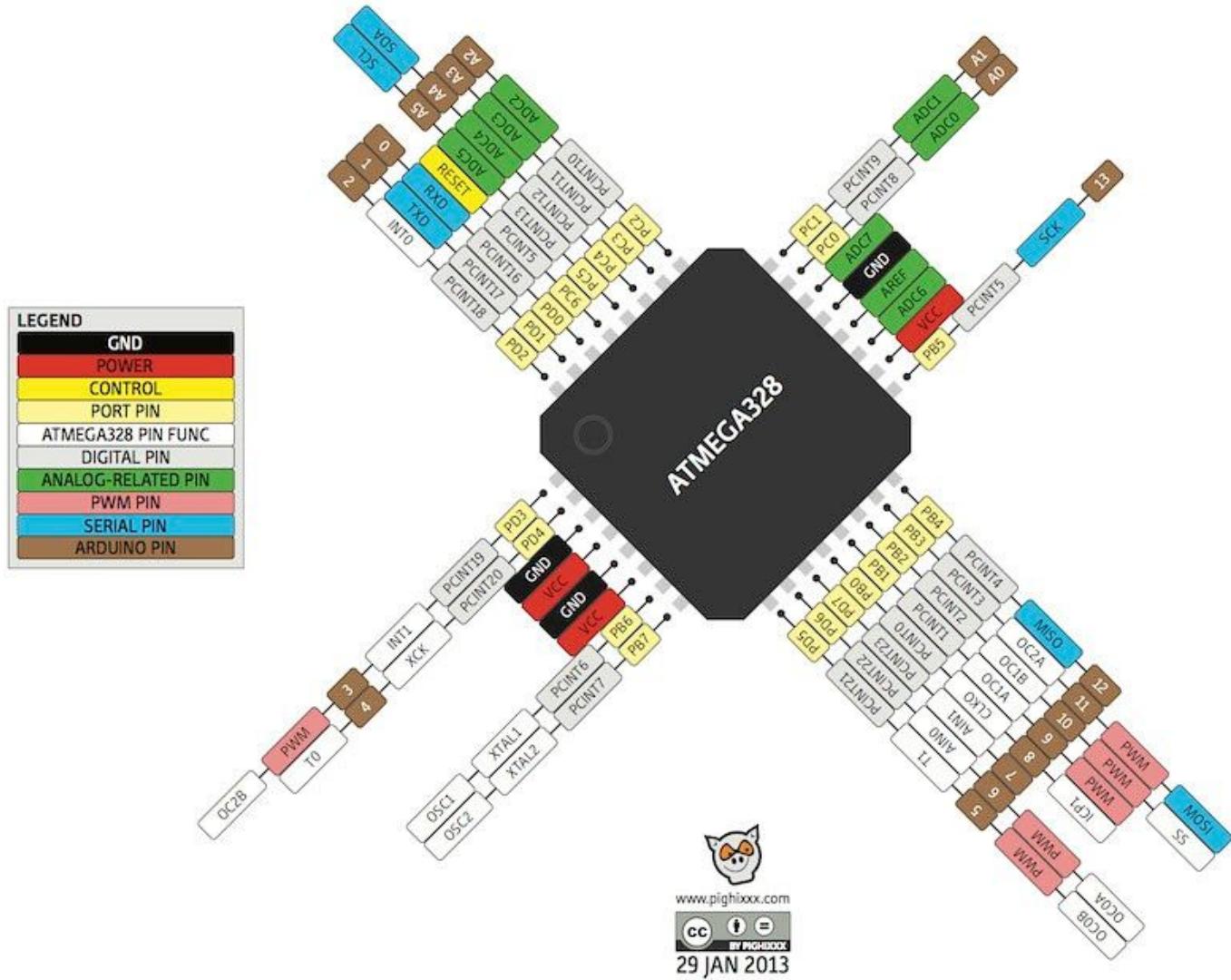
So when looking into getting an atmega328 to work first you need to burn the Arduino boot loader show in The variety of different ways here [From Arduino to ATmega328](#). I will be using the FTDI Adapter Is something that needs to be kept the mind while doing this is the fact that The hardware pinout for this chip is

### TQFP Top View



<https://www.youtube.com/watch?v=kDL9CHratZE>

This Image Shows the physical pinout of the chips but Confused and Confusingly the pin 1 of port pinout does not Equal what can be seen for the function of the Pin as pin 1 Is a PWN pin Arduino is concerned it is pin ~D2

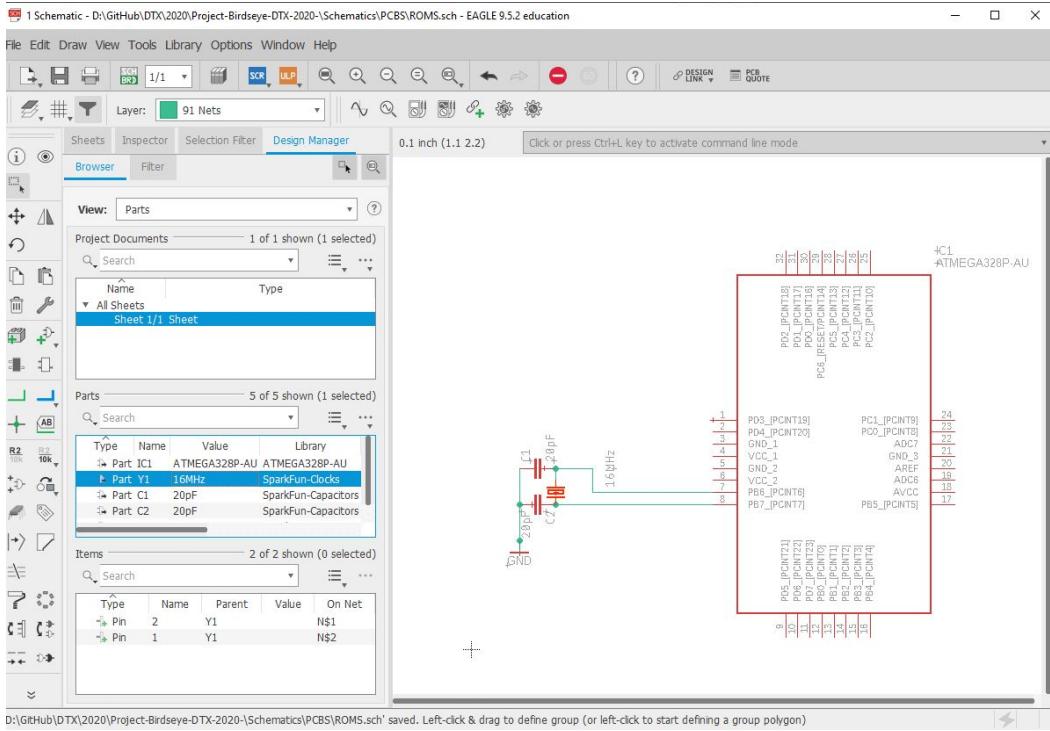


So there is the full layout for the pins. With this in mind, I am now proceeding to make a remake

<https://www.arduino.cc/en/Tutorial/ArduinoToBreadboard>

<https://www.arduino.cc/en/Main/Standalone>

Eagle Cad here I have added an image of the 16 MHz Crystal connected to ground



[Git\[added 16mhz +grounding\]](#)

Crystal Oscillator work of the Piezoelectric effect. The Crystal needs to be connected to ground as crystal need grounding as when the crystal vibrates it can send a signal back down the connected wires so the ground nullifies these signals by redirecting them to ground. The process of Grandma goes to a 20 microfarad Ceramic capacitor.

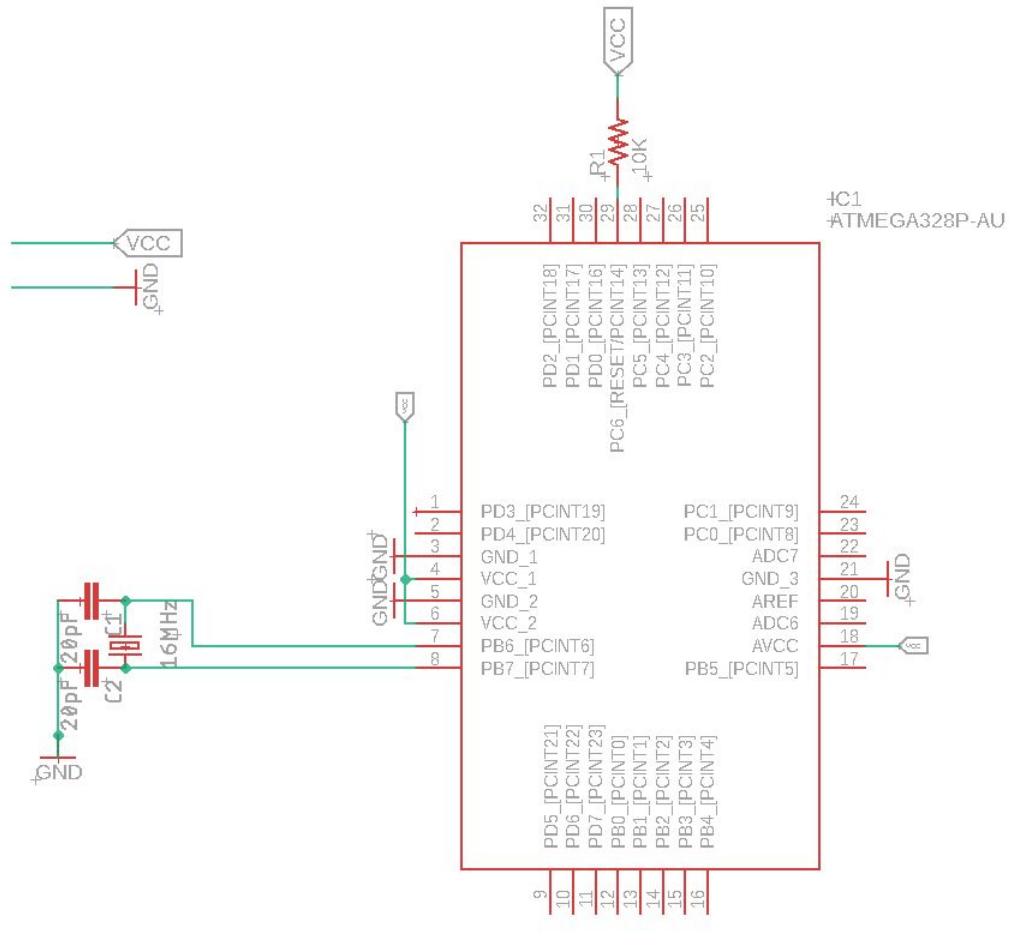
They provides a square wave signal which determines the time required for each T state

3.3v is Good for a max of 8 MHz

5v is Good for a max of 16 MHz

<https://www.youtube.com/watch?v=YzcKQWwkzWs>

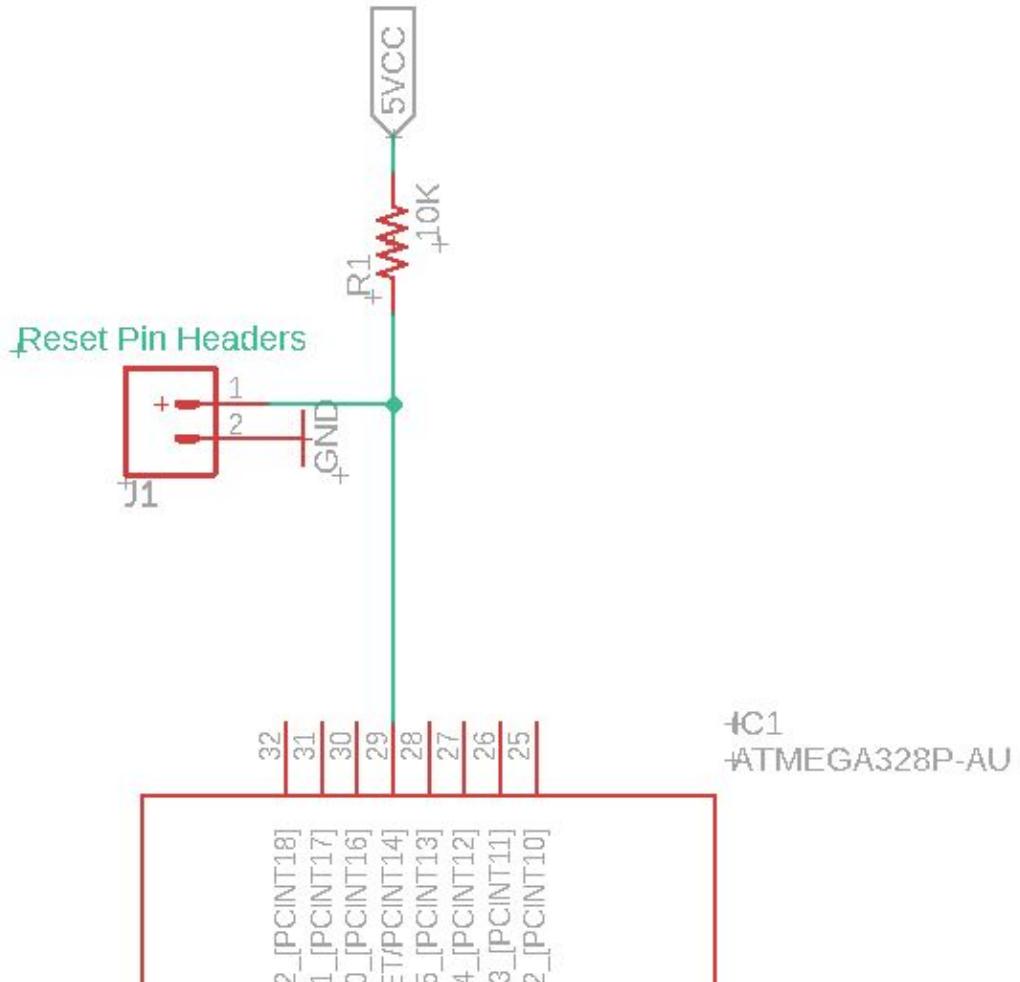
<https://www.elprocus.com/what-is-the-piezoelectric-effect-working-and-its-applications/>



Git[[added 16mhz +grounding](#)]

Here added is part of the Electrical relationships between VCC

Git[[added .gitignore so that the temp .s#1, .s#2 files dont get upload to upstream git repo](#)]



Added reset headers that can be shorted to reboot the IC

<https://octopart.com/598-8710-307f-dialight-868662#Specs>

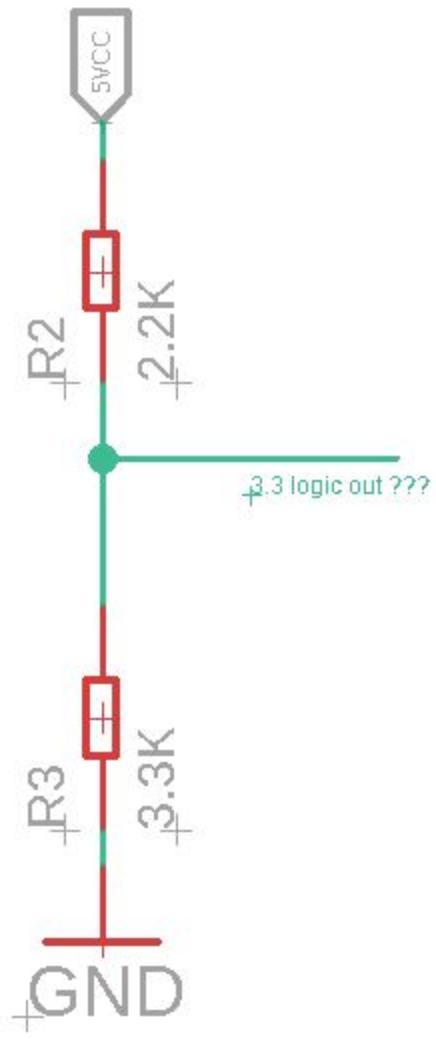
<https://octopart.com/598-8710-307f-dialight-868662#PriceAndStock>

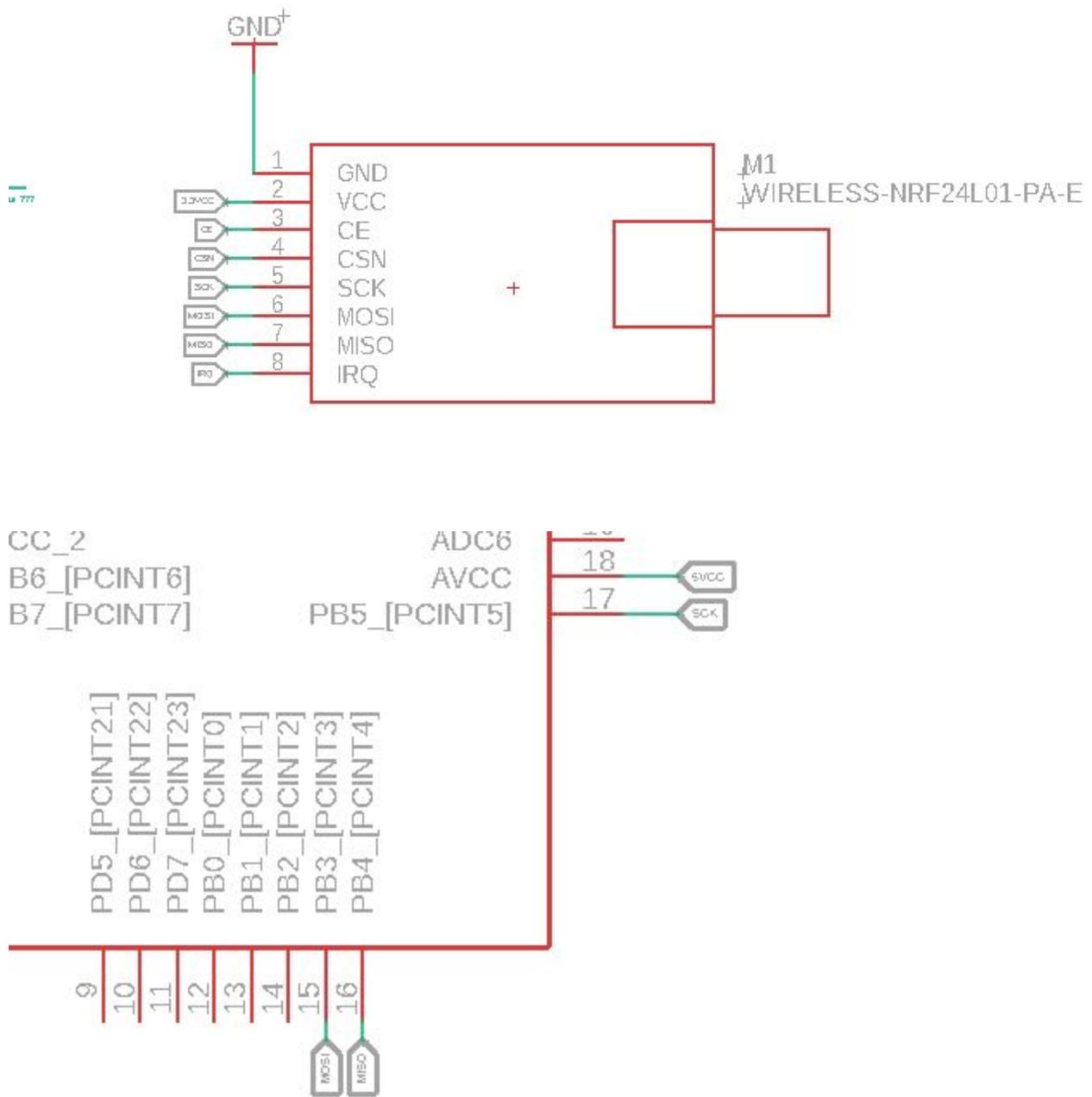
Through many difficulties I have managed to find CAD models and specs for the SMD RGB LED's with the Components name being 598-8710-307F. These LEDs are going to be used to output system status info to the user. Eg when batty need charing (also can send msg back to computer and makes a pop-up or buzz..... )

Design for this PCB is currently underway LEDs.sch

ATMEGA328P-AU is a version of the ATMEGA328 that is power efficient verion

git[[Start of NRF24lo1 hook up & LED](#)]





Here I have stated the Electrical connections [middle & bottom] between these components for most if the pins anyone and also what I [top] is a voltage divider Drop 5 volts to 3.3 for this Transceiver but this is yet to be tested if it works in practice.

Another option I am also looking into is Utilising a voltage regulator, The research for this is currently under way for what is the most efficient and practical in my use case

## LED Related info

Side note led has been moved to a spare PCB so that they can be repositioned so that they will be visible external there for more useful when the case is designed later. So See led part of a project this is found in

the Capacitors is used to smooth out the sin waves as to stop a pulse of energy from potentially destroy Components

^^^^^^^^^^^^^^^^^

Talk more about the physics behind sine waves and Pulse width modulation

<https://www.allaboutcircuits.com/textbook/alternating-current/chpt-7/square-wave-signals/>

Square waves are equivalent to a sine wave at the same (fundamental) frequency added to an infinite series of odd-multiple sine-wave harmonics at decreasing amplitudes.

That then raises the question of how I am going to power the ROMS.

## POWER

To power the ROMS

## Voltage regulator

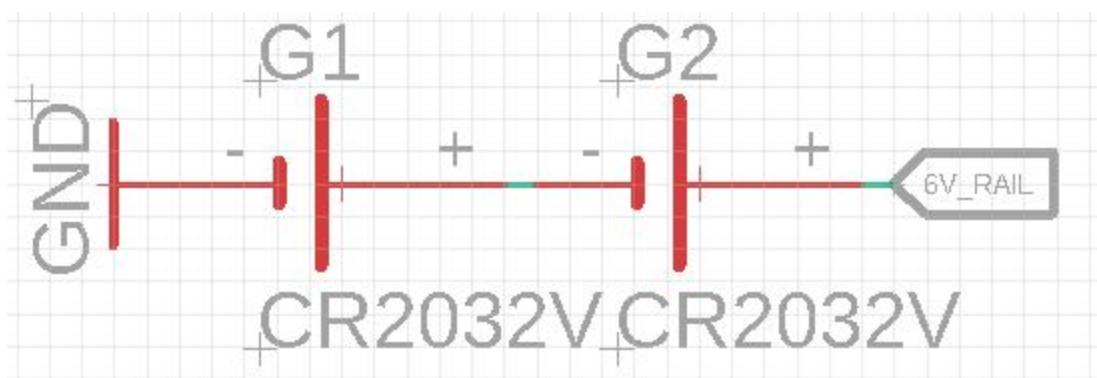
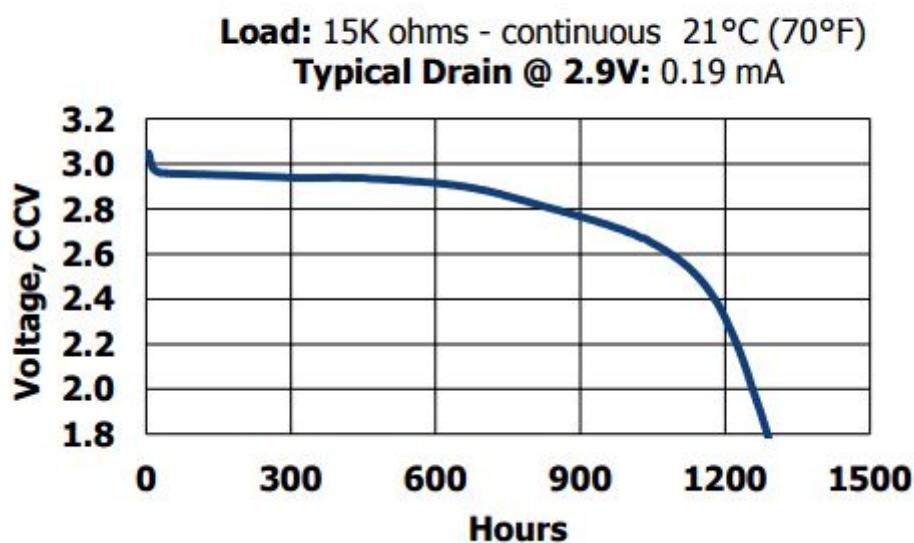
Currently the middle of design this will backup to git when progress has been made

So So because everything is going to be running off 3.3 volts or 5 volts I am looking at using two

So I am going to use [two CR2032 - 3V](#)

That gives me a total of 6V or does it

## Continuous Discharge Characteristics



CR2032 N placed in series resulting in 6 volts

As seen in The image above Did initially the coin battery start off what's above 3 volts around 3.2 I'm running two of these and parallel will give me 6.4 When fully charged (new) And this would completely fry any regulators if you were just basing the typical output on his average discharge voltage. So where I had initially thought hey 3 + 3 is 6 OK let's get a regulator that is writing for a maximum of 6 volts or whatever but when exploring deep as explained above this would not work so I then recalculated and with that I needed the minimum Of at least 7 volts best safe So not tooFry List my components as the only rated for Max of 5 volts or 3.3v. To prevent this I am looking at USING two 3.3 (for this led PCB) and 5 volt (for ROMs) regulator So now I get to have the fun of working out what regulator to use

### Voltage Regulators

so I see there are 3 main types

Linear Regulators

Switching Regulators

Zener Diodes

I guess you could almost count Buck converts

In the end I Decided To go with a Linear Regulators Low dropout. So I due to the fact that my input voltage(6) is close to the 5 I can Afford to use Low Dropout Linear (LDO) Otherwise the heat been dispersed would completely fry itself

The pro with this is the fact that they are simple cheap they produced low noise and the fast switching the issues with them though is that they're generally for higher voltage switching the highly efficient and Nexus voltage gets turned into heat there for giving them family limitations and that has the perfect for low current usage the voltage and is close to the voltage out and when you require low noise environment. Which is exactly my use case.

If i needed more then 100 mA then i will would be Advantageous to use a switch instead.

<https://www.digikey.co.nz/en/product-highlight/s/stmicroelectronics/ldo-regulators>  
[LDO \(Low Dropout Linear Regulator\)](#)

After looking on Digikey and not finding what I am looking for I took to google

And found [this page](#). It houses the datasheet for a series of LDO's

So i will be using the

LT1763CS8-3.3

And

LT1763CS8-5

These LDO have 8 pins, four each side.

These pins are

**BYP (Pin 6/Pin 4)**

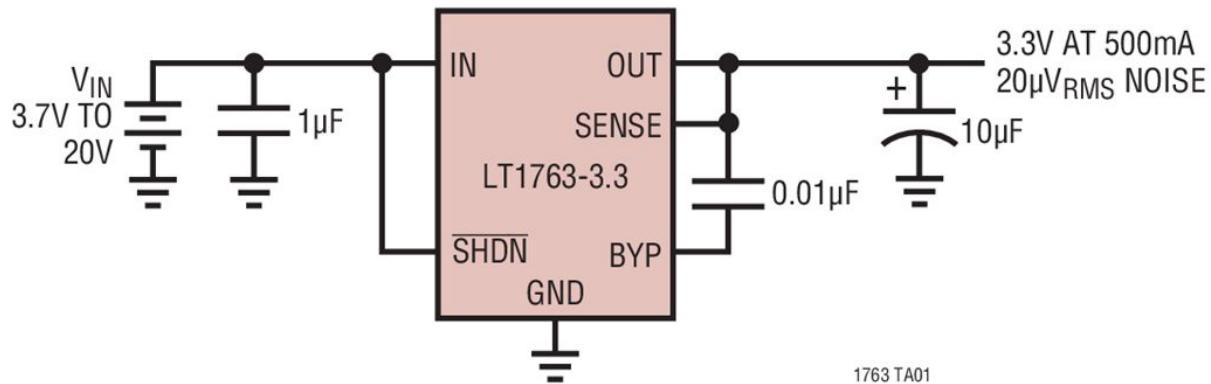
achieve low noise performance from the regulator if not used do not connect pin  
06

**IN (Pin 10, 11/Pin 8)**

(VIN is the completely unaltered input power before the regulator)

Power into regulator

## 3.3V Low Noise Regulator



(layout if the same for 3.3v and the 5v visions )

I will be Replicating the circuit in below in Eagle for

LT1763CS8-3.3

And

LT1763CS8-5

Libraries have also been added

LT1763CS8-3.3\_TRPBF.lbr

And

LT1763CS8-5TRPBF.lbr

So that the schematic has the needed parts

[LT1763 Series – 500mA, Low Noise, LDO Micropower Regulators \(datasheet\)](#)



The bypass pin is not utilized due to the fact that it is only needed for when you're trying to achieve lower noise to Signal ratio.

Talk about how the wireless chip comes to the atmega 328 IC  
(physics of the radio waves maybe ?)

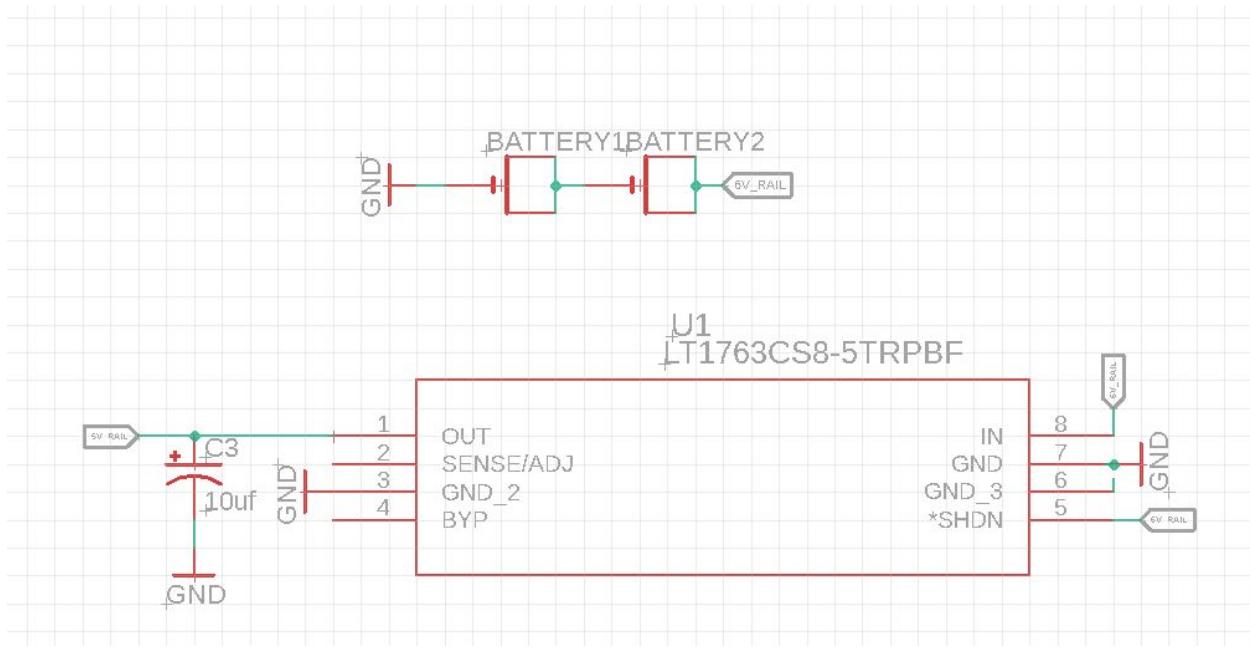
and had another thought Whether it was possible to Calculate the resistor with ohms to provide 3.3 volts to the transceiver Rather than needing  
A voltage regulator /Voltage divider etc

Also In short, R.O.M.S What can indicate to the LED board via serial connection to control the lights by the secondary atmega328 chip. Further down the page for the development of the LED PCB

End 18/2/20

Start 20/03/2020

With the power system designed The now I need to implement it to my schematics Sure one might just ask why don't just all everything on 3.3v well, As for ROMS I have PIR sensor that needs to be run at 5v sure I could just shift up the volage but having the this would mean that I would Be restricted is in at 3.3 volts you were unable to run atmega328 chips at its full performance of 20 MHz as my use case Is better utilized to when operating at 16 MHz as 16 MHz give me a double speed of the bass performance meaning conversion calculations are simpler as well as 16 MHz crystals being standardize. Is it 3.3 volts you are only able to run that mega328p chip at 8 MHz insecurity situation which this will be deployed in speed is everything.



So here the power Regulator and supply have been added to my schematic for ROMS.

Some other things to keep in mind is that I also need to take 6v to the LC\_Board

So know that I all ready have 3.3v regulator on the LC\_Board

And I 3.3v also happen to need 3.3v on my ROMS Board so first thoughts were to pass 6V off to LC\_board run it thought the 3.3v regulator on the LC\_Board then

# End

## LC Board (LED Controller Board)

### Overview

Control 3x RGB LED for feedback to a user about status.

Development

## Start 19/2/20

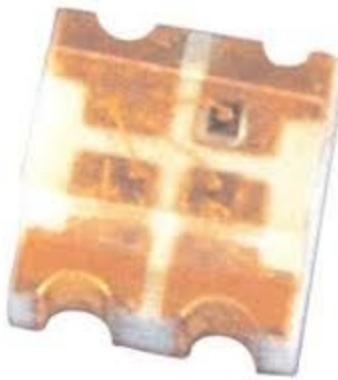
So

### MOSFETS

I needed a way to control the first method that comes to mind. It is simply just powering the LEDs directly from the IC. There should be there is that the atmega328p that I'm using operates at 5 voltages and that would completely fry the components. (As if I can get this to work for the LEDs are also most likely be read utilizing the same technique for toggling power to other components which did not need to be constantly powered). Next on my plausible Solutions list was using Pulse width Modulation (PWM for short) On a half duty cycle of 5v it would hypothetically give out well... i am not sure whether or not really a true 2.5 volts r is it just a realy short burst of 5v as seen [here](#). I'm going to be inquiring to the teacher about this So that I can get a solid answer that way I can Get a definite answer

Then this is the also even once they have power these led have a common anode meaning that they have one pin that provides power and three ground

As seen here



alt(here is an image of the SMD RGB LED I will be using )

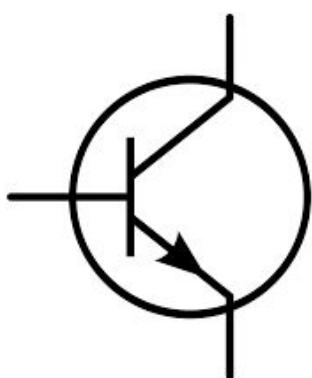
ChipLED	Dialight Part Number	Color	Material	Dom. $\lambda$ Typ. (nm)	Intensity Typ. (mcd)	Forward Voltage Typ. (V)	Viewing Angle	Height	Test Current (mA)	Fig	Type
<b>0603 Series Package (1.6mm X 0.8mm X Height)</b>											
	597-3326-607F	Green	InGaN	525	150	3.4	130	0.8	20	1	Single Color
	597-3607-607F	Blue	InGaN	470	60	3.3	130	0.8	20	1	Single Color
	597-5004-407F	Red	AlInGaP	626	50	1.9	152	0.7	20	1	Single Color
	597-5112-407F	Red	AlGaAs	647	11.7	1.7	152	0.7	20	1	Single Color
	597-5203-407F	Orange	GaAsP	606	3.4	2.2	152	0.7	20	1	Single Color
	597-5213-407F	Orange	AlInGaP	605	65	1.9	152	0.7	20	1	Single Color
	597-5223-407F	Yellow	AlInGaP	590	65	1.9	152	0.7	20	1	Single Color
	597-5312-407F	Green	GaP	567	6.4	2.1	152	0.7	20	1	Single Color
	597-5412-407F	Yellow-Green	GaP	572	11.7	2.1	152	0.7	20	1	Single Color
<b>0606 Series Package (1.6mm X 1.6mm X Height)</b>											
	598-8010-107F	Red	AlInGaP	635	40	2.2	140	0.7	20	2	Single Color
	598-8020-107F	Red-Orange	AlInGaP	625	150	2	140	0.7	20	2	Single Color
	598-8030-107F	Orange	AlInGaP	605	80	2	140	0.7	20	2	Single Color
	598-8040-107F	Yellow	AlInGaP	593	130	2	140	0.7	20	2	Single Color
	598-8050-107F	Yellow	AlInGaP	587	130	2	140	0.7	20	2	Single Color
	598-8060-107F	Yellow-Green	AlInGaP	573	40	2	140	0.7	20	2	Single Color
	598-8070-107F	Green	GaP	566	20	3.2	140	0.7	20	2	Single Color
	598-8081-107F	Green	InGaN	523	300	3.2	140	0.7	20	2	Single Color
	598-8091-107F	Blue	InGaN	473	90	3.2	140	0.7	20	2	Single Color
<b>0805 Series Package (1.6mm X 1.6mm X Height)</b>											
	598-8410-207CF	Red / Green	AlInGaP	635 / 565	60 / 40	2 / 2	140	0.7	20	3	Bi-Color
	598-8430-207CF	Orange / Green	AlInGaP	605 / 568	100 / 40	2 / 2	140	0.7	20	3	Bi-Color
	598-8440-207CF	Yellow / Green	AlInGaP	590 / 570	135 / 50	2 / 2	140	0.7	20	3	Bi-Color
	598-8450-207CF	Yellow / Green	AlInGaP / InGaN	592 / 530	120 / 120	2 / 3.2	140	0.7	20	3	Bi-Color
	598-8460-207CF	Yellow / Red	AlInGaP	590 / 640	135 / 50	2 / 2.2	140	0.7	20	3	Bi-Color
	598-8710-307F	Red / Green / Blue	AlInGaP / InGaN / InGaN	635 / 525 / 470	60 / 120 / 90	2 / 3.2 / 3.2	140	0.7	20	4	Tri-Color
	598-8720-307F	Red-Orange / Green / Blue	AlInGaP / InGaN / InGaN	625 / 525 / 470	120 / 150 / 60	2 / 3.2 / 3.2	140	0.7	20	4	Tri-Color
	598-8740-307F	Yellow / Green / Blue	AlInGaP / InGaN / InGaN	590 / 525 / 475	110 / 220 / 90	2 / 3.2 / 3.2	140	0.7	20	4	Tri-Color

The part name is DIALIGHT\_598-8710-307F we can see that has 3 forward voltage values

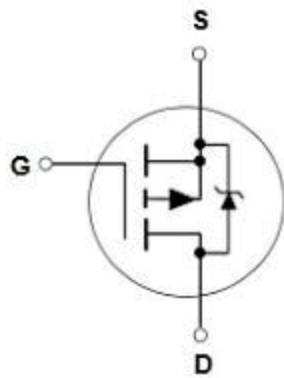
This is for each of the three colors each there  
And each color has a differce volage useds

So can next I need to work out how I can control what pins are connected as i am looking at using needs to be able to control nine 9 pins as each LED has three pins that need to control the color. So 3 pins and 3 led means  $3 \times 3$  gives 9, 9 pins to control

To do this i will be controlling each pins connected to the ground via some device. The two contestants were a transistor or MOSFET



^▲ transistor



^▲ MOSFET

When comparing the base of a transistor to the Gate of a MOSFET, it can be seen that there is actually a physical connection where current would flow from the base if it were connected to ground. This would just be a waste of power. So an alternative is to utilize a MOSFET which utilizes the effect of inducing a current flow via magnetic fields. Once the capacitance is charged, there's no need to continue providing power, therefore, there is minimal to no loss-making it super-efficient.

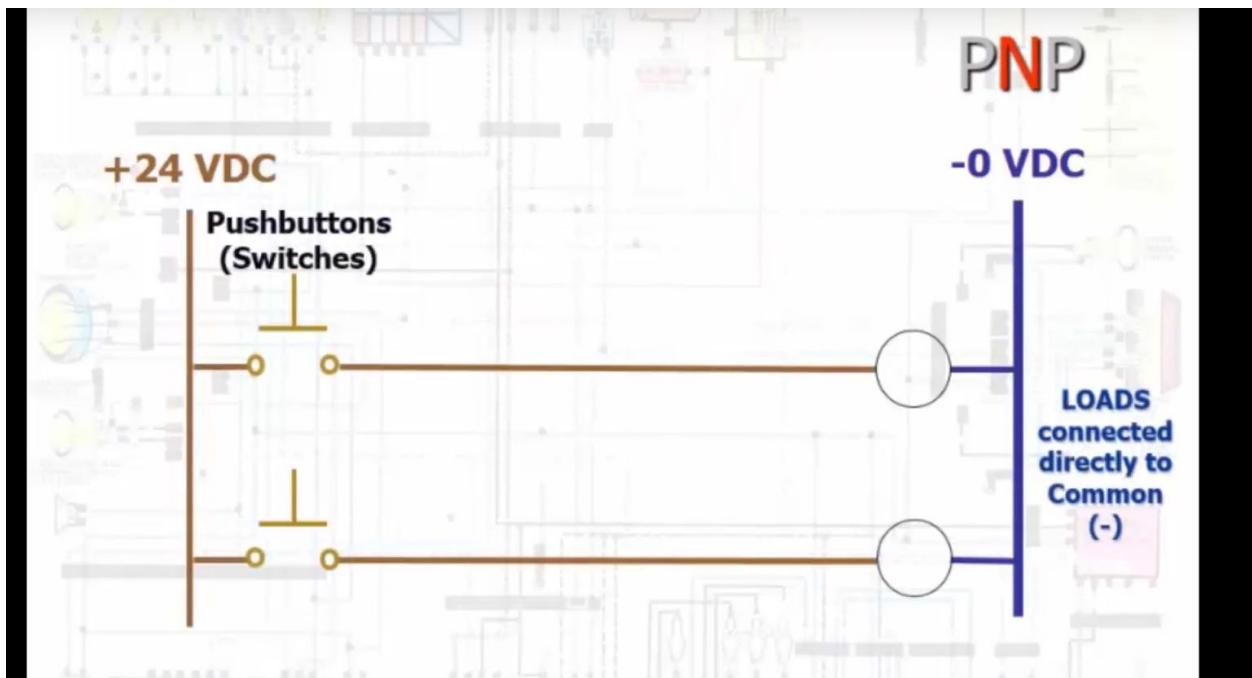
That is why I have picked MOSFET over transistors

So I started looking it to information about MOSFET

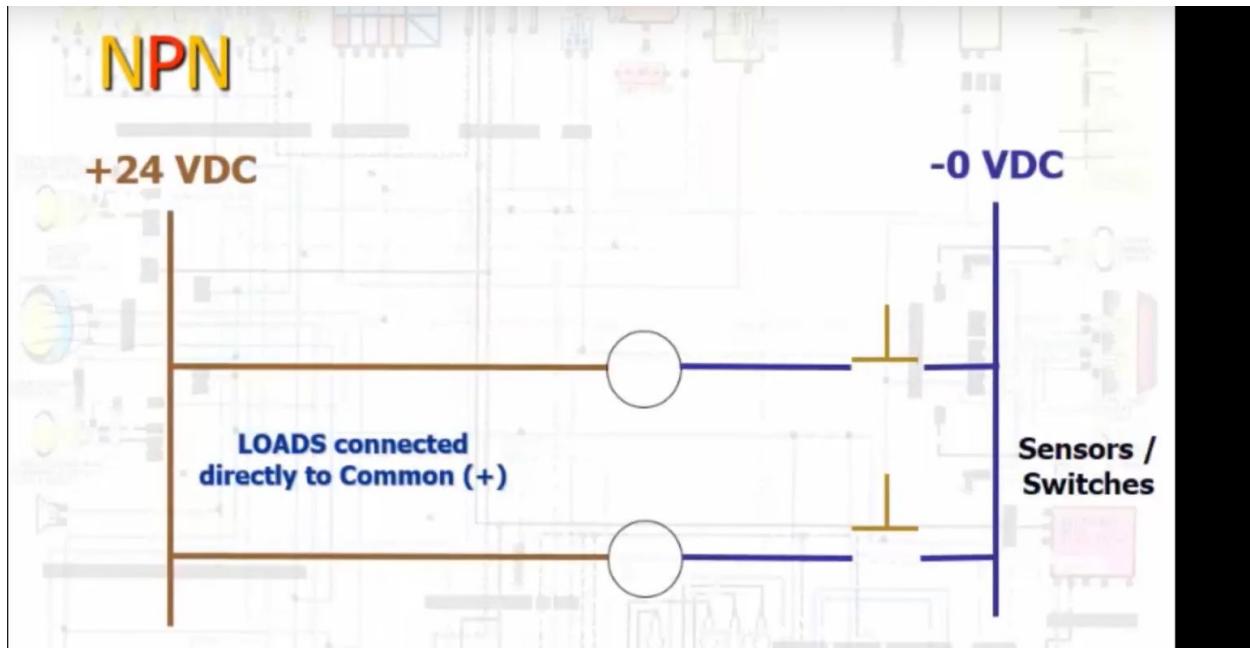
<https://oscarliang.com/how-to-use-mosfet-beginner-tutorial/>

So for starting there are two types n-channel and p- channel  
There are used in the two Different scenarios given below

In short, PNP is when the switch is placed be for the connected load, in this case, a MOSFET is our equipment switch. therefore the placed between the VCC the load as seen here. This way



This is as in NPN you have your load be for the switch therefor



What type n or p channel will depend how I designing the Circuit to my needs

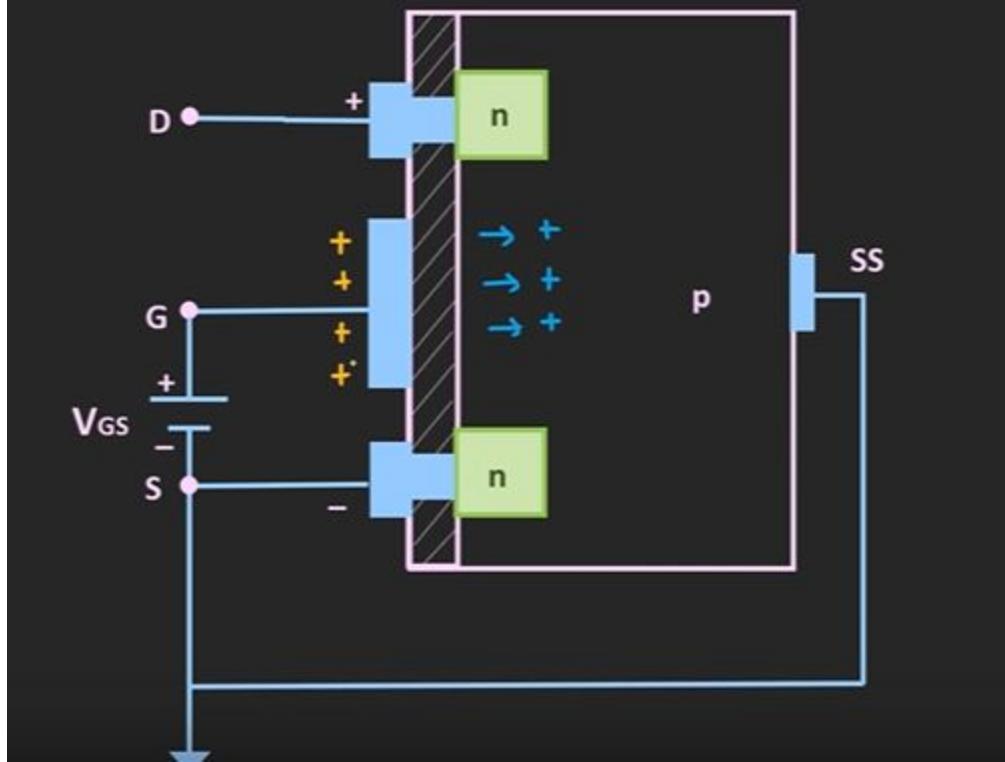
There is also the mode do consider as shown here .

<https://www.allaboutcircuits.com/video-lectures/mosfets-mos-field-effect-transistors/>

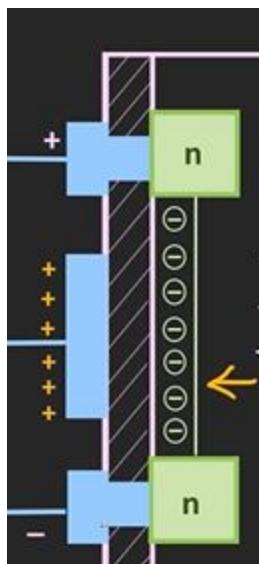
I will be going with enhancement-mode MOSFETs as in my apperation were it is battey operated having a contence drain from a deplation mode MOSFET (these are more like a variable resistor) would be the a incorct use for this component.

Enhancement-mode MOSFETs Work by when a sufficient voltage is applied to the gate (the amount of voltage changes from MOSFET TO MOSFET) it will Induce magnetic field in p material as the seen here.

# Enhancement Type MOSFET



Which in turn allows for current flow from the source to the drain. - in a circle is repetitive of current flow as electrons are negatively charged



So in the end after Deciding which Mosfet I'm going to utilize I'm back to facing the issue how he can make going to control all of these MOSFETs sure I could use 9 Very valuable pins from my atmega328 On my R.O.M.S And with this particular project I could probably just get this to work but the catch being that it would be limited to the fact that it would in future not have the ability to be upgraded due to lack of spare digital/analog pins. So the next consideration is to take a whole nother atmega328 chip and have it dedicated to just controlling these lights and communicate via serial protocol back to R.O.M.S And have this whole part of the LED board just running 5 volts that way it would only require one power source. Most likely I will Regulate this with a 5-volt regulator.

So with this in mind this there is more to consider when picking a MOSFET for your project

Hows about the gate threshold(  $V_{gs(th)}$  ) is a point where the MOSFET will start to conduct current but with high resistance. gate-source voltage is What scales to allowing more current through once your parcel point

[Topic: About the good usage of N-channel MOSFET ? \(Read 4714 times\)](#)

[n-channel / logic level / low Rds MOSFET - and datasheet questions - Page 2](#)

[Topic: n-channel / logic level / low Rds MOSFET - and datasheet questions](#)

[Understanding MOSFET On-State Drain-to-Source Resistance - Technical Articles](#)

RDS(on) idea seems simply when the gate is off the resistance between source and drain is extremely high—so high that we assume zero current flow. Listen to NZ scales more voltage applied to the gate pin the more current can flow through from Source to drain (Until blows itself up)

So as long as the RDS(on) Met in the gate is provided sufficient power Then we should be fine

This is important as I will be needing To drive mosfets at a logic level (3.3v or 5v) so the RDS(on) is Important to know this can be obtained by looking at graphs why this is seen in the conversation showing just below

<https://www.youtube.com/watch?v=oEBS7kJz6U>

<https://www.embeddedrelated.com/showarticle/809.php>

logic level MOSFET vs normal MOSFET

[MOSFET Confusion - Logic Level vs. Standard](#)

[Logic level vs "normal" MOSFETS...](#)

This simply means what the Mosfet runs from the approximate 3.3 to 5-volt value on the gate to Source Rather than 10 volt switch and microcontroller typically cannot output natively

[https://www.youtube.com/watch?v=P\\_5kPfwzT80](https://www.youtube.com/watch?v=P_5kPfwzT80)

<https://electronics.stackexchange.com/questions/75516/determining-the-maximum-gate-voltage-for-an-n-channel-mosfet>

Here's a breakdown some of the parameters

<https://www.embeddedrelated.com/showarticle/809.php>

Characteristic		Symbol	Unit	Description
Drain-source voltage		$V_{DSS}$	V	The maximum voltage that can be applied across drain and source, with gate and source short-circuited
Gate-source voltage		$V_{GSS}$	V	The maximum voltage that can be applied across gate and source, with drain and source short-circuited
Drain current	DC	$I_D$	A	The maximum DC current that can pass through the drain to source
	Pulse	$I_{DP}$		The maximum allowable peak drain current for pulsed operation
Power dissipation ( $T_c=25^\circ\text{C}$ )		$P_D$	W	The maximum power that can be dissipated by a MOSFET
Avalanche current		$I_{AS}$	A	The maximum peak non-repetitive current that is permitted under avalanche conditions
Avalanche energy		$E_{AS}$	mJ	The maximum non-repetitive energy that the MOSFET can dissipate under avalanche breakdown conditions
Channel temperature		$T_{ch}$	$^\circ\text{C}$	The maximum allowable chip temperature at which a MOSFET operates
Storage temperature range		$T_{stg}$	$^\circ\text{C}$	The maximum temperature at which a MOSFET may be stored without voltage applying
Isolation voltage		$V_{ISO(\text{RMS})}$	V	The maximum voltage at which a MOSFET can maintain isolation between the designated point on the case and electrode leads
Tightening torque		TOR	N·m	The maximum torque that may be applied in the axial direction when tightening a screw

(Clarification with mosfet From someone who knows what they're actually doing unlike me)

9:33 PM

Hey

so have worked out that i need enhanced mode mosfets (n and p channel) for my needs

have a started learning how to read the mosfet datasheets and they are full on so i was wounding on if you could guidance on how to work out what mosfet is best fit to my purpose. as in how can i determine that is fit for my project.

I'm going to be working with a max of roughly 30mA and 5V

but I need a mosfet that can be driven by 3.3 volts and 5 volts on the gate and be full on.

thank Oliver

oh and preferably I'm looking at SMD at sot-23 size

9:52 PM

Awesome! Your requirements are very easy to meet with a FET of that size. You will want to look at the gate threshold voltage being lower than what you're switching.

You can now call each other and see information like Active Status and when you've read messages.

Do you know what frequency you want to switch at? Gate capacitance plays a role into that

Even FETs that aren't very good are likely to have less than one ohm of on resistance, and that would result in just 30 mV of voltage drop - something you don't worry about for low speed signals

Signal speed is in a critical factor for this use case

So long as within the 1sec mark

Which I believe is relatively easy to meet

\*\*\*

Signal speed isent a critical factor for this use case

If you wanted 20 MHz I'd start doing the calculations haha

as i have two FETs use cases

1. is to control some of the components connections to ground (essentially turning on and off the device)

2. bidirectional 3.3 to 5 volt converter

so pretty much this <https://bit.ly/2v500xO> (but for that I'm thinking of just working and what components are used and integrating it directly to my PCB is that needs to be worthy of 16 MHz)

[media.digikey.com](#)

media.digikey.com

Those FETs on the spark fun board are nothing special, and they've got a nice schematic for you to copy 😊

If you look at the 2N7000 from ON semi, you'd think it was suitable but then you'll notice the V<sub>gs\_th</sub> is awfully close the to 3.3 V you're wanting to use (max rating). I wouldn't use that part based on that one characteristic

The 2N7000 is (was?) a classic go-to for low voltage switching applications and I've used thousands

The lower voltage stuff I do now still often uses ON semi parts, but the part numbers are much harder to remember

hm...

looking at the 2N7000 and its V<sub>gs\_th</sub> would you be able to elaborate more on why that is bad for it to be so close to 3

The V<sub>gs\_th</sub> is the point where the FET starts conducting at all - usually 1 uA or so. You need to exceed that to be confident the FET would turn on enough

Insidiously, many would work fine and it would be the odd part that wouldn't (due to production tolerances)

The trick, then, is to look at the on resistance graph and see where your gate-source voltage ranks

Unfortunately this data sheet doesn't have one, and you're left with just a couple of data points at 4.5 and 10 V

Based on that alone, I'd just find another part that has better characteristics, rather than bothering measuring a few myself

My technique for finding a FET is to use Digikey, put in a few filter criteria, sort by price and then read a few data sheets.

V<sub>gs\_th</sub> type parameter which specifies what voltage it is fully on

Nah, the lowest voltage where it starts to turn on

Usually, turning on means conducting just 1 uA - and you wanted 30 mA or so

Hence 3 V being suspiciously close to 3.3 V for my liking

ok i see

So in short look at the graphs to see when it will let 30 mA or so though

take something like <https://nz.mouser.com/datasheet/2/308/BSS138-1300116.pdf>

its V<sub>GS(th)</sub> min it says it is 0.8V with a MAX 1.3v

would that MAX mean that is when it's fully conducting ?

[nz.mouser.com](http://nz.mouser.com)

[nz.mouser.com](http://nz.mouser.com)

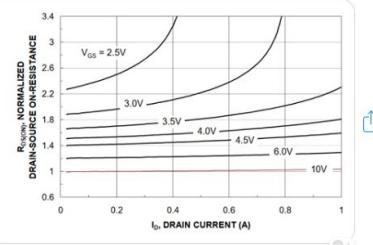
Nah - max means out of all the devices they have measured, the V<sub>gs\_th</sub> will never exceed 1.3 V

So on most, it will be 0.8 V, but it will vary

They're telling you the part's tolerance effectively

Oh I see so that's like the min Max variation

Here's the graph that you want (taken from your datasheet):



So with just 2.5 V, you can get around 2-3 ohms

And that would still work out for you - your drop would be less than 100 mA in the worst case

You're closer to that 3.5 V line which gives you even more headroom

Part of engineering is getting as close to the limits as you can to save money, and other times it's getting as far away from the limits as you can afford to save potential problems.

yeah i would me more the 3.3v And then i could also use the same mosfet also at 5 volts by the sounds

Given you might not be making 1000 of this, you could spend triple on the FET and still not have a significant financial impact 😊

Yes

That one can go up to 20 V before it blows

hehe

Ok I can start to see all the pieces starting fit together now. How they all sort of interlink

that has been a A massive help so much apprecia

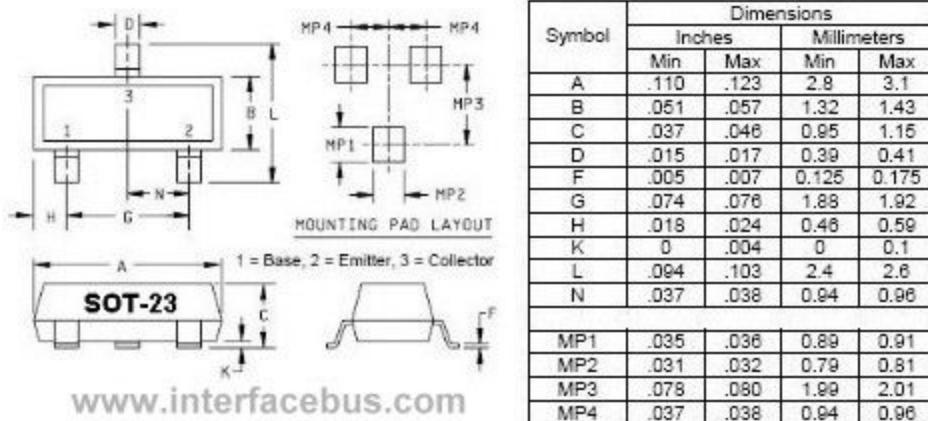
No worries 😊

If you understand all of that, you'll be set for 2nd year electronics at university 😊

(Conversation took place 20/02/20: 9:50 pm with A certified electronics engineer with a degree from university who is actively working in the industry as well)

armed with this knowledge I feel I'm able to make an informed decision on which component more explicitly which MOSFET would be the best option for my particular use-cases while considering things like budget, usability, flexibility, and accessibility

I will be going with SOT-23 footprint due to its sizes



These are the two MOSFETs I am looking at getting  
And Both and work at 3.3 and 5 volts make them very Versatile title

N channel: BSS138

<https://nz.mouser.com/datasheet/2/308/BSS138-1300116.pdf>

P channel: DMN65D8L

<https://www.diodes.com/assets/Datasheets/DMN65D8L.pdf>

## Power

I have already over most of the folwing information in the ROMS development sprint's  
To see Power heading under ROMS for more info. The main difference between the two  
is that LC\_Board will be running on 3.3v instead of 5v.

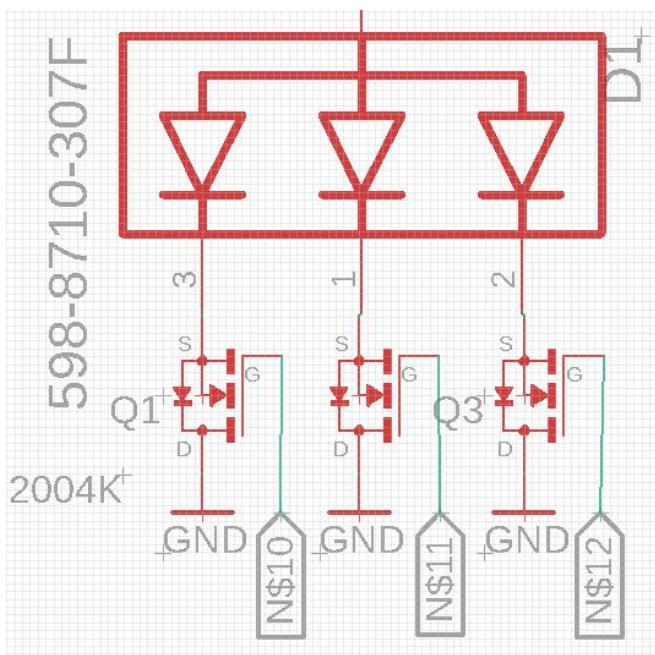
Power for this will be provided from the VIN in on the IO of this board

Then it will be regulated to 3.3v via LT1763CS8-5TRPBF



This marks the completion of Of the first implementation of the Schematic  
[git\(power system for the LED\)](#)

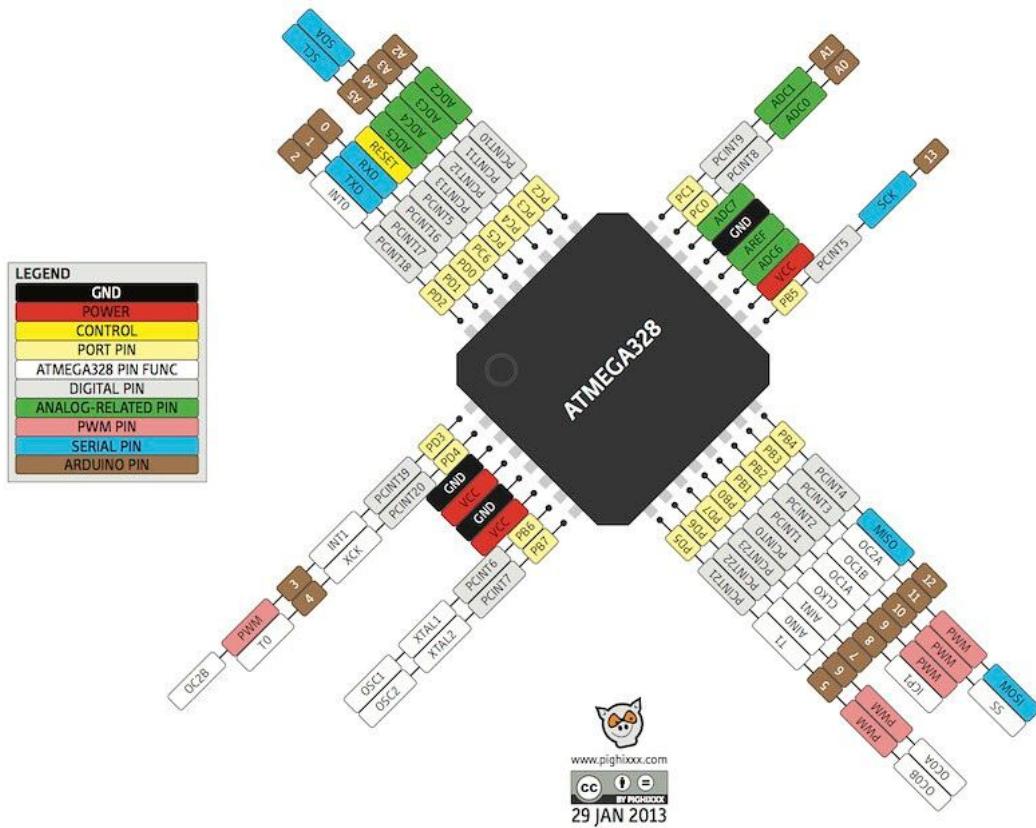
With the power sorted I now am going to hook up the MOSFET on the GND of the  
 RGB LED's To a digital pins on the atmega328p chip



Below is the pinout if the atmega328p

The brown pins with 0 to 13 are all digital pins i could use.

But due to the fact i am also going to need some of this for the serial interface for connection with the R.O.M.S these pins are the RXD and TXD pins i made a note not to use them



I have selected pins

D5 - Red -

D6 - Green -

D7 - Blue -

D8 - Red -

D9 - Green -

D10 - Blue -

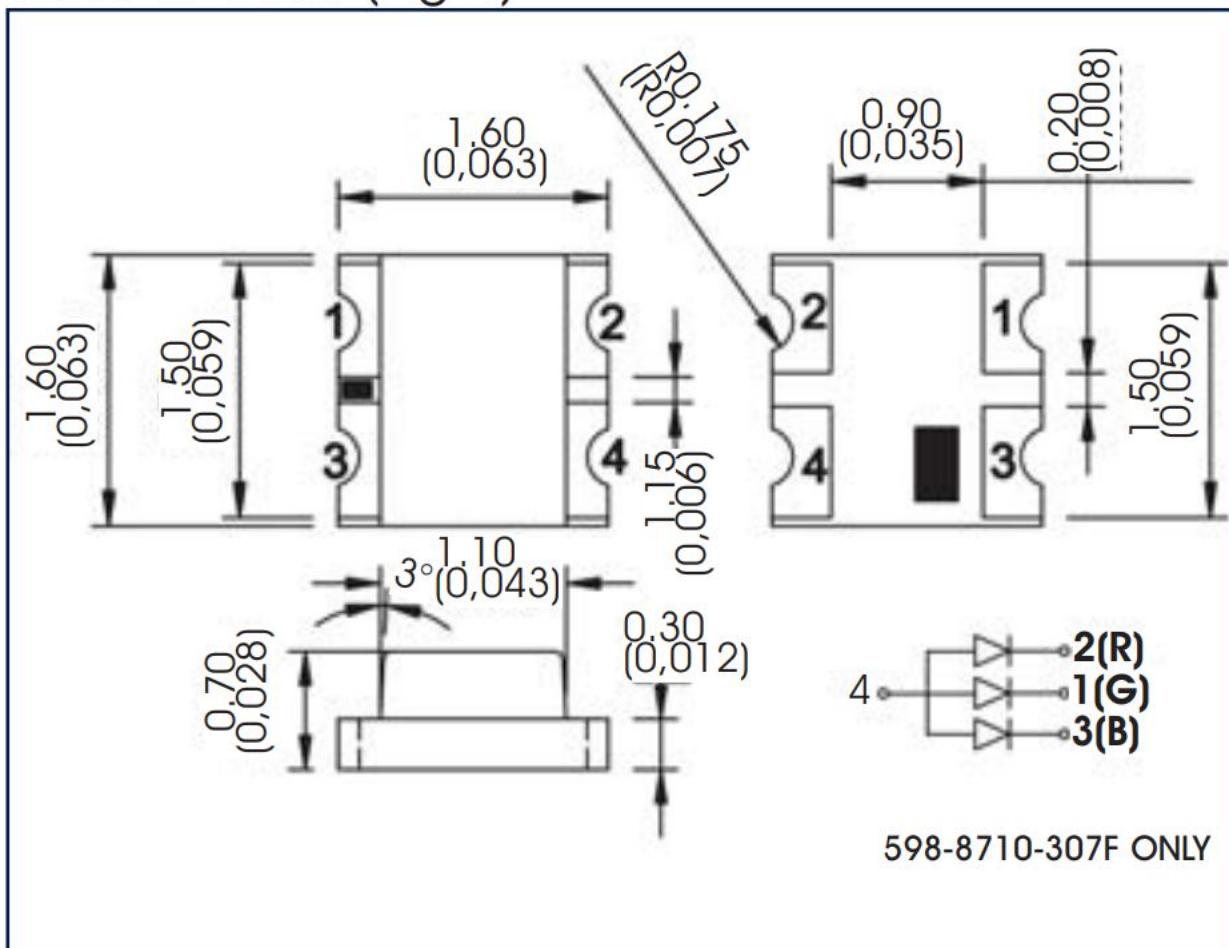
D11 - Red -

D12 - Green -

D13 - Blue -

As according to this datasheet

## 0606 Tri-Color (Fig 4)



IC communication

LED board is the operations on 3.3v and the ROMS runs on 5v so when communicating over serial communication (TX and RX) pins on the used for this communication happen to also operate at the corresponding Voltages for each board.

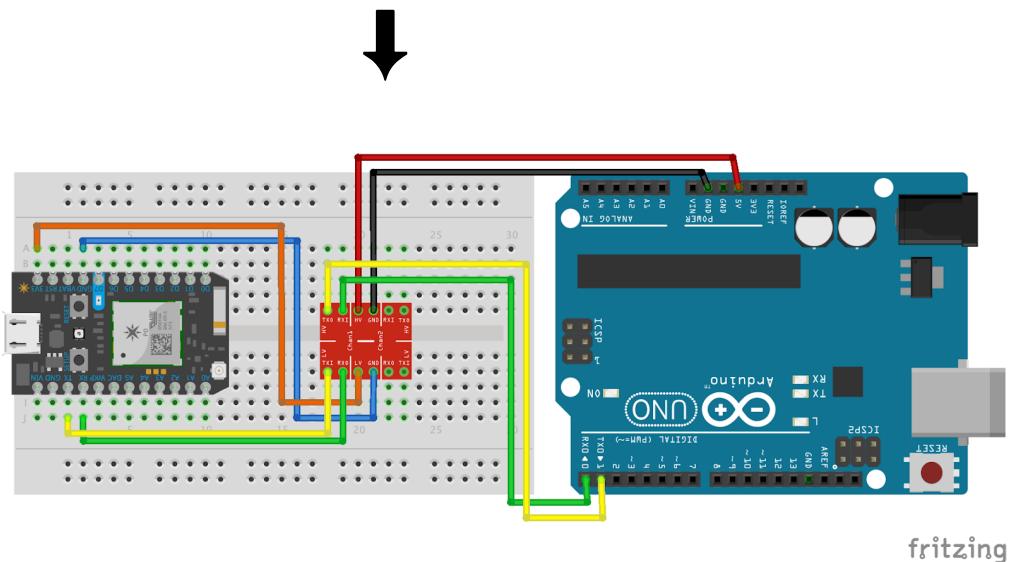
The catch is if the ROMS runs on 5v meaning that the TXD when connected to RXD on the 3.3v board. This would

[A Bidirectional Logic Level Converter \(for I2C\)](#)

<https://youtu.be/t-yuYasIKtY?t=349>

[http://cdn.sparkfun.com/datasheets/BreakoutBoards/Logic\\_Level\\_Bidirectional.pdf](http://cdn.sparkfun.com/datasheets/BreakoutBoards/Logic_Level_Bidirectional.pdf)

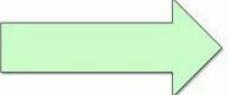
I Could just buy a standalone board seen by the arrow (the Red PCB)

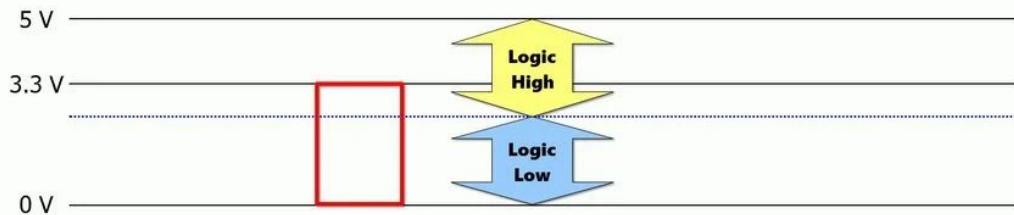


In short how this work is

If you have 5v on the high end the then with the MOSFETs VGS being 0v (as both G and S are sitting at 3.3v there for no difference ) then the low will be pulled high and the low signal will be received as high but

If the High was sitting at 0V then the MOSFET would turn on and the current would flow from low to high, and due to the fact that 3.3 is still counted as a logic high

**3.3V**  **5V**



Sure I Could I have you something like a dedicated chip with a 4-bit bus like a TXB0104 but the parts needed Logic Level Converter are also used in the rest of my project means that I happen to have his parts already on hand for when I do create it. So rather than being required to purchase another component, I could just use the surplus of my other components to achieve the same endpoint.

What is needed is a n channel MOSFET and a some 10K resistors

First I needed to fix my eagle library for my MOSFET. This MOSFET .lbr from <https://github.com/sparkfun/SparkFun-Eagle-Libraries/blob/master/SparkFun-Electromechanical.lbr>

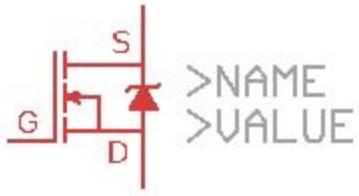
It found it to have this .lbr to be lacking on some labels on the n channel MOSFET

This is how it looked right now



0.2in 10mm  
N-channel MOSFET transistor

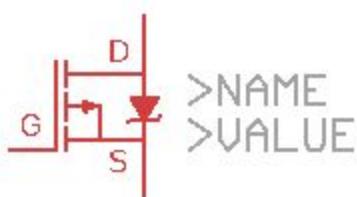
Here the pins are not labeled. To make this easier on myself so that I don't have to keep working what pins are what. So here is the edited version



0.2in 10mm  
**N-channel MOSFET transistor**

Switches electronic signals

I didn't need to do this for the p-channel MOSFETs as they were all ready labeled on the Schematic



10mm  
0.2in

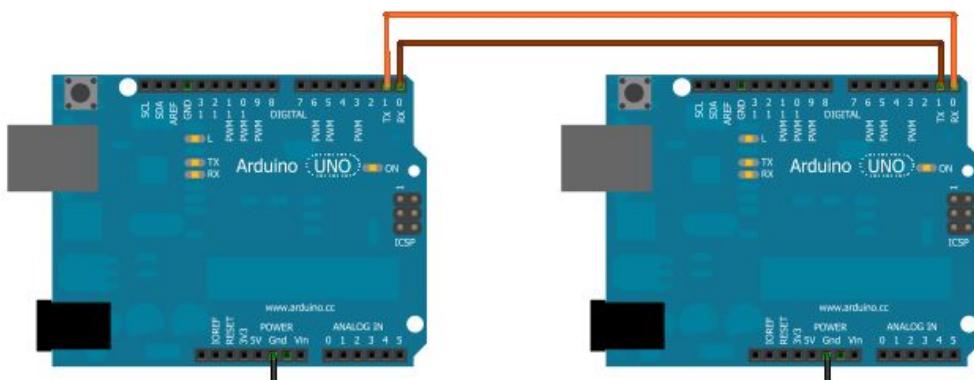
### P-channel MOSFET

Switches electrical signals

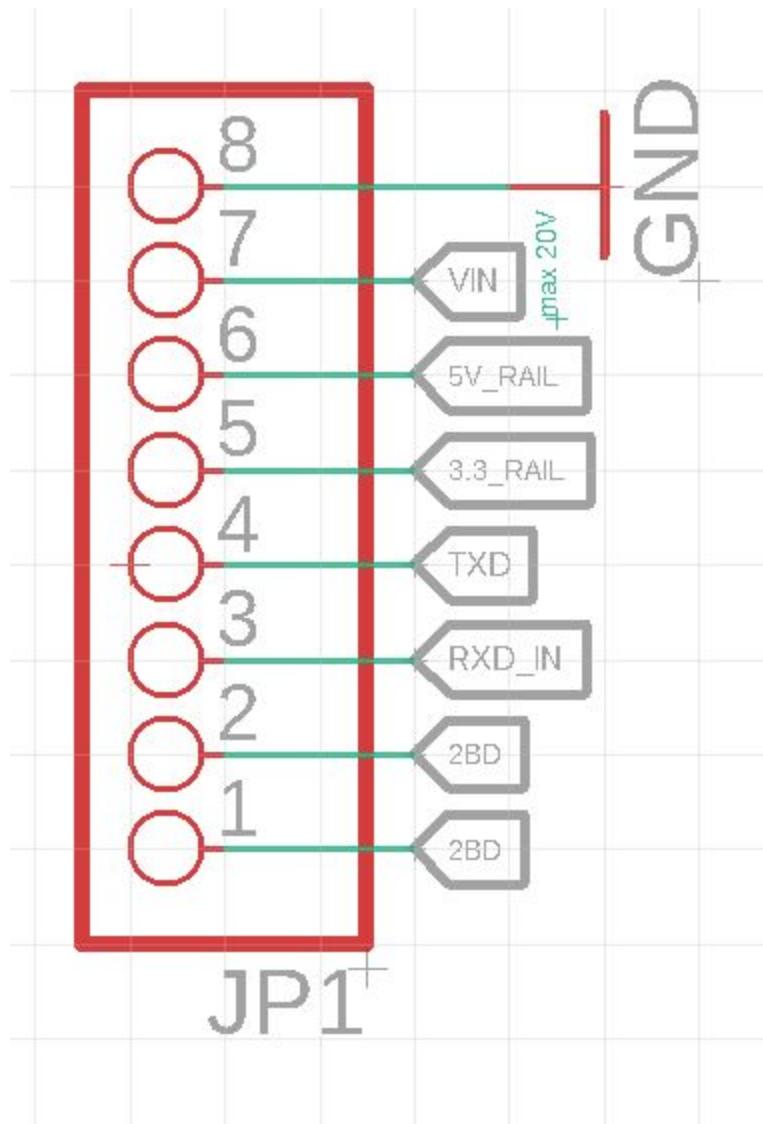
There is a .EG of how the how Arduino with serial communication.

The **RXD** of the left PCB to the **TXD** of the right PCB

The **TXD** of the left PCB to the **RXD** of the right PCB



IO



GND is used so be connected to

So allow to hook up to the battery input on the VIN pin this supports a max of 20v and around 1.6 A

5V\_rail takes a pre knownen stable 5v this is used to provide power to for future version for latter projects, so it here for a future version that might need this so I am keeping my option open

3.3V\_rail is for accepting a fixed input of 3.3 voltages or it can be used to be connected

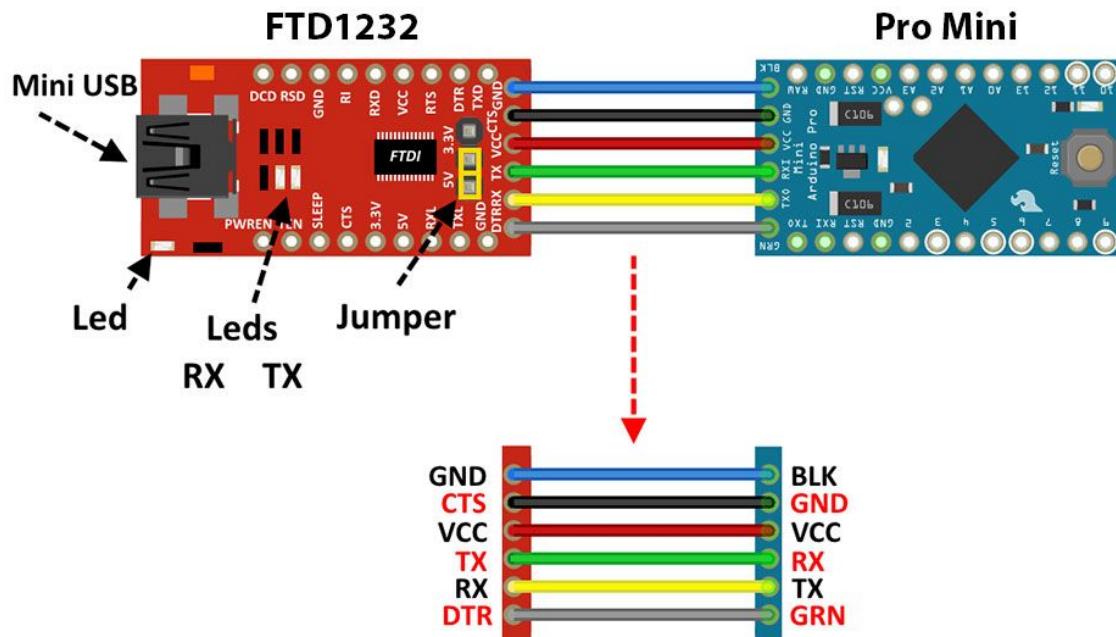
TXD is used for sending the serial data out from the PCB

RXD\_IN is for receiving serial data other from the PCB (refer to the 2nd image above)  
to it opens

Then there are two pins called 2BD this is short for *to be developed* And keeps my options open For further development

After Retrospect the IO needs a to Due to the fact that I forgot to arrange the pins when hooking up my if FTDI chip (FTL232RL)for when I am to upload the program to the atmega328p chip.

Here is an image of the FTDI chip hooked up to an Arduino mini pro



So for my project this FTL232RL will connect to this pinouts

Here is CTS ,DTR ,BLK ,GRN. So before I continue, I am working out that these are.

So after talking with some people, it turns out that BLK & GRN if literally the color wire in the FTDI cable there are used for transmitting CTS and DTR data. CTS and RTS is used for a flow control, this is used for sending a high singal when the device is ready to receive more data but in my used case that is not needed.

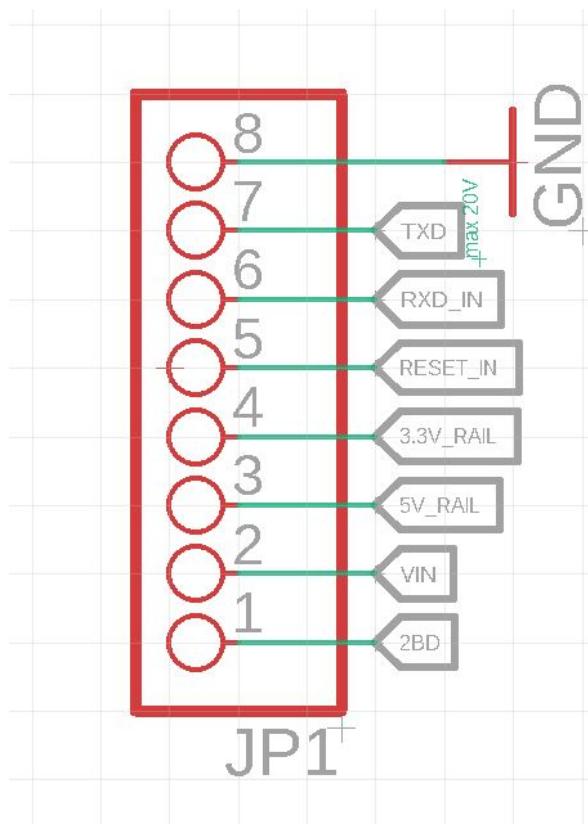
CTS is 'clear to send' [this pin is not needed]

RTS is 'ready to send' [this pin is not used]

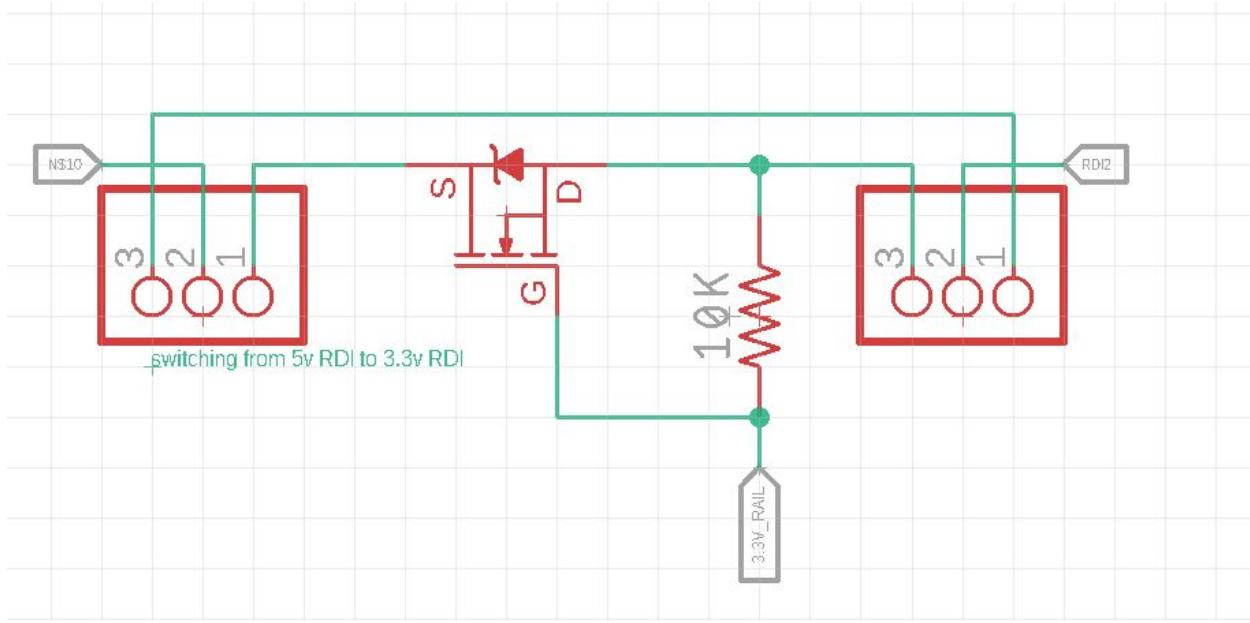
DTR is used for sending the reset signal to reboot the atmega328 chip once code has been uploaded

So here is my updated io for the LC\_Board

Git [[updated io](#)]



Added the reset in pin and also rearrange the layout so that it is a better match FTDI adapter .



Here I have haded the two headers for switching the input of RDI from being progressed as a 5v signal (jumper 2-1) on the left side and jumper (3-2) on the right. Whereas for 3.3v RDI input signage you want to put the jumper on the left (2-3) and on the right (1-2)

This is needed as the FTDI adapter will output an RDI of 3.3v. Were as the ROMS board will send a RDI of 5v that need to be converted to a 3.3v RDI before going to the Atmega 328p

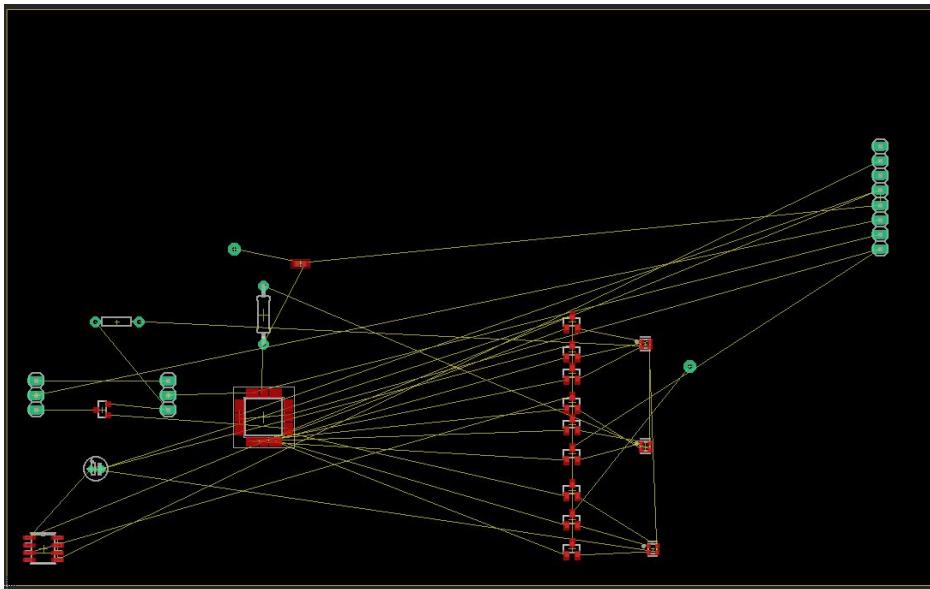
here is just a note to the reader as something i have to keep in mind  
<https://arduino.stackexchange.com/questions/8733/what-are-the-implications-of-running-an-atmega328p-at-8-mhz-and-3-3-v-with-the-a>

## PCB Layout

1 square on the grid == 1.27mm<sup>2</sup>

After used eagle cad to take the pria defined elecattions connection from my schematic file and then used the parts footprints and placed them in a .brd file this file is used for definding the phyical rationship for the parts and physical wires.

They started all jumpbled but after some rearning and placement on the board it now looks like this

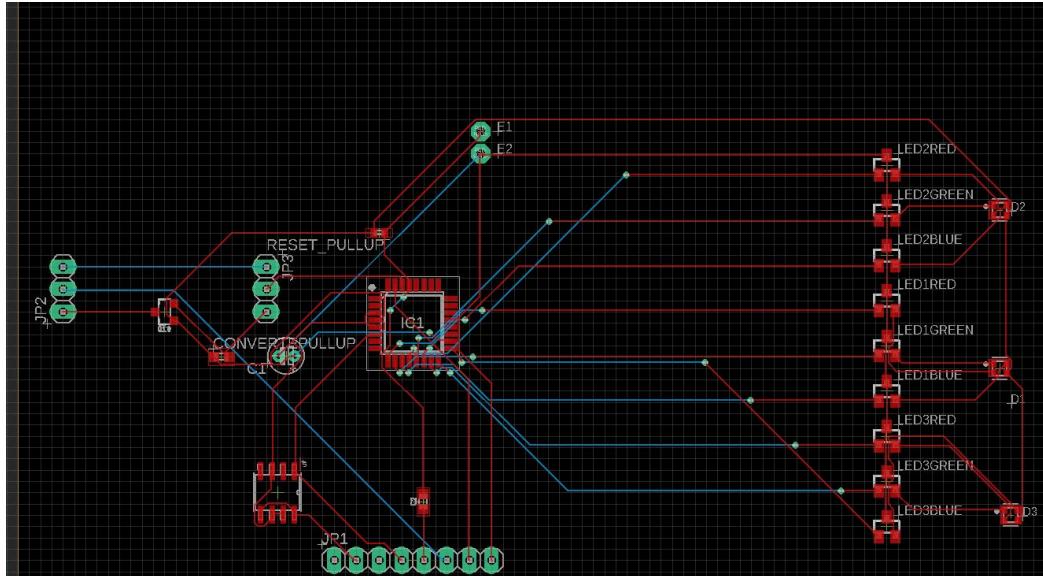


Here we can see that i cam starting to get the parts into there groups

Eg

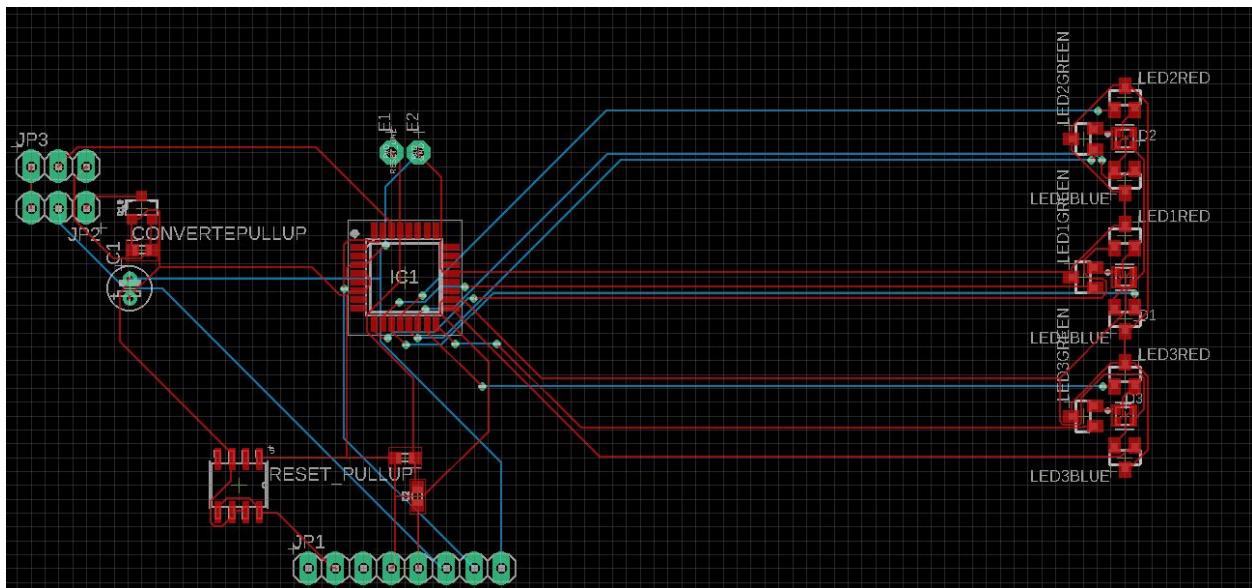
Power, Led , io,etc

All the yellow lines that can be seen are called air wires. These are used to Show the electrical relationship between components define the physical wires between them. the routing tools used to add the physical wires. In a relatively simplistic Circuit like this then you can use a function called autorouter which essentially utilizes the computer to generates the most efficient pass between components without having any overlaps.

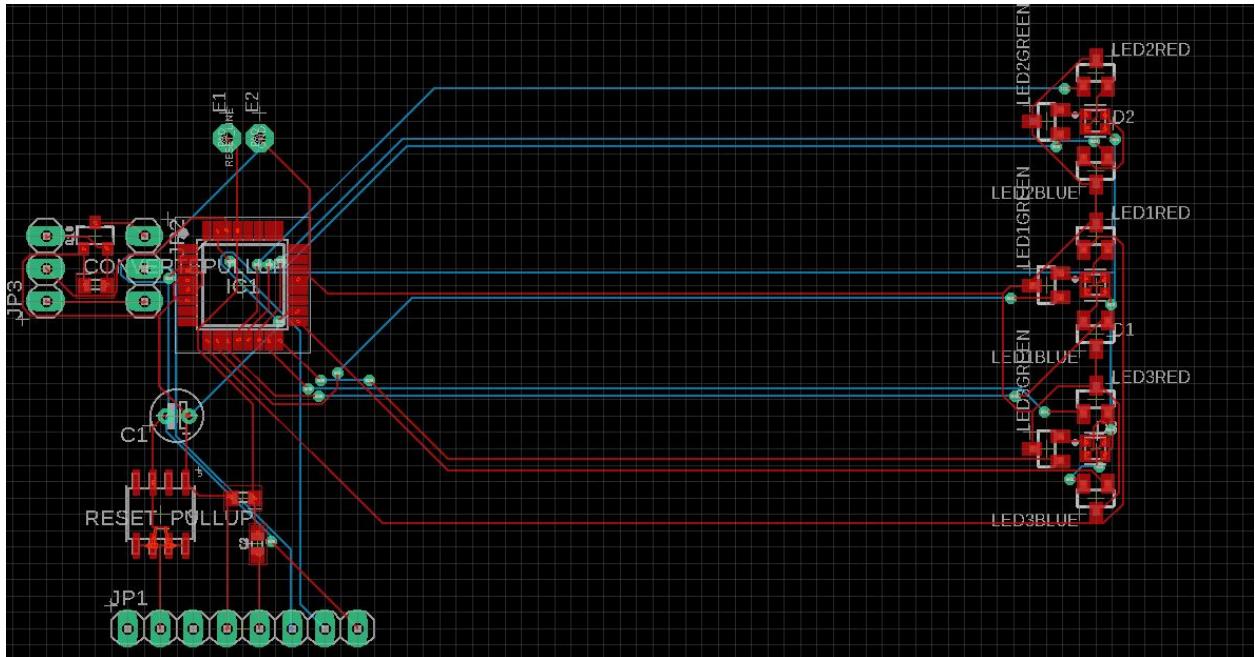


Above you can see the outcome of utilizing autoroute Recognising that the internet pretty decent job of looking at everything consider That I had to place only components in Rough groups.

After revision, I have looked at all other Opportunities to Start shrinking my board design and optimize it more here is the next revision



On the left, I have compressed the headers for selecting the 3.3 volts or the 5-volt RDI as well as trying out a new method of compressing the LEDs and MOSFETs on the right.



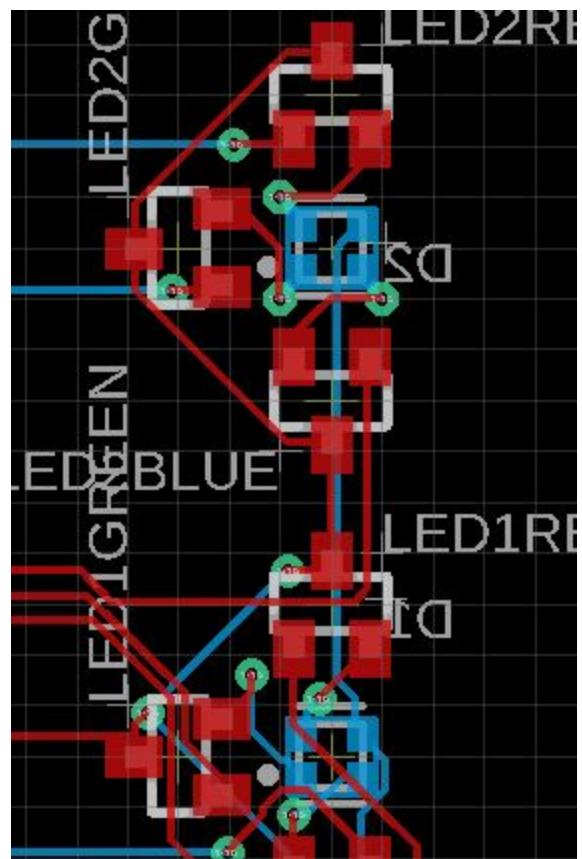
Again compacting the left side down more while trying to maintain it at a scan which I can still realistically make

Seeing as i want the LED to be flush with the case there I needed to move the led from the top of the PCB (red color) to the bottom (blue color).

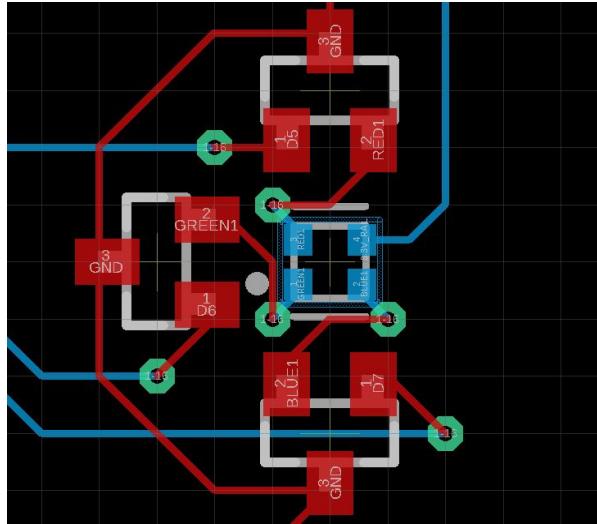
#### Layout reviews

Here on the right image I have moved the RGB LED's to the back as seen in blue. The wires were placed by autorouter and are very messy. The need for the wiring to be tidy is for making the latter anisising/reviewing the pcb at a latter date. So to achieve this i will to wire this by hand.

The low there is an image of my manually Connected wires have resulted in a Uniform Circuit Layout. So yes sometimes it does pay to do things by hand. [Spark fun guide](#) helped a lot here.

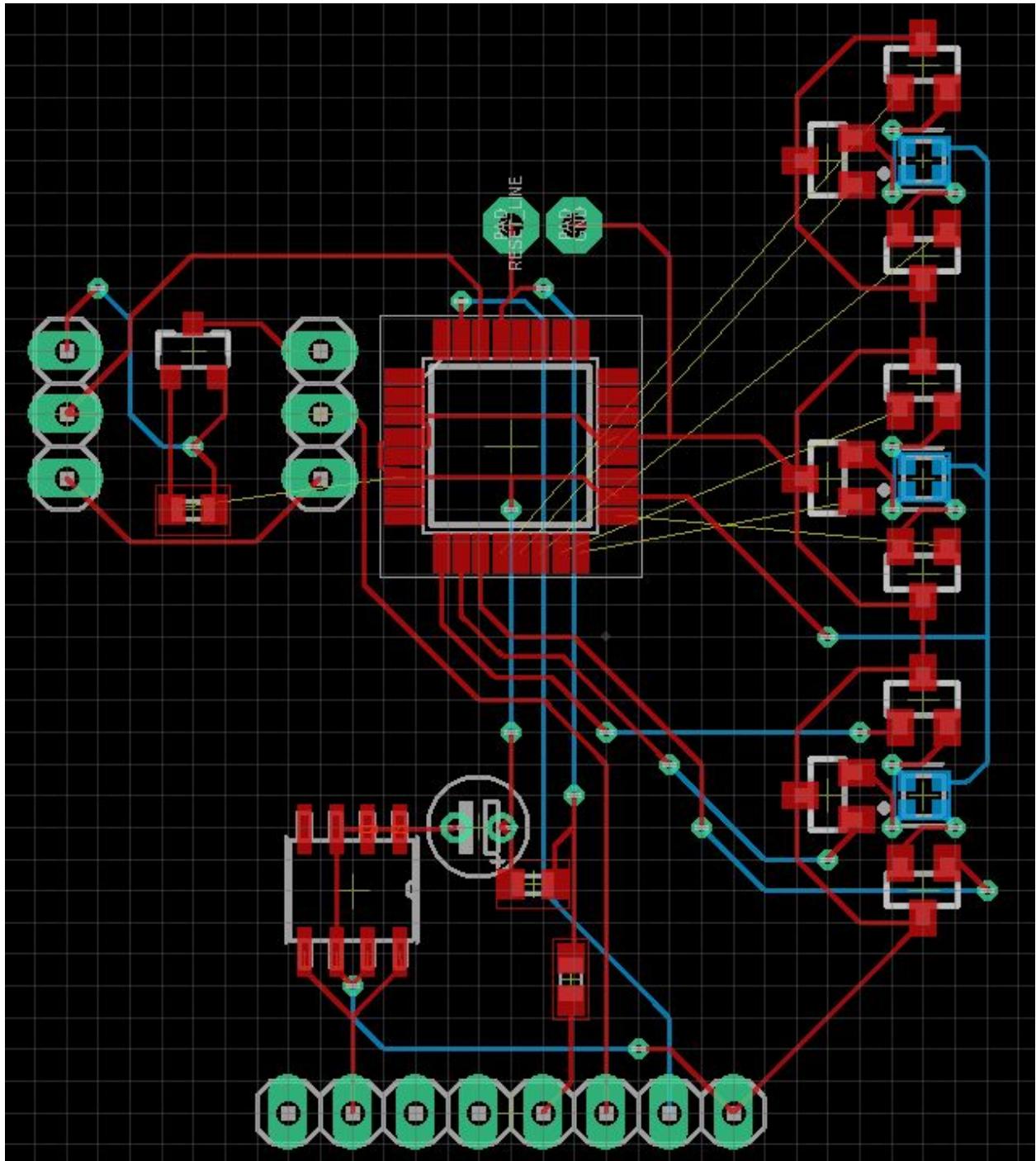


The image on the below is the remake on the part in the bottom right of the image on the right



Here is the layout from my last trial of this type of layout.

Here i have just the last 2 led to connect



Throughout the process of green the PCB I may have renamed some names without the schematic editor open therefore their became essentially two different versions of this PCB and the result is that the difference is created and one edited did not sync to the other and earn of this I now have to go through manually fix errors, to prevent this is the future from happing i need to have a feedback loop enabled this can be simperly

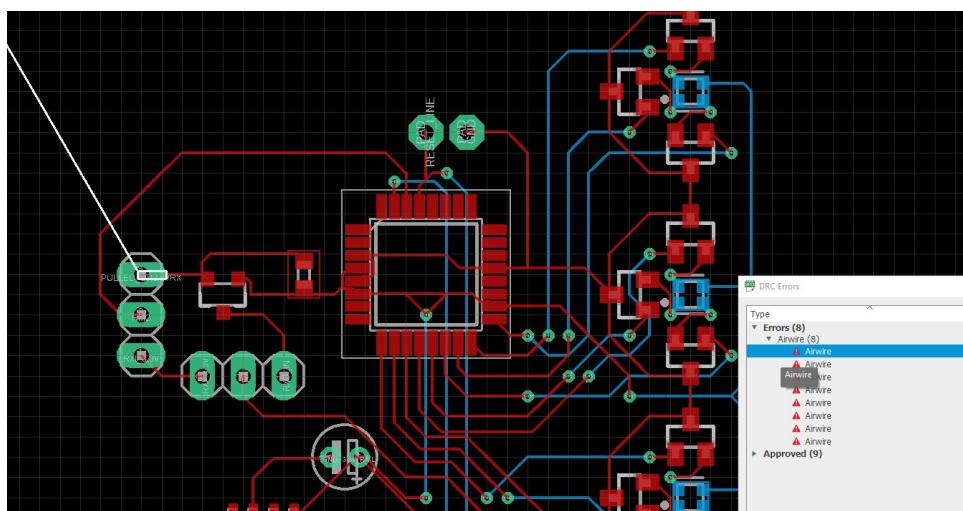
acheaved by just have the Schematics editer open as well as the board editer open at the same time

▼ Consistency errors (11)

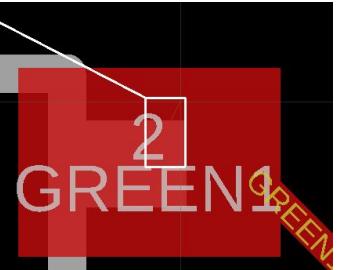
- |  |   |
|--|---|
| ⚠ Different connections on IC1 pin PD0_[PCINT16] and pad 30 (RXI2 / RDI2)              | 1 |
| ⚠ Different connections on JP1 pin 4 and pad 4 (3.3V_RAIL / none)                      | 1 |
| ⚠ Different connections on JP1 pin 6 and pad 6 (RXI / RDI)                             | 1 |
| ⚠ Different connections on JP3 pin 2 and pad 2 (RXI2 / RDI2)                           | 1 |
| ⚠ Different connections on LED2BLUE pin G and pad 1 (D10 / D13)                        | 1 |
| ⚠ Different connections on LED2GREEN pin G and pad 1 (D9 / D11)                        | 1 |
| ⚠ Different connections on LED2RED pin G and pad 1 (D8 / D12)                          | 1 |
| ⚠ Different connections on LED3BLUE pin G and pad 1 (D13 / D10)                        | 1 |
| ⚠ Different connections on LED3GREEN pin G and pad 1 (D12 / D9)                        | 1 |
| ⚠ Different connections on LED3RED pin G and pad 1 (D11 / D8)                          | 1 |
| ⚠ Different connections on SWITCHINGFROM5VRDITO3.3VRDIINPUT pin 2 and pad 2 (RXI / ... | 1 |

GIT[[Syncing schematic with board fixed](#)]

Also on the top of the errors, I had accidentally created turns out I had not actually check that they head properly connected to the components, therefore, I have this issue



Of where they are technically by each other but not physically connected.



To fix this it is just a matter of moving the wire back And adding an additional section to it finishing the link.

Git[[R1 Finish \(yet to test\)](#)]

Here R1 for LC\_board is complete and parts need to order so that construction can commence, till then see *Construction process* to see the physical development of this board

(added all needed part to part list on google sheets found in 2020 DTX For Oliver page Components and power calculations.)

Also with this daughter board of the ROMS designed. The next step is to continue the ROMS PCB designing so I can then continue with the construction process

End 16/03/2020

## Cases

### Overview

For Protection for R.O.M.S + LC\_Board and relay so that the PCB Can some of the more Delicate components are protected. This also serves the secondary purpose of making it more friendly to the eye.

### Development

Not started yet

Construction process (2.5 & 3.5)

ROMS

LC\_Board

As a user

there should be modes that ROMS can be put into  
this will configure that sensor will be used and when

 OLLYDOTDEV added 2.5 2.7 3.7 labels 13 days ago

 OLLYDOTDEV added this to Back Log in Birdseye via automation 13 days ago

 OLLYDOTDEV added the ROM'S label 13 days ago

 OLLYDOTDEV added this to the Sprint 11 milestone 4 days ago

 OLLYDOTDEV moved this from Back Log to In progress in Birdseye 4 days ago



OwnerAuthor

OLLYDOTDEV commented 3 days ago

to start off i started with taking some of my older test code `Full_Trigger_Test.ino` and added the capabilities to have individual sensors turned on and off depending on control variables



OwnerAuthor

OLLYDOTDEV commented 3 days ago •

edited

to import this test code into `ROMS.cpp`

then a custom function called was make `SecurityMode()`

this takes the mode that is transmitted from the Raspberry Pi and depending on the mode, it configures the sensors to be the enabled/ disabled.

other than that the only other main code optimizations is that when it is in the off state it has a software flag set so that

it reduces the unnecessary time used to poll the sensor data but rather dedicates it extra time to be prepared to receive transmissions and be ready to change mode



OLLYDOTDEV closed this 3 days ago

## Wireless Communication Subsystem recompiled (RPI ZERO W) #30

Closed

OLLYDOTDEV opened this issue 19 days ago · 1 comment

Closed

# Wireless Communication Subsystem recompiled (RPI ZERO W) #30

OLLYDOTDEV opened this issue 19 days ago · 1 comment

## Comments



Owner

OLLYDOTDEV commented 19 days ago •

edited

as a software engineer

I have a [Wireless Communication Subsystem](#) but so far that was compiled with C++, C, and java for it to run on atmega328p chips [#2](#)

now this as to be refined to just Raw c++ to that it can be Compiled with the GNU C++ Compiler for better knows as [g++](#)

so that It can be also run in the RPI zero



OLLYDOTDEV added [2.5](#) [2.7](#) [2.8](#) [3.5](#) [3.7](#) [3.8](#) PI ZERO W labels 19 days ago



OLLYDOTDEV added this to Back Log in [Birdseye](#) via automation 19 days ago



OLLYDOTDEV added this to the [Sprint 8](#) milestone 19 days ago



OLLYDOTDEV mentioned this issue 19 days ago

[Wireless Communication Subsystem Development](#) #17

Closed



OLLYDOTDEV moved this from Back Log to Sprint Backlog in [Birdseye](#) 19 days ago



OLLYDOTDEV moved this from Sprint Backlog to TODO (For Sprint) in [Birdseye](#) 19 days ago



OLLYDOTDEV moved this from TODO (For Sprint) to In progress in [Birdseye](#) 19 days ago



OLLYDOTDEV mentioned this issue 19 days ago

Wireless data processing #29

Closed



OwnerAuthor

OLLYDOTDEV commented 17 days ago •

edited

so the first step was to fix the syntax to that it was setup for raw C++ , this had to be done as you cant compile straight from arduino hybirde code straight to C++ .

once the code was all in C++ i then needed to comefile it with `g++` as this as this is part of the GNU Compiler Collection used to compile C++ code but you cant just compile with the NRF24 lib as you need to also as some parameters to inclune this the custom library [see](#) for how to complie.

there was all so been [added is a make](#) file that can be run to complie the code also so that is will help future people with mainating the code and there for the Sustainability of the project and thus implications, why this is important is that i will not allway be about to maintain this github repo and there for necessary action have been made to help the enduser or other developers or even the end uses to keep this updated and functioning to that the platform that you project upholds will be avaiable to time to some and still work how it was (or will be used) intentions.

[04316a5](#)



OLLYDOTDEV added [implications 2.7/3.7\[Excellence\]](#) labels 16 days ago



OLLYDOTDEV closed this 16 days ago

Birdseye automation moved this from In progress to Completed In Sprint 16 days ago



OLLYDOTDEV moved this from Completed In Sprint to Archive in Birdseye 13 days ago

## Wireless data processing #29

Closed

OLLYDOTDEV opened this issue on 18 Aug · 8 comments

Closed

## Wireless data processing#29

OLLYDOTDEV opened this issue on 18 Aug · 8 comments

### Comments



Owner

OLLYDOTDEV commented on 18 Aug •

edited

As a software engineer

There needs to be some backend to take the data from #17 #30 and work out what to do with the given data packet. this will lead on to the mode selection found in #23  
thus a conditional switching statement will be implemented to complete this story

OLLYDOTDEV changed the title RPI Wireless data processing Wireless data processing on 18 Aug

OLLYDOTDEV added 2.7 2.8 3.7 3.8 labels on 18 Aug

OLLYDOTDEV added this to Back Log in Birdseye via automation on 18 Aug

OLLYDOTDEV mentioned this issue on 18 Aug

Wireless Communication Subsystem Development #17

Closed

OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye 19 days ago

OLLYDOTDEV mentioned this issue 19 days ago

Mode Input #23

Closed



OwnerAuthor

OLLYDOTDEV commented **16 days ago** •

edited

pseudo-code for the sending function

there are three data packet types that I might send

Mode | alert | status

Send role

DONE

```
function Mode (Mode) {  
  
    check role is a valued role  
  
    packet header = mode  
    data = role  
  
    call send packet function.  
    transmit(header,data)  
}
```

send alert status | only will be called if there is a status change

DONE

```
function sendalert () {  
  
    get alert status  
  
    packet header = alert  
    data = status of alert  
}
```

status ||

DONE

```
function getstatus () {  
  
    packet header = status  
    data = power up
```

}



OwnerAuthor

OLLYDOTDEV commented **16 days ago** •

edited

pseudo-code for the receiving

reader header of packet and trigger a switch state of one of these options

Alert

Done

```
run selected lockdown scripts
```

Mode packet

Done

```
if (packet.type == role ) {  
  
    switch(){  
  
        mode1 (IR)  
            call function to configure ROMS to mode 1  
        mode2 (PIR)  
            call function to configure ROMS to mode 2  
        mode3 (ALL)  
            call function to configure ROMS to mode 3  
    }  
}
```

what each mode will do will be done in the next sprint and found in [#23](#)

status

Done

```
when packet = status {  
  
    nothing as it is just to test if there is a connecting between the radios  
  
}
```

or It might be other in that case it will just output it to the Serial monitor then do nothing with it



OLLYDOTDEV added this to the Sprint 9 milestone 15 days ago



OwnerAuthor

OLLYDOTDEV commented 14 days ago •

edited

08cfda5 & a8e03e7 contains the implementation of Wireless data processing that is able to account for a range of border cases via using a wide range of different custom functions.

while some of these are the same functions as used in #30 they will have been modified to ensure reliability and validity.

such as `RECEIVE()` function updated to support the new data structure of the packets this structure houses the `Header` and `Data` that is processed using `non-trivial string manipulation` to allow it to be transmitted. as well as added a case switch.

the `switch used` in the `RECEIVE()` function within the `RPI.Cpp` file is using a whitelist system to check for incoming packets that have matching packet header properties of `MODE,STATUS,ALERT` if it doesn't match any of them then the packet is disregarded.

whereas the `RECEIVE()` function for `ROMS.ino` is only looking for `MODE,STATUS` packet Header as it will be the sending out a packet with an `ALERT` header therefor does not need to look for it, this helps with ensuring logical response by simplifying the potential outcomes



OwnerAuthor

OLLYDOTDEV commented 14 days ago

another function used/ changed is the `TRANSMIT(string header, string data )` this function is able to take two parameters. The header is used to see the header of the packet. this header is used to determine what should be done with the contents inside the packet, eg what mode ROMS should be in or just used to test the connection of the radios. these parameters are phased into char arrays before being formatted into a packet and then transmitted, for more on this process see [here](#)



OwnerAuthor

**OLLYDOTDEV commented 13 days ago**

a function added uniquely to `RPI.cpp` is `void ModeInterface(void)`

this function is used to set up the packet that contains what mode ROMS should be in. as for now it is just set to a status value as that in will be added in [#23](#)



OwnerAuthor

**OLLYDOTDEV commented 13 days ago**

both will have in time the `getstatus()` function and all that does I check if there is a connection between NRF24 radios.



OwnerAuthor

**OLLYDOTDEV commented 13 days ago**

lastly ROMS.ino a function added to it is `SecurityMode()` this function allows the data from a MODE packet to be deciphered into instructions. that can be converted into what mode ROMS should be running in.



OwnerAuthor

**OLLYDOTDEV commented 13 days ago**

for next stage of using this data after it has been processed see #23



**OLLYDOTDEV closed this 13 days ago**

[Birdseye](#) automation moved this from Backlog (Sorted by priority) to Completed In Sprint **13 days ago**



**OLLYDOTDEV moved this from Completed In Sprint to Archive in [Birdseye](#) 13 days ago**

## components list #28

**Closed**

[OLLYDOTDEV](#) opened this issue on 17 Aug · 0 comments

**Closed**

## components list#28

[OLLYDOTDEV](#) opened this issue on 17 Aug · 0 comments

### Comments



Owner

**OLLYDOTDEV commented on 17 Aug**

As a user

i want to be able to know where and what to buy

so future people developing this know what parts to use when remaking this projects

update cost and list of used components

[https://docs.google.com/spreadsheets/d/16NvosoglUdbh59W8HpK1O01PnWvv-FwU3\\_pFYV\\_oCNE/edit#gid=1414830219](https://docs.google.com/spreadsheets/d/16NvosoglUdbh59W8HpK1O01PnWvv-FwU3_pFYV_oCNE/edit#gid=1414830219)

-  OLLYDOTDEV added 2.8 3.8 implications labels on 17 Aug
  -  OLLYDOTDEV added this to Back Log in Birdseye via automation on 17 Aug
  -  OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye 4 days ago
  -  OLLYDOTDEV moved this from Backlog (Sorted by priority) to In progress in Birdseye 16 hours ago
  -  OLLYDOTDEV moved this from In progress to Archive in Birdseye 16 hours ago
  -  OLLYDOTDEV closed this 16 hours ago
- Birdseye automation moved this from Archive to Completed In Sprint 16 hours ago
-  OLLYDOTDEV moved this from Completed In Sprint to Archive in Birdseye 16 hours ago

## Licensing #27

Closed

OLLYDOTDEV opened this issue on 15 Aug · 2 comments

Closed

## Licensing#27

OLLYDOTDEV opened this issue on 15 Aug · 2 comments

### Comments



[REDACTED]

Owner

OLLYDOTDEV commented on 15 Aug •

edited

as a user

I want to be able to know that all projects of this project will be able to used in the open-source community but not included in any Proprietary work. so what everyone is able to benefit from the works of the team



OLLYDOTDEV added the implications label on 15 Aug



OwnerAuthor

OLLYDOTDEV commented on 15 Aug

note to self to look into

<https://choosealicense.com/>

GNU GPLv3 License to repo



OLLYDOTDEV added this to Back Log in Birdseye via automation on 16 Aug



OLLYDOTDEV self-assigned this on 16 Aug



OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye 4 days ago



OwnerAuthor

OLLYDOTDEV commented 16 hours ago

privacy and licensing was simple as I care about sharing improvements. this GNU GPLv3 lets people do what ever they want so long so they keep there work open source is everybody to benefit from each other's hard at work

 OLLYDOTDEV closed this [16 hours ago](#)

Birdseye automation moved this from Backlog (Sorted by priority) to Completed In Sprint [16 hours ago](#)

 OLLYDOTDEV moved this from Completed In Sprint to Archive in [Birdseye 16 hours ago](#)

## Linux distribution #24

Closed

OLLYDOTDEV opened this issue on 5 Aug · 7 comments

Closed

## Linux distribution#24

OLLYDOTDEV opened this issue on 5 Aug · 7 comments

### Comments



Owner

OLLYDOTDEV commented [on 5 Aug](#)

As a developer

I need some sort of operating system to interface with the hardware and provide firmware.

this is so that the raspberry pi zero w can be used to its fullest potential of sweet features.

 OLLYDOTDEV added [2.8](#) [3.8](#) labels [on 5 Aug](#)

 OLLYDOTDEV added this to the [Sprint 6](#) milestone [on 5 Aug](#)

 OLLYDOTDEV added this to Back Log in [Birdseye](#) via automation [on 5 Aug](#)



OwnerAuthor

OLLYDOTDEV commented on 5 Aug •

edited

While I may be using a raspberry pi zero w I will not be using the traditional [noobs](#) or Raspberry pi OS. I have been open to other Linux arm based distros and when you consider the fact that the key part of the PI is to inject keystrokes into the computer [#22](#)

now inject keystrokes normally is used to in pentesting or malicious hacking so what better distro to use other than kali Linux as kali will have all the needed prerequisites.

<https://gist.github.com/jgamblin/2441964a1266764ed71f3243f87bbeec>

this script allowed me to install the `raspi-config` command on kali Linux allow for easy config for later use as I am trying to make it as easy as I can for another developer to pick up this project as one of my implications.



OwnerAuthor

OLLYDOTDEV commented on 5 Aug

as a start I will not be using any old version of kali Linux but rather a custom version compiled by RoganDawes this has an added framework which turns a Raspberry Pi Zero W into a flexible, low-cost platform for pentesting, red teaming and physical engagements ... or into "A Little Offensive Appliance". thus allow being to interface [#22](#) HID scripts and more with this framework. (more on this framework with [#21](#)) the download for this ISO is found [here](#)



OwnerAuthor

**OLLYDOTDEV commented on 5 Aug**

it was found in sprint 5 that #16 was having issues due to some missing dependencies that would have already been in place if I was using a more stock distro so what I need to find is how to get these missing libraries onto my pi.



OwnerAuthor

**OLLYDOTDEV commented on 6 Aug •****edited**

so for a start, I found that I needed to start off with enabling SPI

this is done with editing the /boot/config.txt and changing `dtparam=spi=off` to `dtparam=spi=on`

then rebooting then SPI is enabled

see <https://www.raspberrypi.org/documentation/hardware/raspberrypi/spi/README.md>



OwnerAuthor

**OLLYDOTDEV commented on 7 Aug**

now down to the core of the issue is that I file is missing dependencies for the compiler. so the first thing to sort out was the fact that `arm-linux-gnueabi` so I set that up using some of the comments from [https://www.acmesystems.it/arm9\\_toolchain](https://www.acmesystems.it/arm9_toolchain)

but while it did get me

```
root@kali:/usr/include/arm-linux-gnueabi/gnu# ls
lib-names-soft.h lib-names.h libc-version.h stubs-soft.h stubs.h
```

from here I can see that all I am missing is the `stubs-hard.h`

after a lot a googling I was unable to find how to obtain this file. that is when I started to think what if modify the `Makefile.inc`

well after seeking help on the GitHub repo for the NRF24 library, I was pointed in the right direction on where I needed to start modifying the code [nRF24/RF24#614 \(comment\)](#).

with this in mind, I changed the code from requiring `stubs-hard.h` to `stubs-soft.h`. This is what `stubs-hard` is best explained by [googlesource](#)

**TLDR:** It is used for defining part of the architecture for Advanced RISC Machines (ARM)

with this, I then just need to tell the config file to use SPI

this is done by when you are in the `/projects/RF24-1.3.7` then you just run `./configure --driver=SPIDEV`

after that you can then use `make; sudo make install` and it will compile and install the library in the Linux install as seen here on the GitHub [wiki](#) for this page.

and that should be all the setup needed for the Linux Distribution.



OwnerAuthor

OLLYDOTDEV commented on 7 Aug

while that is all I had planned for this sprint the amount of research the had taken prior to this sprint is why this was able to run so quickly. So with this completed i can get back on working on #16

 OLLYDOTDEV closed this [on 7 Aug](#)

Birdseye automation moved this from Back Log to Completed In Sprint [on 7 Aug](#)

 OLLYDOTDEV added [implications](#) [PI ZERO W](#) labels [on 7 Aug](#)

 OLLYDOTDEV mentioned this issue [on 9 Aug](#)

Wireless Communication Subsystem Development #17

[Closed](#)

 OLLYDOTDEV added the [2.8/3.8\[Merit\]](#) label [29 days ago](#)

 OLLYDOTDEV moved this from Completed In Sprint to Archive in [Birdseye](#) [19 days ago](#)



OwnerAuthor

OLLYDOTDEV commented [2 days ago](#) •

edited

Note

it will try to connect to a AP as a station

ssid: Pi\_Point

pw: Projectbirdeye

172.16.0.1:8000 via CDC ECM and RNDIS

if an ap with those attributes cant be found it will switch into a fall back mode and host its down ssid for other nodes to connect to

when this project is deployed it is highly recommended that these settings are changed.

So to access the webserver it needs to running in station mode not

Owner

OLLYDOTDEV commented on 27 Jul •

edited

As a user

I should be able to make a choice on what mode the ROMS is in. (the data for this will come from #29 )

so ROMS knonws how the data will be handled

 OLLYDOTDEV added 2.7 2.8 3.7 3.8 labels on 27 Jul

 OLLYDOTDEV added this to Back Log in Birdseye via automation on 27 Jul

 OLLYDOTDEV added the PI ZERO W label on 7 Aug

 OLLYDOTDEV mentioned this issue 19 days ago

Wireless data processing #29

Closed

 OLLYDOTDEV changed the title Mode selection Mode Input 13 days ago

 OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye 13 days ago

 OLLYDOTDEV moved this from Backlog (Sorted by priority) to Sprint Backlog in Birdseye 13 days ago

 OLLYDOTDEV moved this from Sprint Backlog to In progress in Birdseye 13 days ago

 OLLYDOTDEV added this to the Sprint 10 milestone 13 days ago



OwnerAuthor

OLLYDOTDEV commented 10 days ago

talk about

what you tryed to get C++ to get user input via web interface

and why I settlated on using live phasing



OwnerAuthor

**OLLYDOTDEV commented 9 days ago**

with the aim here being to control the mode via a given input via a GUI(graphical user interface) . I needed to work out what was I going to use for the GUI. So over the past 4 days have consisted of test what forms of backend software can run on the RPI W running Kali Linux (arm6l).

The first option It tried to get working was a node.js. this would have been great as it non-blocking asynchronous back-end API but would have allowed direct integrating with my C++ but the RPI W is running on the ARMV6 RISC CPU architecture and when also combined with also using an older Linux kernel you are unable to install nodejs. (yes also in docker this was not able to be executed when using another distro )

the next option that research show was to host the server with C++

while this does work it is with frameworks like [Crow](#),[µWebSockets](#),[Mongoose](#),[Boost Beast](#) , [cpprestsdk](#)

while I tested most of them only having 512MB of ram restricted to already compiled binaries and well there are hard to come by and the only other option was to cross-compile them for ARM6L but due to this project being due in 2 weeks this is not sufficient time to set that up.

so that consider I was left with a basic web server, was one option to use the Nginx web server but for some reason, it was not able to find any files on the SD card.

In the End, Had to use the backup plan for when all else failed (because well that what happened) so for this pack up plan I am using is apache2 webserver. this at first didn't work when setup but after reinstalling it then worked just fine.

with the host working. I am next able to now write the code that will allow the user to interact via a web GUI.

the reason why it was decided to utilize a web interface was that most modern devices will be able to interface to control it allowing for greater usability



OLLYDOTDEV added the **implications** label **9 days ago**



OwnerAuthor

OLLYDOTDEV commented **9 days ago**

for the frontend, it will HTML and maybe some CSS, as the aim it functionally with less focus on the Aesthetics

the backend will be run of PHP as being a general-purpose scripting language it works well with the integration of C++ CLI with the UNIX Terminal. as it is able directly to call and execute files, again this helps with usability as it helps to show the system status and allow to more diverse usage. this is done with `shell_exec()` while this would run the code it wouldn't show the user(as it is a blocking function ) if anything has been/is running there for i am using to look for non blocking version of this command



OwnerAuthor

OLLYDOTDEV commented **5 days ago** •

**edited**

while `shell_exec()` does call the function it is a blocking function. therefore It doesn't give an output till the end of the script has been reached, this is an issue as the code that needs to be executed is in a forever loop and therefore will never reach the end and in turn never give an output. so the alternatives are being considered as a nonblocking function.

options are

javascript using [EventSource](#)

using [pcntl\\_fork](#) this makes a child process PHP PDI

or the Linux command [at](#) in use with `shell_exec()`



OwnerAuthor

OLLYDOTDEV commented [5 days ago](#) •

**edited**

First, I needed to install the `at` package

```
sudo apt-get install at
```

then needed to remove `www-data` from `/etc/at.deny` (this allows the `at` command to be executed from the web browser)

```
with      that      I      can      call      my      C++      function      with
shell_exec('/projects/Project-Birdseye-DTX-2020/CODE/Release/WebServer/commands/
ALL.sh | at now 2>&1');
```

but while when tested the PHP script from a CLI it runs just fine but the issue happens to be that the running RPI need to be run as sudo as it is using the SPI interface and the SPI library can only be run as root (sudo) so this was the [fix added](#) `data-www` to have root perms



OwnerAuthor

OLLYDOTDEV commented **5 days ago**

using  
shell\_exec('sudo  
/projects/Project-Birdseye-DTX-2020/CODE/Release/WebServer/commands/ALL.sh | at  
now 2>&1');

calls a external bash script that first off kill any other scripts that would interfere with its functionality.

timeout 5 sudo ps -ef | grep ./../RPI/RPI | grep -v grep | awk '{print \$2}' |  
xargs kill

then the compiled RPI.cpp is executed sudo ./../RPI/RPI ALL

and with that code is being called from the web browser. but to make it more

flexible I will be implementing the use interface to the allow section of the different modes.  
this will consist of a simple gui



OwnerAuthor

OLLYDOTDEV commented **4 days ago** •

**edited**

to allow the nonblocking operation for the front end. PHP-FPM had to be [setup](#)

after that as talk about previously, the `at` command will be called on page load as this allows us to run code on a separate CPU processes allowing for a asynchronous command execution. the commands that `at` executes is read from a file stored in `/projects/Project-Birdseye-DTX-2020/CODE/Release/WebServer/commands/` this in has are a set of bash file that are then run to asynchronous run RPI software.

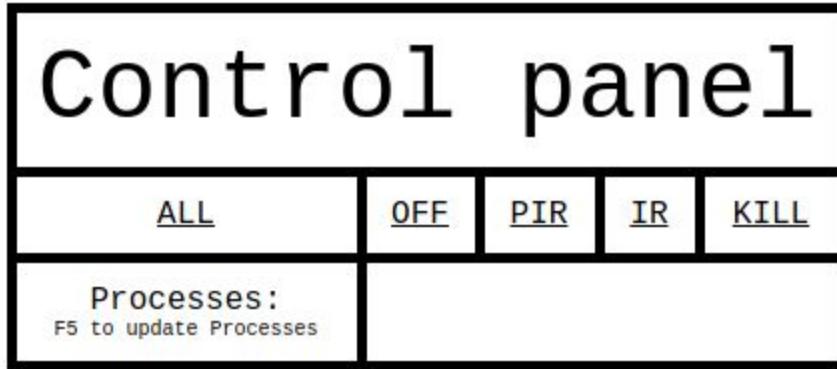


OwnerAuthor

OLLYDOTDEV commented **4 days ago** •

edited

here in the `index.php`,



From here if you for example click on the ALL link then

the code from `all.php` is run

```
<?php
require('assets/Control.php');
Control();

echo shell_exec('sudo at now -f
/projects/Project-Birdseye-DTX-2020/CODE/Release/WebServer/commands/all.sh ');

home();
?>
```

the page starts off by calling the `Control()` function this displays the Control panel

Next with `shell_exec()` called the `at` command to start running RPI asynchronously.

Then to end everything the `home()` function is called this used JavaScript to redirect the browser to the index page this server the purpose of updating the GUI to show run Processes.

Control panel				
ALL	OFF	PIR	IR	KILL
Processes: F5 to update Processes	root 23903 0.0 0.5 4484 2588 ? SN 15:09 0:00 /projects/Project-Birdseye-DTX-2020/CODE/Release/RPI/RPI OFF			

this increasing the Usability due to the system status being displayed - Implications

 [OLLYDOTDEV](#) closed this [4 days ago](#)

Birdseye automation moved this from In progress to Completed In Sprint [4 days ago](#)

 [OLLYDOTDEV](#) moved this from Completed In Sprint to Archive in [Birdseye](#) [4 days ago](#)

## HID scripts #22

Closed

[OLLYDOTDEV](#) opened this issue on 27 Jul · 3 comments

Closed

## HID scripts#22

[OLLYDOTDEV](#) opened this issue on 27 Jul · 3 comments

### Comments



Owner

OLLYDOTDEV commented on 27 Jul •

edited

As a developer

I will need to use HID (human interface device) scripts emulate a keyboard to control the computer

So that #21 can utilize these scripts

 OLLYDOTDEV added 2.7 2.8 3.7 3.8 labels on 27 Jul

 OLLYDOTDEV added this to the Sprint 5 milestone on 27 Jul

 OLLYDOTDEV added this to Back Log in Birdseye via automation on 27 Jul

 OLLYDOTDEV removed this from the Sprint 5 milestone on 27 Jul

 OLLYDOTDEV mentioned this issue on 5 Aug

Linux distribution #24

Closed

 OLLYDOTDEV added the PI ZERO W label on 7 Aug

 OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye 4 days ago

 OLLYDOTDEV moved this from Backlog (Sorted by priority) to TODO (For Sprint) in Birdseye 3 days ago

 OLLYDOTDEV added this to the Sprint 12 milestone 2 days ago



OwnerAuthor

OLLYDOTDEV commented 2 days ago

Once I had connected the RPI to my test bench (my desktop) with a USB cable. this USB cable must be connected to the RPI zero w data USB NOT the power USB port.

then to test if there was an HID connection with my test bench

i used the example HID cli command found in the Repo [README.md](#)

```
P4wnP1_cli hid run -c 'type("Hello world")'
```

and just as expected it typed Hello world

```
root@kali:/projects/Project-Birdseye-DTX-2020/CODE/Release/RPI# P4wnP1_cli hid run -c 'type("Hello world")'
TempFile created: /tmp/HIDscript052558274
Start appending to 'HIDscript052558274' in folder 'TMP'
hello worldResult:
null
root@kali:/projects/Project-Birdseye-DTX-2020/CODE/Release/RPI#
root@kali:/projects/Project-Birdseye-DTX-2020/CODE/Release/RPI# hello world
```

the great thing about this is that due to the fact that is running of the bash command line I am able to put this to a bash script file (.sh) and these files can be run from `RPI.cpp`.

from here I can start making some more useful HID scripts



OwnerAuthor

OLLYDOTDEV commented [2 days ago](#)

a function that is a simple but yet universally recognized in the short cut to the lock screen  
(Windows, Linux,

macOS)

So in the last hid script the `type` function was used which just directly takes the input in types it out

The other important function is the `press` function this allows the uses of modifier keys

The modifier keys are

`LEFT_CTRL`

`RIGHT_CTRL`

`LEFT_ALT`

`RIGHT_ALT`

`LEFT_SHIFT`

`RIGHT_SHIFT`

`LEFT_GUI`

`RIGHT_GUI`

P4wnP1 allows using aliases for common modifiers

`CTRL == CONTROL == LEFT_CTRL`

`ALT == LEFT_ALT`

`SHIFT == LEFT_SHIFT`

`WIN == GUI == LEFT_GUI`

[https://github.com/OLLYDOTDEV/P4wnP1\\_aloa](https://github.com/OLLYDOTDEV/P4wnP1_aloa)

with that, I can take that knowledge to make

P4wnP1\_cli hid run -c 'press("GUI 1")' and well this locks the screen on Linux and windows anyway, I don't have a mac to test on  
but here is the [test on my personal system](#)



OwnerAuthor

OLLYDOTDEV commented [2 days ago](#) •

edited

added to the HID folder is also desktop.sh,lock.sh,switch.sh as some to suit some potentially common use cases infrastructures will be in a place where end users can add their own custom hid. but with having HID scripts made, the next move it is to integrate them with the rest of the system as will be seen in [#21](#)



OLLYDOTDEV closed this [2 days ago](#)

Birdseye automation moved this from TODO (For Sprint) to Completed In Sprint [2 days ago](#)



OLLYDOTDEV mentioned this issue [2 days ago](#)

p4wnp1 aloa cli #21

Closed



OLLYDOTDEV moved this from Completed In Sprint to Archive in [Birdseye](#) [17 hours ago](#)

## p4wnp1 aloa cli #21

Closed

OLLYDOTDEV opened this issue on 27 Jul · 9 comments

Closed

## [p4wnp1 aloa cli#21](#)

OLLYDOTDEV opened this issue on 27 Jul · 9 comments

### Comments



Owner

OLLYDOTDEV commented on 27 Jul •

edited

As a programmer

I will be using p4wnp1 aloe on a PI Zero to custom HID scripts to control the PC with web config thus allowing the computer to be controlled by the PI zero.

OLLYDOTDEV added 2.7 2.8 3.7 3.8 labels on 27 Jul

OLLYDOTDEV added this to the Sprint 5 milestone on 27 Jul

OLLYDOTDEV added this to Back Log in Birdseye via automation on 27 Jul

OLLYDOTDEV mentioned this issue on 27 Jul

HID scripts #22

Closed

OLLYDOTDEV removed this from the Sprint 5 milestone on 5 Aug

OLLYDOTDEV mentioned this issue on 5 Aug

Linux distribution #24

Closed

OLLYDOTDEV added the PI ZERO W label on 7 Aug

OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye 4 days ago

OLLYDOTDEV moved this from Backlog (Sorted by priority) to TODO (For Sprint) in Birdseye 3 days ago

OLLYDOTDEV moved this from TODO (For Sprint) to Sprint Backlog in Birdseye 3 days ago

OLLYDOTDEV added this to the Sprint 12 milestone 2 days ago



OwnerAuthor

OLLYDOTDEV commented **2 days ago**

with the #22 hid scripts made and located in [HID Folder](#). they now needed to be executed when

this was done with `system("my_bash_script.sh"); <--- some hid script`

but an issue is that the way that `ROMS` is setup is that it will transmit everyone that when it polls the sensor and they are triggered that will transmit "alert" but does not say when setup to say there it is no longer trigger. therefore `ROMS` sends a lot of `Active` packets and since the HID runs everyone a `Active` packet is received in depending on the hid script that is currently enabled the second activation does the inverse for the first. So if the first one hides everything by minimising all windows, the second the `HID` script activates it might do the inverse and maximise windows... and repeat

there are two ways to fix this

1. every time that `active` alert packet is received to start a countdown timer and while that count down is active don't let the HID script reactivate.
2. add a sending function to the `ROMS` code that also says then the sensors are no longer trigger and then not allow the HID script to retrigger until it received that it is no longer triggered.

i will be going with number 2 as the data status verification method as it would be more reliable due to the fact that it is using software flags to confirm whether the situation is active or not rather than just taking a guess after X amount of time.



OwnerAuthor

OLLYDOTDEV commented **2 days ago**

with reliability in mind as with the Functionality, in short of error unacceptable, It must work flawlessly therefor I have two systems in placed to stop a double activation of the HID script

The first one takes place on `ROMS` and what it does is restricted the transmissions to only when there is a change in the state. EG ACTIVE -> OFF vice versa. this us using the `JustTransmitted` Boolean variable as a software flag for whether there has been a Transmission. `d8302ae` this also happen to speed up the overall total loop processing time which is a plus which allows more operations per second

and the second one is that takes place on `RPI`

this worked my added `if()` statements to the `AlertStatus` function.

the first one checks if `HID_Active` is true and if so prevents the HID script from being run again.

the next if statement resets the `HID_Active` bool value to false when once a `Alert` packet with the data of `OFF` has been Received

then the last if statement only runs if `HID_Active` is set to false and data of `ACTIVE` has been Received

[096533e](#)



OLLYDOTDEV added the `implications` label [yesterday](#)

OwnerAuthor

OLLYDOTDEV commented [yesterday](#)

To improve the user user experience we can see that for the HID portion of this system is lacking when it comes to `Usability Heuristics` as for now there is no way of seeing what HID script is active due to a lack of visibility of system status. there is also a issue of User control and freedom as if the end user wants to chance what HID script will be active then it needs to recompile the `RPI.cpp` and that takes time, there Projectbirdeye is out of the box working solution.

To fix the lack of visibility for the system status the active hid script will be displayed on the web interface in addition the web interface will be able to control what HID script will be activated as well as the addition of new scripts



OwnerAuthor

OLLYDOTDEV commented [yesterday](#) •

edited

So the start with the fix for `RPI.cpp` was to set it to execute from a constant file called `Selected.sh`

and now to control the contents of `Selected.sh` this is where the changes to the web interface come in.

the first change is to do with the dynamic layout

Select HID Script:			
ChromeNewTab.sh	Desktop.sh	HID11.sh	HID7.sh
HID8.sh	KillChrome.sh	Lock.sh	MinWindow.sh
Switch.sh			

Here every HID script is read from the folder and then the name displayed. (in progress is the adding of the contents to the `Selected.sh` ) this layout will add a new row once there is a total of 4 columns worth of cells.

each of these cells will get given a href (hyperlink) to `hid.php` but to be able to work out what link was clicked each link will have a hyperlink with a parameter of the name of the HID script to set at active. to get the parameters from the hyperlink with `$_GET`



OwnerAuthor

**OLLYDOTDEV commented yesterday**

and just as expected changing my URL to hid.php?active=ChromeNewTab.sh when combined with

```
<html>
<body>
<?php
// https://www.w3schools.com/php/php_superglobals_get.asp
echo "INFO: " . $_GET['active'];
?>
</body>
</html>
```

we get the expected output of

**INFO: ChromeNewTab.sh**



OwnerAuthor

**OLLYDOTDEV commented 22 hours ago**

with this site is used to

1. copy the selected .sh into selected.sh <-- this is that the RPI binary executes
2. set selected.txt to have the path of the active directory



OwnerAuthor

**OLLYDOTDEV commented 20 hours ago**

the first error that was encountered was that the input PHP command `COPY()` was failing to do task 1

you as a alternative are used the native Linux `cp` in conjunction with php's ability to execute commands to run

```
echo"<script>alert('$file. Set as Active HID Script');</script> ";
```

as for number 2

```
$myfile = fopen("../HID/Selected.txt", "w") or die("Unable to open file!");
fwrite($myfile, $file);
fclose($myfile);
```

the allow the software to set permanent storage to be read later (by the control panel)

`chmod 747 *` in the one `HID` directory persistent value as otherwise it cant be written too.



OwnerAuthor

OLLYDOTDEV commented **17 hours ago**

the last key piece to add to the control panel is feedback to show what HID script is selected. this will a matter of reading from my persistent file that contains the filename of the Selected file.

todo this

```
$txtfile = fopen("../HID/Selected.txt", "r") or die("Unable to open file!");
echo "Selected: ";
echo fread($txtfile,filesize("../HID/Selected.txt"));
fclose($txtfile);
```

this reads the name of the scripts that will be executed when an ALERT it sent out.

as a final part of the functionality, uses can add cusion HID Scripts via the web interface. Todo this some old code that i have used in other older project will be reused from [Abideyouth](#)

while i could just add a file upload form. because HTML form has no validation / sanitation they cant be trusted, infact if the information comes from the use it is best practice to always sanitise it and verify that it meets the expected requirements.

things that will be verified are the files

- fileSize
- file error (was there a error uploading it )
- fileType (the type of file to prevent unwanted types of files being uploaded)



OwnerAuthor

OLLYDOTDEV commented [17 hours ago](#) •

edited

while a html forms do provide these information they do nothing with the data and it can also be faked to the method of cross comparing check the information that the form gives to the data we can extract from the file.

<https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/blob/68bcfd0d9fa4246f5fd13cd707b0082ebd91ba05/CODE/Release/WebServer/upload.php>

is there this process takes place.



OLLYDOTDEV moved this from Sprint Backlog to Archive in Birdseye 16 hours ago



OLLYDOTDEV closed this 16 hours ago

Birdseye automation moved this from Archive to Completed In Sprint 16 hours ago

## Case #20

Closed

OLLYDOTDEV opened this issue on 13 Jun · 1 comment

Closed

## Case#20

OLLYDOTDEV opened this issue on 13 Jun · 1 comment

### Comments



Owner

OLLYDOTDEV commented on 13 Jun

As a user

ROMS must offer protection from external factors and therefore relatively robust in the fact that you should be at chuck in your backpack. while also being lightweight and easy on the eyes aesthetically

so people don't need to worry physically on them and also make it look less conspicuous



OLLYDOTDEV added ROM's 2.5 2.8 3.5 3.8 labels on 13 Jun



OLLYDOTDEV added this to Back Log in Birdseye on 13 Jun



OLLYDOTDEV mentioned this issue on 13 Jun

## RGB Interface #5

Closed

 OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye on 23 Jun

 OLLYDOTDEV mentioned this issue on 29 Jun

## IR Sensor #14

Closed

 OLLYDOTDEV added the On\_Hold label 16 hours ago



OwnerAuthor

OLLYDOTDEV commented 16 hours ago

never left prototype stage from the breadboard combined with the project running out of time it'll be no longer developed

 OLLYDOTDEV closed this 16 hours ago

Birdseye automation moved this from Backlog (Sorted by priority) to Completed In Sprint 16 hours ago

 OLLYDOTDEV moved this from Completed In Sprint to Archive in Birdseye 16 hours ago

## PCB #19

Closed

OLLYDOTDEV opened this issue on 13 Jun · 1 comment

Closed

## PCB#19

OLLYDOTDEV opened this issue on 13 Jun · 1 comment

## Comments



Owner

## OLLYDOTDEV commented on 13 Jun

As an engineer

I need a platform to connect all of the components of ROMS to make a coherent circuit / electrically connecting the components it also gives mechanical support

otherwise, without ROMS with just be a pile of components sitting there unable to perform the desired function.

 OLLYDOTDEV added ROM'S 2.5 3.5 labels on 13 Jun

 OLLYDOTDEV added this to the Sprint 1 milestone on 13 Jun

 OLLYDOTDEV added this to Back Log in Birdseye via automation on 13 Jun

 OLLYDOTDEV added 2.8 3.8 labels on 13 Jun

 OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye on 13 Jun

 OLLYDOTDEV moved this from Backlog (Sorted by priority) to In progress in Birdseye on 13 Jun

 OLLYDOTDEV moved this from In progress to Completed In Sprint in Birdseye on 16 Jun

 OLLYDOTDEV moved this from Completed In Sprint to TODO (For Sprint) in Birdseye on 16 Jun

 OLLYDOTDEV moved this from TODO (For Sprint) to Sprint Backlog in Birdseye on 16 Jun

 OLLYDOTDEV moved this from Sprint Backlog to Backlog (Sorted by priority) in Birdseye on 16 Jun

 OLLYDOTDEV added the On\_Hold label 16 hours ago



OwnerAuthor

## OLLYDOTDEV commented 16 hours ago

never left prototype stage from the breadboard combined with the project running out of time then it'll be no longer developed

 OLLYDOTDEV closed this 16 hours ago

Birdseye automation moved this from Backlog (Sorted by priority) to Completed In Sprint 16 hours ago

 OLLYDOTDEV moved this from Completed In Sprint to Archive in Birdseye 16 hours ago

## IO #18

Closed

OLLYDOTDEV opened this issue on 13 Jun · 1 comment

Closed

## IO#18

OLLYDOTDEV opened this issue on 13 Jun · 1 comment

### Comments



Owner

OLLYDOTDEV commented on 13 Jun

As a developer

For ROMS it needs a to have IO ports

To allow uploading of new Skechers and for debugging or to be later used as a means to provide power.

 OLLYDOTDEV added the 2.5 label on 13 Jun

 OLLYDOTDEV added this to the Sprint 1 milestone on 13 Jun

 OLLYDOTDEV added this to Back Log in Birdseye on 13 Jun

 OLLYDOTDEV added ROM'S 2.8 3.8 labels on 13 Jun

 OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye on 23 Jun



OwnerAuthor

OLLYDOTDEV commented [16 hours ago](#)

never left prototype stage from the breadboard combined with the project running out of time the it'll be no longer developed

 OLLYDOTDEV added the [On\\_Hold](#) label [16 hours ago](#)

 OLLYDOTDEV closed this [1 hour ago](#)

Wireless Communication Subsystem Development #17

Closed

OLLYDOTDEV opened this issue on 12 Jun · 26 comments

Closed

Wireless Communication Subsystem Development

#17

OLLYDOTDEV opened this issue on 12 Jun · 26 comments

Comments

@OLLYDOTDEV

Owner

OLLYDOTDEV commented on 12 Jun •

As an engineer

To utilize the transceivers within ROMS I need software that will link the radios

So that data can be transferred allow ROMS to communicate with the Central local relay

@OLLYDOTDEV OLLYDOTDEV added ROM'S 2.5 2.7 2.8 3.5 3.7 3.8 labels on 12 Jun

@OLLYDOTDEV OLLYDOTDEV added this to the Sprint 1 milestone on 12 Jun

@OLLYDOTDEV OLLYDOTDEV added this to Back Log in Birdseye on 12 Jun

@OLLYDOTDEV OLLYDOTDEV removed this from the Sprint 1 milestone on 13 Jun

@OLLYDOTDEV OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye on 23 Jun

@OLLYDOTDEV OLLYDOTDEV mentioned this issue on 19 Jul

Sensors #12

Closed

@OLLYDOTDEV OLLYDOTDEV moved this from Backlog (Sorted by priority) to TODO (For Sprint) in Birdseye on 27 Jul

@OLLYDOTDEV OLLYDOTDEV added this to the Sprint 5 milestone on 27 Jul  
@OLLYDOTDEV OLLYDOTDEV moved this from TODO (For Sprint) to Review in Birdseye on 5 Aug  
@OLLYDOTDEV OLLYDOTDEV removed this from the Sprint 5 milestone on 5 Aug  
@OLLYDOTDEV OLLYDOTDEV added the On\_Hold label on 5 Aug  
@OLLYDOTDEV OLLYDOTDEV mentioned this issue on 7 Aug  
Transceiver #16  
Closed  
@OLLYDOTDEV OLLYDOTDEV moved this from Review to TODO (For Sprint) in Birdseye on 9 Aug  
@OLLYDOTDEV

Owner  
Author  
OLLYDOTDEV commented on 9 Aug •  
with the #24 set up  
the #16 will next be startup then I can make a start on the code

start off with install the NRF24 library to the Arduino IDE

@OLLYDOTDEV OLLYDOTDEV added PI ZERO W and removed On\_Hold labels on 9 Aug  
@OLLYDOTDEV OLLYDOTDEV added this to the Sprint 7 milestone on 9 Aug  
@OLLYDOTDEV OLLYDOTDEV moved this from TODO (For Sprint) to In progress in Birdseye on 16 Aug  
@OLLYDOTDEV

Owner  
Author  
OLLYDOTDEV commented on 16 Aug  
#24 cover most of the setup but in short

<http://tmrh20.github.io/RF24/Linux.html>  
<http://tmrh20.github.io/RF24/RPi.html>

cover what needs to be for setting everything. again the only issue I had was due to the fact what I am using kali Linux I did not have stubs-hard so for the easy of me and other people trying to replicate a similar project I have made a fork with a reminder of what do if you encounter this issue as it was not documented anywhere on the web and had to be directly inquired with the head developer of this repository

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 16 Aug •

as for testing the connection made in this user story

all that I needed to do from here was to make sure the radio object instructor was being given the correct CE and CSN pins number and that they match with the hardware layout given in

image

with that, I was ready to test.

note for latter usage the constant variable was use in place of the address array  
const uint64\_t pipes[2] = { 0xABCDABCD71LL, 0x544d52687CLL }; // radio address

If project birds eye is every deployed this array should be changed to ensure privacy

[https://youtu.be/JR7T\\_4C1Hg](https://youtu.be/JR7T_4C1Hg).

with all of this working how I wanted it to I am now about to continue with further development of the code

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 17 Aug

while I may now be able to control the NRF24 I how need to consider the flow of information for this, I can check my flow chart seen here.

image

(From Components and relationships sheet)

from here we can see that there is two mainstream of data that are being transferred. the first data stream is the mode that the ROMS should be in. (RPI --> ROMS) and the other steam of stat would be the alert status coming from the (ROMS --> RPI)

now it so happens the NRFT24 is only half-duplex meaning that it can only transmit or received data but not at the same time and has to switch modes. whereas a radio with full-duplex is able to transmit and received at the same time. see image to a visual explanation.

[image](#)

[ref](#)

[@OLLYDOTDEV](#)

Owner

Author

OLLYDOTDEV commented on 17 Aug

<https://lastminuteengineers.com/nrf24l01-arduino-wireless-communication/>

give a good wire up on now the inner workings the nRF24L01 module works when It comes to the duplexing system.

so with both streams of data identified I now will work on the logic that driver when what radios know what and when to send and receive

[@OLLYDOTDEV](#)

Owner

Author

OLLYDOTDEV commented on 18 Aug

so really all that needs doing is to close the gap. This to consider when writing this code is for this is.

that the radios I am using are only half-duplex

try and keep power usage to a minimum

[@OLLYDOTDEV](#)

Owner

Author

OLLYDOTDEV commented on 18 Aug

Setup

#-----

import NRFT24 Library

the set default mode to RX

```
initialize radio object
let channels and adders
#-----
#TX
if input needs to be sent
set radio to TX
take input and formate it so that it is ready to send.
write to FIFO (First In, First Out) buffer
wait till FIFO butter is empty
reset to RX mode so that it is ready to received data
```

```
#-----
#RX
loop (
check if radio free
listen to radio
pass data from radio data to variable
)
this would be the core of the transmission
```

on the ROMS and RPI, there would get in place some logic extra logic #29 to hand the data input/output of this Communication Network.

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 28 days ago •

to here after a week of debugging and coding, I think I have found out have a way for me to make a Virtual serial link.

how the logic works is explained in the comment above

see here for code

b3fb46a

so while this code that I have write might work but you can't be sure if it hasn't been fully tested but this arose an issue

the hardware that this was going to be tested on was an Arduino and a raspberry pi zero. while the Arduino use the Arduino environment with its helper functions as well as C++

whereas raspberry pi zero can be used .cpp files raw ` C++ files. This is where my issue arises as if I code for one platform here it will not work on the other platform so this is why I have set up another Arduino for tested to just make sure that the logic of this Wireless\_Communication\_NRFT24\_Test.ino is working.

IMG\_20200828\_202618

once I have that the usability search functionality for this code is as desired for the user story then I will be able to manually Port the code into a Version where the Raspberry Pi will be able to understand. (if there was more time available I would consider making automatic compiler due to time restrictions and budgetary constraints this will not happen but the framework needed for the automatic compiler will be laid out and place for a latter developer to pick this up and make this and wanted to keep developing this project)

something I must keep in mind with using radios is the Legal Implications. NRF24 radio operates on the 2.4 - 2.5Ghz Radio band, this is great as we can see that within ISM Bands that part of the radio Spectrum is carved out Worldwide for people Amateur meaning that it is unlicensed thus everybody is able to freely use it. but found within this band we mainly see the IEEE 802.11n wifi standard which is only found in the 2.4Ghz band. so to prevent interference with other mainstream services, the radio's i am using will be set to only use 2.5Ghz

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 28 days ago •

so I broke it down to smaller core components BULK\_SEND.INO and BULK\_READ.ino

Here is a testing video showing that I was able to break down my aim into two separate scripts that are able to automatically reconnect ensuring functionality in the event that this signal was interrupted without the need of a person to manually configure it again to connect.

but while this is great and all it lacks the ability to both transmit and receive per each node.

so next I will be upgrading Wireless\_communctionation test so what all nodes are able to transmit and receive.

as of that last commit, it is able to receive just fine but it is unable to transmit successfully so what is when is next to work on

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 26 days ago •

Sending was not to hard do all that is needed for a simple send function is  
radio.writeFast(&wireless\_send, 4)

and it will find the location of the wireless\_send array in memory and then transmit the next four bytes.

the advantage of using radio.writeFast over radio.write is that radio.writeFast it uses queues so rather than it having to the microprocessor having one place if information if sent and received by the other radio, is dump everything it has that needs to be sent into the NRF24 chipset buffer allowing the microprocessor to be free to continue with other checks, this allowing the radio so send data at a fast speed as there is no wait time for the second or third set of data to be received by the radio before it can be retransmitted.

but it has the issue that the packet was not successfully received it is unable to tell and this leads us to out End-user considerations as if for some reason if the packet was not received it could result in the alert sub system not being sent off and in turn alert subsystem isn't sent off when needed then it would result in the whole point of this project being irrelevant

@OLLYDOTDEV OLLYDOTDEV added the 2.5/3.5[Excellence] label 26 days ago

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 26 days ago •

to work that's the packet was received intact we can use a CRC, in short CRC is just a checksum (cryptographic hash function that will always give the same output if the same input is given) is used to check if the packet is fully received

image (Checksum image from Wikipedia)

Both Nodes already have the checksum function and all that happens is when the input of the received data in contrast to the checksum of the received data if the checksums match then the data was received successfully.

these principles are implemented into nRF24L01+, it also uses the Enhanced shockburst mode for send RF data thus allowing to have these more complicated methods of validation compared to the traditional regular nrf24 packet.

image

(image from <http://yveaux.blogspot.com/2014/07/nrf24l01-sniffer-part-1.html>)

but so far I have only shown how I will be using checksums but that by itself is not enough to reliably determine whether the transmission was received. there is where the acknowledgment (ACK) subroutine comes into use. This sub-routine automatically sends back an ACK packet and according to the official examples of the NRF24 library tmrh20.github.io and also this is stated in the documentation " Returns: True if the payload was delivered successfully false if not"

image

to see if we received ACK packet that needs to be put in an IF statement. Returns 0 if no ACK packet received . 1 if successfully received ACK packet

```
if (radio.writeFast(&buf,32){  
// error code  
}
```

now if there was a error then i cant be sure that the data was successfully received and will re-transmit until I get ACK packet back

this gives a valid demonstration on how to secure a reliable connection between NRF24 radios  
[youtube.com/Andreas\\_Spiess](https://www.youtube.com/Andreas_Spiess)

using this ack system gives me a form of feedback control allowing me to confirm if the Functionality & Sustainability (it is able to self correct if it happens ) to ensure reliability - Implications

@OLLYDOTDEV OLLYDOTDEV added the 2.7/3.7[Excellence] label 26 days ago  
@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 26 days ago

there i have added ACK capabilities to my transmission code as well as smooth out another bug I was having after a successful transmission of a still continue to transmit rather than defaulting back to receive mode. This issue is caused by some incorrect logic within the an if statement that controlled when to change the mode back to RX(received).

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 26 days ago •

With this we can see that if I give the device a packet to send I will automatically switch into TX mode then transmit the packet and looking ACK packet and to then switch back into RX mode if it did get confirmation that the packet was received successfully if it does not receive an act packet able continue to retransmit until it gets a reply.(while it is still waiting for a ACK packet I puts it in a queue that then get cycled through of tasks for the microprocessor to complete.)

image

note: On the odd occasion radios will not connect to each other and is a simple matter of rebooting both radios and issue will be fixed

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 26 days ago

Having it automatically switch into TX mode is great but there is a rare board case that both nodes set them self both to TX mode due to both trying to transmit at the same time no packets will be received and they will stay in the transmit mode infinitely. now, this is a bit of an issue. here is that the printed out when both ended up in transmit mode

image

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 26 days ago

There are two ways to fix this in my mind.

using txStandBy();

using a timer to see if there has been x amount of failed transmissions

after some testing of plausible approaches both methods, I've come up the third method

3. this uses txStandBy(time); to Number of milliseconds to retry failed payloads then if it still fails after that I all ready know that is had been failing for X ms so I then will all the RXF() function (this function changes the mode receive) and after 5 seconds looking if another radio is sending then Return to trying to send the last message

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 24 days ago

well turn out that using txStandBy(time) in this manner would be an incorrect uses of this function, but for while trying to get this function to work that I had managed to create the logic need for it anyway fortunately I found a way to reuse it

```
if(0==radio.txStandBy() ){ // keeps trying to send data for 5 seconds
    Serial.println("Unable to Transmit ");
    Serial.println("Checking to other Radio is Transmitting ");
    RXF(); // change to

    while(receiving == true){
        Serial.println("other radio transmitting waiting for available transmission slot");
        RECEIVE();
    }

    TXF();
    receiving = false;
}
}else{
    Serial.println("Transmission Successful\n");
    UnsentData == false;
}
```

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 24 days ago

so while this might not be the desired outcome of this operation of the transmission system in the development of the radio drop out sub-system there was another idea that some to mind. a fourth option that could be used in place of the logic to control this sub system. I can use the system of keeping track of the time spent trying to transmit, this by its self will work but to ensure that this reserve subsystem does not accidentally engage to do this I will also be checking if the amount of fails transmitters is at x amount

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 24 days ago •

commit 7c9ae55 shows what changes what made.

the main changes that can be focused on are

error reset function as this used to stop the incrementing values reaching a border case value. it also being that the TX down subsystem will get activates when it reaches a value of 10 (starting to count from 0-)

```
if(error > 9){ // if error count greater than 10 reset value
    error = 0;
}
```

the next another main part that needed to be modified as there needed to be some logic to check how much time has past

and a change in time is found with the final - initial = change

and on the odd case where maybe the amount of failed transmission not at the required threshold is 10 but for some reason, the microprocessor is running behind in the execution of the code then this will see that the radio code should be executed quicker than that and I like to cause of that is due to the fact that the other radios are sending so I sets Transmissiontime = true; so what it knows next time to look for a radio signal next time I go to the transmit and acting as a fallback to catch in the unexpected board cases that were already caught last statement. as due to this being part of the critical functionality you helping the radios to recover connection having multiple failed safes is a practical safety measure as some you need to consider for implications is the end user is how the client will end up utilising this item that's why all main systems able to independently from user input recover from unexpected board cases

```
else{
    stopTime = millis();
    if(stopTime - startTime > 5000)
        Serial.println(stopTime - startTime );

    Serial.println("Transmission taking too long");
    Transmissiontime = true;
}
```

there are more changes made to the code but these are the main ones that stick out, other code included within this change is primarily for allowing the code talked about to fulfill as full functionality

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 24 days ago

next of to allow it the Wireless network to dynamically send input to data rather than pre-allocated payloads

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 23 days ago

for this Typedef and Structures Combined and key C++ alias naming function

norwegiancreations

and example of this being implemention on both NRF24 project from other electronic engineers.

so the first change that needs to be made is to allow for dynamic payloads. dynamic payloads for the radio is easy as radio.enableDynamicPayloads() ; just needs to be called in the start-up.

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 23 days ago

as well so changing the fixed payload size . this changed mygetting the payload size with sizeof(wireless\_receive )

@OLLYDOTDEV OLLYDOTDEV added the implications label 21 days ago

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 21 days ago •

dynamic payloads work fine but the Text I am trying to send happens to be in a string form and the NRF24 Radio Library I am using happen to not support transmitting or receiving strings but rather only char, char arrays, int, Bytes

so this is where non-trivial string manipulation comes into play, I began seeing what form string can be converted into. the first thing that comes to mind was converting into Bytes (raw binary) but turn out, fortunately, strings can be converted to char array with relative ease why shown here

```
DataPak.Data.toCharArray(RadioBuffPak.Buff,DataPak.Data.length());
```

but that didn't work there is like the likes of charAt() but I was unable to get that to work.

but what I was able to get to work was

```
BuffPak.Data[i] = DataPak.Data[i];  
^^^^ ^^^
```

char array String

demo of this code can be viewed here.

with all of this, I am able to send and receive Strings by converting them to Char array then transmitting them and then converting them back to a String

image

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 21 days ago •

As for char array to String Conversion, it is done by calling the C++ String Constructor in the format String foo(char\_array)

as found in <https://forum.arduino.cc/index.php?topic=519481.0> String TempBuffString(BuffPak.Data) is what am using is found 6e22f91

and this covers my non-trivial string manipulation, so the full process

```
string >> char > > char array > > Typedef and Structures Comb >> packet transmitted(bytes) >>
received(bytes) >> Typedef and Structures Comb >> Char array >> Char >> string
```

it should be noted that due to Typedef and Structures Combined you cant just directly declare the char array into it but rather have to set another temp String equal to the char array then make the temp String = the string you want to equal the array

```
String TempBuffString(BuffPak.Data); DataPak.Data = TempBuffString;
```

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 21 days ago

note while testing the receiving data will always be 32 bytes as that is the size of the char array

image

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 19 days ago •

the last check that needed to be implemented was to check if the packet meets the necessary conditions to be able to send via the nrf24 radio.

There are two checking key points that need to be checked

when converting the String into the char array buff to make sure that the string is not larger than the array this is done with

```
if(Wireless_Send.Data.length() <= sizeof(Buff_Send.Data)){
```

With this I am able to stop the prevent overloading Char array with to large-sized string

also to stop data loss it is checked if the Buffer that the radio is going to send is smaller than the max amount of byte the radio can send if(sizeof(Buff\_Send)> 32){

@OLLYDOTDEV OLLYDOTDEV added 2.8/3.8[Merit] and removed PI ZERO W labels 19 days ago

@OLLYDOTDEV OLLYDOTDEV changed the title Wireless Communication Network Wireless Communication Subsystem Development 19 days ago

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 19 days ago

With this the network is fully working but in the microprocessor side of the code.

it now needs to be Compiled into raw C++ this will be covered in #30

@OLLYDOTDEV OLLYDOTDEV closed this 19 days ago

Birdseye automation moved this from In progress to Completed In Sprint 19 days ago

@OLLYDOTDEV OLLYDOTDEV moved this from Completed In Sprint to Archive in Birdseye 19 days ago

@OLLYDOTDEV OLLYDOTDEV mentioned this issue 19 days ago

Wireless data processing #29

Transceiver #16

Closed

OLLYDOTDEV opened this issue on 12 Jun · 15 comments

Closed

Transceiver

#16

OLLYDOTDEV opened this issue on 12 Jun · 15 comments

Comments

@OLLYDOTDEV

Owner

OLLYDOTDEV commented on 12 Jun

As a User

I will be needing to have the capability to be used remotely way from my computer

As it much increases the versatility/flexibility and allows a more preventive approach of privacy.

@OLLYDOTDEV OLLYDOTDEV added ROM'S 2.5 2.7 2.8 labels on 12 Jun

@OLLYDOTDEV OLLYDOTDEV added this to the Sprint 1 milestone on 12 Jun

@OLLYDOTDEV OLLYDOTDEV added this to Back Log in Birdseye on 12 Jun

@OLLYDOTDEV OLLYDOTDEV added 3.7 3.8 3.5 labels on 13 Jun

@OLLYDOTDEV OLLYDOTDEV removed this from the Sprint 1 milestone on 13 Jun

@OLLYDOTDEV OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye on 23 Jun

@OLLYDOTDEV OLLYDOTDEV mentioned this issue on 27 Jul

Sensors #12

Closed

@OLLYDOTDEV OLLYDOTDEV moved this from Backlog (Sorted by priority) to TODO (For Sprint) in Birdseye on 27 Jul

@OLLYDOTDEV OLLYDOTDEV added this to the Sprint 5 milestone on 27 Jul

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 27 Jul •

Wireless communication is one of the many things that makes the whole project posable. Having a ROMS is a non-local location that allows ROMS to be Preemptive in the calculation to the time till the "threat" becomes an issue.

Wireless communication is all based on EMF waves but this isn't physics so I won't go into more depth on how they work but rather cover what option I have for Wireless communication.

A great overview of RF modules is this video

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 27 Jul •

the classic 433mhz RF transmitters and receiver.

Pro's

cheep

has high penetration due to being a low frequency

uses only 1 pin

simple to use

Con's

no hardware id./ encryption

a low data rate of 2400bps

simplex output no two way with communication

low bandwidth  
short-range (3m stock and up to 100m with mod )  
@OLLYDOTDEV

Owner  
Author  
OLLYDOTDEV commented on 28 Jul •  
NRF24

Pro's

transceiver  
fast response time as it uses SPA  
longish-range 100-800ish m  
can be used with a node relay-based system  
has SMD, RL, THC  
uses a feature-rich library  
high data bandwidth due to using 2.4Ghz  
it uses the cluttered 2.4Ghz band so it's a little extra traffic can go unnoticed.

Con's

Using the cluttered 2.4Ghz band  
users lots of pins  
it doesn't like long connection wires as the signal from pins to the controller is very susceptible to interference. (this is just an issue with ESP commutation )  
it uses 3.3v for power  
needs the use of an external library.  
@OLLYDOTDEV

Owner  
Author  
OLLYDOTDEV commented on 28 Jul •  
HC12

Pro's

works with 3.2 - 5.5v power

uses serial communication to talk with the controller so nice and easy to use

no extra library needed to use

transceiver

Con's

You have to use 'AT' commands to control

not as cheap as other modules

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 28 Jul •

LoRa

Pro's

transceiver

can be used in a node network

robust

low power

super long-range (6Km)

uses dual band of 443Mhz or also 1960Mhz

Is a newer type of hardware

Con's

Uses SPI commutation but needs a total of 11 pins to use in total

uses 3.3v

needs a library to work

min of 100ms delay between each packet

medium to low bandwidth

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 28 Jul

HC06 Bluetooth module

Pro's

use just to pins to control  
works with both 3.3v and 5v  
transceiver  
can be connected with smartphones  
Con's

range about 10m  
"At" commands to configure  
@OLLYDOTDEV

Owner  
Author  
OLLYDOTDEV commented on 28 Jul •  
wifi

Pro's

native to PI zero w that I am using  
best bandwidths of all the other RF radios  
Con's  
short-range  
able to have the signal jammed eg (overload with packets, MID)  
not power-efficient  
@OLLYDOTDEV

Owner  
Author  
OLLYDOTDEV commented on 28 Jul •

So these are the some RF radios that are used. So to work out what one I am going to use I need to look and see if there is any large issues with any that straight out rules them out from being considered.

classic 433mhz RF transmitters and receiver is the first module that I can see that could be an issue.

the fact that they have not a transceiver meaning that I would need to have two pairs of modules and that would start to take up a lot of internal room thus taking it off my list

HC06 Bluetooth module

All in all a great module but Bluetooth

It can lose connection in certain conditions like walls as it tends to use low wattage antenna.

It has low bandwidth as compared to Wi-Fi.

It allows only short-range communication between devices.

Security is weak as it can be hacked with ease.

LoRa

while it has to be one of the promising and interesting to knowledge is out there but due to

there is the issue that I have have the amount of free pins free thus ruling out this option

Wifi

while it might be everywhere but it is not known for having the best security.

not really well suited for usage with a battery as it has high power usage compared to other methods

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 30 Jul •

I have chosen to use the NRF24 as it just seems to fit my needs best and also what I had accessible on the cheap. so the first issue I needed to fix was getting a 3.3 power #11

with this, I then tested the theory of the voltage divider on a breadboard.

is I didn't have the right Resistors so I had to add some in serials that way the total Ohms was added.

IMG\_20200729\_205207

In short, I have a 5v input from USB that then this voltage goes orange oval we can see a 2.2k Ohms Resistor

then in line, we have a pull-down Resistors with a total value of 3k (as seen in the green oval)

also after the first 2.2k have a brown lead this is where I can take the 3.3 voltage to power the Transceiver as for now, I have to connect to the input of my multimeter check if it was 3.3v and it indeed 3.3v (a quick note that the NRF24 can handle 1.9V to 3.6V)

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 30 Jul •

next is to work out what pins I will need to uses that way I can then added it the ROMS schematic for the PCB

<https://www.instructables.com/id/NRF24L01-With-ATtiny85-3-Pins/>

<https://components101.com/wireless/nrf24l01-pinout-features-datasheet>

<https://howtomechatronics.com/tutorials/arduino/arduino-wireless-communication-nrf24l01-tutorial/>

these are the places for my guide to hooking up the NRF24

<https://lastminuteengineers.com/nrf24l01-arduino-wireless-communication/>

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 5 Aug

now while I do have the NRF24 connected to the SPI interface and while I can just upload the .INO file from <https://github.com/nRF24/RF24>

but when it comes to using this library on the raspberry pi zero w I was having issues  
image

thus putting this sprint 5 to a halt as so further continue the user need the raspberry pi zero w set up so that they are able to have a remote control for the ROMS

@OLLYDOTDEV OLLYDOTDEV closed this on 5 Aug

Birdseye automation moved this from TODO (For Sprint) to Completed In Sprint on 5 Aug

@OLLYDOTDEV OLLYDOTDEV moved this from Completed In Sprint to Sprint Backlog in Birdseye on 5 Aug

@OLLYDOTDEV OLLYDOTDEV moved this from Sprint Backlog to Review in Birdseye on 5 Aug

@OLLYDOTDEV OLLYDOTDEV removed this from the Sprint 5 milestone on 5 Aug

@OLLYDOTDEV OLLYDOTDEV added the On\_Hold label on 5 Aug

This was referenced on 5 Aug

Linux distribution #24

Closed

GPIO #25

Closed

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 7 Aug

to See more of the software look at #17

@OLLYDOTDEV OLLYDOTDEV added this to the Sprint 7 milestone on 9 Aug

@OLLYDOTDEV OLLYDOTDEV removed On\_Hold 2.7 3.7 labels on 9 Aug

@OLLYDOTDEV OLLYDOTDEV moved this from Review to TODO (For Sprint) in Birdseye on 9 Aug

@OLLYDOTDEV OLLYDOTDEV mentioned this issue on 9 Aug

Wireless Communication Subsystem Development #17

Closed

@OLLYDOTDEV OLLYDOTDEV added the PI ZERO W label on 9 Aug

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 14 Aug

well while I was going to hooking the NRF24 to the raspberry pi I worked out that I needed some way to connected so for that i will be on #25. while working i had some large let backs

@OLLYDOTDEV OLLYDOTDEV reopened this on 14 Aug

Birdseye automation moved this from TODO (For Sprint) to Back Log on 14 Aug

@OLLYDOTDEV OLLYDOTDEV moved this from Back Log to In progress in Birdseye on 14 Aug

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 16 Aug •

there is the pinout for the NRF24 is

image

and there is the pin out of the RPI zero (the w version has the same layout.)  
image

so all that I need to do is connect them up and together via the diagram shown below from tmrh20.  
image

as for the Arduino  
image  
there is it connections

with that done I am left with

image

added Aluminum Electrolytic Capacitor to help stabilize transmission

image

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 16 Aug

with this the hardware side of the Transceiver is complete

@OLLYDOTDEV OLLYDOTDEV closed this on 16 Aug

Birdseye automation moved this from In progress to Completed In Sprint on 16 Aug

@OLLYDOTDEV OLLYDOTDEV moved this from Completed In Sprint to Archive in Birdseye 19 days ago

## IR Sensor #14

Closed

OLLYDOTDEV opened this issue on 11 Jun · 3 comments

Closed

# IR Sensor#14

OLLYDOTDEV opened this issue on 11 Jun · 3 comments

## Comments



Owner

OLLYDOTDEV commented on 11 Jun

From an engineering view

This will be using the main sensor as a tripwire and well to detect movement within a room

So it will trigger the alert system protecting the private information



OLLYDOTDEV added ROM's 2.5 labels on 11 Jun



OLLYDOTDEV added this to the Sprint 1 milestone on 11 Jun



OLLYDOTDEV added this to Back Log in Birdseye on 11 Jun



OLLYDOTDEV added 2.8 3.8 labels on 13 Jun



OLLYDOTDEV removed this from the Sprint 1 milestone on 13 Jun



OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye on 23 Jun



OLLYDOTDEV moved this from Backlog (Sorted by priority) to Sprint Backlog in Birdseye on 24 Jun



OLLYDOTDEV added the Sensors label on 24 Jun



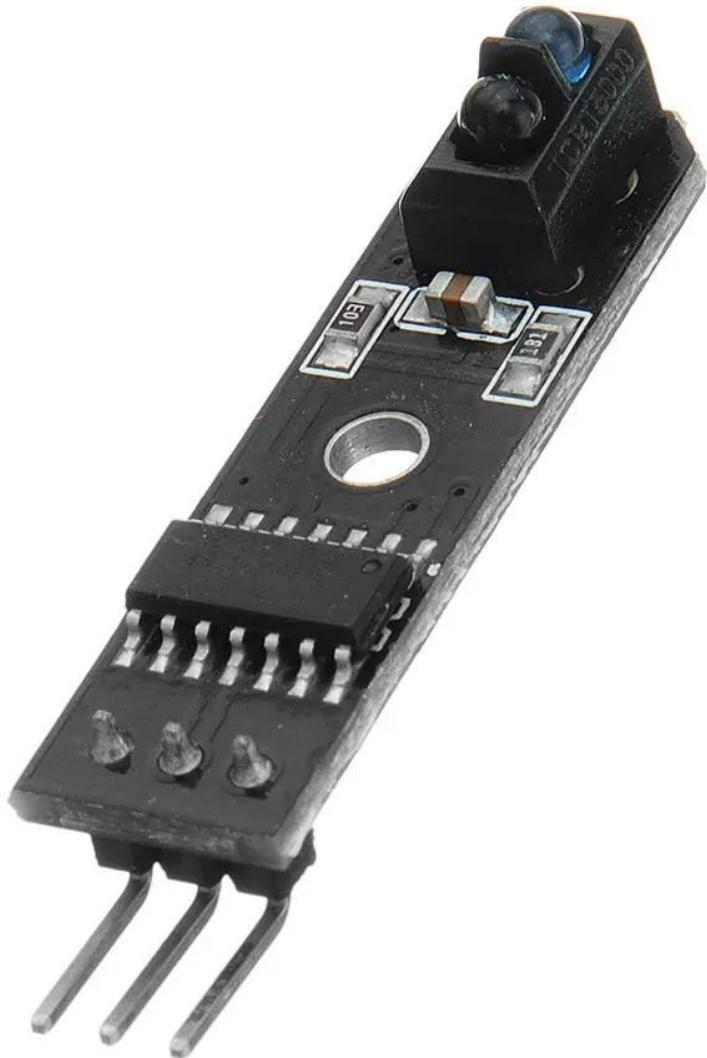
OLLYDOTDEV added this to the Sprint 3 milestone on 25 Jun



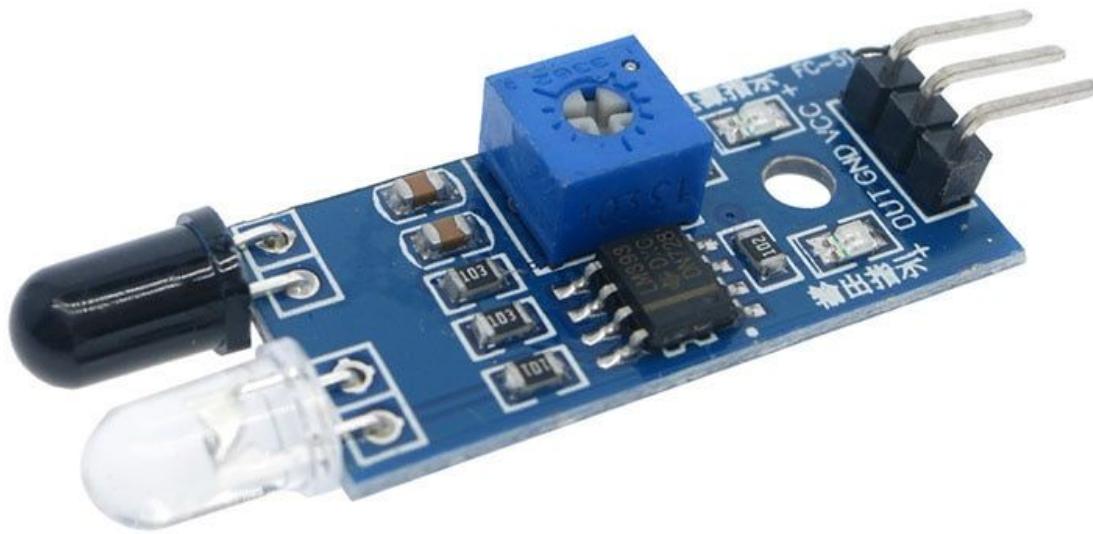
OwnerAuthor

OLLYDOTDEV commented on 25 Jun

The obvious choices for me to use for an is a [TCRT5000 based sensor](#) or [LM393 IR sensor](#)



[TCRT5000 based sensor]



[LM393 based]

I happen to already have a hand full of both of these

tonight I will test what sensor will be better suited to this project as then I will have access to the hardware



OwnerAuthor

OLLYDOTDEV commented **on 26 Jun** •

edited

There is one major difference between both of these sensors it is that the LM393 based sensor happens to also be capable of an analog output signal that when with the sensitivity of the receiving diode is controlled by the potentiometer, in this case, I am able to get the IR sensor at having a max trigger range of a roundabout 0 to 12 cm see [here \(video\)](#) for demo

whereas the TCRT5000 based sensor would still work the purpose of the sensor of detecting if a door had opened/closed but with a smaller max and would in turn decrease some of the situations that ROMS could be useful in. [demo \(video\)](#)

The videos in the paragraphs above this will give you a quick idea of what is happening with the sensors and the prototype/test setup I am using. In short to recap I am using the LM393 IR based sensor over the TCRT5000 based IR sensor due to the fact that it uses an LM393 (low voltage comparator) combined with a potentiometer (variable resistor) that allows to fine turn the output of the IR sensor.

As a start, I pulled together some code that will read the value of the A0 pin

```
int IRSensor = A0; // connect ir sensor to arduino pin 2
void setup()
{
    Serial.begin(115200);
    while (!Serial) {
        ; // wait for serial port to connect. Needed for Native USB only
    }
    pinMode (IRSensor, INPUT); // sensor pin INPUT
}
void loop()
{
    Serial.println(analogRead (IRSensor));
    delay(100);
}
```

So as for a start, it showed a value of about 1020.

The value 1020 is the same as saying 5v

Here is what it looks like when zooming in on that 5 volts

It can be seen that there is a value inconsistency of +-1

this should be kept in mind for later when making this more accurate.

There is what happens when I trigger the IR sensor by putting an object in front of it right now it has a max distance of 3cm so any time you put an object within the max distance it will trigger as seen in the image above.

This is great but I want to see If it is possible to get more performance out of my hardware, in this case, to increase the max distance from 3cm to some great value. There is only one thing I am able to change on the PCB

(credit for image goes to [henrysbench](#))

Potentiometer so happened to control the distance that the LM393 IR sensor activates so for trying out all the values that this

there a small handful with some interesting properties

First is with the potentiometer all the way anticlockwise I get a pretty much-fixed output of 1020

the next is when the comparator is a value so low that the led turn on (this LED indicates whether the digital 1 or 0) so with all the online tutorials using a digital read this is as far they would be able to see as past this point but I have opted to use an analog read meaning that this LED is deceptive in reality should be ignored

here is the potentiometer to fully to the clockwise direction which is supposed to be most sensitive but this is not so.

as much as it is at the increased it is from the base distance in fact in yields a total of about 7 cm. But the one hindering of this is the fact that if we look very closely at the points (see image below) some of the value that is that should be set as the value (triggered value) jump up to a rest value (see red circle) and if all that I was just checking if the code great or less then a 37.6 then there

could be some false activations but this is not the worst part if you look at the green circle then we can see that it drop below the threshold for the low value and this is where the issue appears as this would trigger a false positive and in turn trigger the system. This is important to be noted for [#12](#) so that this can be prevented in the master version of this code

but there is the most interesting thing is when I orientate the potentiometer so it is not quite a digital one but almost it spazzes out. frantically jumps between the 1000 value and the 500 value but is still able to drop the value below 50 thus giving me values that I can work with when programming in [#12](#)

so I was like this is odd so I did some more testing of the distance it had increased to a massive 32cm activation distance, that is over 10 times total improvement.

having this great range significantly opens up more possibilities for different mounting positions and locations for keeping an eye on entry/exit doors.

OLLYDOTDEV mentioned this issue [on 26 Jun](#)

## Sensors #12

Closed



OwnerAuthor

OLLYDOTDEV commented [on 29 Jun](#)

This is sensor will be mounted on [#20](#) rather than directly to the ROMS PCB this will be done via  
in internal headers

All that is need to hook up of the IR sensor is rather easy as it only uses three pins

VCC = 5V POWER

GND = Gound

OUT = Data out

the data out is that we care most about as this is what gives us the sensor data values

I added pins for it to be connected via a ribbon cable

the header pin for IR\_OUT goes to Arduino pin A3 (hardware PC3)

I picked A3 as it is an analog pin rather than digital pins. the advantage of using an analog pin is covered in this [comment](#)

GIT[added header pins for IR Sensor](#)

see [#12](#) for the full programming development

[OLLYDOTDEV](#) closed this [on 29 Jun](#)

[Birdseye](#) automation moved this from Sprint Backlog to Completed In Sprint [on 29 Jun](#)

[OLLYDOTDEV](#) moved this from Completed In Sprint to Archive in [Birdseye](#) [on 27 Jul](#)

[OLLYDOTDEV](#) added the [2.5/3.5\[Excellence\]](#) label [29 days ago](#)

## PIR Sensor #13

Closed

OLLYDOTDEV opened this issue on 11 Jun · 2 comments

Closed

## PIR Sensor#13

OLLYDOTDEV opened this issue on 11 Jun · 2 comments

### Comments

Owner

OLLYDOTDEV commented on 11 Jun

As user

I need more than one forum of a sensor on ROMS as a backup for #12

so I can be sure that the information protection system activates

OLLYDOTDEV added ROMS 2.5 labels on 11 Jun

OLLYDOTDEV added this to the Sprint 1 milestone on 11 Jun

OLLYDOTDEV added this to Back Log in Birdseye on 11 Jun

OLLYDOTDEV added 2.8 3.8 labels on 13 Jun

OLLYDOTDEV removed this from the Sprint 1 milestone on 13 Jun

OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye on 16 Jun

OLLYDOTDEV moved this from Backlog (Sorted by priority) to Sprint Backlog in Birdseye on 24 Jun

OLLYDOTDEV added the Sensors label on 24 Jun

OLLYDOTDEV added this to the Sprint 3 milestone on 25 Jun

OLLYDOTDEV moved this from Sprint Backlog to In progress in Birdseye on 18 Jul

OLLYDOTDEV modified the milestones: Sprint 3, Sprint 4 on 18 Jul

OLLYDOTDEV mentioned this issue on 18 Jul

## Sensors #12

Closed

 OLLYDOTDEV added the  implications label on 18 Jul

OwnerAuthor

OLLYDOTDEV commented on 18 Jul

PIR or passive infrared sensor

(note PIR do not work well in a hot environment where the ambient temperature is the same as people's this is one of the limitations of the functionality)

is a sensor that is used to detecting people.

for this project birdseye I have decided to go with the HC-SR501

- it is great as it has a long Sensing range: Max 7 m.
- it does have an Adjustable delay before triggering but this will not be used as I will be doing this in software.
- Input voltage range from 4.5 to 5v which is great as that is with my ROMS operational voltage
- has an Angle Sensor around 100 degrees FOV

[specs from here](#)

the other competitor was the HC-SR505 it has a smaller range and in theory the same cone angle but in practice, it is greater.

see [here](#)

added need header to ROMS pcb to allow for PIR sensor connection

here is my wire up for testing

the code for this can be found on Github [here](#)

both of these sensor fall under what is called a 1x1 pixel. as in short how they work are they take the average ambient infrared input and then checking if there has been a change in temp in the same place. with the sensor that has only one LARGE pixel you can get more pixel 4x4 8x8 16x16 etc that in turn allows you to see images and make out objects but there have been much research done and it has can be seen that in very few cases are the extra pixels properly utilized or give any additional reliability, therefore, they were not considered as a sensor for this project. as typically they more commonly used as bad thermal cameras (high pixel count)

OwnerAuthor

OLLYDOTDEV commented [on 18 Jul](#) •

edited

now to move on to getting the two to work together

#12 will show this next part in the sprint

OLLYDOTDEV closed this [on 18 Jul](#)

Birdseye automation moved this from In progress to Completed In Sprint [on 18 Jul](#)

OLLYDOTDEV moved this from Completed In Sprint to Archive in [Birdseye](#) on [27 Jul](#)

OLLYDOTDEV added the 2.5/3.5[Merit] label [29 days ago](#)

## Sensors #12

Closed

OLLYDOTDEV opened this issue on 11 Jun · 26 comments

Closed

## Sensors#12

OLLYDOTDEV opened this issue on 11 Jun · 26 comments

## Comments

Owner

OLLYDOTDEV commented on 11 Jun

As an end-user

I need ROMS to be able to detect in a variety of situations. in turn, be able to handle the information for the Sensors depending on the situation.

This is so that any private/secure information is protected.

OLLYDOTDEV added ROMS 2.5 labels on 11 Jun

OLLYDOTDEV added this to the Sprint 1 milestone on 11 Jun

OLLYDOTDEV added this to Back Log in Birdseye via automation on 11 Jun

OLLYDOTDEV mentioned this issue on 11 Jun

PIR Sensor #13

Closed

OLLYDOTDEV added 2.7 2.8 3.7 3.8 3.5 labels on 13 Jun

OLLYDOTDEV removed this from the Sprint 1 milestone on 13 Jun

OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye on 16 Jun

OLLYDOTDEV moved this from Backlog (Sorted by priority) to Sprint Backlog in Birdseye on 24 Jun

OLLYDOTDEV added the Sensors label on 24 Jun

OLLYDOTDEV added this to the Sprint 3 milestone on 25 Jun

OwnerAuthor

OLLYDOTDEV commented on 26 Jun

While working out what IR sensor I was going to use for [#14](#) I happen to run need to run some tests for this there was some test code that I produced. See [#14 \(comment\)](#) for more info about what it does but this code. It is most likely that some version based on this code will be using when developing this full code for the sensors

OLLYDOTDEV mentioned this issue [on 26 Jun](#)

IR Sensor #14

Closed



OwnerAuthor

OLLYDOTDEV commented [on 26 Jun](#) •

edited

Here it was run a test for IR sensor it shows an issue that I should be kept strongly in mind

[#14 \(comment\)](#)

in short to make sure that the trigger value is not a false negative I need to take an average value over a course of time to negate any false triggers

OwnerAuthor

OLLYDOTDEV commented [on 29 Jun](#)

```
if (IRdatacount >= IRcheckcount) {  
}
```

So I started off looking if anyone had made the code I was looking for everyone seemed to say that is what I was looking for <http://www.arduino.cc>

so I have it a test

and it worked flawlessly as there is no dips in my values, am I surprised not really as this code is found on the official Arduino page

```
/*  
 * Smoothing  
  
 * Reads repeatedly from an analog input, calculating a running average and  
 * printing it to the computer. Keeps ten readings in an array and continually  
 * averages them.  
  
 * The circuit:  
 * - analog sensor (potentiometer will do) attached to analog input 0  
  
 * created 22 Apr 2007  
 * by David A. Mellis <dam@mellis.org>  
 * modified 9 Apr 2012  
 * by Tom Igoe
```

```
This example code is in the public domain.
```

```
http://www.arduino.cc/en/Tutorial/Smoothing
*/
// Define the number of samples to keep track of. The higher the number, the
// more the readings will be smoothed, but the slower the output will respond to
// the input. Using a constant rather than a normal variable lets us use this
// value to determine the size of the readings array.

const int numReadings = 20;

int readings[numReadings];      // the readings from the analog input
int readIndex = 0;              // the index of the current reading
int total = 0;                  // the running total
int average = 0;                // the average

int inputPin = A3;

void setup() {

    pinMode(inputPin, INPUT);
    // initialize serial communication with computer:
    Serial.begin(9600);
    // initialize all the readings to 0:
    for (int thisReading = 0; thisReading < numReadings; thisReading++) {
        readings[thisReading] = 0;
    }
}

void loop() {
    // subtract the last reading:
    total = total - readings[readIndex];
    // read from the sensor:
    readings[readIndex] = analogRead(inputPin);
    // add the reading to the total:
    total = total + readings[readIndex];
    // advance to the next position in the array:
    readIndex = readIndex + 1;

    // if we're at the end of the array...
    if (readIndex >= numReadings) {
        // ...wrap around to the beginning:
        readIndex = 0;
    }

    // calculate the average:
    average = total / numReadings;
    // send it to the computer as ASCII digits
```

```
    Serial.println(average);
    delay(1);          // delay in between reads for stability
}
```

for anyone who does under here a good brack down on [how it works](#)

now that is a big change mainly from the fact that we can see that our noise floor is now above 60, therefore, increasing the reliability of the values that we receive hopefully reducing/ if not completely removing all values that would give false positives.

OwnerAuthor

### OLLYDOTDEV commented on 30 Jun

it was all so considered to use a system that works on the bases of this pseudo code

```
first, remove key 0 of array  
shuffle all key of an array down  
add a new key with new sensor data
```

```
get a total of all the key added together  
then take a total and divide to get the average
```

while in theory, this would work if I wasn't using a microcontroller with 2K of ram but I am so in the interest of saving processing power and storage I will not be using a shuffling method also note that C++ is not made to be used dynamically but rather fixed (this decrease the needed resource overhead and means that this is great for IC ) as one an array has been made with a fixed amount of values you can't easily change the array to have less or more keys but only change the content of the data at key value.

OwnerAuthor

### OLLYDOTDEV commented on 3 Jul

I had mentioned that #14 I could get a 32 cm Range but that was under lightly controlled conditions but ROMS is not going to be used in a controlled environment and hence the real-life in day to day environments are more like 3 to 8 cm as every environment is slightly different to the next to fix this the sensor could be recalculated automatically but adjusting the potentiometer, in that case, it would make sense to use a digital potentiometer that can be controlled by an atmega328p. now this would have a layer of complexity that while it would allow for the greater flexibility due to increased range as hoped for it is more practical to use a more reliable signal at the cost of range via

1. having a default setting where it is ok in most environments or also having the option
2. to configure the IR sensor manually if better range is needed

OwnerAuthor

**OLLYDOTDEV commented on 7 Jul**

So something I have found is that old light bulbs happen to give off IR light off that means that I can no longer to option one and I need to have a setup config mode as one of my relevant implications functionality in this case functionality is being flexible to work and multiple locations without restrictions

OwnerAuthor

**OLLYDOTDEV commented on 7 Jul**

So while the IR sensor I am using does have an ADC onboard I am not happy with the value that it considers a low and high therefor I am reading the raw sensor data and give me the ability to control what is considered a 0 or 1here is the code I used next is to add a configuration mode where rather than sending out values it calibrates self

OwnerAuthor

**OLLYDOTDEV commented on 7 Jul**

the calibration function has been now implemented the variable calibration\_trigger controls whether or not the sensor will stay with local environment to set the IR sensors sensitivity or. it will pass on the signal to the relay

1 = calibration mode on | 0 = calibration mode off

to calibrate the sensor

put ROMS the desired Max distance a value under 12 cm is good

then turn the potentiometer on the sensor clockwise till it can be turned clockwise no more

next slowly turn anticlockwise to indicator LED turns off

then turn clockwise again just enough for the led to turn back on

DONE

the sensor is calibrated for the environment

OwnerAuthor

**OLLYDOTDEV commented on 7 Jul**

example on how to calibrate is shown here

<https://youtu.be/vRiN55FDCng>

[OLLYDOTDEV](#) moved this from Sprint Backlog to In progress in [Birdseye](#) on 18 Jul

[OLLYDOTDEV](#) modified the milestones: [Sprint 3, Sprint 4](#) on 18 Jul

OwnerAuthor

**OLLYDOTDEV commented on 18 Jul**

This issue and #13 have been moved to milestone 4 (sprint 4) as the time need to complete them undercalulated and they needed to be moved to the next sprint as they at what provides the move value.

OwnerAuthor

**OLLYDOTDEV commented on 19 Jul**

here is the sensor subsystem. it has been making to keep working and send keep send data so that whenever that when if the atmega328p does error out when it comes back up it the sensor all ready power on while this does have the drawback of some power loss due to Quiescent Current. the trade-off is worth it as 3 seconds mean all the difference. When fist started off I had thought to try and minimize quiescent Current to try and maximize the battery life but in this latter version I am just keeping parts like the PIR and IR sensor powered so that as soon as the control IC is online we will be in back to business is is acceptable as the sensors picked in #13 and #14 both have low Quiescent Current.

OwnerAuthor

**OLLYDOTDEV commented on 19 Jul**

with the hardware for here sorted it is time for being.

I need to bring the software together that sets a state of being triggered which then can later be detected with #17.

OwnerAuthor

OLLYDOTDEV commented on 19 Jul •

edited

in short this stage sorta just take parts from my test code and merges in together.

so my taking pir\_test.ino, IR\_Sensor\_Conf.ino, and SMOOTH\_DATA.ino

(all off these files can be found here in the Project-Birdseye-DTX-2020/CODE/TESTING)

code from pir\_test.ino will be used to control the input from the PIR sensor

from this here is what needs to be done

add boolean for whether the PIR sensor has been triggered or not

adapt IR code to use a boolean

make SMOOTH\_DATA.ino into a class

OwnerAuthor

OLLYDOTDEV commented on 21 Jul

explain more on the smooth data. it is what I am using on the IR sensor to make my reading more accurate by taking an average over an amount of time. The base of this code was found open-source here <http://www.arduino.cc/en/Tutorial/Smoothing>

starting to I need to make it function. todo this need to first make it so that values to be pass to the function to latter have an output return the smooth data

OwnerAuthor

OLLYDOTDEV commented on 22 Jul

here is the basis of a function.

so I'm my case for the parameters I am using are is readings is all that would need to be passed

OwnerAuthor

**OLLYDOTDEV commented on 22 Jul**

change of plan instead of making a function I will be using object-oriented programming and uses a class to make a blueprint as such as needed for the likes of 2.7 for NCEA but it also has the added benefit of allow me to reuse this class on more then one sensor if needed in the future keeping my options open for later development or for future developers spick up and continue the project as this is open source as accessibility in open source and just general availability to everybody as one of my implications

**OLLYDOTDEV** added the **implications** label **on 22 Jul**

OwnerAuthor

**OLLYDOTDEV commented on 22 Jul**

while testing on how to get class's to work I have moved this testing into a new file called Smoothing\_class\_test.ino

once this is working I can copy the working parts of the code i need into the main full test file

OwnerAuthor

**OLLYDOTDEV commented on 23 Jul**

here you will find my test [file](#).

in short, the point of it is test was to see how the structure for the copy for a c++ class would integrate into my project. Gudies online prooved mainly unhelpful with assisting this it was found to be more useful to take the [example code](#) and reverse engineer. Due to not having access to my hardware, I can't test if this code produces the same desire output. this will be done latter tonight

OwnerAuthor

**OLLYDOTDEV commented on 23 Jul •**

**edited**

and here we have with a working version off data smoothing as found on <http://www.arduino.cc/en/Tutorial/Smoothing> but rather in the manipulated into a form of a class to increase for future flexibility for me for other developers.



to check that that the code had been correctly converted to be used as a class i am using TDD or otherwise known as test-driven development.

OwnerAuthor

OLLYDOTDEV commented on 23 Jul •

edited

so with this get up there is an example of how the class works.

to make a object for it is a easy as

Class name object name (of you choice)

AnalogSmooth IRsensor;

now that we have a object name

we just need to call that object name + the method we want to use

so IRsensor.Smooth\_setup(); and BAM the IR sensor is set up and ready to have its input be smoothed and have some of the extra noise removed.

this [page](#) will show the brake down on the layers to a class

OwnerAuthor

OLLYDOTDEV commented on 23 Jul

next step is to take this smoothing code and add it into the main testing code as talked about here  
[#12 \(comment\)](#)

OwnerAuthor

**OLLYDOTDEV commented on 23 Jul**

well adding the smooth class to the header file went smoothly and there was no issue with it. but having a reliable data source revealed that the logic for the code was floored and needed to be revamped. eg i missed name a variable and was when it was looking if a status went high it would loop as once it was toggle high there was no method and plays for it to be reset

so started off I have added a part just for debugging to allow me to find issues with more ease with developing this code

verbose debug

otherwise here is the heart of it

```
// IR code
IR_DATA = IRsensor.Smooth(IR_OUT);

if(IR_DATA < IR_Threshold){
// if this if statement activates that means that the sensor has been triggered
IR_Status = 1;
} else{
IR_Status = 0;
}

// pir code
Pir_Data = digitalRead(Pir_Out);
if(Pir_Data == 1){ // if PIR sensor activated then set the alert status to active
(true)
```

```
Pir_Status=1;
}else{
Pir_Status=0;
}

if(Pir_Status || IR_Status == 1){
Alert_Status = 1;
// then send out alert to relay
// sensors have been triggered
}else{
Alert_Status = 0;
// no sensor activated do nothing
}
```

this just allows the atmega328 work out that sensors have been triggered.

it all works all and great

as if either of the sensors gets activated the alert status is activated that will in time link into the  
[#17](#)

but it has one issue and that is the fact on startup IR Data is all way at the around of value of 110  
see [pastebin](#) for full log. but in short, it starts at a low value and slowly fills up the array smooth  
before stabilizing. further investigation will be conducted tomorrow.

OwnerAuthor

**OLLYDOTDEV commented on 24 Jul**

So first off before I can fix the issue I must work out what is the cause of the issue. The issue was found by looking at the output of the variables that get utilized with averaging in the smooth.h file

the point where the error was found was here `_average = _total / _numReadings;` this line of code takes the total of the past

x reading and calculates the average value (hence the class name analogsmoothing)

So ways to counter this there was a handful of options considered.

1. change the values of assisted variables. In this case, the only variables that have an effect on the average value are `_total` and `_numReadings` and editing these would break the rest of the system there for this rules out this option,
2. fully rewrite the logic of the averaging system. the rest of the system is just fine so no need to remake the whole thing to just get this small part to work so I won't be using this.
3. wait for x time (eg 10sec ) worth of data to pass be for allowing the alert system to be activated. Yes is an option that can work but I reckon I can find a quicker more time-efficient method.
4. once x amount has values have pasted then allow alerts to be sent. I have decided to go with a variation of this sort of design.

OwnerAuthor

OLLYDOTDEV commented on 24 Jul •

edited

my first attempt at this I thought I worked but with more testing, it found that it still had flaws within the code.

the approach I had to take was to wait until `_ValuecCount` was great than `_StartSkip` but the issue was that it still need to return some value so I set it to so with getting to the first value to takes it is most likely to work most of the time but the issue is that it doesn't handle any broader cases of say if the sensor starts off in an activated state.

```
if(_ValuecCount < _StartSkip){  
  
    Serial.print("Skipping start value number:");  
    Serial.println(_ValuecCount);  
    _ValuecCount++;  
    // give temp output value of first reading  
    return(_readings[0]);  
}  
else{  
    // return value of object  
    return(_average);  
}
```

code found in Smooth.h

OwnerAuthor

OLLYDOTDEV commented on 24 Jul

so do counter these border cases I need to change the point of intercept.

seeing that the intercepting at the point where data end I then started to investigate the other end the input within the main code.

so If I adapt the code I just used for this end of the system there is a good chance that I should have a working fix to 8 unreliable values.

```
if(_ValuecCount < _StartSkip){  
    IRsensor.Smooth(IR_OUT); // triggers method but doesnt assign output to variable  
    Serial.print("Skipping start value number:");  
    Serial.println(_ValuecCount);  
    _ValuecCount++;  
}  
else{  
    IR_DATA = IRsensor.Smooth(IR_OUT); // triggers method and assign output to  
    variable  
}
```

and just like that it work and is able to hand the external border case allow for a more robust [code](#) and outcome

OwnerAuthor

OLLYDOTDEV commented [on 27 Jul](#)

and with this complete, I need to work on is transmitting the signal to a relay so that pi zero knows that the alert status has been triggered on ROMS. this can be followed with [#16](#)

OLLYDOTDEV closed this [on 27 Jul](#)

Birdseye automation moved this from In progress to Completed In Sprint [on 27 Jul](#)

OLLYDOTDEV moved this from Completed In Sprint to Archive in [Birdseye](#) on [27 Jul](#)

## Power Regulation #11

Closed

OLLYDOTDEV opened this issue on 11 Jun · 4 comments

## Comments

Owner

OLLYDOTDEV commented on 11 Jun

As an Engineer

To prevent a hardware/ software failed as this can happen due to unreliable power fluxuation

So having something to Regualat the provided power would, in turn, make this a more reliable platform

OLLYDOTDEV added ROM's 2.5 labels on 11 Jun

OLLYDOTDEV added this to the Sprint 1 milestone on 11 Jun

OLLYDOTDEV added this to Back Log in Birdseye via automation on 11 Jun

OLLYDOTDEV added 2.8 3.5 3.8 labels on 13 Jun

OwnerAuthor

OLLYDOTDEV commented on 16 Jun

this was solved in #8 (comment)

OLLYDOTDEV closed this on 16 Jun

Birdseye automation moved this from Back Log to Completed In Sprint on 16 Jun

OLLYDOTDEV modified the milestones: Sprint 1, Sprint 2 on 16 Jun

OLLYDOTDEV moved this from Completed In Sprint to TODO (For Sprint) in Birdseye on 16 Jun

OwnerAuthor

### OLLYDOTDEV commented on 16 Jun

due to COVID-19 some changes to are going to be able made as I no longer can buy the needed Power regulator.

OLLYDOTDEV reopened this [on 16 Jun](#)

Birdseye automation moved this from TODO (For Sprint) to Back Log [on 16 Jun](#)

OLLYDOTDEV mentioned this issue [on 16 Jun](#)

Battery #8

Closed

OLLYDOTDEV added the LC\_Board label [on 16 Jun](#)

OwnerAuthor

### OLLYDOTDEV commented on 17 Jun

#5 (comment) I bring up the fact that I will still be using 3.3v on the LC\_board but I won't have a voltage regulator on it so I will be using a voltage divider. to calculate the value of the needed resister I will be using

this formula

to make my life easier I will be using this [voltage divider calculator](#)

so with an input  $V_{in}$  of 5v

If it set  $R_1$  to a 2K Ohms

and  $R_2$  to 3k Ohms

With these values

Giving a Vout (output voltage )of 3 Voltages Which is within the save usage range for my LEDs

OwnerAuthor

**OLLYDOTDEV commented on 21 Jun**

Power for LC\_Board will be coming from the primary PCB from within ROMS. As said [#11 \(comment\)](#) I will be using a voltage divider, in doing so I take my 5v\_Rail from the IO and hook it up to the voltage divider giving be the needed voltage to

here is the voltage divider made Eagle cad within LC\_Board.sch

**OLLYDOTDEV** closed this [on 23 Jun](#)

**Birdseye** automation moved this from Back Log to Completed In Sprint [on 23 Jun](#)

**OLLYDOTDEV** removed this from the [Sprint 2](#) milestone [on 23 Jun](#)

**OLLYDOTDEV** moved this from Completed In Sprint to Archive in [Birdseye](#) [on 23 Jun](#)

**OLLYDOTDEV** mentioned this issue [on 30 Jul](#)

Transceiver #16

Closed

 OLLYDOTDEV added the 2.5/3.5[Merit] label 29 days ago

## Voltage level reading #10

Closed

OLLYDOTDEV opened this issue on 11 Jun · 1 comment

Closed

## Voltage level reading#10

OLLYDOTDEV opened this issue on 11 Jun · 1 comment

### Comments

Owner

OLLYDOTDEV commented on 11 Jun

As engineer

To use the added Hardware of the Battery Meter from #9 I need to have a conversion layer so that analog voltage is converted to values that is able to be used by #7 in turn showing the status of the device.

So that there is more useful data can be displayed .

OLLYDOTDEV added ROM's 2.5 labels on 11 Jun

OLLYDOTDEV added this to the Sprint 1 milestone on 11 Jun

OLLYDOTDEV added this to Back Log in Birdseye on 11 Jun

OLLYDOTDEV added 2.7 3.7 2.8 3.8 labels on 13 Jun

OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye on 13 Jun

OLLYDOTDEV moved this from Backlog (Sorted by priority) to Back Log in Birdseye on 13 Jun

OLLYDOTDEV removed this from the Sprint 1 milestone on 13 Jun

OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye on 23 Jun

OLLYDOTDEV added the **On\_Hold** label [16 hours ago](#)

OwnerAuthor

OLLYDOTDEV commented [16 hours ago](#)

never left prototype stage from the breadboard combined with the project running out of time the it'll be no longer developed

OLLYDOTDEV closed this [16 hours ago](#)

Birdseye automation moved this from Backlog (Sorted by priority) to Completed In Sprint [16 hours ago](#)

OLLYDOTDEV moved this from Completed In Sprint to Archive in [Birdseye 16 hours ago](#)

Battery Meter #9

Closed

OLLYDOTDEV opened this issue on 9 Jun · 1 comment

Closed

Battery Meter

#9

OLLYDOTDEV opened this issue on 9 Jun · 1 comment

Comments

@OLLYDOTDEV

Owner

OLLYDOTDEV commented on 9 Jun

As a user

ROMS should be able to show the user what the battery charge is

As otherwise there is a risk of ROMS powering down due to lack of power and in turn not performing as expected

@OLLYDOTDEV OLLYDOTDEV added ROM'S 2.5 labels on 9 Jun

@OLLYDOTDEV OLLYDOTDEV added this to the Sprint 1 milestone on 9 Jun

@OLLYDOTDEV OLLYDOTDEV added this to Back Log in Birdseye via automation on 9 Jun

@OLLYDOTDEV OLLYDOTDEV changed the title Battery Meter Battery Meter (Hardware) on 11 Jun

@OLLYDOTDEV OLLYDOTDEV changed the title Battery Meter (Hardware) Battery Meter on 11 Jun

@OLLYDOTDEV OLLYDOTDEV mentioned this issue on 11 Jun

Voltage level reading #10

Closed

@OLLYDOTDEV OLLYDOTDEV added 2.8 3.8 labels on 13 Jun

@OLLYDOTDEV OLLYDOTDEV removed this from the Sprint 1 milestone on 13 Jun

@OLLYDOTDEV OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye on 23 Jun

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented 16 hours ago

never left prototype stage from the breadboard combined with the project running out of time the it'll be no longer developed

@OLLYDOTDEV OLLYDOTDEV added the On\_Hold label 16 hours ago

@OLLYDOTDEV OLLYDOTDEV closed this 16 hours ago

Birdseye automation moved this from Backlog (Sorted by priority) to Completed In Sprint 16 hours ago

@OLLYDOTDEV OLLYDOTDEV moved this from Completed In Sprint to Archive in Birdseye 16 hours ago

## Battery #8

Closed

OLLYDOTDEV opened this issue on 9 Jun · 7 comments

Closed

## Battery#8

OLLYDOTDEV opened this issue on 9 Jun · 7 comments

## Comments

Owner

OLLYDOTDEV commented on 9 Jun

As a user

There needs to be some way that ROM's from work without the need for it to be plugged directly into the source of external power.

So a fix would be to add some sort of battery to the system

OLLYDOTDEV added ROM's 2.5 labels on 9 Jun

OLLYDOTDEV added this to the Sprint 1 milestone on 9 Jun

OLLYDOTDEV added this to Back Log in Birdseye on 9 Jun

OLLYDOTDEV added 2.8 3.8 labels on 13 Jun

OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye on 13 Jun

OLLYDOTDEV moved this from Backlog (Sorted by priority) to In progress in Birdseye on 13 Jun

OwnerAuthor

OLLYDOTDEV commented on 13 Jun

At first when Research started into providing power to ROMs it was decided that there will need to be some sort of capacitor to smooth out the waves coming from the power source As the act a bit of a Reservoir as in when there is a lack of energy days are able to provide a small boost and when there is the increased it is able to absorb some of that excess energy

OwnerAuthor

OLLYDOTDEV commented on 13 Jun

Talk more about the physics behind sine waves and Pulse width modulation

<https://www.allaboutcircuits.com/textbook/alternating-current/chpt-7/square-wave-signals/>

Square waves are equivalent to a sine wave at the same (fundamental) frequency added to an infinite series of odd-multiple sine-wave harmonics at decreasing amplitudes.

OLLYDOTDEV pinned this issue [on 13 Jun](#)

OLLYDOTDEV unpinned this issue [on 13 Jun](#)

OwnerAuthor

OLLYDOTDEV commented [on 14 Jun](#)

That then raises the question of how I am going to power the ROMS and its core components [#2](#) ,  
[#4](#)

For this, I will be needed to provide two voltage levels a 5v rail and also a 3.3v rail so for this I thought I would play it on the safe side and use two [CR2032 - 3V](#) due to there small size and a total output of 6v or does it

Voltage discharge rate chart (top image)

CR2032 N placed in series resulting in 6 volts (bottom image)

As seen in The image above initially the coin battery starts off what's above 3 volts around 3.2v. Since I will be running two of these and parallel will give me 6.4 When fully charged (new) And this could completely fry any regulators if you were just basing the typical output on his average discharge voltage. So where I had initially thought hey 3 + 3 is 6 OK let's get a regulator that is writing for a maximum of 6 volts recalculating and with that I needed the minimum Of at least (having more overhead is fine )7 volts best safe So not too fry my components as the only rated

for Max of 5 volts or 3.3v. To prevent this I am looking at USING two 3.3 (for this led PCB,[#6](#) ([comment](#))) and 5 volts (for ROMs,[#2](#)) regulators

Now time to research more sort of regulators there are out there and what suits my purpose best

OwnerAuthor

**OLLYDOTDEV commented on 14 Jun**

After coming back from [#8 \(comment\)](#) and looking into regulators I have found that there are 3 Primary types of [Voltage Regulators](#)

Linear Regulators

Switching Regulators

Zener Diodes

[Buck converts](#)

In the end, I Decided To go with a Low dropout Linear Regulators. So I due to the fact that my input voltage of 6v is close to the 5v I can Afford to use Low Dropout Linear (LDO) otherwise the heat as any extra voltage is converted to heat so with having only

The main pro with this is the fact that they are simple/cheap / produce low noise as just said the only issue is that any excess voltage gets turned into heat there for giving them limitations and but this is not an issue in low voltage appliances where the low supply voltage and is close to the voltage out and when you require low noise environment. Which is exactly my use case.

From past projects, I have found that a good place to start of looking for parts is [\[Digikey\]\(https://www.digikey.co.nz/en/product-highlight/s/stmicroelectronics/ldo-regulators](https://www.digikey.co.nz/en/product-highlight/s/stmicroelectronics/ldo-regulators)

LDO)(Low Dropout Linear Regulator)

After looking on Digikey and not finding what I am looking for I took to google

And found [this page](#). It houses the datasheet for a series of LDO's

I have a choice to use

LT1763CS8-3.3 to provide 3.3v rail and LT1763CS8-5 for 5v rail

These LDO have 8 pins, four each side.

These pins are

BYP (Pin 6/Pin 4)

achieve low noise performance from the regulator if not used do not connect pin

06

IN (Pin 10, 11/Pin 8)

(VIN is the completely unaltered input power before the regulator)

Power into regulator

I will be Replicating the circuit in below in Eagle for

LT1763CS8-3.3

And

LT1763CS8-5

Libraries have also been added

LT1763CS8-3.3\_TRPBF.lbr

And

LT1763CS8-5TRPBF.lbr

So that the schematic has the needed parts from the [datasheet](#)

The bypass pin is not utilized due to the fact that it is only needed for when you're trying to achieve lower noise to Signal ratio and these LDO all ready have a signal to noise sufficient to my needs

it should be noted that it was considered to uses  
resistors to make a volage to make a voltage divider to drop the volage

OwnerAuthor

**OLLYDOTDEV commented on 14 Jun**

With the [power delivery designed](#) The now I need to implement it to my schematics

Some other things to keep in mind is that I also need to take 6v From ROMS to the LC\_Board via #5

It was thought able having the 3.3v regulator on the ROMS then send 3.3v to LC\_board but It

It occurred to me that rather need to redesign a very similar item in a future project that it should be designed to be able to work independently of other components and be a standalone subsystem as will be seen in #6 .

OwnerAuthor

OLLYDOTDEV commented on 14 Jun

This marks the completion of Of the first implementation of the Schematic  
git(power system for the LED)

OLLYDOTDEV moved this from In progress to Completed In Sprint in Birdseye on 16 Jun

OLLYDOTDEV closed this [on 16 Jun](#)

OLLYDOTDEV mentioned this issue [on 16 Jun](#)

### Power Regulation #11

Closed

OLLYDOTDEV modified the milestones: [Sprint 1](#), [Sprint 2](#) [on 16 Jun](#)

OLLYDOTDEV moved this from Completed In Sprint to TODO (For Sprint) in [Birdseye](#) [on 16 Jun](#)

OwnerAuthor

### OLLYDOTDEV commented [on 16 Jun](#)

So after viewing at the end of sprint meeting with my self I work out that some of the need parts for the battery/power system can no longer be brought due to COVID-19

#11 (comment) so no longer with access to my first choice of power regulators I am will have to drop the supplied voltage to the ROMS PCB down to 4.5v from 6v. 4.5 voltages will be provided by 3 AA batteries giving around a nominal voltage of 1.5 voltages \* 3 gives me the needed next best case.

To deal with any power fluctuation I will use a 10uf 50v capacitor to normalize the output voltage by holding any extra check that might occur with a power spick but also hold some charge so that if there is a small dip in the output voltage it is able to make up for the lost of voltage and keep it at an equilibrium

OLLYDOTDEV reopened this [on 16 Jun](#)

Birdseye automation moved this from TODO (For Sprint) to Back Log [on 16 Jun](#)

OLLYDOTDEV closed this [on 23 Jun](#)

Birdseye automation moved this from Back Log to Completed In Sprint [on 23 Jun](#)

OLLYDOTDEV removed this from the [Sprint 2](#) milestone [on 23 Jun](#)

OLLYDOTDEV moved this from Completed In Sprint to Archive in [Birdseye](#) [on 23 Jun](#)

OLLYDOTDEV added the [2.5/3.5\[Achieved\]](#) label [on 24 Aug](#)

OLLYDOTDEV added [2.5/3.5\[Excellence\]](#) and removed [2.5/3.5\[Achieved\]](#) labels [29 days ago](#)

As a programmer

I need to add some control code to convert the current drive status to a LED output

So the LED's added in #6 will be able to reflect the Current drive status

OLLYDOTDEV added 2.5 ROM's labels on 8 Jun

OLLYDOTDEV added this to Back Log in Birdseye via automation on 8 Jun

OLLYDOTDEV added this to the Sprint 1 milestone on 8 Jun

OLLYDOTDEV mentioned this issue on 11 Jun

Voltage level reading #10

Closed

OLLYDOTDEV added 2.7 2.8 3.8 labels on 13 Jun

OLLYDOTDEV removed this from the Sprint 1 milestone on 13 Jun

OLLYDOTDEV moved this from Back Log to Sprint Backlog in Birdseye on 16 Jun

OLLYDOTDEV moved this from Sprint Backlog to Back Log in Birdseye on 16 Jun

OLLYDOTDEV moved this from Back Log to Sprint Backlog in Birdseye on 16 Jun

OLLYDOTDEV mentioned this issue on 22 Jun

RGB LED's #6

Closed

OLLYDOTDEV moved this from Sprint Backlog to Backlog (Sorted by priority) in Birdseye on 23 Jun

OLLYDOTDEV added the On\_Hold label 17 hours ago

OwnerAuthor

OLLYDOTDEV commented 16 hours ago

dim unnecessary to develop while still on Prototype stage in the did not provide the most value to the customer/due to the ad job process trying to provide whatever is going to provide the most value to the customer

[OLLYDOTDEV](#) closed this [16 hours ago](#)

Birdseye automation moved this from Backlog (Sorted by priority) to Completed In Sprint [16 hours ago](#)

OwnerAuthor

[OLLYDOTDEV](#) commented [16 hours ago](#)

never left prototype stage from the breadboard combined with the project running out of time  
the it'll be no longer developed

[OLLYDOTDEV](#) reopened this [16 hours ago](#)

Birdseye automation moved this from Completed In Sprint to Back Log [16 hours ago](#)

[OLLYDOTDEV](#) closed this [16 hours ago](#)

Birdseye automation moved this from Back Log to Completed In Sprint [16 hours ago](#)

[OLLYDOTDEV](#) moved this from Completed In Sprint to Archive in Birdseye [16 hours ago](#)

## RBG LED's #6

Closed

[OLLYDOTDEV](#) opened this issue on 7 Jun · 17 comments

Closed

## RBG LED's#6

[OLLYDOTDEV](#) opened this issue on 7 Jun · 17 comments

### Comments

Owner

OLLYDOTDEV commented on 7 Jun

As a user

It would be highly convenient to have Device status feedback of the ROM'S

So what I Know that is happening and whether the ROM'S is ready to be used

OLLYDOTDEV added ROM'S 2.5 labels on 7 Jun

OLLYDOTDEV added this to the Sprint 1 milestone on 7 Jun

OLLYDOTDEV added this to Back Log in Birdseye on 7 Jun

OLLYDOTDEV mentioned this issue on 8 Jun

LED control code #7

Closed

OLLYDOTDEV added 2.8 3.5 3.8 labels on 13 Jun

OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye on 13 Jun

OLLYDOTDEV moved this from Backlog (Sorted by priority) to In progress in Birdseye on 13 Jun

This was referenced on 13 Jun

External Components (Atmega 328p) #4

Closed

RGB Interface #5

Closed

OwnerAuthor

OLLYDOTDEV commented on 14 Jun

<https://octopart.com/598-8710-307f-dialight-868662#Specs>

<https://octopart.com/598-8710-307f-dialight-868662#PriceAndStock>

Through many difficulties, I have managed to find CAD models and specs for the SMD RGB LEDs with the Component's name being 598-8710-307F. These LEDs are going to be used to output system status info to the user. Eg when batty need charing (also can send msg back to the computer and makes a pop-up, flash Red)

Design for this PCB is currently underway as LEDs.sch

the dialight LED's I am using happen to have 3 anodes per component once for each RGB LED each of these anodes corresponds to a color, Eg R,G,B meaning to use the desired amount of three RGB LEDs that would require a total of 9 pins (1 per anode) on the ROMS atmega328p without having that amount of pins free it first thought I looked into was having on the additional PCB (as talked about in [#5](#) ) an addition atmega328p microprocessor that acts as a node that branches off the Primary atmega328 allowing for the much-needed pins to control the LED's. [#5 \(comment\)](#) will go into greater detail how this will work for connecting the two chips

OLLYDOTDEV mentioned this issue [on 14 Jun](#)

Battery #8

Closed



OwnerAuthor

OLLYDOTDEV commented [on 14 Jun](#)

I needed a way to control the first method that comes to mind. It is simply just powering the LEDs directly from the main IC([#2 \(comment\)](#) ). There should be there is that the atmega328p that I'm using operates at 5v and that would completely fry the leds as they are rated for about 3.4v

(The part name is DIALIGHT\_598-8710-307F we can see that has 3 forward voltage values  
This is for each of the three colors each there  
And each color has a differce volage useds  
)

**OLLYDOTDEV commented on 14 Jun**

A concept to approach in this issue was a plausible solution using Pulse width Modulation (PWM for short) On a half duty cycle of 5v it would hypothetically could maybe be averaged via a capacitor as seen [here](#). I'm going to be inquiring to the teacher about this So that I can get a solid answer that way I can get a definite answer, ok well yes that has potential there is too many things I could go wrong with acting as an irregular power supply.

so after looking into this more yes it might work but firstly it would provide a way too much amperage as the LED at max can only handle 30mA and 5v from the Atmega328p can be at great as 200mA just under 20times. so it would be no good

OwnerAuthor

**OLLYDOTDEV commented on 14 Jun**

<https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/8#issuecomment-64370573>

2

With using the LDO regulators going to control the voltages I can now get back to working out how to control the LEDs as stated in [#6 \(comment\)](#) . Whats better to control something then a switch so how about an Electronics switch such as transistors

In short, a MOSFET is a Fancy transistor

but when comparing the base of a transistor to the Gate MOSFET can be seen that there is actually a physical connection where and drainage from that pin would occur would just be a waste of power. So An alternative is to utilize a MOSFET which utilizes The effect of inducing a current flow via magnetic fields, once though capacitance is charged there's no need to continue providing power as there is no discharge, therefore, there is minimal to no loss-making it super-efficient Circuit

That is why I have picked MOSFET over transistors

So I started looking it to information about MOSFET

<https://oscarliang.com/how-to-use-mosfet-beginner-tutorial/> was a good place that helped me a lot to understand how they worked

OwnerAuthor

OLLYDOTDEV commented **on 14 Jun**

So for starting there are two types n-channel and p- channel

There are used in the two Different scenarios given below

(info from youtube)

In short, PNP is when the switch is placed before the connected load, in my case, a MOSFET is out equipment switch. therefore the placed between the VCC of the load as seen here.

whereas NPN is the opposite

There is also the mode that you need to consider as there are [two types](#)

I will be going with enhancement-mode MOSFETs as in project is it is battery operated as having a content drain from a depletion-mode MOSFET (these are more like a variable resistor) would be the incorrect use for this component and Inefficient.

[Enhancement-mode MOSFETs](#)Work by when a sufficient voltage is applied to the gate (the amount of voltage changes from MOSFET TO MOSFET) it will Induce magnetic field in p material as the seen here.

Which in turn allows for current flow from the source to the drain. - in a circle is repetitive of current flow as electrons are negatively charged

OwnerAuthor

**OLLYDOTDEV commented on 14 Jun**

So with this in mind this there is more to consider when picking a MOSFET for your project

Gate threshold otherwise known as  $V_{gs(th)}$  is a point where the MOSFET will start to conduct current but with high resistance. gate-source voltage is scaled to allowing more current through once your parcel point. eg within a given range more voltage at  $V_{gs(th)} = I_s$  an inverted depletion curve ratio.

[Understanding MOSFET On-State Drain-to-Source Resistance - Technical Articles](#)

Topic: n-channel / logic level / low Rds MOSFET - and datasheet questions

[n-channel / logic level / low Rds MOSFET - and datasheet questions - Page 2](#)

Topic: About the good usage of N-channel MOSFET

RDS(on) idea seems simply when the gate is off the resistance between source and drain is extremely high—so high that we assume zero current flow. This scales as more voltage applied to the gate pin the more current can flow through from Source to drain (Until blows itself up due to much voltage, not recommended )

Logic level MOSFET vs normal MOSFET

[MOSFET Confusion - Logic Level vs. Standard](#)

[Logic level vs "normal" MOSFETS](#)

to put it simply means what the Mosfet runs from the approximate 3.3 to 5-volt value on the [gate to Source](#) Rather than higher values like 10v switch and microcontrollers typically don't normal output natively higher than logic level voltage.

So as long as the RDS(on) Met in the gate is provided sufficient power Then we should be fine

This is important as I will be needing To drive MOSFETs at a logic level (3.3v or 5v) so the RDS(on)

Here's a breakdown some [Main parameters of a MOSFET](#)

OwnerAuthor

**OLLYDOTDEV commented on 14 Jun**

Making sure that you use the right specs for a project is important to know. this info can be obtained by looking at graphs. To confirm my finding I talked to someone who works in the electronics industry.



(Conversation took place 20/02/20: 9:50 pm with A certified electronics engineer with a degree from university who is actively working in the industry as well)

Armed with this knowledge I feel I'm able to make an informed decision on which component more explicitly which MOSFET would be the best option for my particular use-cases while considering things like budget, usability, flexibility, and accessibility

OwnerAuthor

**OLLYDOTDEV commented on 14 Jun**

I will be going a SOT-23 footprint due to its sizes so the two MOSFETS I am looking at getting will both work at 3.3 and 5 Volts making them very Versatile and reusable within this project. for my N channel MOSFET, I will be using a [N channel: BSS138](#)

and for my P channel MOSFET, I will be using a P channel: [DMN65D8L](#)

OwnerAuthor

**OLLYDOTDEV commented on 14 Jun**

here it was the RBG LED look with when hooked up to MOSFETS within Eagle CAD schematic view

(the gate voltage for the MOSFET is driven by the digital pins on the atmega328 )

Below is the pinout if the atmega328p

The brown pins with 0 to 13 are all digital pins i could use.

But due to the fact i am also going to need some of this for the serial interface for connection with the R.O.M.S these pins are the RXD and TXD pins i made a note not to use them

I have selected pins (D then the number is The corresponding pin on the atmega328p)-(this is the color it is controlling)

D5 - Red -

D6 - Green -

D7 - Blue -

D8 - Red -

D9 - Green -

D10 - Blue -

D11 - Red -

D12 - Green -

D13 - Blue -

As according to this datasheet anyway

OwnerAuthor

OLLYDOTDEV commented on 14 Jun

After used eagle cad to take the prior defined Electrical connection from my schematic file and then used the parts footprints and converted them into a .brd file this file is used for defining the physical relationship for the parts and physical wires.

They started all jumbled but after some Shuffling of parts this is what it looks like

Here we can see that i cam starting to get the parts into there groups

Eg

Power, Led, io, etc

All the yellow lines that can be seen are called air wires. These are used to Show the electrical relationship between components that define the physical wires between them. the routing tools used to add the physical wires. In a relatively simplistic Circuit like this then you can use a function called autoroute which essentially utilizes the computer to generates the most efficient pass between components without having any overlaps.

Above you can see the outcome of utilizing autoroute did a pretty decent job of looking at everything consider That I had to place only components in Rough groups.

After revision, I have looked at all other Opportunities to Start shrinking my board design and optimize it more here is the next revision

On the left, I have compressed the headers for selecting the 3.3 volts or the 5-volt RDI as well as trying out a new method of compressing the LEDs and MOSFETs on the right.

Again compacting the left side down more while trying to maintain it at a scale which I can still realistically make my hand

OwnerAuthor

OLLYDOTDEV commented on 14 Jun

Seeing as I want the LED to be flush with the case where I needed to move the led from the top of the PCB (red color) to the bottom (blue color).



Here on the (image above), I have moved the RGB LEDs to the back as seen in blue. The wires were placed by autorouter and are very messy. The need for the wiring to be tidy is the PCB at a later date. So to achieve this I will wire this by hand.

The (image above) there is an image of my manually Connected wires that have resulted in a Uniform Circuit Layout. So yes sometimes it does pay to do things by hand. [Spark fun guide](#) helped a lot here on how to do a good looking job. If if you compare the image just above to the one above the image that contains all 9 MOSFETs you will see a major difference in the layout

Here is everything looking nicely wired by hand

OLLYDOTDEV commented on 14 Jun

Throughout the process of green the PCB, I may have renamed some names without the schematic editor open therefore they became essentially two different versions of this PCB and the result is that the difference is created and one edited did not sync to the other and earn of this I now have to go through manually fix errors, to prevent this in the future from happing I need to have a feedback loop enabled this can be simply achieved by just have the Schematics editor open as well as the board editor

open at the same time

as fixing this was a poor use of my time

GIT[[Syncing schematic with board fixed](#)]

Git[R1 Finish (yet to test)]

Here R1 for LC\_board is complete and parts need to order so that construction can commence, till then see Construction process to see the physical development of this board

(added all needed part to part list on google sheets found in 2020 DTX For Oliver page Components and power calculations.)(at time of write this it is on google drive but will be backed up to GitHub once the project is complete )

Also with this daughter board of the ROMS designed. The next step is to continue the ROMS PCB designing so I can then continue with the construction process

OLLYDOTDEV added the LC\_Board label on 14 Jun

OLLYDOTDEV moved this from In progress to Completed In Sprint in Birdseye on 16 Jun

OLLYDOTDEV closed this on 16 Jun

OLLYDOTDEV modified the milestones: Sprint 1, Sprint 2 on 16 Jun

OLLYDOTDEV moved this from Completed In Sprint to TODO (For Sprint) in Birdseye on 16 Jun

OLLYDOTDEV reopened this on 16 Jun

Birdseye automation moved this from TODO (For Sprint) to Back Log on 16 Jun

OwnerAuthor

### OLLYDOTDEV commented on 16 Jun

After the sprint review (with me, myself and I), it was noticed that while the proposed design work would and achieve the aim of the user story. Between when I started designing this part of the project found a circuit called [shift registers](#). This would allow me to make LC\_Board cheaper, simpler, and even better it will make it easier to produce. Therefore this second sprint I will be focusing on remaking LC\_board to use a shift register.

OwnerAuthor

### OLLYDOTDEV commented on 17 Jun

To start off with the shift registers I will be changing my the IO from [#5](#) and also removing everything else other then the LED from the Schematic. Next, I need to add my level shifter, the level shifter I have picked to use is the STP16C596 in the TSSOP24 SMD package. I have chosen this chip over other mainstream chip such as the 74HC595 due to the need to use 9 pins and a chip like 74HC595 can only control 8 pin so have gone with the STP16C596 it can control 16 pins all at once, yes you are able to just use two 74HC595 but I am trying to keep down the cost as this is an implication that I am keeping in mind so using two 74HC595 would firstly cost more and also would take up more space there for making the STP16C596 a better choice.

but the next issue I found was that STP16C596M doest have a part file for eagle cad so as a fix to this I made my own on <https://ms.componentsearchengine.com>

from this I was able to generate STP16C596M.lbr this can be found in Project-Birdseye-DTX-2020/Schematics/libraries/STP16C596M.lbr

with this, I was now able to import the IC into the LC\_Boad.sch

OwnerAuthor

**OLLYDOTDEV commented on 21 Jun**

Ok so with the IO needed for the level shifter sorted out in [#5 \(comment\)](#) it connects them to the IC. To do this we can look at Table 3 on the STP16C596M [Datasheet](#)

From here it can be seen that Power Pins are

GND = Ground terminal // Pin 1

SDD = Supply Voltage Terminal // Pin 24

From here it can be seen that that for the main input- pins that we care able are

SDI= data serial input // Pin 2

SH\_CP =shift clock pulse // Pin 3

ST\_CP = storage register clock pulse // Pin 4

Data Pins that would tied to a fixed voltage

/OE = Output enable // Pin 21 // PULLED DOWN LOW

These pages were used to check the pin hook up to the [datasheet](#) as it is better safe than sorry.

[https://phanderson.com/arduino/stp\\_596.html](https://phanderson.com/arduino/stp_596.html)

<https://www.arduino.cc/en/tutorial/ShiftOut>

OwnerAuthor

OLLYDOTDEV commented on 22 Jun •

edited

now time to get back to hooking up the LEDs so they can be controlled. Now knowing that STP16C596 has 16 toggable outputs, at first it was my thought to connect the anode (positive) then bam but yeah no , if only things were that easy.

(Common anode RGB LED)

well they would be it I was using an RGB led with a Common Anode (shown above) but it is cheaper at get a Common cathode RGB LED as (shown below) there for keeping within the implications of this project I am keeping the costs down.

(Common cathode RGB LED)

To my approach to this is use the fact that the + of current to the point of low charge (eg Ground or the Negative of a battery) So by connecting the output pins from the STP16C596M in the cathodes of the LED's I will be let me control the flow of the current. When a pin for the Shift register is high(5v) then there will be greater (due to STP16C596M running at 5v and the LED at only 3v) electric potential difference there for with no current flowing the LED and in turn, will turn off. Whereas if the pin from the Shift register is set to low then there will be an electric potential difference thought the LED and current will flow and hence the LED will produce light. Sure yes it is backward to how one would normally think to turn on and off of LED but it should work (prototypes of example circuits were used to test the therory behind this) have the control be inverted is no issue due to the fact that code #7 will be able to compensate

OwnerAuthor

OLLYDOTDEV commented on 23 Jun

Here the LEDs have been connected to OUT put pins Shift register. I have done as much testing as I can with parts I have on hand put the key to this is yet to be tested. the Key is for the Shift register to be bidirectional so when they are not providing power they hopefully and act as a path to ground. this will be tested once the shipment of parts has arrived still then this sprint is at an end and will need to be reopened once the appropriate components in unavailable to be tested/prototyped

38e38a7

OLLYDOTDEV closed this [on 23 Jun](#)

Birdseye automation moved this from Back Log to Completed In Sprint [on 23 Jun](#)

OLLYDOTDEV moved this from Completed In Sprint to Backlog (Sorted by priority) in Birdseye [on 23 Jun](#)

OLLYDOTDEV added the [On\\_Hold](#) label [on 24 Jun](#)

OLLYDOTDEV removed this from the [Sprint 2](#) milestone [on 24 Jun](#)

OLLYDOTDEV moved this from Backlog (Sorted by priority) to Review in Birdseye [on 5 Aug](#)

OLLYDOTDEV added the [2.5/3.5\[Excellence\]](#) label [29 days ago](#)

OLLYDOTDEV moved this from Review to TODO (For Sprint) in Birdseye 16 hours ago

OLLYDOTDEV moved this from TODO (For Sprint) to Archive in Birdseye 16 hours ago

## RGB Interface #5

Closed

OLLYDOTDEV opened this issue on 7 Jun · 12 comments

Closed

RGB Interface

#5

OLLYDOTDEV opened this issue on 7 Jun · 12 comments

Comments

@OLLYDOTDEV

Owner

OLLYDOTDEV commented on 7 Jun

As an engineer

this part of the IO Dedicated to sending signals to the LED on external PCB needed

It is Impractical to LED's mounted directly on the main PCB and still has the LED display on the outside on the Protective case.

@OLLYDOTDEV OLLYDOTDEV added ROM'S 2.5 labels on 7 Jun

@OLLYDOTDEV OLLYDOTDEV added this to the Sprint 1 milestone on 7 Jun

@OLLYDOTDEV OLLYDOTDEV added this to Back Log in Birdseye on 7 Jun

@OLLYDOTDEV OLLYDOTDEV added 2.7 3.7 labels on 13 Jun

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 13 Jun

The initial plan was for the display LEDs to be located directly on the main PCB it was later decided that due to design restrictions it would be unlikely that you would be able to see the LEDs if they were located on the main PCB server the decision was made to make a secondary PCB to how's the display LEDs that can be repositioned to the desired location when the case design is decided in #20

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 13 Jun

so with having an addition atmega328p on the secondary PCB (now called LC\_Board)

To due lack of pins on the main atmega328p (for more info see #6 )

this atmega328p I have it dedicated to just controlling these lights and communicate via serial protocol back to R.O.M.S

This was referenced on 14 Jun

RBG LED's #6

Closed

Battery #8

Closed

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 14 Jun

Due to LC\_board operations on 3.3v and the ROMS runs on 5v so when communicating over serial communication (TX and RX) pins on the used for this communication happen to also operate at the corresponding Voltages for each board. so I am going to need a real-time conversion unit eg something like [this](A Bidirectional Logic Level Converter (for I2C)) how they work explained here Sparkfun does provide a datasheet on how there Bidirectioal logic level converter would work as seen in the image below

000018\_Selection

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 14 Jun

In short how this work is frankly awesome

If you have 5v on the high end the then with the MOSFETs VGS being 0v (as both G and S are sitting at 3.3v there for no difference ) then the low will be pulled high and the low signal will be received as high but if the High was sitting at 0V then the MOSFET would turn on and the current would flow from low to high, and due to the fact that 3.3 is still counted as a logic high

000019\_Selection

Sure I Could I have you something like a dedicated chip with a 4-bit bus like a TXB0104

but the parts needed Logic Level Converter are also used in the rest of my project means that I happen to have his parts already on hand for when I do create it. So rather than being required to purchase another component, I could just use the surplus of my other components to achieve the same endpoint.

What is needed is a n channel MOSFET and a some 10K resters

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 14 Jun

First I needed to fix my eagle library for my MOSFET. This MOSFET .lbr from the git repo that I sourced it form as there where some labels that were missing on the n channel MOSFET

000020\_Selection

[before]

Here the pins are not labeled. To make this easier on myself so that I don't have to keep working what pins are what. So here is the edited version

000021\_Selection

[after]

I didn't need to do this for the p-channel MOSFETs as they were all readily labeled on the Schematic

000022\_Selection

@OLLYDOTDEV OLLYDOTDEV added the LC\_Board label on 14 Jun

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 14 Jun

As for how the atmega328p on Roms will talk to the atmega328p on LC\_Board we can look at how Arduino's use with serial communication.

The RXD of the left PCB to the TXD of the right PCB

The TXD of the left PCB to the RXD of the right PCB

seen here

000023\_Selection

to starting of making the IO for the LC\_Board

000024\_Selection

GND is so that everything will have a common GND

VIN allows to hook up to the battery input on the VIN pin this supports a max of 20v and around 1.6 A

5V\_rail takes a pre knownen stable 5v this is used to provide power to for future version for latter projects, so it here for a future version that might need this so I am keeping my option open

3.3V\_rail is for accepting a fixed input of 3.3 voltages or it can be used to be connected

TXD is used for sending the serial data out from the PCB

RXD\_IN is for receiving serial data other from the PCB (refer to the 2nd image above)

to it opens

Then there are two pins called 2BD this is short for to be developed And keeps my options open For further development

After Retrospect the IO needs a reset line for when hooking up my if FTDI chip (FTL232RL)for when I am to upload the program to the atmega328p chip. But that's why I added a 2BD(to be decided) pins

Here is an image of the FTDI chip hooked up to an Arduino mini pro

000025\_Selection

So for my project this FTL232RL will connect to this pinouts

Here is CTS ,DTR ,BLK ,GRN. So before I continue, I am working out that these are.

So after talking with some people, it turns out that BLK & GRN if literally the color wire in the FTDI cable there are used for transmitting CTS and DTR data. CTS and RTS is used for a flow control, this is used for sending a high singal when the device is ready to receive more data but in my used case that is not needed.

CTS is 'clear to send' [this pin it not needed]

RTS is 'ready to send' [this pin is not used]

DTR is used for sending the reset signal to reboot the atmega328 chip once code has been uploaded

So here is my updated IO for the LC\_Board

Git[updated io]

000026\_Selection

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 14 Jun

Added the reset in pin and also rearrange the layout so that it is a better match FTDI adapter.

000027\_Selection

Here I have haded the two headers for switching the input of RDI from being progressed as a 5v signal (jumper 2-1) on the left side and jumper (3-2) on the right. Whereas for 3.3v RDI input signage you want to put the jumper on the left (2-3) and on the right (1-2)

This is needed as the FTDI adapter will output an RDI of 3.3v. Were as the ROMS board will send a RDI of 5v that need to be converted to a 3.3v RDI before going to the Atmega 328p I have talk about how this will be done here

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 14 Jun

It should be noted that for LC\_Board to run at 3.3v it will need to disable the brown out so what if doesn't to a chip force shutdown. <http://www.engbedded.com/fusecalc/> lets you work out what to change.

@OLLYDOTDEV OLLYDOTDEV moved this from Back Log to Sprint Backlog in Birdseye on 16 Jun

@OLLYDOTDEV OLLYDOTDEV moved this from Sprint Backlog to TODO (For Sprint) in Birdseye on 16 Jun

@OLLYDOTDEV OLLYDOTDEV moved this from TODO (For Sprint) to In progress in Birdseye on 16 Jun

@OLLYDOTDEV OLLYDOTDEV moved this from In progress to Completed In Sprint in Birdseye on 16 Jun

@OLLYDOTDEV OLLYDOTDEV closed this on 16 Jun

@OLLYDOTDEV OLLYDOTDEV modified the milestones: Sprint 1, Sprint 2 on 16 Jun

@OLLYDOTDEV OLLYDOTDEV moved this from Completed In Sprint to TODO (For Sprint) in Birdseye on 16 Jun

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 16 Jun

With my change in plan as seen #6 (comment) The interface will be changed to account for a new io to control the shift register

@OLLYDOTDEV OLLYDOTDEV reopened this on 16 Jun

Birdseye automation moved this from TODO (For Sprint) to Back Log on 16 Jun

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 16 Jun

the changes that will be to be made for this interface are not to major as Shift Registers only need three pins for data (DS, ST\_CP, SH\_CP) and one 5v and GND. for the RGB I will still need 3.3v for it so I will keep it simply and use a level shifter make out of a 2K and 3k R resistor

@OLLYDOTDEV OLLYDOTDEV mentioned this issue on 17 Jun

Power Regulation #11

Closed

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 17 Jun

To start it is work reading this first. So with having the Shift Register in the LC\_Board Schematic I am now about to see what Ports I need to use.

2020-06-17

11\_01\_51-1

Schematic

C\_\_Users\_\_obell\_\_Documents\_\_GitHub\_\_2020\_Project-Birdseye-DTX-2020\_Sch

(IO)

For a start, I can remove the TXO, RXI, Reset\_In and Vin pins this levels me with only GND and V5 pins

the three pins I need to hook up are

DS = data serial input // Found on pin 2

SH\_CP =shift clock pulse // Found on pin 3

ST\_CP = storage register clock pulse // Found on pin 4

With those pins, I will be able to control everything I need to shift register with the STP16C596

A brief run down how the communication will be working

"How this all works is through something called "synchronous serial communication," i.e. you can pulse one pin up and down thereby communicating a data byte to the register bit by bit. It's by pulsing second pin, the clock pin, that you delineate between bits. This is in contrast to using the "asynchronous serial communication" of the Serial.begin() function which relies on the sender and the receiver to be set independently to an agreed-upon specified data rate. Once the whole byte is transmitted to the register the HIGH or LOW messages held in each bit get parceled out to each of the individual output pins. This is the "parallel output" part, having all the pins do what you want them to do all at once." arduino.cc

@OLLYDOTDEV

Owner

Author

OLLYDOTDEV commented on 21 Jun

000002-2020-06-21 02\_24\_49-Window

(Updated IO)

Now with an IO changed to the new specifications.

@OLLYDOTDEV OLLYDOTDEV closed this on 23 Jun

Birdseye automation moved this from Back Log to Completed In Sprint on 23 Jun

@OLLYDOTDEV OLLYDOTDEV removed this from the Sprint 2 milestone on 23 Jun

@OLLYDOTDEV OLLYDOTDEV moved this from Completed In Sprint to Backlog (Sorted by priority) in Birdseye on 23 Jun

@OLLYDOTDEV OLLYDOTDEV moved this from Backlog (Sorted by priority) to Completed In Sprint in Birdseye on 23 Jun

@OLLYDOTDEV OLLYDOTDEV moved this from Completed In Sprint to Archive in Birdseye on 23 Jun

@OLLYDOTDEV OLLYDOTDEV added the 2.5/3.5[Excellence] label on 24 Aug

# External Components (Atmega 328p) #4

Closed

OLLYDOTDEV opened this issue on 5 Jun · 2 comments

Closed

## External Components (Atmega 328p)#4

OLLYDOTDEV opened this issue on 5 Jun · 2 comments

### Comments

Owner

OLLYDOTDEV commented on 5 Jun

As an electronics engineer

These extra components are needed to increase speed and stability for exected uses

So that ROMS can be trusted as a security device by the user

OLLYDOTDEV added ROM's 2.5 labels on 5 Jun

OLLYDOTDEV added this to the Sprint 1 milestone on 5 Jun

OLLYDOTDEV added this to Back Log in Birdseye on 5 Jun

OLLYDOTDEV added 2.8 3.5 3.8 labels on 13 Jun

OLLYDOTDEV mentioned this issue on 13 Jun

Atmega 328p #2

Closed

OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye on 13 Jun

OLLYDOTDEV moved this from Backlog (Sorted by priority) to In progress in Birdseye on 13 Jun

OwnerAuthor

**OLLYDOTDEV commented on 13 Jun**

continuing from #2

So there is the full layout for the pins. With this in mind, I am now proceeding to remake

<https://www.arduino.cc/en/Tutorial/ArduinoToBreadboard>

<https://www.arduino.cc/en/Main/Standalone>

Eagle Cad here I have added an image of the 16 MHz Crystal connected to ground

GIT[[added 16mhz +grounding](#)]

Crystal Oscillator work of the Piezoelectric effect. The Crystal needs to be connected to ground as crystal need grounding as when the crystal vibrates it can send a signal back down the connected wires to the ground nullifies these signals by redirecting them to ground The process of Grandma goes to a 20 microfarad Ceramic capacitor.

They provide a square wave signal which determines the time required for each T state

3.3v is Good for a max of 8 MHz

5v is Good for a max of 16 MHz

<https://www.youtube.com/watch?v=YzcKQWwkzWs>

<https://www.elprocus.com/what-is-the-piezoelectric-effect-working-and-its-applications/>

GIT[[added 16mhz crystal + grounding](#)]

Here added is part of the Electrical relationships between VCC

GIT[[added .gitignore so that the temp .s#1, .s#2 files dont get upload to upstream git repo](#)]

Added reset headers that can be shorted to reboot the IC

GIT[[Start of NRF24lo1 hook up & LED](#)]

next up #6

OwnerAuthor

**OLLYDOTDEV commented on 13 Jun**

it should be noted that I will be running at 5v to allow my Atmega328p to run at 16 MHz giving me double the default processing speed and in turn quick reaction times removing one potential bottleneck, which is a critical consideration when time is at the essence do with security

OLLYDOTDEV mentioned this issue [on 14 Jun](#)

Battery #8

Closed

OLLYDOTDEV moved this from In progress to Completed In Sprint in Birdseye [on 16 Jun](#)

OLLYDOTDEV closed this [on 16 Jun](#)

OLLYDOTDEV moved this from Completed In Sprint to Archive in Birdseye [on 23 Jun](#)

OLLYDOTDEV added the [2.5/3.5\[Achieved\]](#) label [on 24 Aug](#)

## Bootloader (Atmega 328p) #3

Closed

OLLYDOTDEV opened this issue on 5 Jun · 1 comment

Closed

## Bootloader (Atmega 328p) #3

OLLYDOTDEV opened this issue on 5 Jun · 1 comment

### Comments

Owner

OLLYDOTDEV commented [on 5 Jun](#)

As a developer

I want To load the Arduino boot loader on to the Atmega 328p

As it makes programming much easier and also allow me to use more mainstream liberals

OLLYDOTDEV added the [2.5](#) label [on 5 Jun](#)

OLLYDOTDEV added this to the [Sprint 1](#) milestone [on 5 Jun](#)

OLLYDOTDEV added this to Back Log in Birdseye [on 5 Jun](#)

OLLYDOTDEV added the [ROM'S](#) label [on 5 Jun](#)

OLLYDOTDEV added [2.7](#) [2.8](#) [3.8](#) labels on 13 Jun

OLLYDOTDEV removed this from the [Sprint 1](#) milestone on 13 Jun

OLLYDOTDEV moved this from Back Log to Sprint Backlog in Birdseye on 16 Jun

OLLYDOTDEV moved this from Sprint Backlog to Back Log in Birdseye on 16 Jun

OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye on 23 Jun

OwnerAuthor

OLLYDOTDEV commented [3 days ago](#)

<https://learn.sparkfun.com/tutorials/installing-an-arduino-bootloader>

OLLYDOTDEV closed this [3 days ago](#)

Birdseye automation moved this from Backlog (Sorted by priority) to Completed In Sprint [3 days ago](#)

OLLYDOTDEV removed the [2.7](#) label [3 days ago](#)

OLLYDOTDEV moved this from Completed In Sprint to Archive in Birdseye [3 days ago](#)

## Atmega 328p #2

Closed

OLLYDOTDEV opened this issue on 4 Jun · 1 comment

Closed

## Atmega 328p#2

OLLYDOTDEV opened this issue on 4 Jun · 1 comment

### Comments

Owner

## OLLYDOTDEV commented on 4 Jun

As a user

I want this to work out that is happened around the ROMS

why as the main point of this project is to work out whether there was been a breach of location as happened and react to it so something needs to calculate that something has happened.

OLLYDOTDEV added ROM's 2.5 labels on 4 Jun

OLLYDOTDEV added this to the Sprint 1 milestone on 4 Jun

OLLYDOTDEV added this to Back Log in Birdseye via automation on 4 Jun

OLLYDOTDEV moved this from Back Log to Backlog (Sorted by priority) in Birdseye on 4 Jun

OLLYDOTDEV added 2.8 3.5 3.8 labels on 13 Jun

OwnerAuthor

## OLLYDOTDEV commented on 13 Jun

Starting off to after I had worked out that I wanted to do for this project

I was faced with how I was going to approach this component of The Project. From main projects, I knew that I was going to tackle the designing of the PCB with eagle cad but as for the actual device itself I had initially thought I would go with something like a raspberry pi zero w But decided that for something that is going to be run on battery power I would rather have something that is more efficient Powerwise, So I turned to look at Arduino's and this was Looking around the promising option but the idea of having to buy A whole bunch of bunch sensors and also fit all compactly would have work but I was looking for something a little more flexible. I thought surely there is a better way to using Arduino, if Arduino was made from smaller Components surely I can do the same just have it more adapted to my project. So after further investigation, I have seen that The do we know Uno is based off the atmega328 DIP chip (Some clones use the TQFP version)

So when looking into getting an atmega328 to work first you need to burn the Arduino boot loader show in The variety of different ways here From Arduino to ATmega328. I will be using the FTDI Adapter Is something that needs to be kept the mind while doing this is the fact that The hardware pinout for this chip is

<https://www.youtube.com/watch?v=kDL9CHratZE>

This Image Shows the physical pinout of the chips but Confused and Confusingly the pin 1 of port pinout does not Equal what can be seen for the function of the Pin as pin 1 Is a PWN pin Arduino is concerned it is pin ~D2

So next it to set up the needed external components see [#4](#)

OLLYDOTDEV moved this from Backlog (Sorted by priority) to In progress in [Birdseye](#) on 13 Jun  
This was referenced on 13 Jun

[External Components \(Atmega 328p\) #4](#)

Closed

[Battery #8](#)

Closed

[RBG LED's #6](#)

Closed

 OLLYDOTDEV moved this from In progress to Completed In Sprint in [Birdseye](#) on 16 Jun

OLLYDOTDEV closed this [on 16 Jun](#)

OLLYDOTDEV moved this from Completed In Sprint to Archive in [Birdseye](#) on 23 Jun

OLLYDOTDEV added the  2.5/3.5[Achieved] label [on 24 Aug](#)

[OLLYDOTDEV](#) mentioned this issue [19 days ago](#)

[Wireless Communication Subsystem recompiled \(RPI ZERO W\) #30](#)