

Arduino Your Life with a Fridge Alarm and Learning IR Remote

By Jonathan Stevens

Jonathan Stevens Who?

- Father of 6
- Husband of 16 years
- C# Developer
- Code and Coffee



Code And Coffee

Stauf's in

Grandview

Thursday's at 7am





Arduino <3

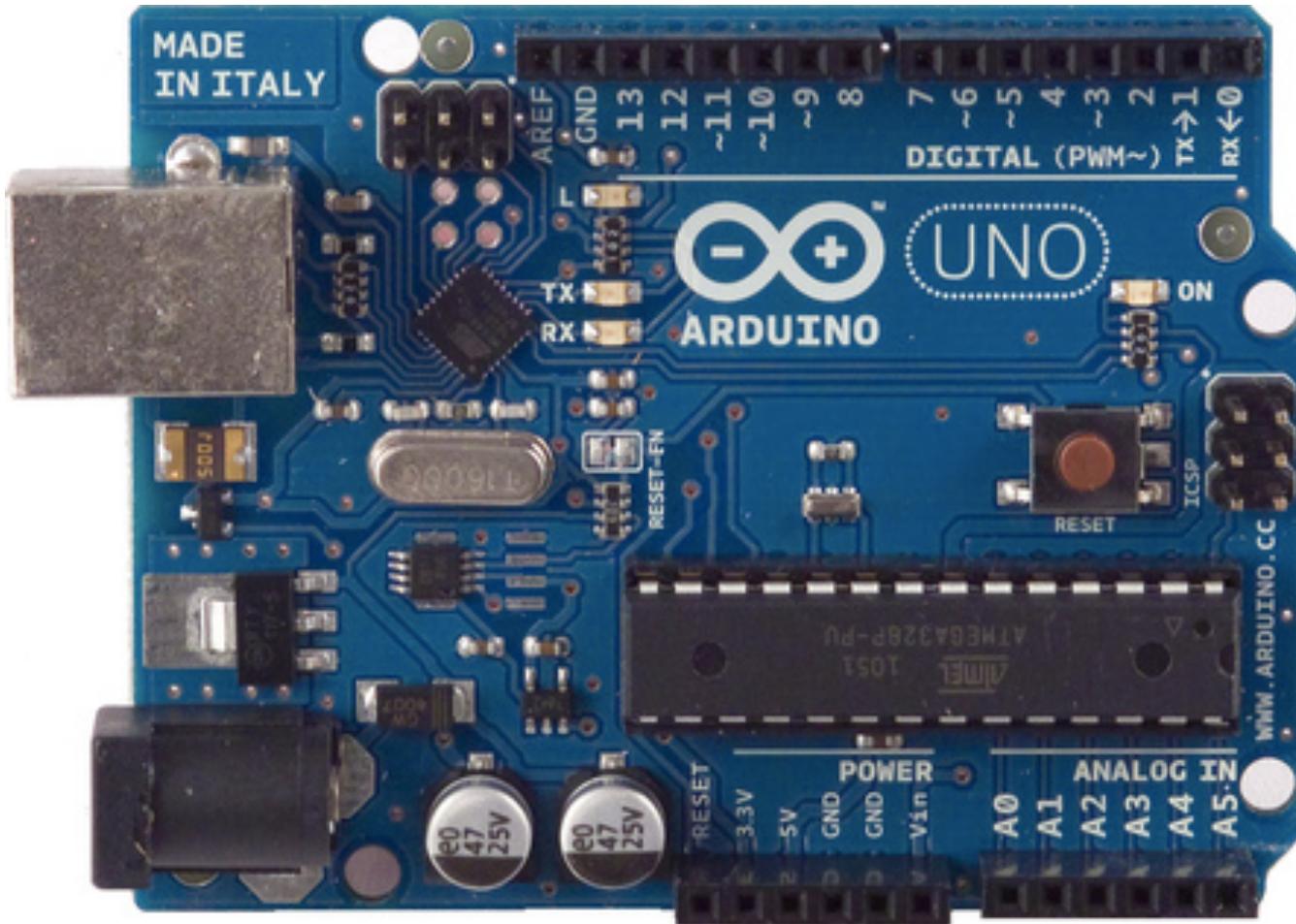
- Last year at CodeMash



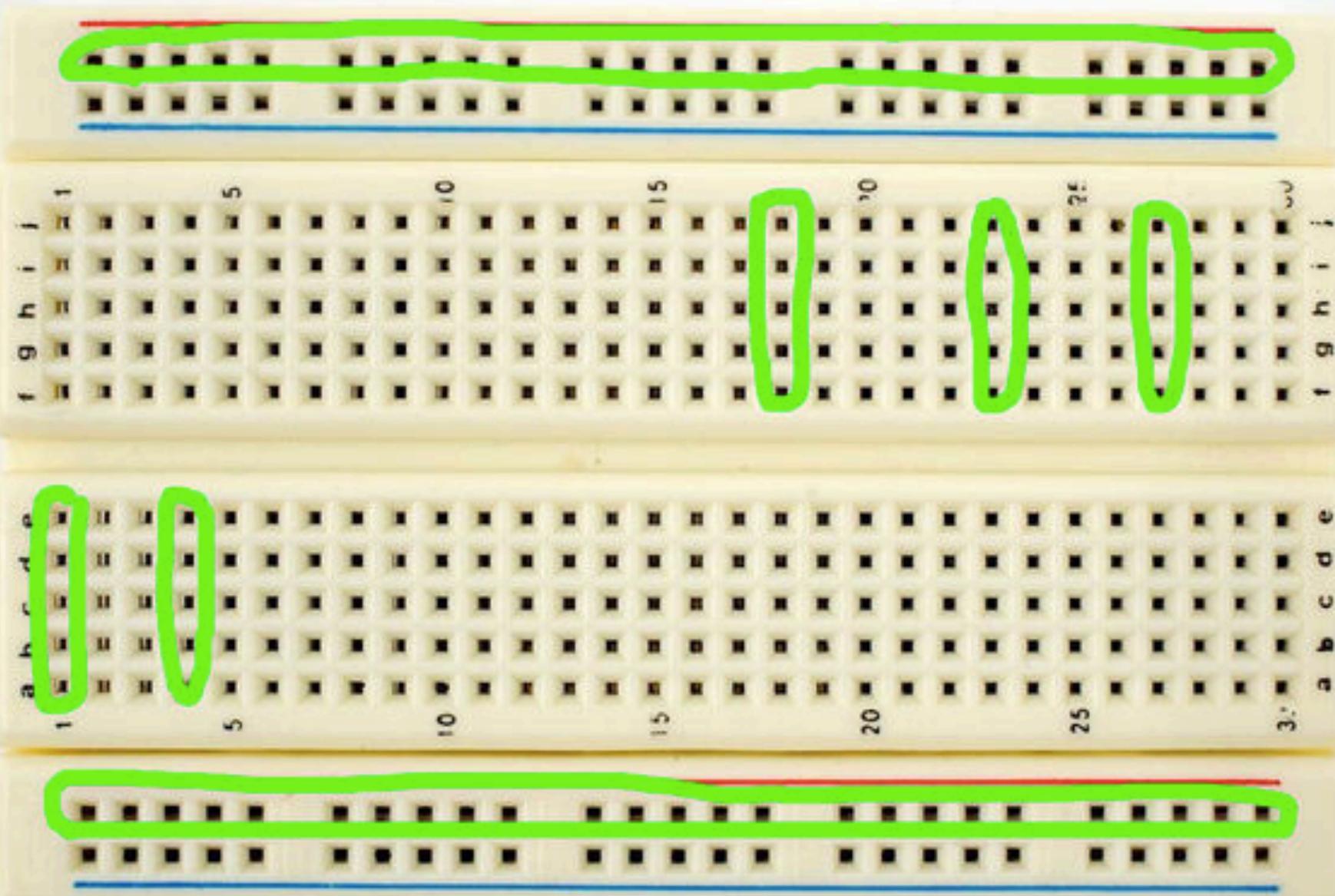
Arduino Knowledge Check

- Arduino
- Bread Board

Arduino Intro



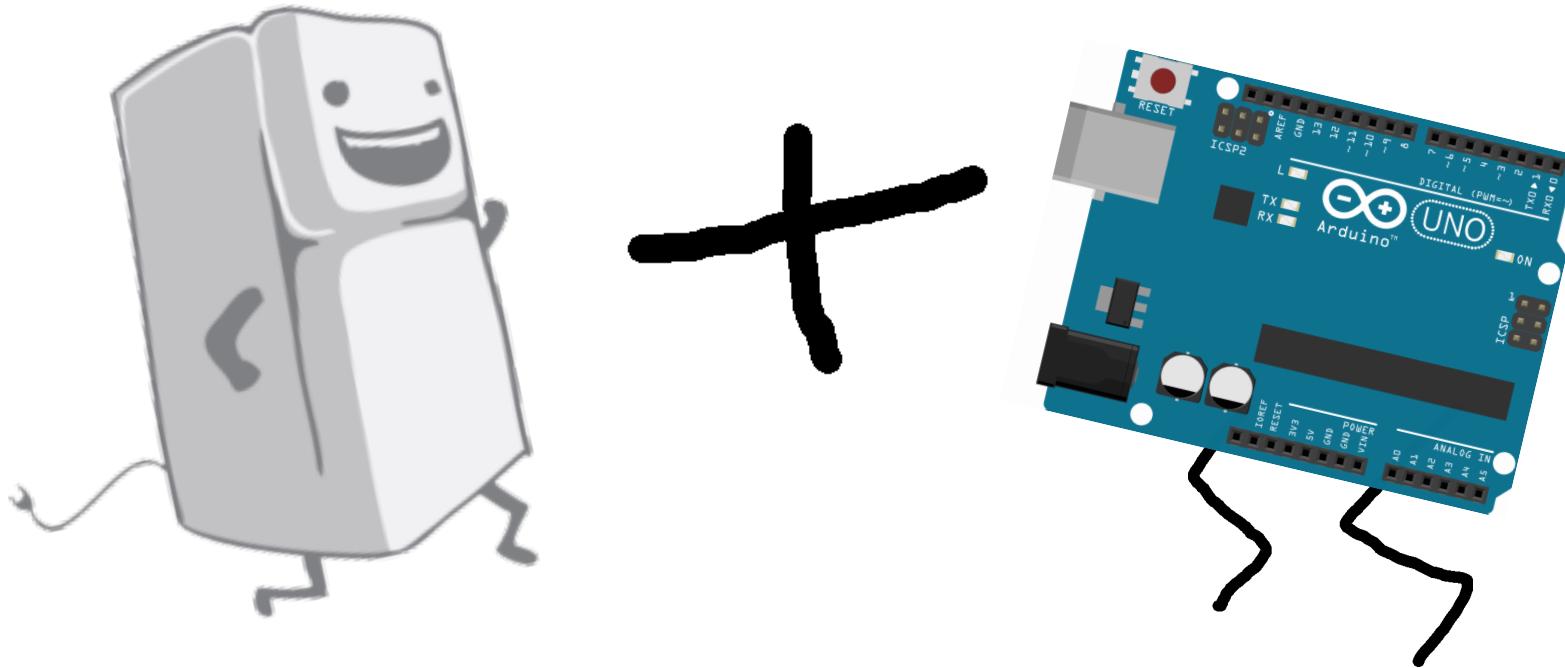
Breadboard Intro



Why Arduino?

- Cheap
- Well Documented
- Free IDE
- Tried a Raspberry Pi First
- Coffee shop friendly
 - No I am not making something dangerous

Arduino Fridge Alarm



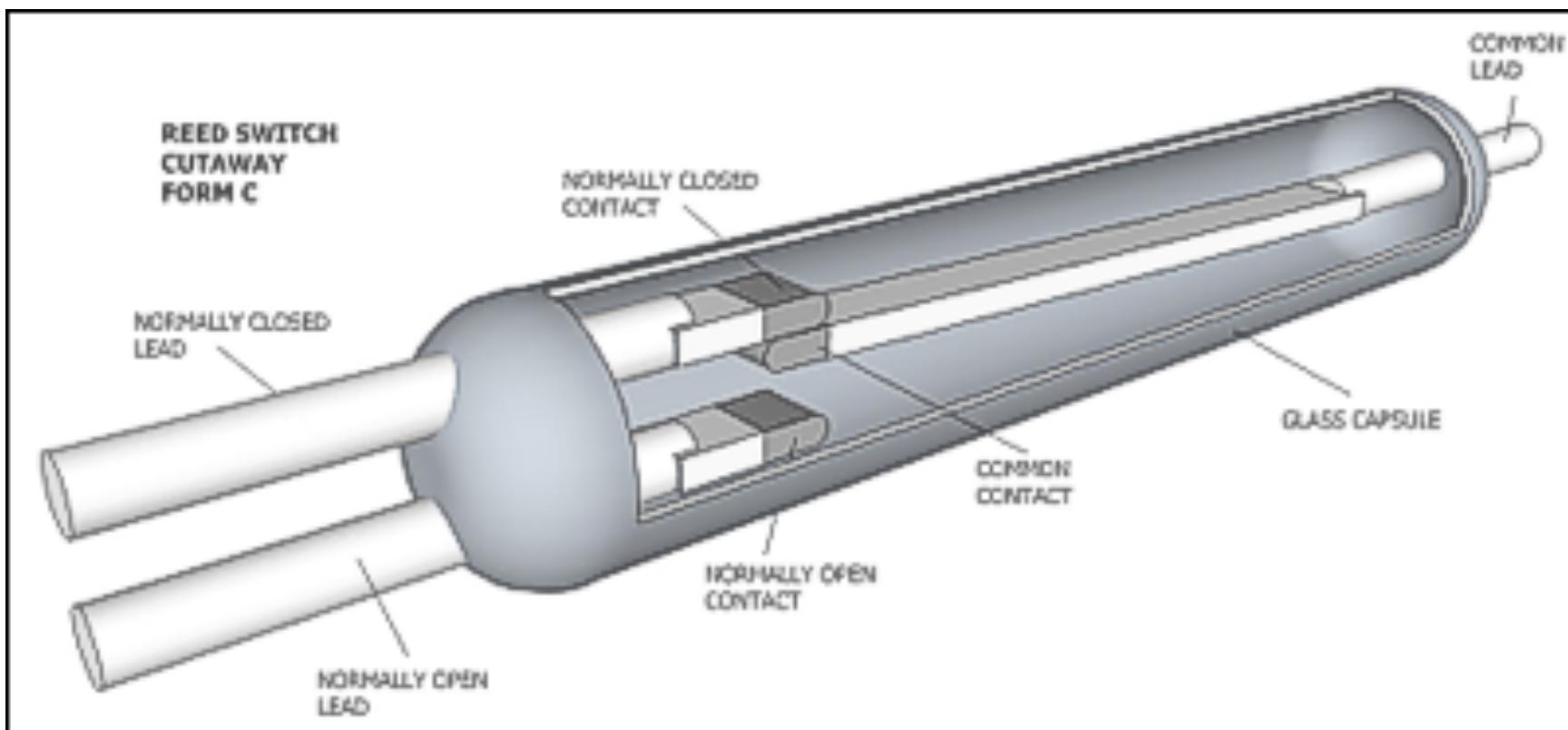
Fridge Problem



Parts

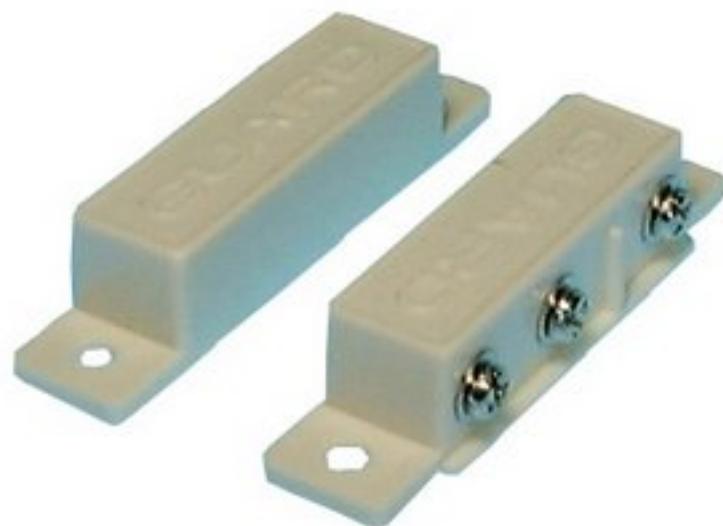
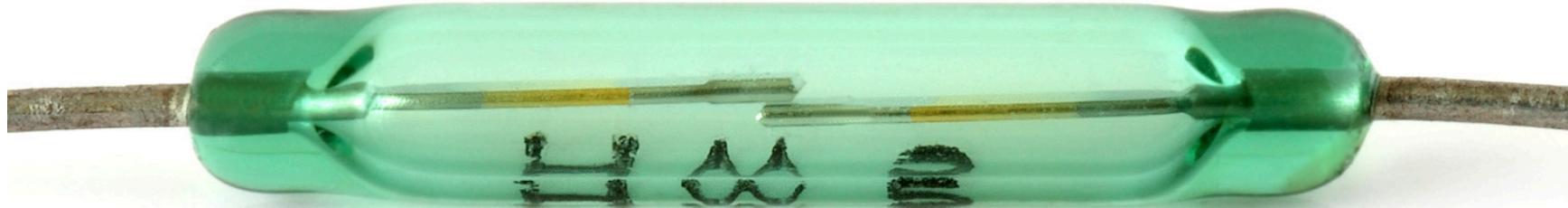
- Arduino
- Reed Switches with NO and NC
 - [http://www.microcenter.com/product/422392/
Switch Magnetic Alarm](http://www.microcenter.com/product/422392/Switch_Magnetic_Alarm)
- Peizo Buzzer
 - <https://www.adafruit.com/products/160>

Reed Switch



<http://www.reedswitchdevelopments.com/how-does-a-reed-switch-work.html>

Reed Switch



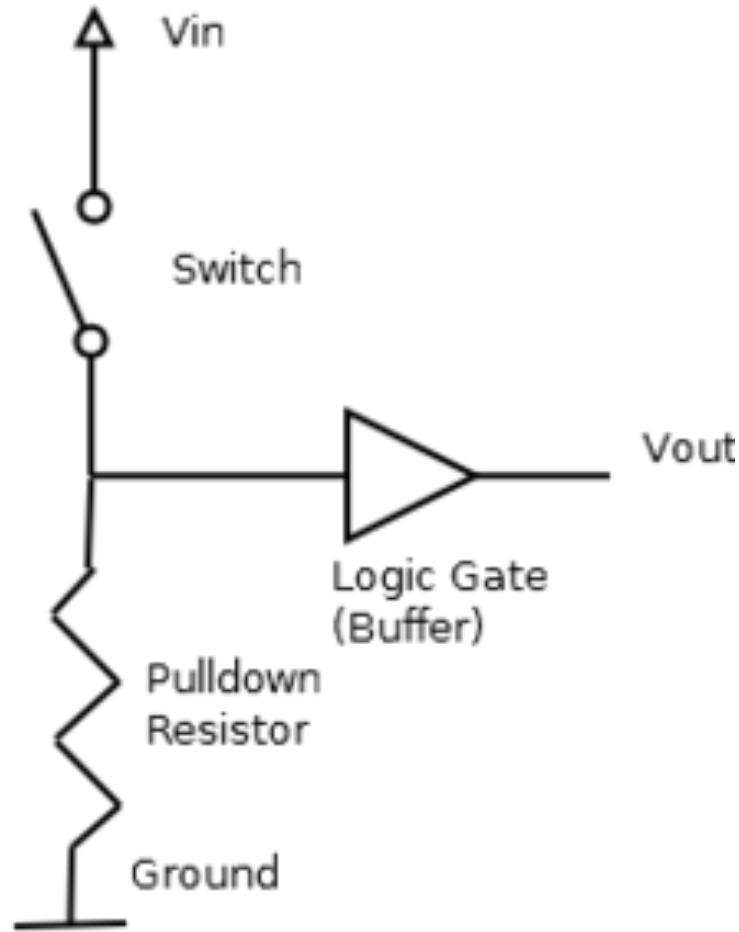
Reed Switch



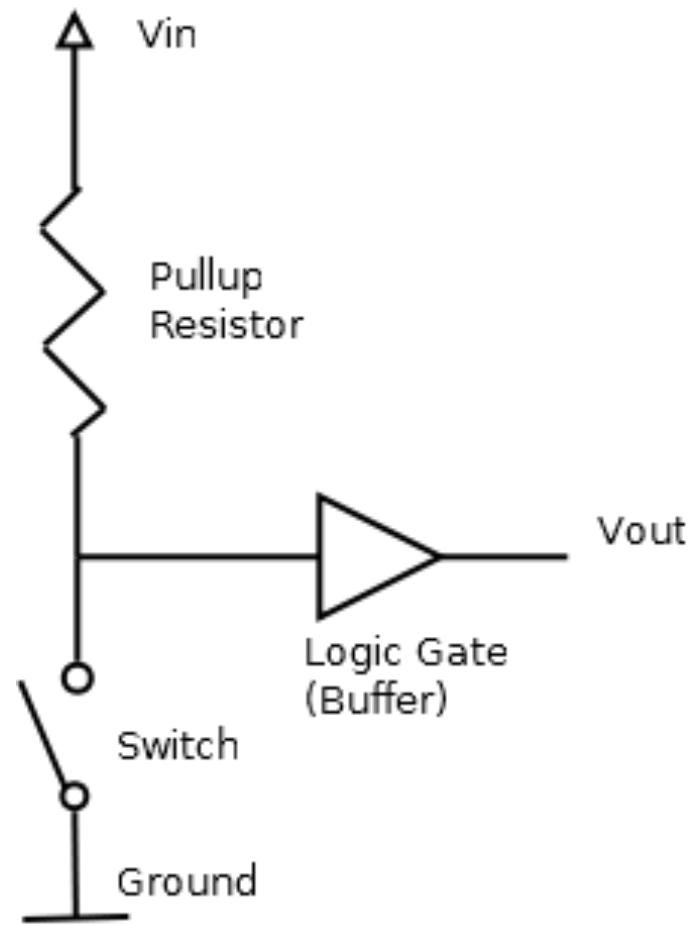
Pull Down vs Pull Up

- Pull down
 - Noisy, chip will detect the smallest of voltage changes
- Pull up
 - Less noisy, voltage drop from 5 volts is easier to detect

Pull Down Resistor



Pull Up Resistor



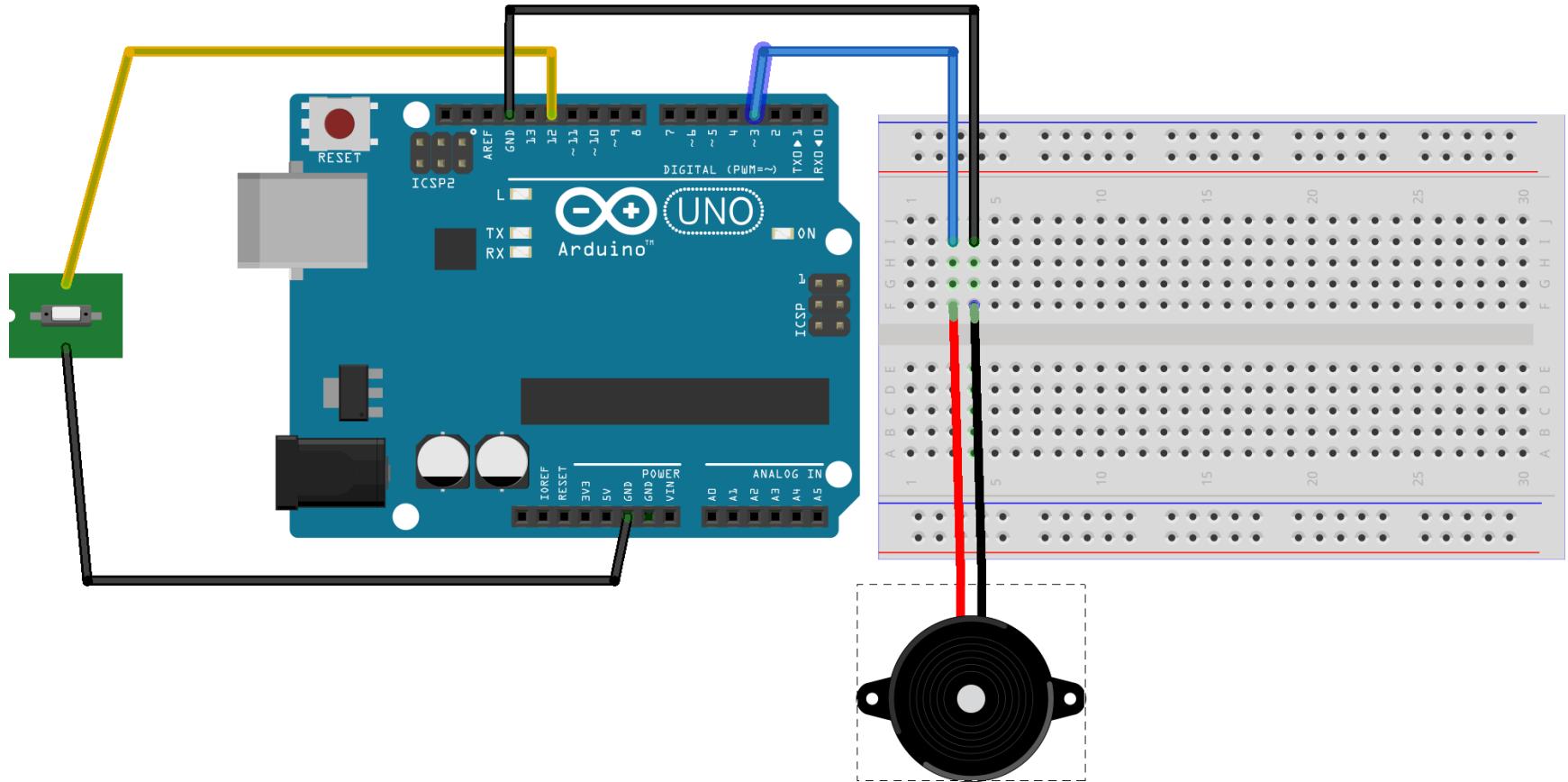
Breadboard Plan

- Code Upload
- Switch
- Buzzer
 - Maybe a resistor

Fridge Alarm Code

<https://github.com/Jonathan75/FridgeAlarm>

Fridge Alarm Breadboard



fritzing



Arduino Fridge Alarm

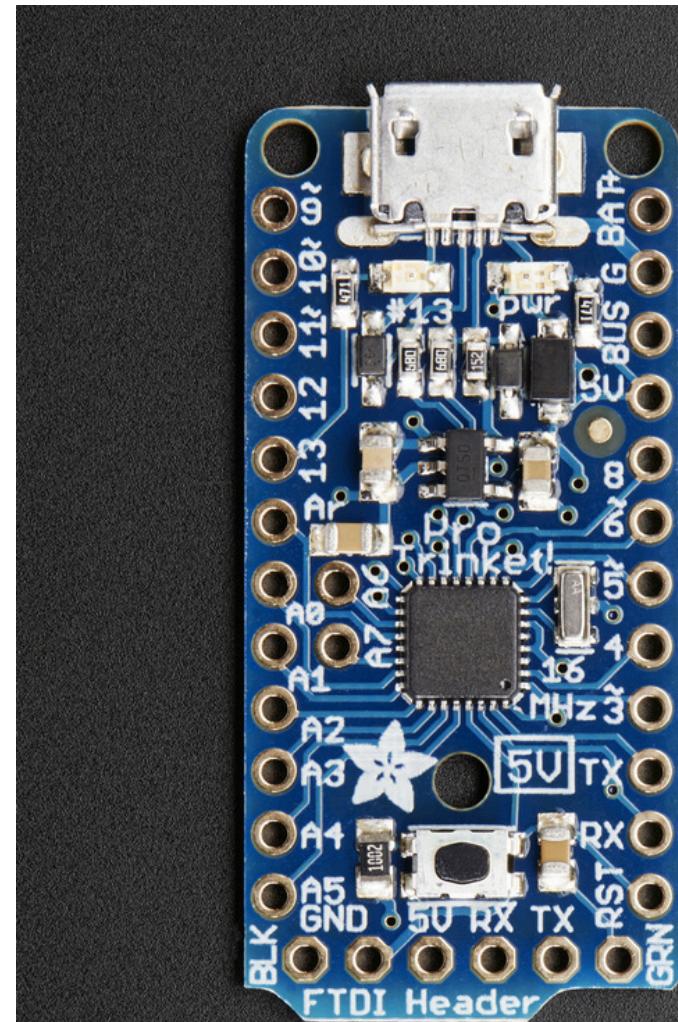
The Ship to Production

Smaller Arduinos

- Pro Mini
- Adafruit Trinket Pro
- Atmel Chip ATmega328 or Attiny85

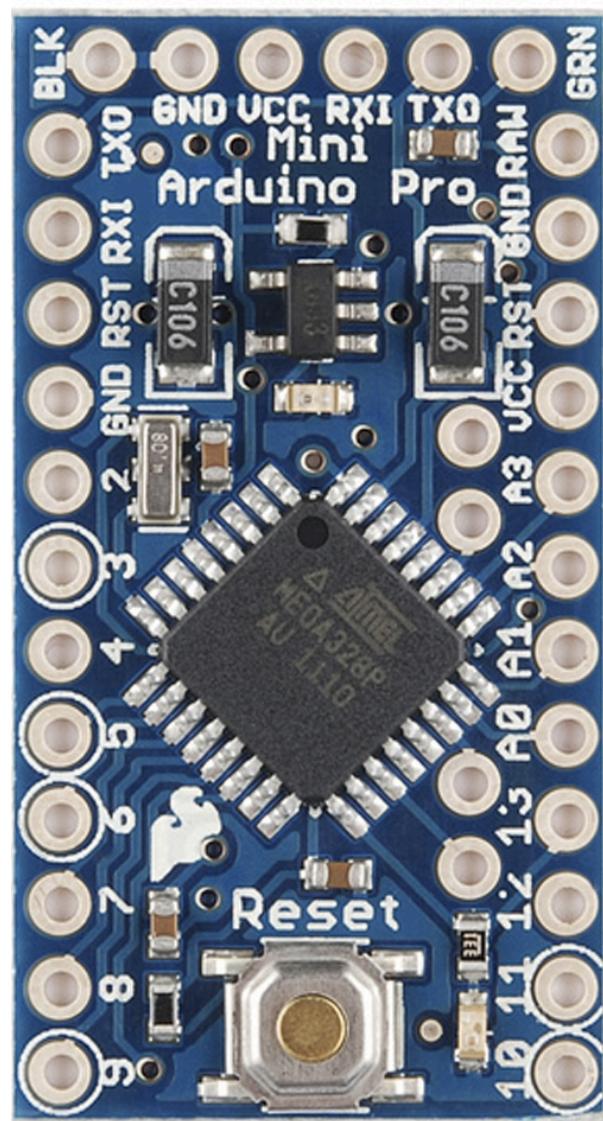
Adafruit Trinket and Trinket Pro

- <https://www.adafruit.com/products/2085>
- http://www.microcenter.com/product/436936/Trinket_5V_Arduino_Controller
- Works with 99% of existing Arduino sketches (anything that doesn't use more than 28K, and doesn't require pins #2 and #7)
- 5 volts or 3 volts
- USB programmable
- Chip ATmega328P
- Needs a FTDI for Debug
- Trinket Pro \$8.75 + shipping
- Trinket \$7
 - no FTDI Debuging



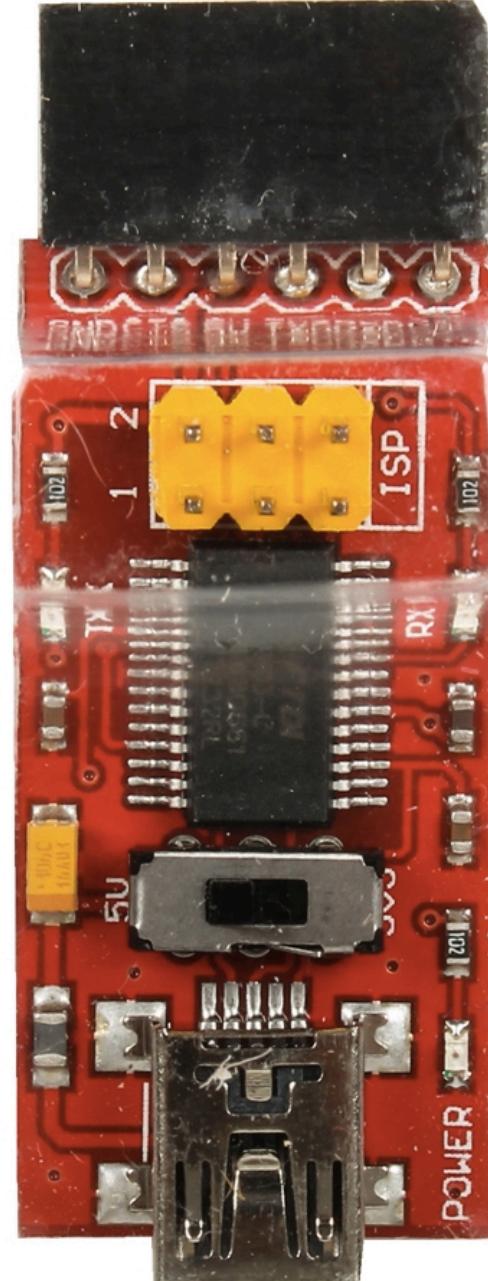
Pro Mini

- <http://www.microcenter.com/product/431996/>
Arduino Pro Mini Board
- Older
- \$8 or cheaper on eBay
- Needs a FTDI to program it
 - Next slide



FTDI Programmer

- \$10
- [http://www.microcenter.com/
product/432350/
FTDI Adapter USB Controller](http://www.microcenter.com/product/432350/FTDI%20Adapter%20USB%20Controller)



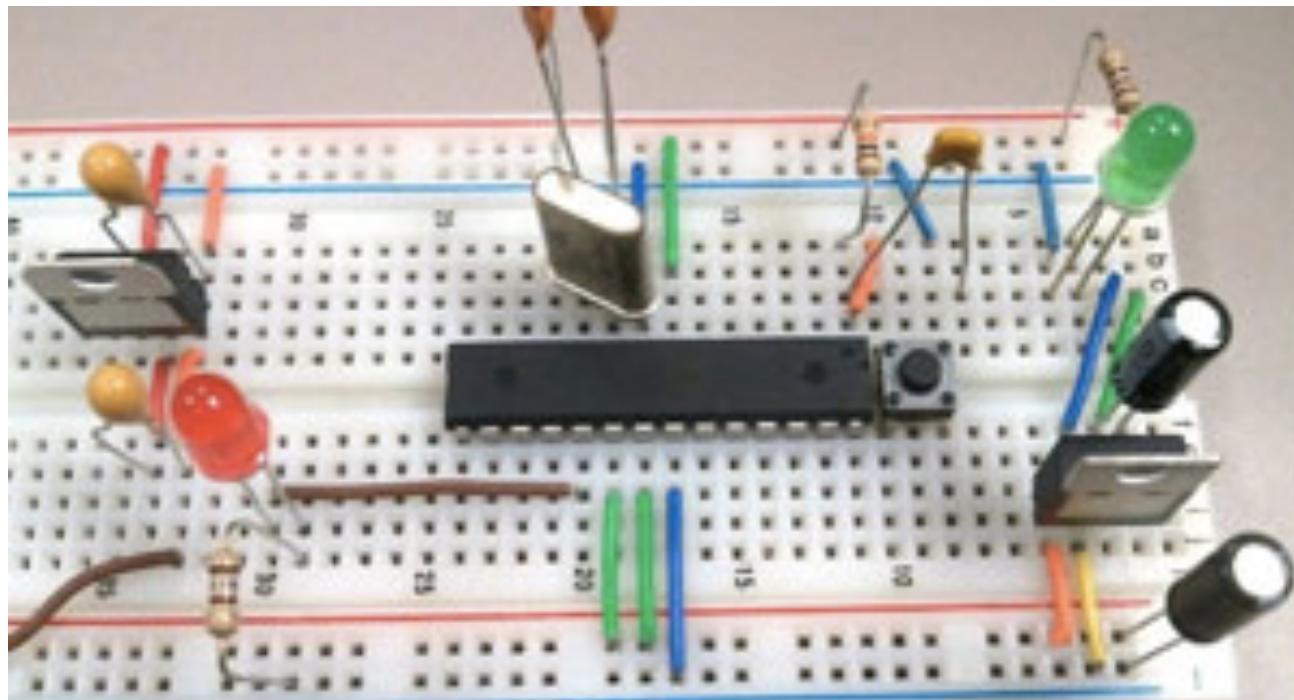
Atmel Chips

ATmega328 \$5

<https://www.jameco.com/jameco/workshop/jamecobuilds/arduino circuit.html>

Attiny85 \$2

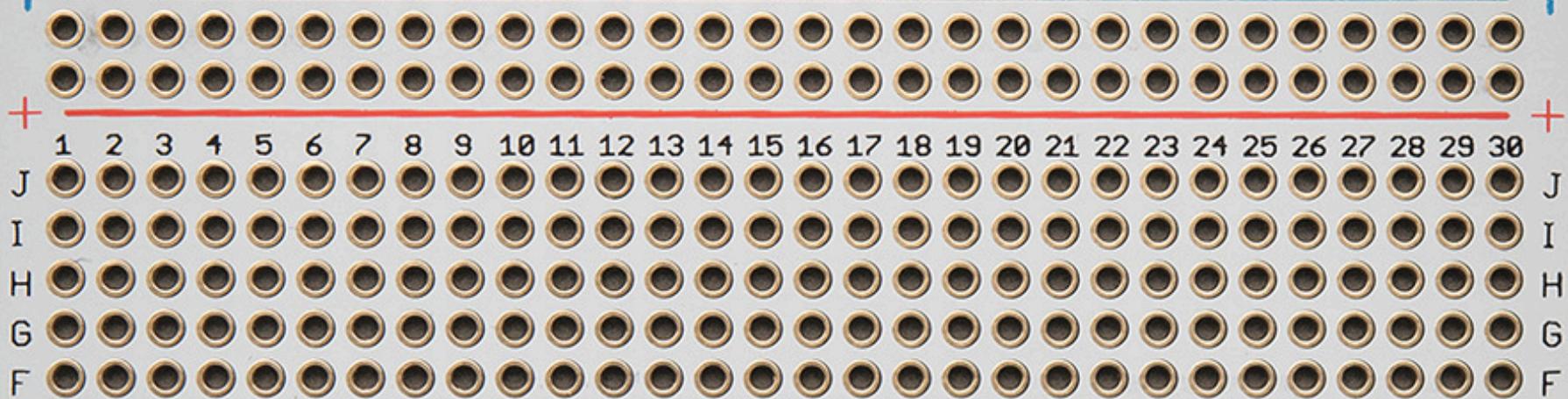
<https://www.digikey.com/product-detail/en/ATTINY85-20PU/ATTINY85-20PU-ND/735469>



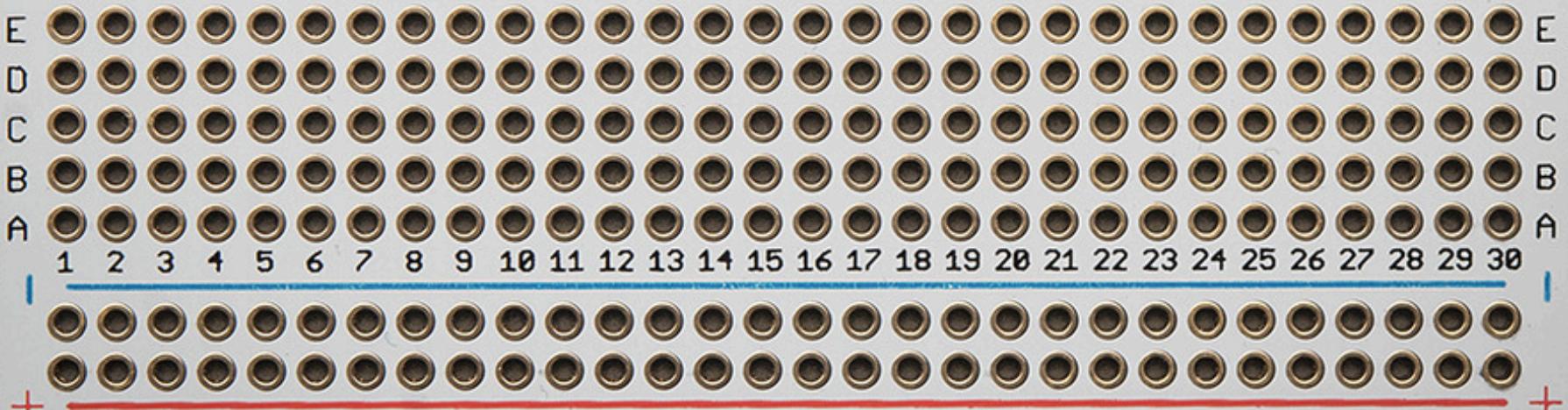
And more....

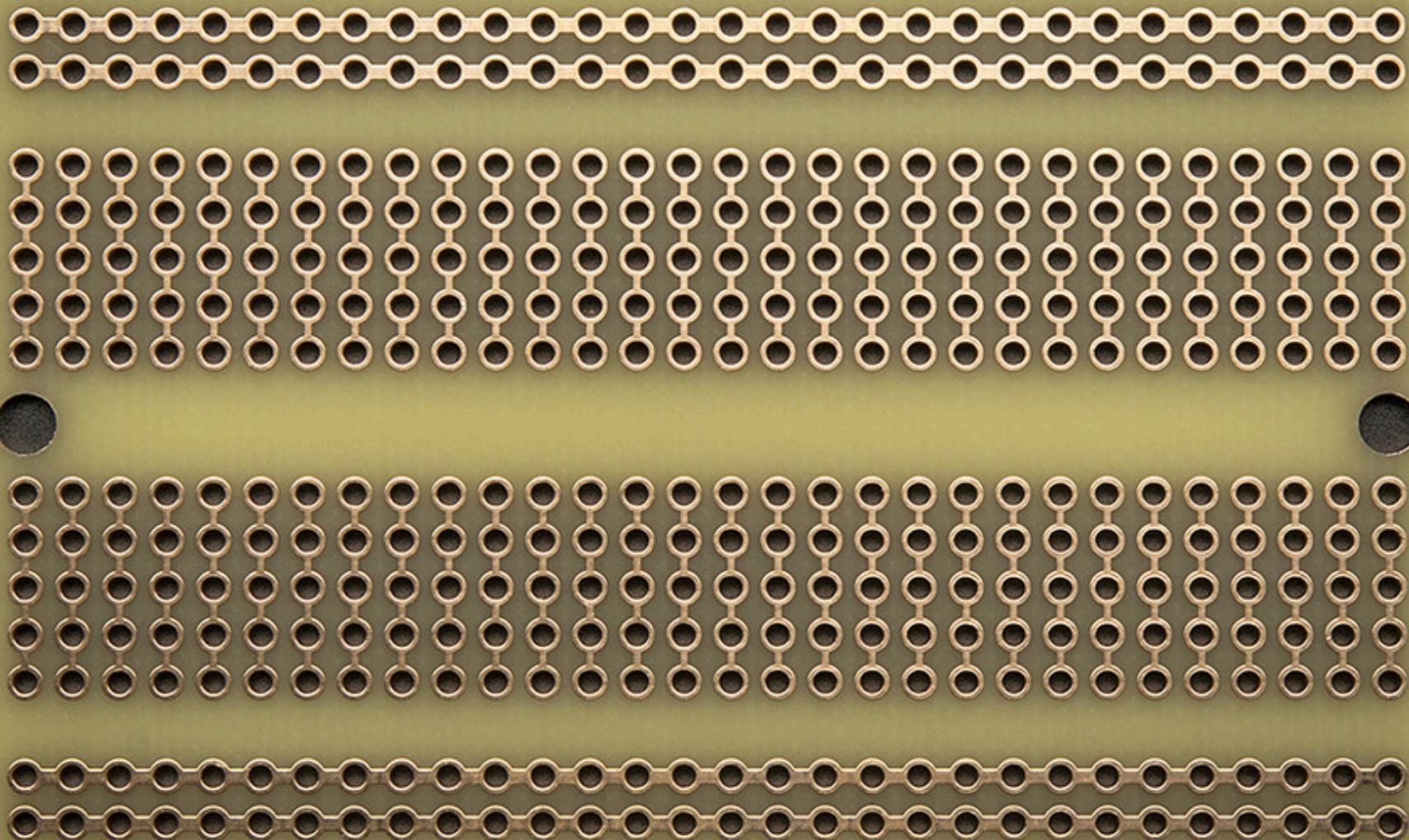
Perforated Board

- Proto Board or Strip Board
 - <https://www.adafruit.com/product/571>
- Plain old Perfboard
 - <http://www.microcenter.com/product/425628/>
[Solder PC Bread Board - 1-1-2 x 1-3-4](#)

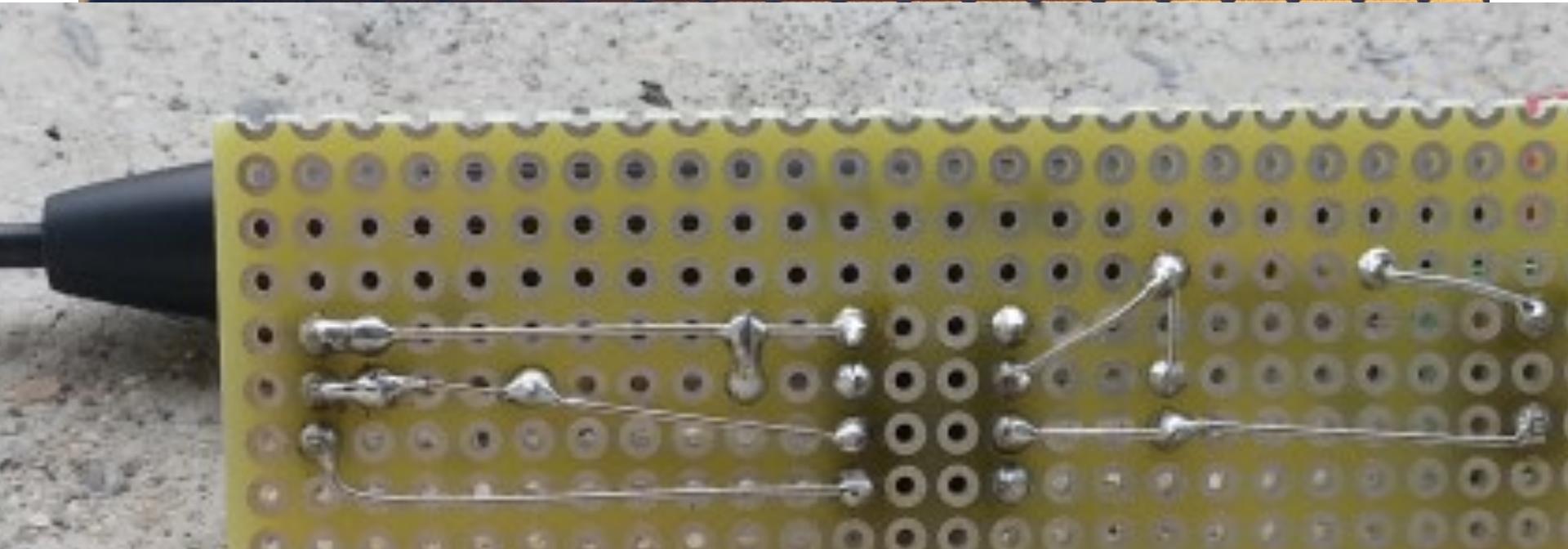
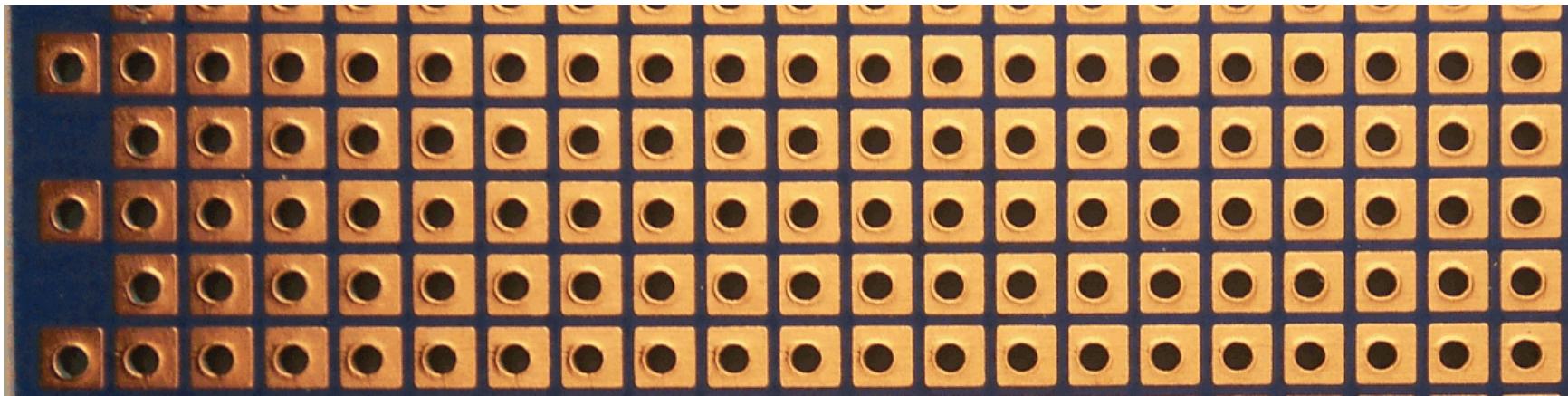


 Adafruit Perma-Proto 1/2 Sized Breadboard





Perf Board



Project box

- You can use anything (card board, plastic ware)
- Maybe get a spare (for everything)

Power options

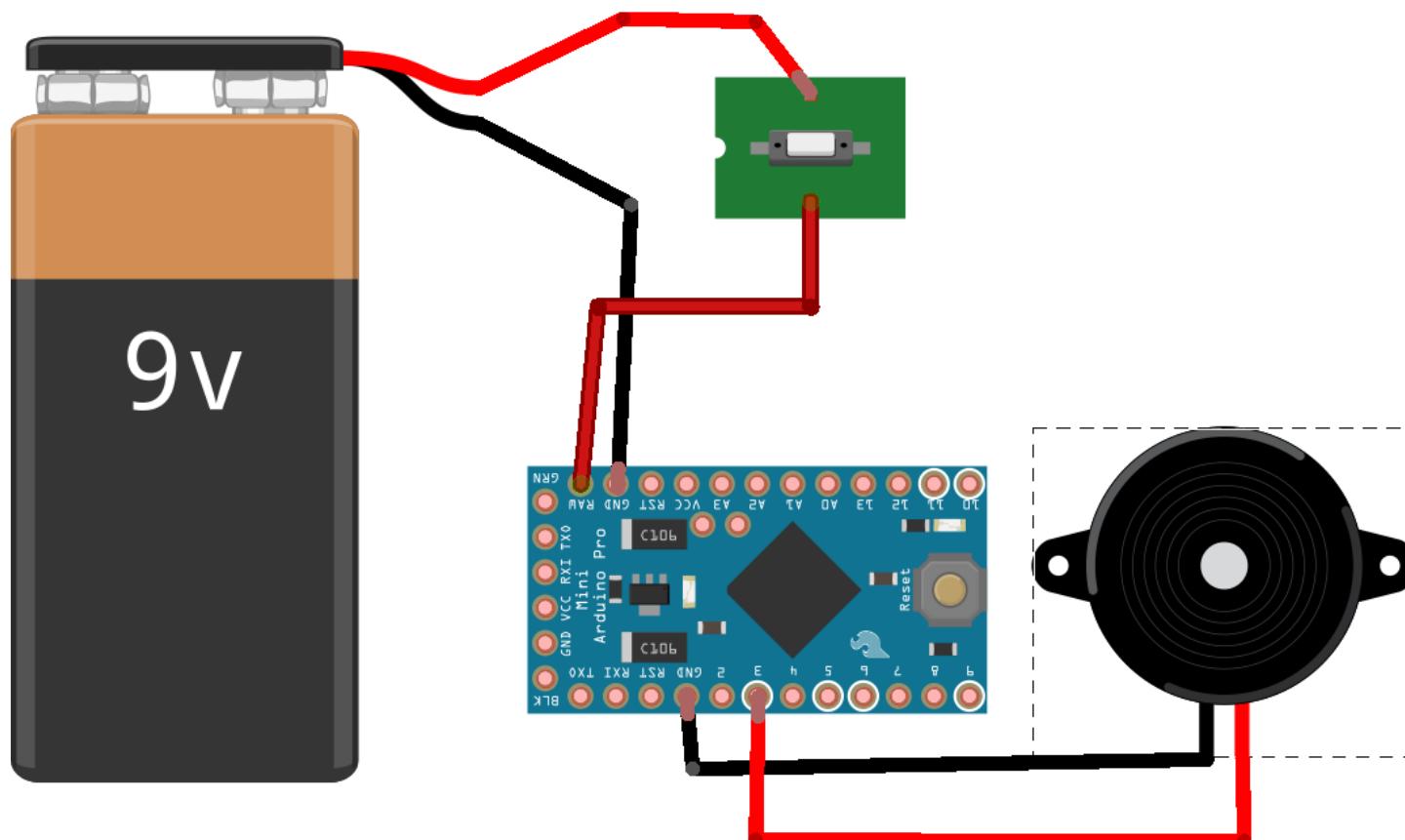
- USB
 - Use old cable for free
 - Cheap 5 volt power
- Battery
 - Recycle a battery holder from an old toy
 - Power management can be tricky
- Wall Wart
 - Power jacks cost money

Fridge Alarm Battery Efficient

- Use the reed switch “Normally Open”

Tiny Fridge Alarm Code

Breadboard Power Saving Fridge Alarm



fritzing

My finished Fridge Alarm Video 1



Finished Fridge Alarm Video 2





Better Music

[http://www.linuxcircle.com/2013/03/31/
playing-mario-bros-tune-with-arduino-and-
piezo-buzzer/](http://www.linuxcircle.com/2013/03/31/playing-mario-bros-tune-with-arduino-and-piezo-buzzer/)

Things I learned

- Hardware is more expensive than Software
- Update your Mac drivers for the USB to Serial interface
- Don't put a power switch on top
- 15 seconds is not long enough of a timeout
- Interrupt the song if the door is closed
- Snooze or Reset switch on top
- Maybe a less nagging melody

Fridge Alarm Ideas

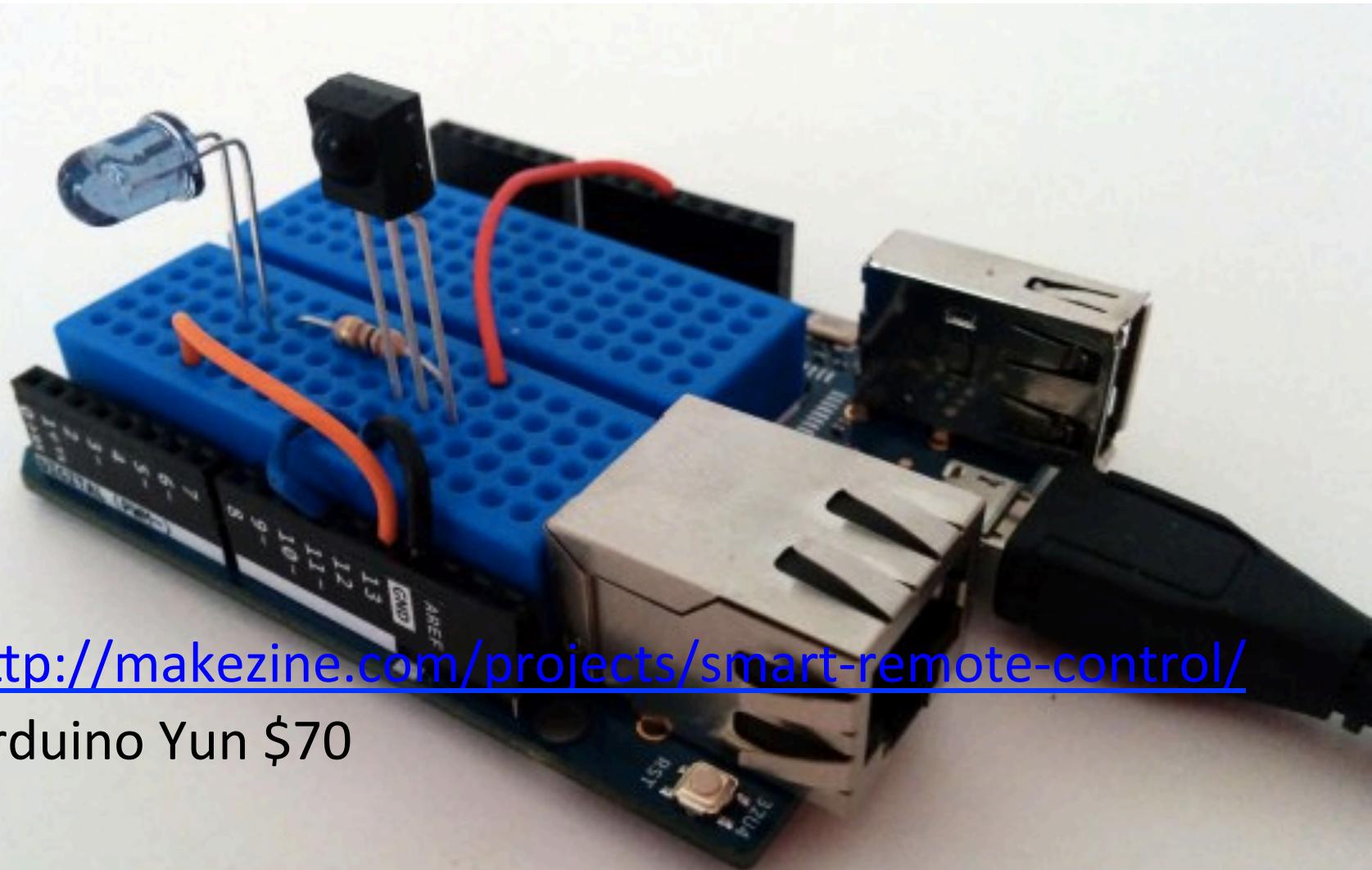
- Send a tweet, email, or web service
- Temperature alarm
- Timeout selector
- Countdown display
- Take a picture by Bobbi Sutliff
- More?

Infrared Remote





Yun Remote Control Project



- <http://makezine.com/projects/smart-remote-control/>
- Arduino Yun \$70

First Remote Project

- Church Pan Tilt camera head remote
- Video Camera zoom remote

Pan Tilt Zoom Remote two remote problem



Pan Tilt Zoom Remote Demo Video 1



Pan Tilt Zoom Remote Demo Video 2



IR Libraries

- Use the one that works for you
- IRremote
 - Ken Shirriff
 - older
 - <https://github.com/shirriff/Arduino-IRremote>
- IRLib
 - Chris Young
 - Rewrite of IRRemote
 - <https://github.com/cyborg5/IRLib>

Infrared Frequency

- Hues of Infrared
 - 850nm
 - 940nm
 - 950nm

Arduino Remote Phase One

- Get Codes!

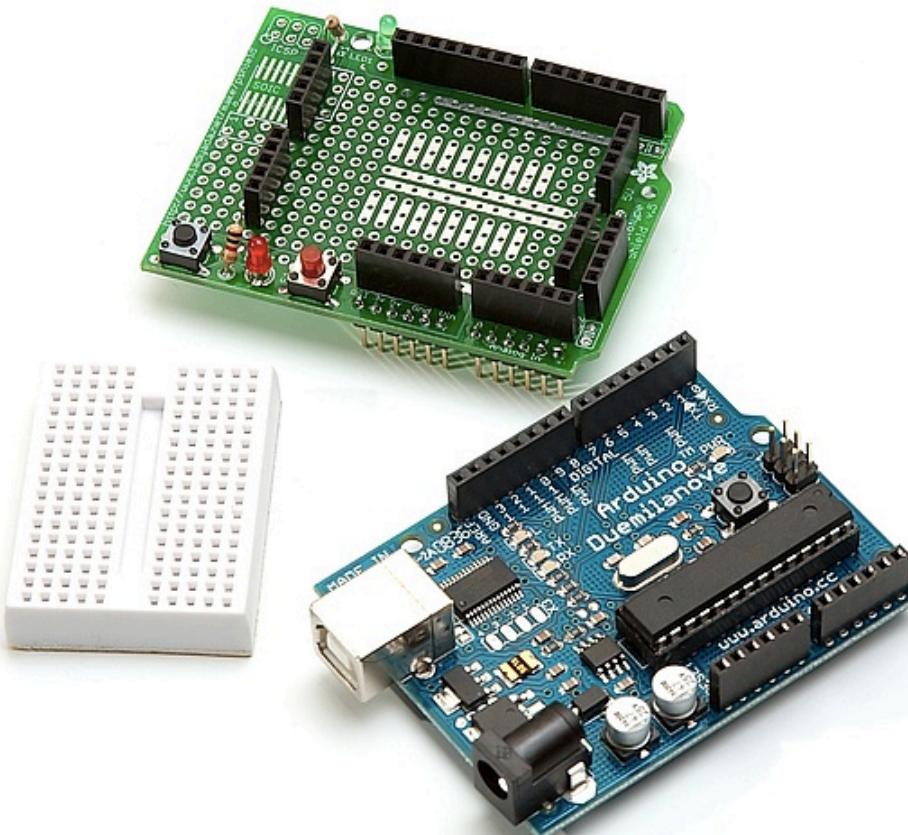
IR Remote Decoder Parts

- Arduino
- IR receiver
 - <http://www.radioshack.com/product/index.jsp?productId=2049727>
 - <https://www.sparkfun.com/products/10266>
- IR LED
 - <http://www.radioshack.com/product/index.jsp?productId=2062565>
- Switch
- 1.0Meg Ohm resistor
- 220 ohm resistor

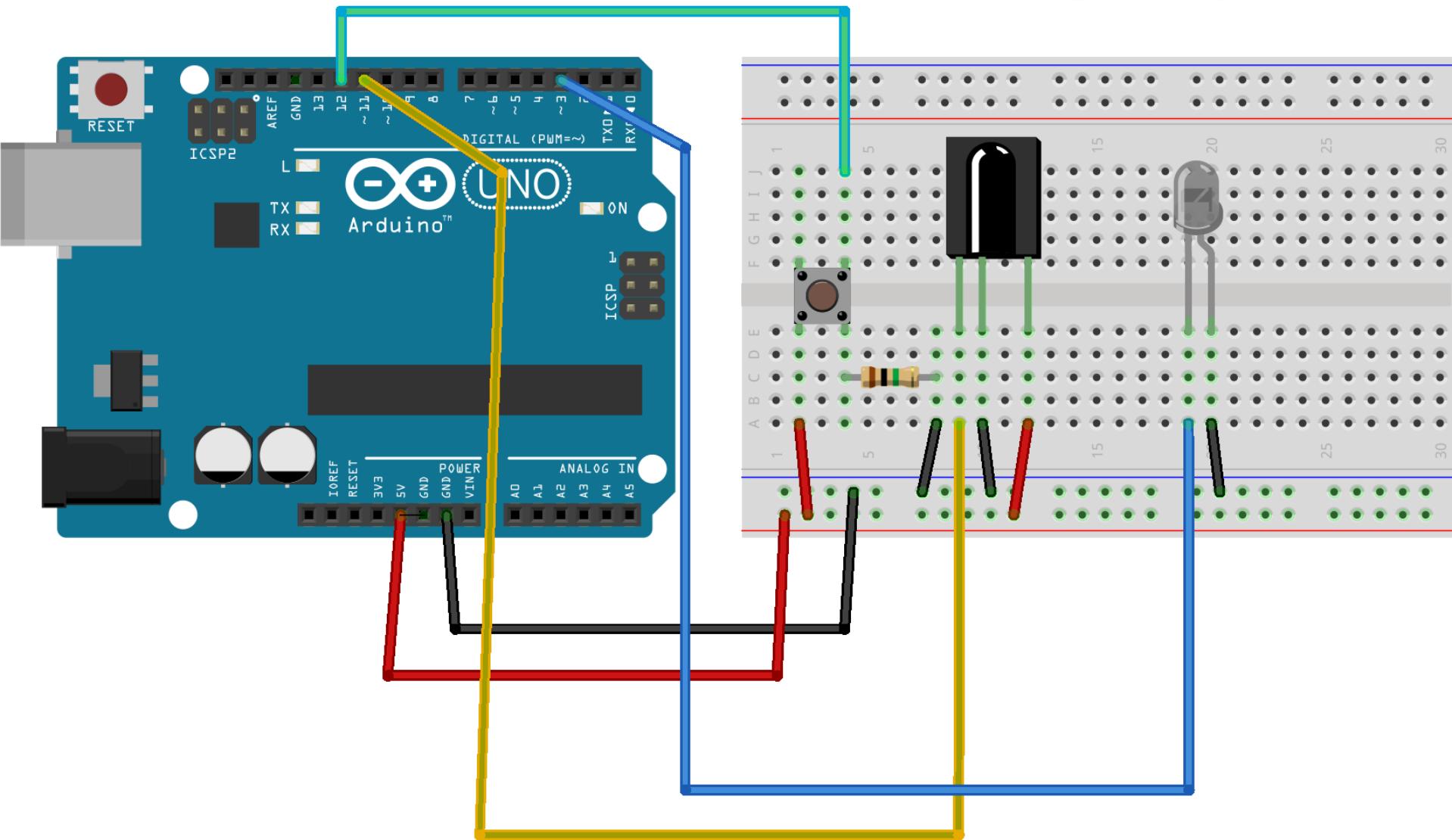
IRremote Decoder Example

- [https://github.com/shirriff/Arduino-IRremote/
blob/master/examples/IRrecord/IRrecord.ino](https://github.com/shirriff/Arduino-IRremote/blob/master/examples/IRrecord/IRrecord.ino)

Proto Shield



IR Decoder Demo



If the IR Code Does not work!

- Try the other IR Library
- Try one of the other IR frequency
- And get rid of your VCR

Arduino Remote Phase Two

Make The Remote

Arduino Remote Plan

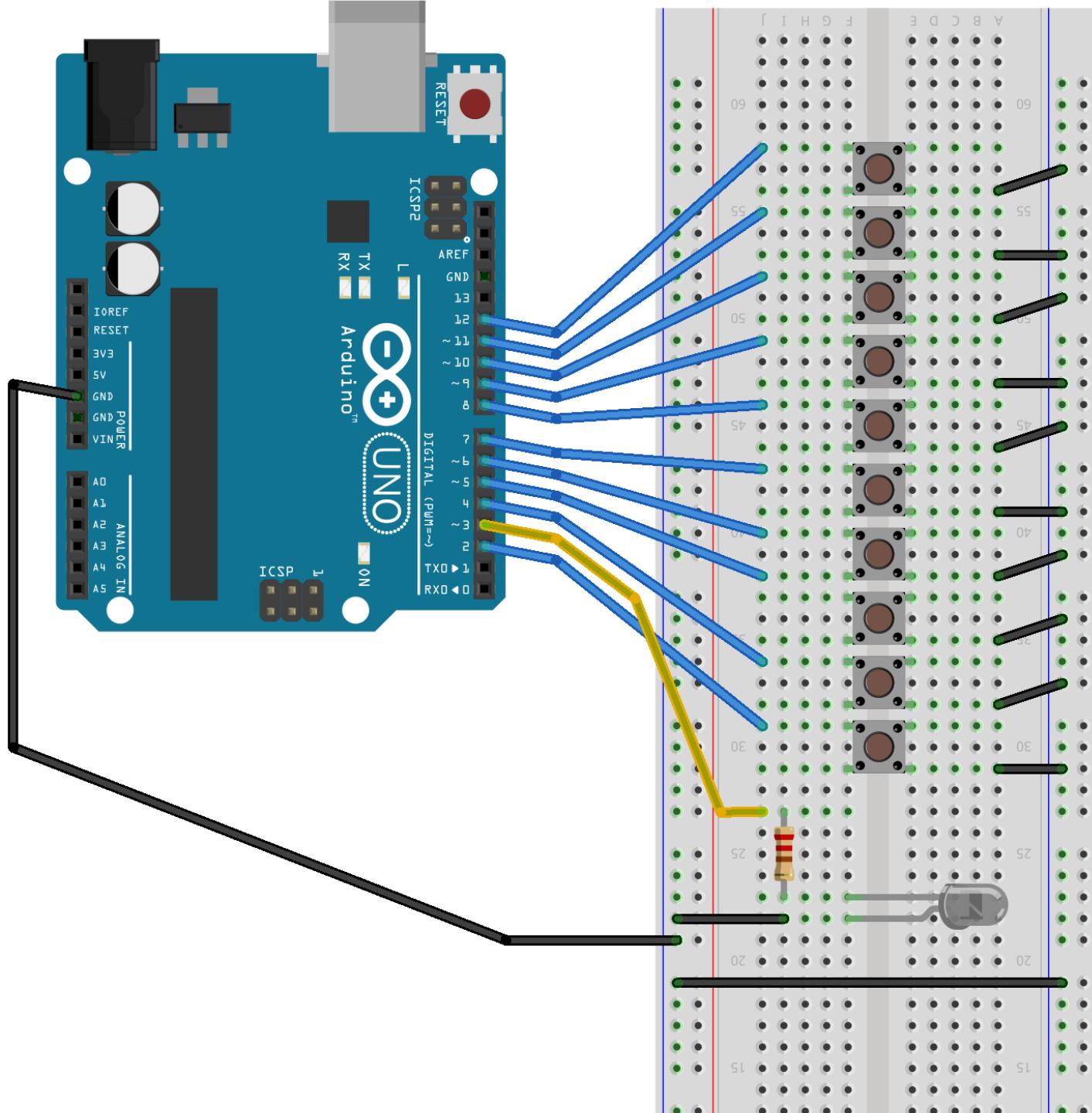
- Breadboard
 - Software
 - Hardware

IR Remote Code

https://github.com/Jonathan75/IR_Remote/

Arduino Remote Parts

- Arduino
- IR LED
 - 220 Ohm resistor
- Bunch More Switches



Arduino Remote Code

- To the ~~Bat Cave~~ IDE

Things I learned

- Do not write to Serial port too fast or you may be unable to upload a new program
- Do check the specs for your parts
- Pull down switches are bad
- Debug lights are very helpful

Remote Ideas

- Find a non volatile memory for storing IR codes
- Create an online network of IR code exchanges
- Use shift register 74HC595 to expand button options
- Raspberry Pi controlled via Smart Phone
- More?

My Picks

- YouTube
 - The Ben Heck Show
 - Adafruit
 - Sparkfun
 - Make

Thanks!

Jonathan Stevens



@Jonathan75



<https://github.com/Jonathan75>

Special Thanks to

Christopher Tenaglia

Nick Hunter