EAA 690
RFID Door Lock

6/18/2015 - Brian Michael

Overview

- How it all started
- Hardware that is used
- Where the hardware can be obtained
- The software for each of the various components.
- Path to current iteration
- What is left to be implemented.

How it all started

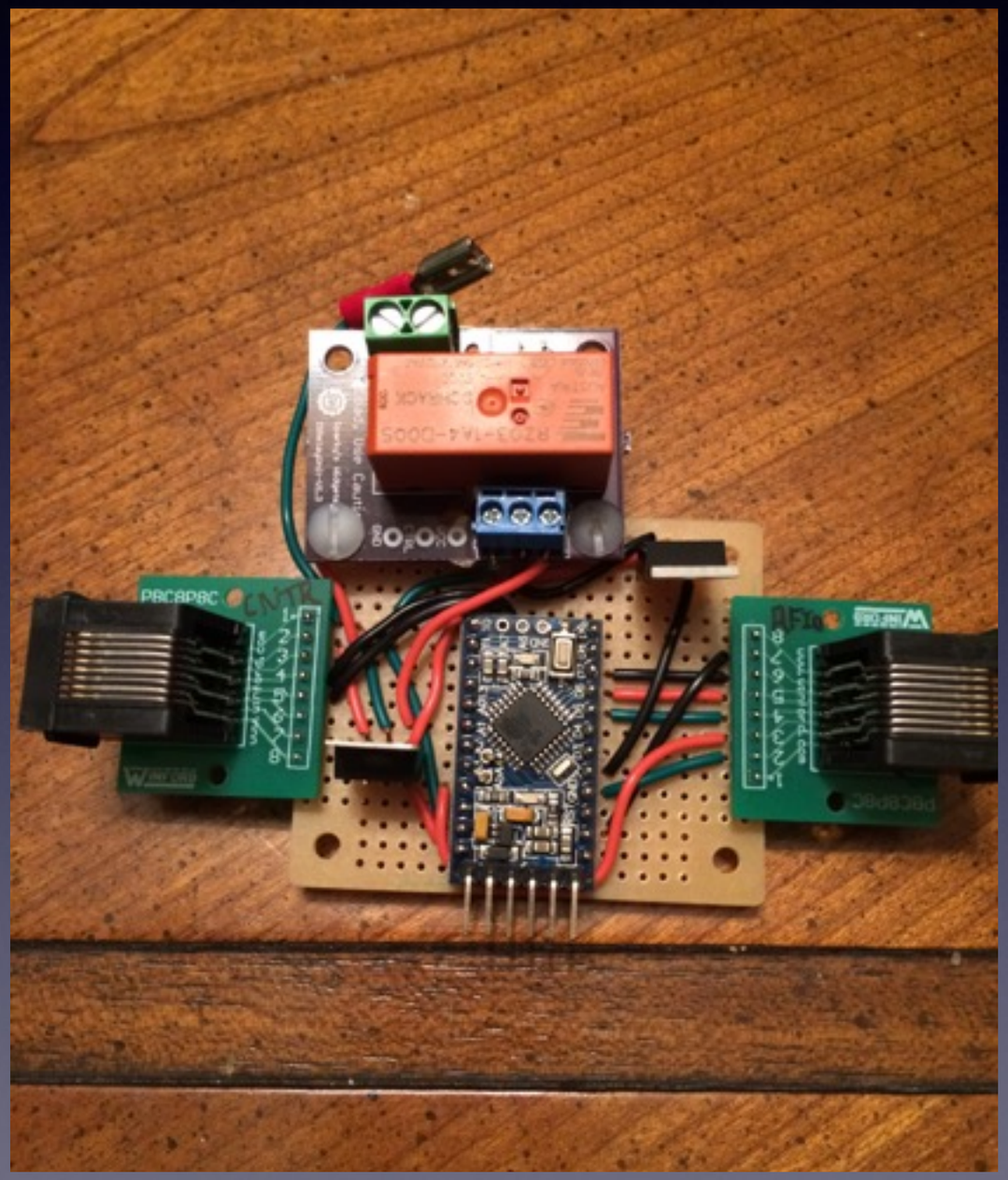
- Lots of outstanding keys
- Ease of use
- Potential for tracking down hangar abuse
- Key doubles as a chapter membership card
- I wanted to learn about micro controllers

Path to Current Iteration

- LCD Display
- Temperature sensor (TMP36)
- WiFi Shield
- Single contoller/door logic

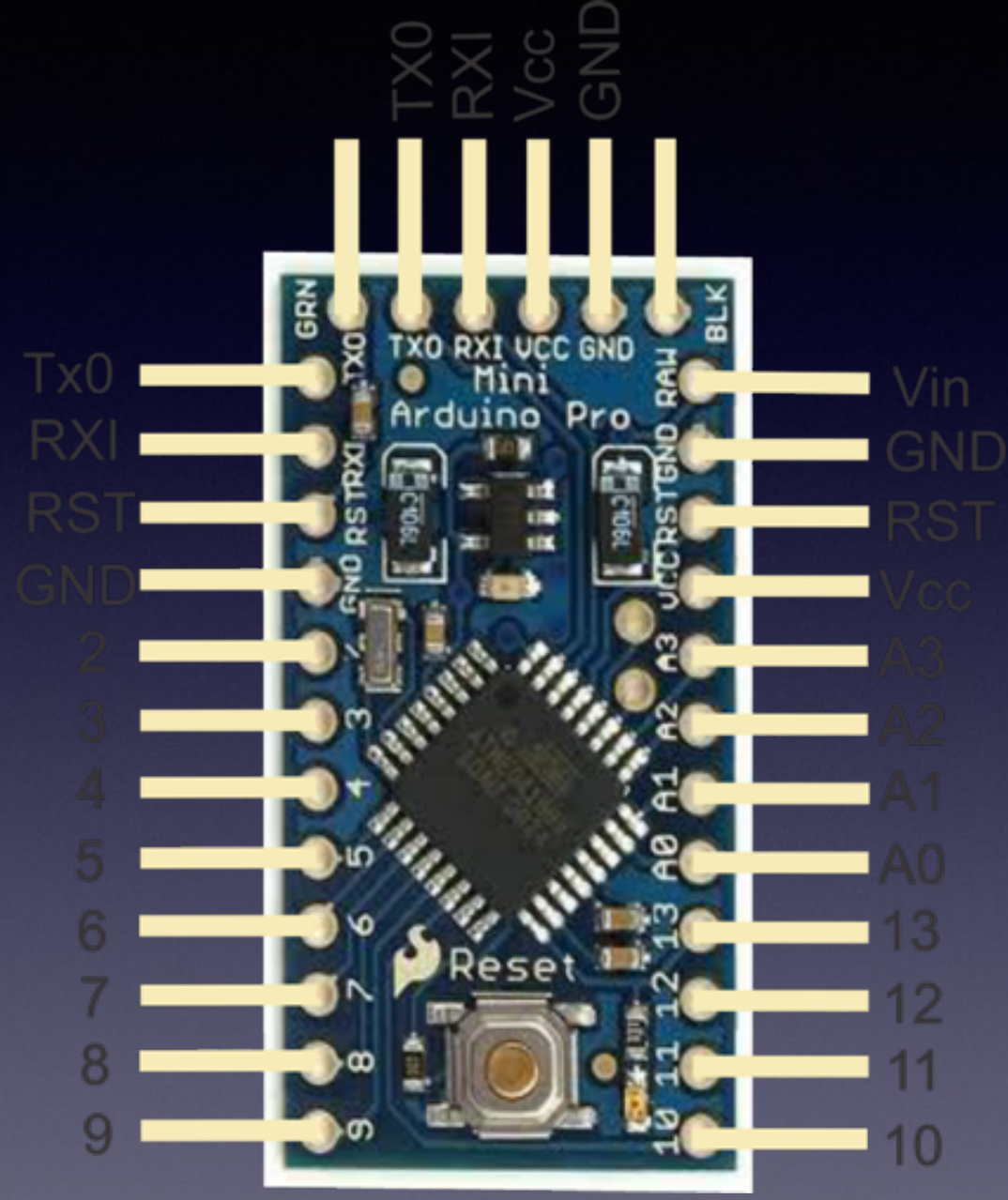
Hardware (Door Inside)

- Arduino Pro Mini 328 - 5V/ 16MHz
- LM7805
- TIP31AG
- RJ45 Jack
- Relay



Arduino Pro Mini Pinout

http://
www.engineersgarage.com/
electronic-components/
arduino-pro-mini-pinout#

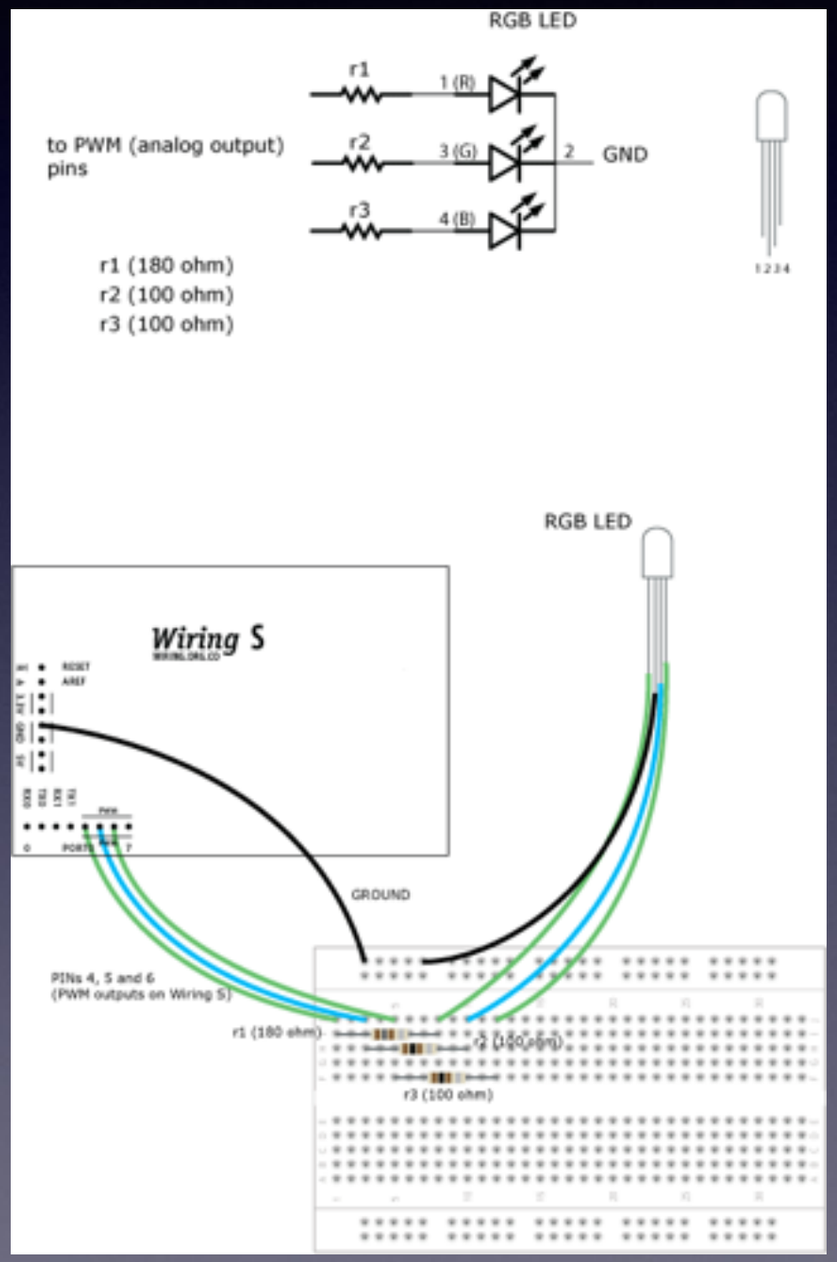


Hardware (Door Outside)

- RFID Reader ID-12LA (125 kHz)
- RFID Reader Breakout
- LED - RGB Clear Common Cathode
- Resistors
- RJ45 Jack

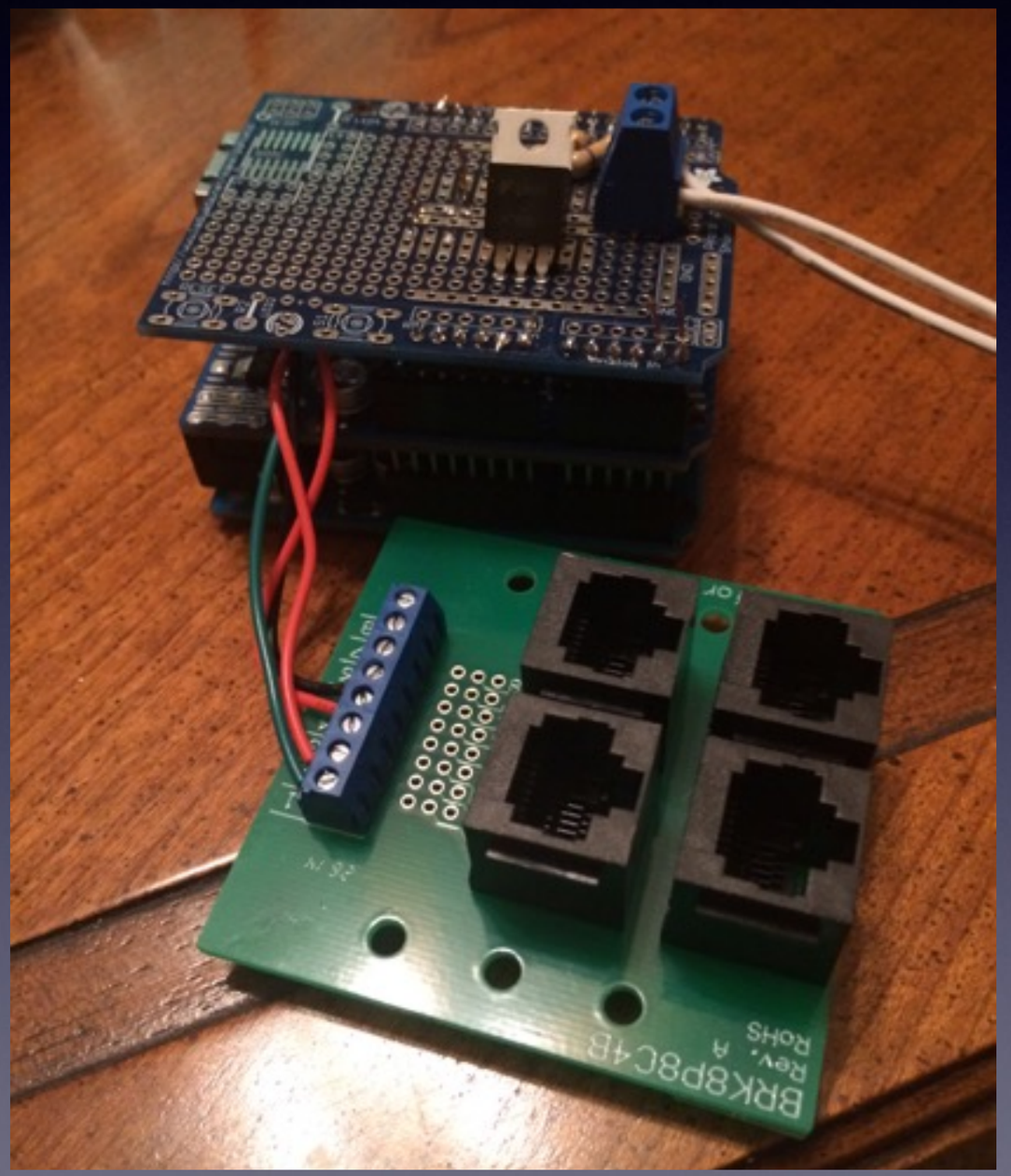
LED Wiring

- http://wiring.org.co/learning/basics/rgbled.html



Hardware (Controller)

- Arduino UNO R3
- Arduino Ethernet Shield
- LM7805
- Resistors
- RJ45 Breakout Board



Hardware (Programmer)

- Arduino UNO R3
- Raspberry Pi
- RFID Reader

Hardware (sources)

- Arduino Pro Mini [$10; http://www.microcenter.com/product/431996/Arduino_Pro_Mini_Board]
- Arduino UNO [$25; http://www.microcenter.com/product/416549/Arduino_Uno_SMD_Rev_3]
- Arduino Ethernet Shield [$45; http://www.adafruit.com/products/201]
- RFID Reader ID-12LA (125 kHz) [$30; https://www.sparkfun.com/products/11827]
- RFID Reader Breakout [$2; https://www.sparkfun.com/products/13030]
- LED [$2; https://www.sparkfun.com/products/105]
- RJ45 breakout board [$18; https://www.winford.com/products/brk8p8c4b.php]
- RJ45 breadboard adapter [$7; https://www.winford.com/products/pbc8p8c.php]
- Relay [$9; https://www.sparkyswidgets.com/product/isrelay/]
- TIP31AG [$0.50; http://www.mouser.com/ProductDetail/ON-Semiconductor/TIP31AG/?qs=sGAEpiMZZMshyDBzk1%2fWi%2fPUgtclNldlGEstToAkcAs%3d]
- LM7805 [$0.50; http://www.mouser.com/ProductDetail/Fairchild-Semiconductor/LM7805CT/?qs=sGAEpiMZZMtdAabcSkQOlwJydEoyhc9b]
- Resistors [$2; http://comingsoon.radioshack.com/search?q=resistors]

Software (Door)

- https://github.com/bsmichael/EAA690_RFID/blob/master/EAA690_Door/EAA690_Door.ino

- Illuminate the tri-color LED as appropriate
- Reset and read the RFID chip
- Send power to the door lock as appropriate

Software (Controller)

- https://github.com/bsmichael/EAA690_RFID/blob/master/EAA690_Controller/EAA690_Controller.ino
- Keep track of time.
- Record access events noting the time each occurs.
- Provide access to event activity upon request.
- Provide the ability to purge access data.
- Maintain (CRUD operations) a database of RFID cards and their validity for a given door.
- Respond to "Door Controller" requests with card accessibility.
- Provide the ability to force a refresh of the database.
- Perform a database refresh on a timed basis.
- Maintain a network connection to the EAA 690 membership database.

Software (Programmer)

- https://github.com/bsmichael/EAA690_RFID/blob/master/EAA690_NewCard/EAA690_NewCard.ino

- https://github.com/bsmichael/EAA690_RFID/tree/master/NewCardApp

- Read RFID card's ID

- Provide RFID value to Raspberry Pi

What Is Left?

- Memory footprint reduction on controller Arduino
- Python application for Raspberry Pi
- Communication with membership database
- Storage of database on SD card
- Log access