Nathan Seidle
SparkFun Electronics

Combos in 45 minutes or less!*

*You know what these mean…


2002

New Products
Top Sellers
SparkFun Originals
Spectacle
Sale
Gift Certificates
Arduino +
Audio
Books
Breakout Boards
Cables +
Components +
Development Tools +
Dings and Dents
Educators
GPS +
Intel® Edison
IoT +
Kits
LCDs +
Prototyping +
Raspberry Pi
Robotics +
Sensors +
SparkX
Swag
Tools +

New Products

See All

PAGE 5 OF 6

SparkFun micro:climate kit
KIT-14217
~~$114.95~~ $54.95

SparkFun micro:arcade kit
KIT-14218
~~$49.95~~ $46.78

SparkFun moto:bit
DEV-14213
~~$14.95~~ $11.18

SparkFun weather:bit
DEV-14214
~~$14.95~~ $10.95

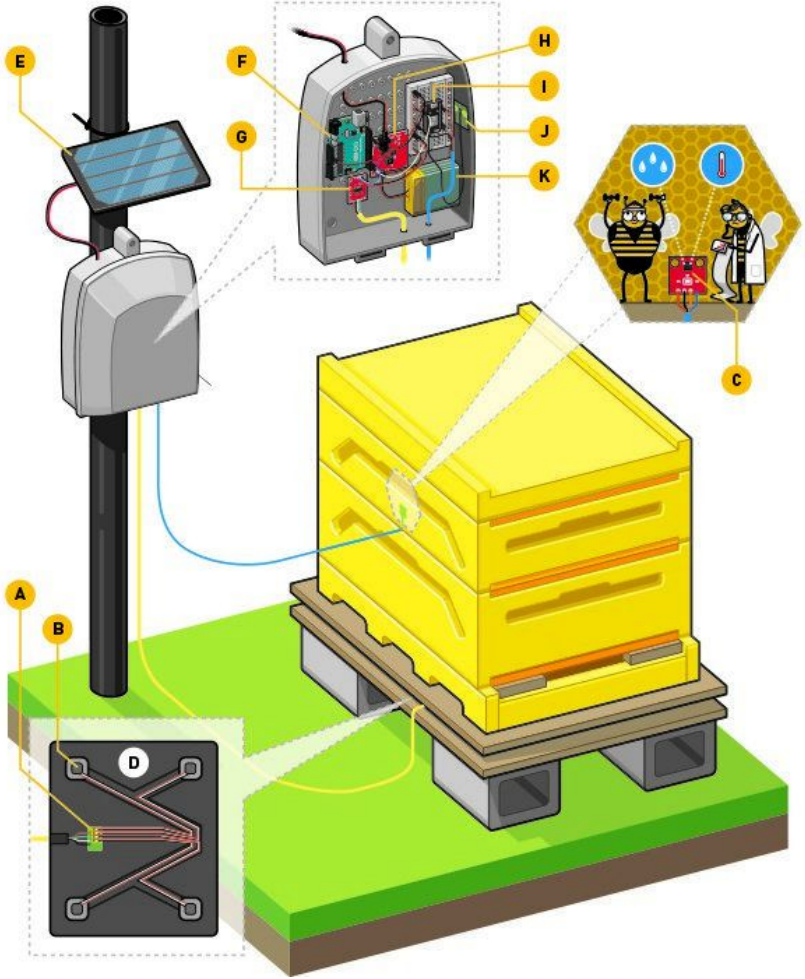
LATEST BLOG POST

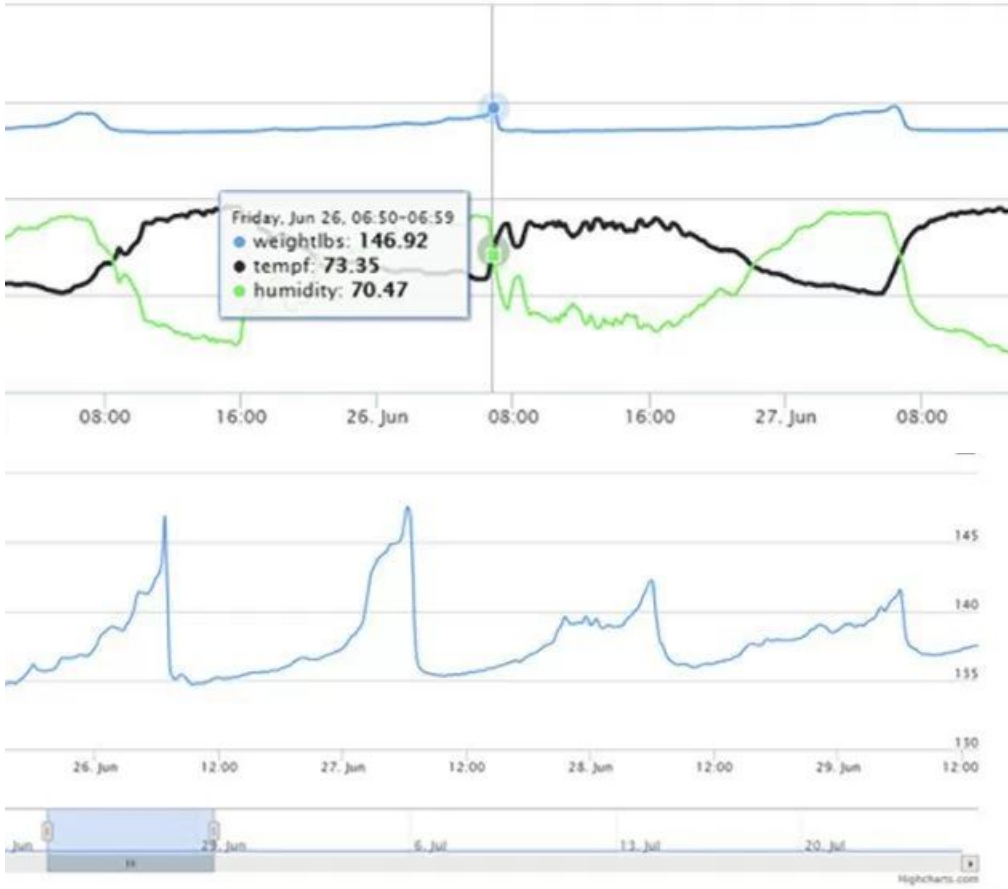
Desk of an Engineer: the Mary Edition


SPEED
LIMIT
15


15
This is the SparkFun Speed Trap. Stand next to the copier and wait for the display to zero out (four seconds). Then proceed at normal walking pace towards the sensor. The max starting range is around where the copier is located.
How does it work? The Speed Trap uses a laser distance sensor to determine distance. The PulsedLight LIDAR sensor emits an invisible infrared laser and times how long it takes for the light to return. The change in distance over time is velocity. If we know you moved 200cm in 1 second that equates to 4.5 miles per hour!
Be careful! Please don't run into the wall or the sign.


RINGSIDE
THE BEST IN BOXING
RINGSIDE
RINGSIDE


E
F
G
H
I
J
K
C
A
B
D

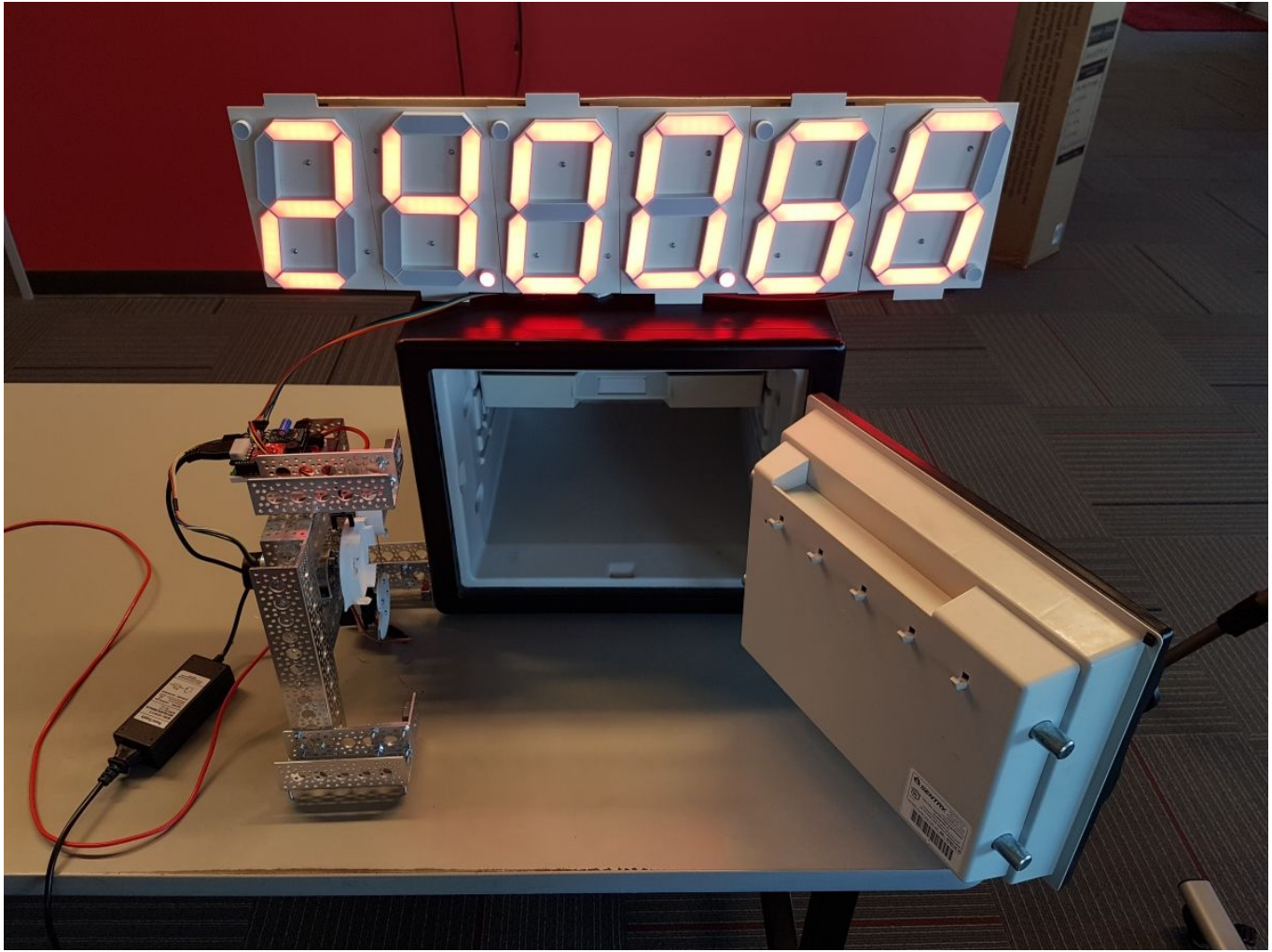

Friday, Jun 26, 06:50-06:59
weightlbs: 146.92
tempf: 73.35
humidity: 70.47
08:00
16:00
26. Jun
08:00
16:00
27. Jun
08:00
145
140
135
130
26. Jun
12:00
27. Jun
12:00
28. Jun
12:00
29. Jun
12:00
Jun
29. Jun
6. Jul
13. Jul
20. Jul
Highcharts.com


216

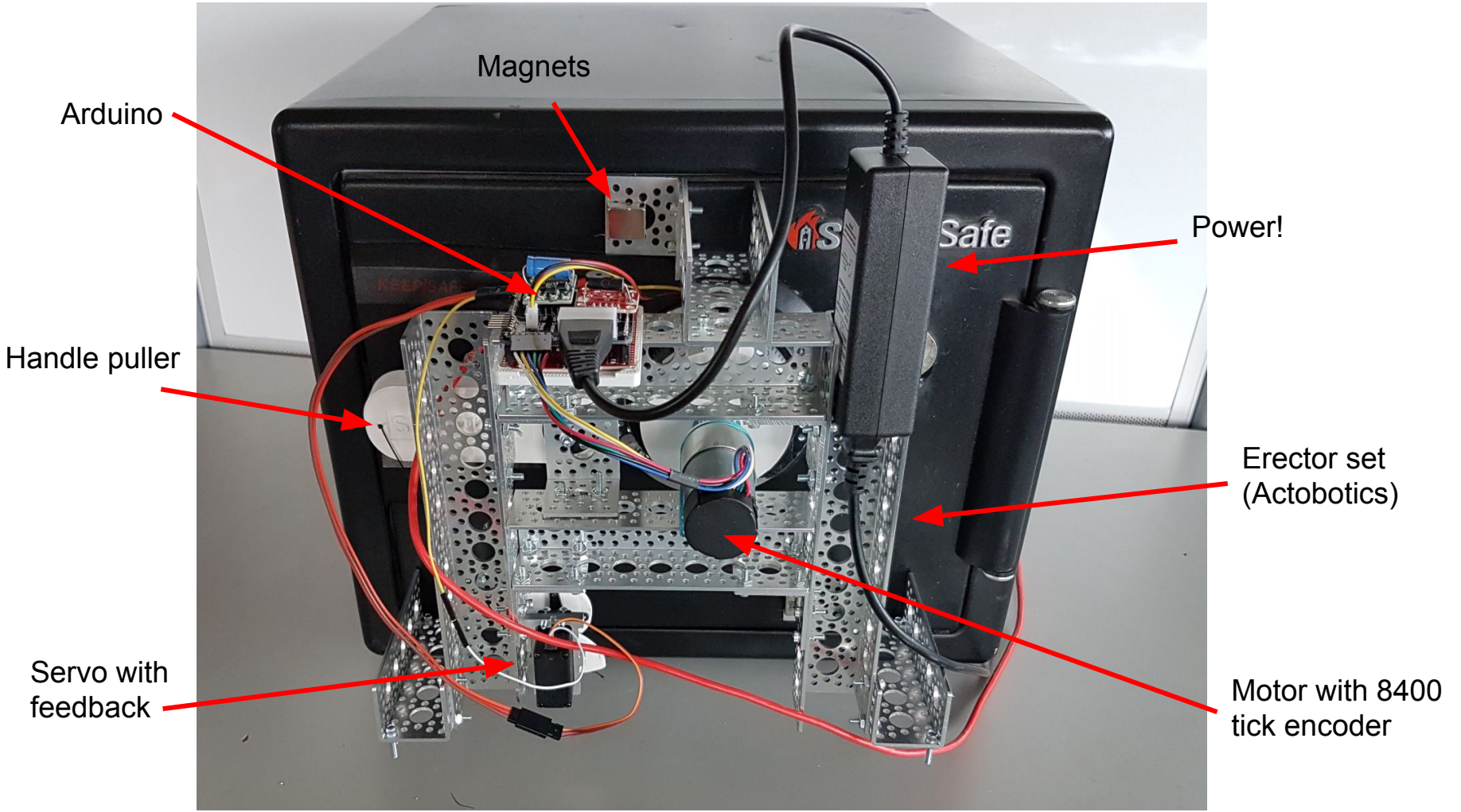

216

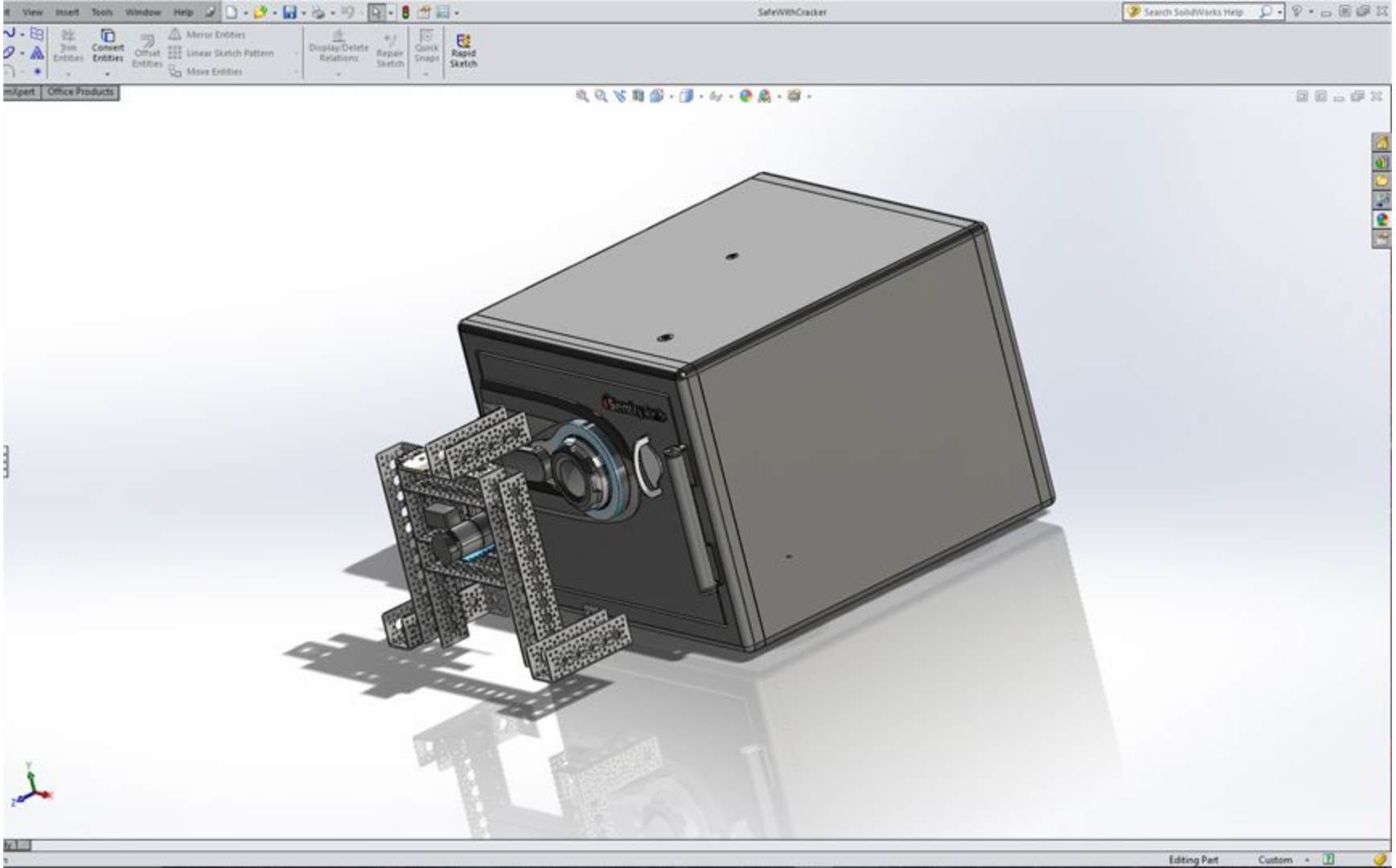

SentrySafe

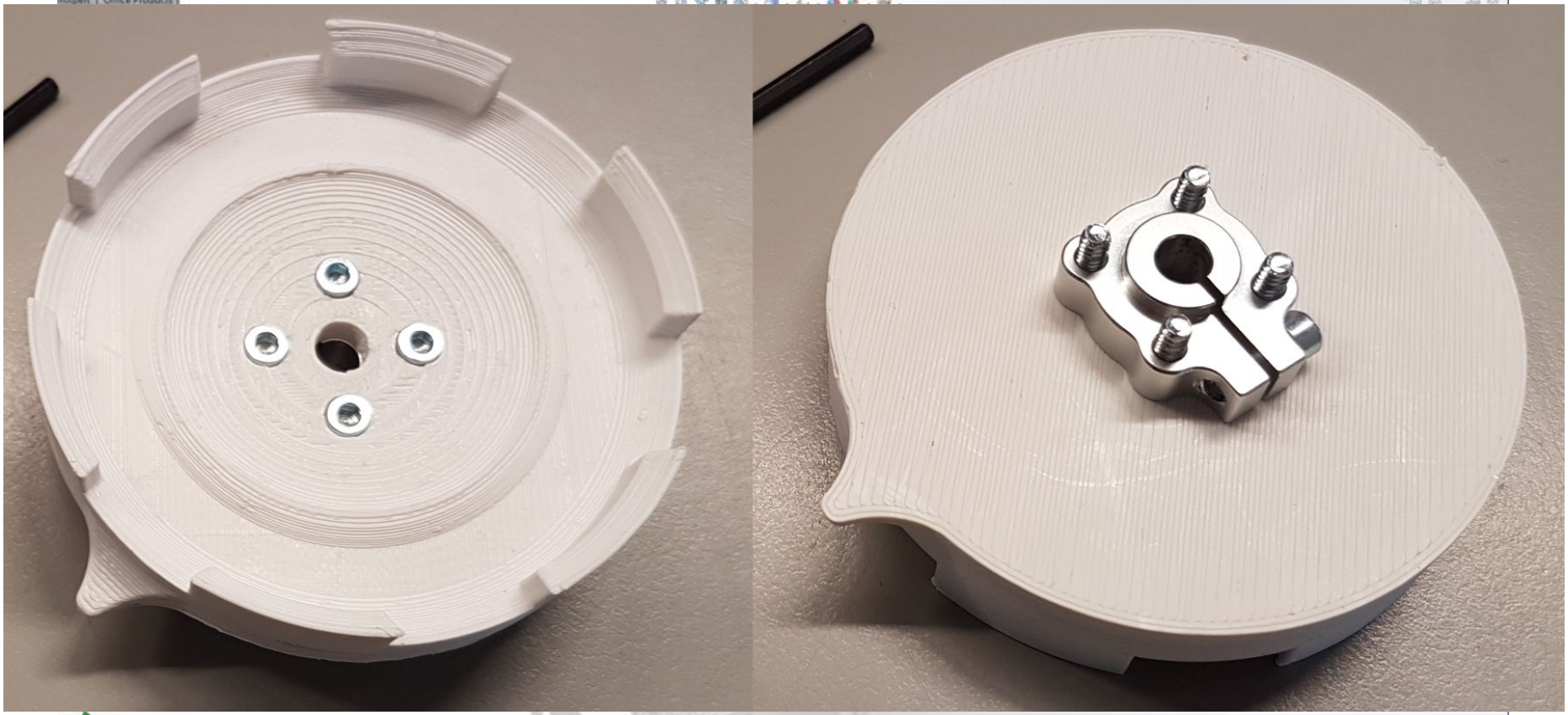

CENTURION

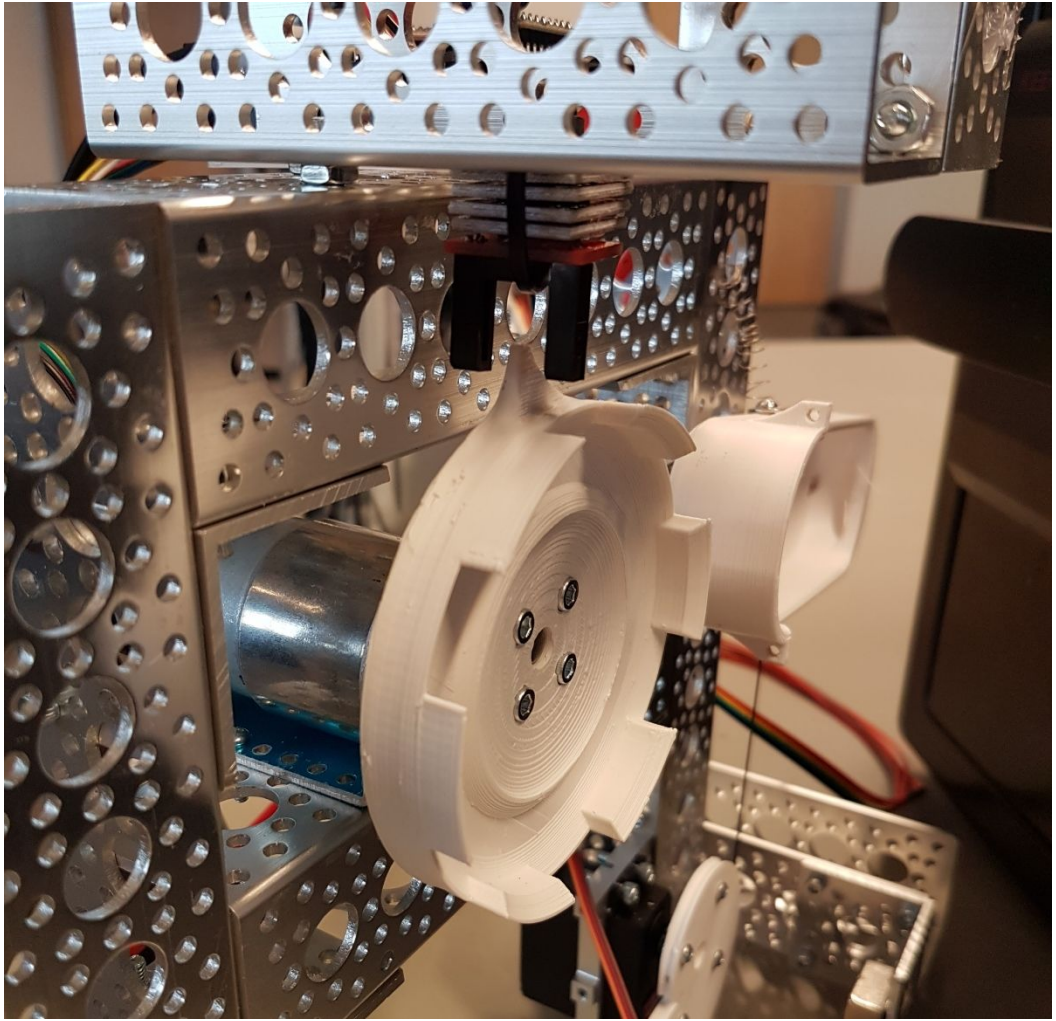

24.08.88

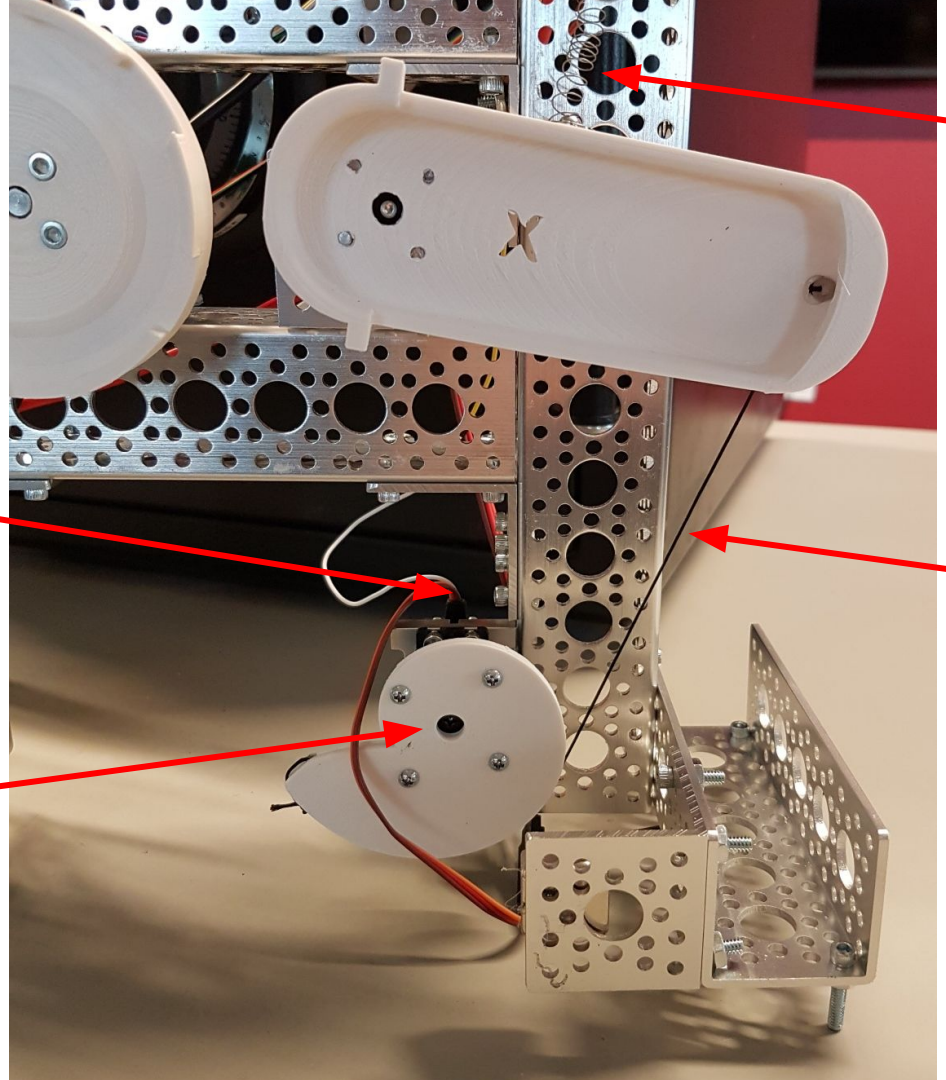
Animation:
How combination safe works

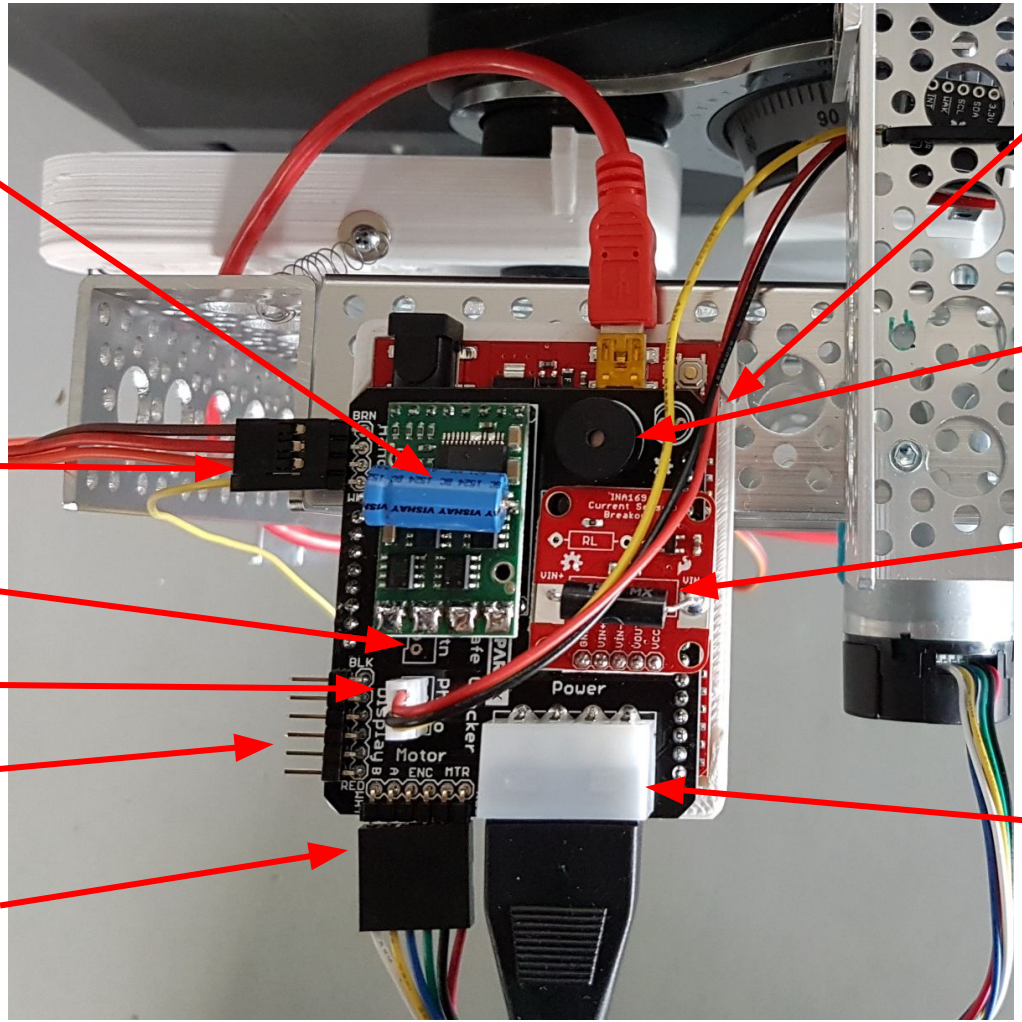

Magnets
Arduino
Power!
Handle puller
Erector set
(Actobotics)
Servo with
feedback
Motor with 8400
tick encoder

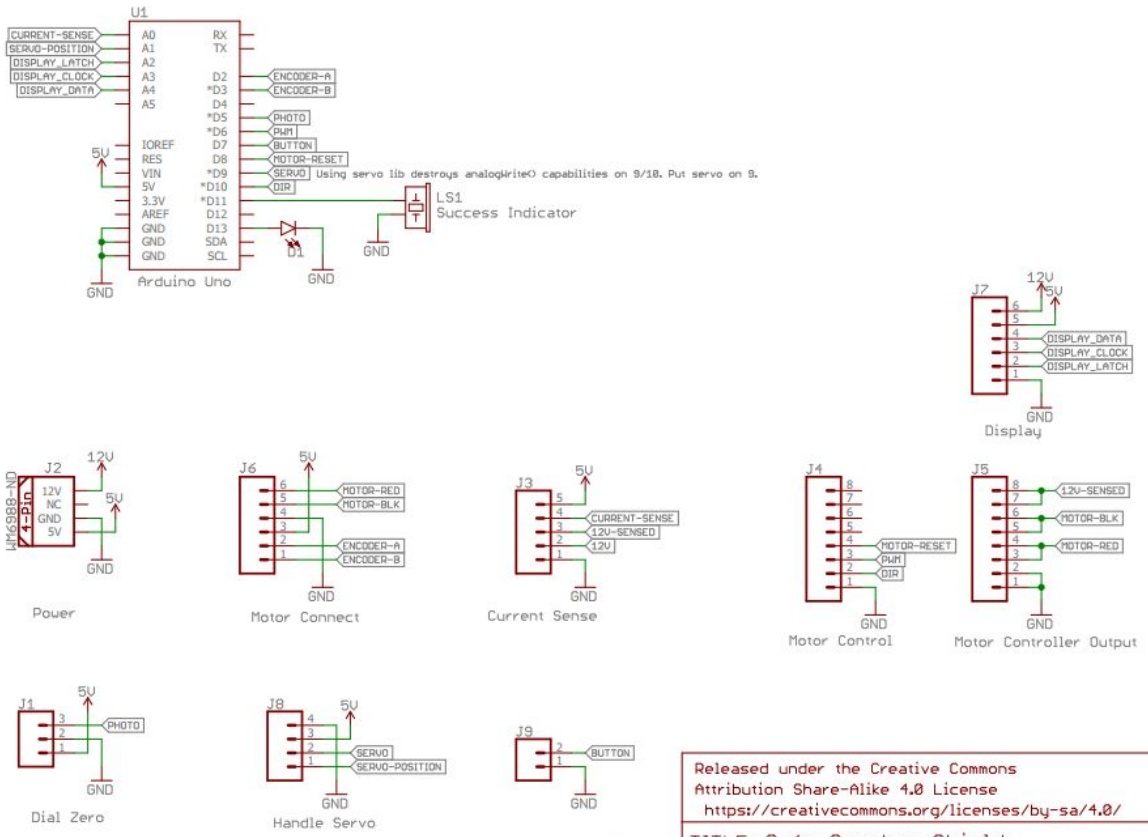

View
Insert
Tools
Window
Help
SafeWithCracker
Search SolidWorks Help
Convert Entities
Offset Entities
Mirror Entities
Linear Sketch Pattern
Move Entities
Display/Delete Relations
Repair Sketch
Quick Snaps
Rapid Sketch
Office Products
Editing Part
Custom






‘Come back here’ spring
Standard servo with analog feedback hack
Very fancy string
The super freaking amazing nautilus gear that made this all work


Motor Driver
Servo and feedback
Go! Btn
‘Home’ Photogate
Display
Motor control and feedback
RedBoard = Arduino
Beep!
~~Current Sensor~~
12V External Hard Drive Power Supply
Power
Motor
ENC MTR



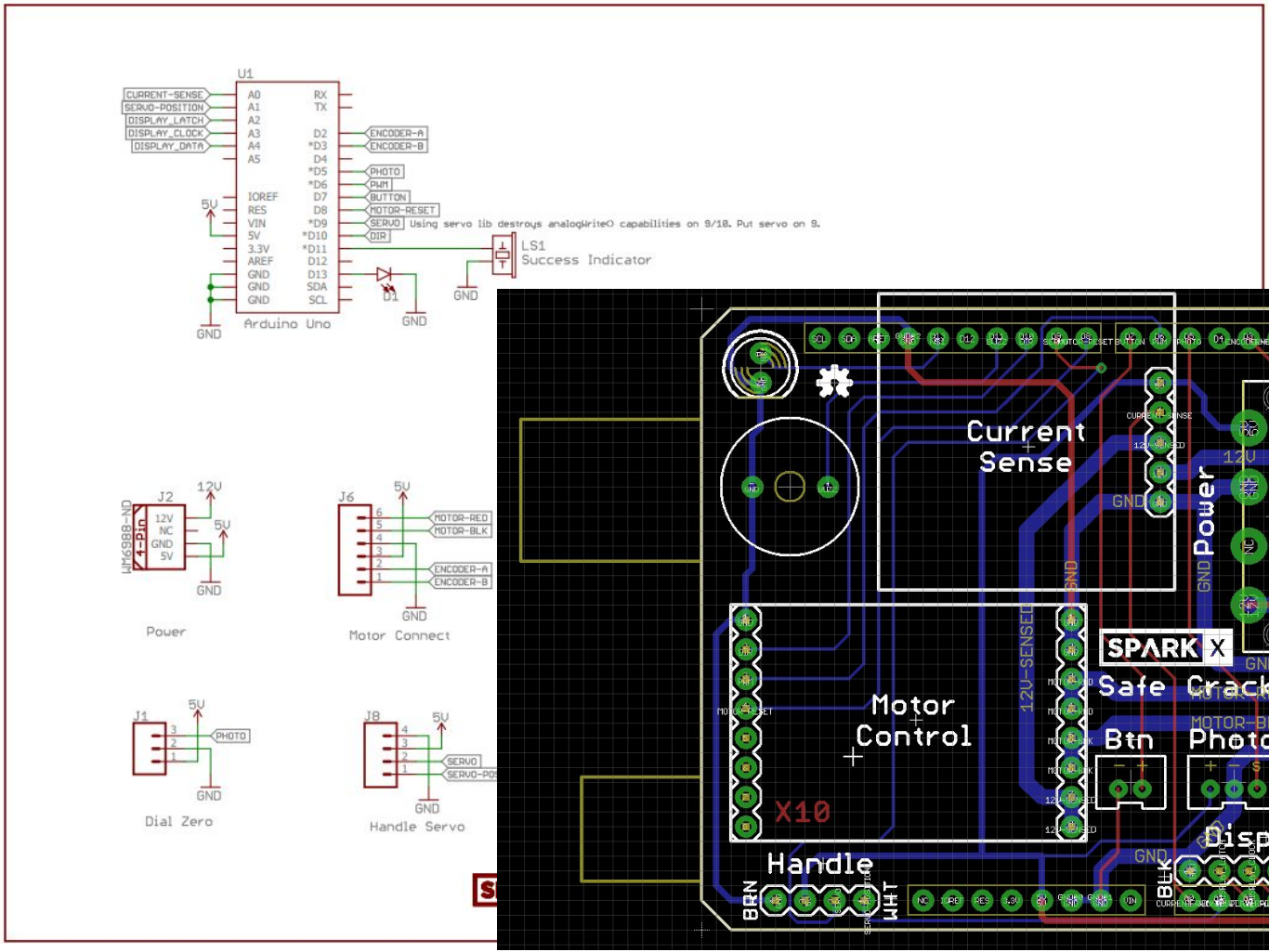
TITLE: Safe Cracker Shield

Design by: N. Seidle

REV: X10

Date: 3/28/2017 8:23 AM

Sheet: 1/1


U1
CURRENT-SENSE
SERVO-POSITION
DISPLAY_LATCH
DISPLAY_CLOCK
DISPLAY_DATA
A0
A1
A2
A3
A4
A5
IOREF
RES
VIN
5V
3.3V
AREF
GND
GND
GND
RX
TX
D2
*D3
D4
*D5
*D6
D7
D8
*D9
*D10
*D11
D12
D13
SDA
SCL
ENCODER-A
ENCODER-B
PHOTO
PWM
BUTTON
MOTOR-RESET
SERVO
DIR
Using servo lib destroys analogWrite() capabilities on 9/10. Put servo on 9.
LS1
Success Indicator
D1
5V
GND
GND
GND
Arduino Uno
J2
WM6988-ND
4-Pin
12V
NC
GND
5V
12V
5V
GND
Power
J6
5V
MOTOR-RED
MOTOR-BLK
ENCODER-A
ENCODER-B
GND
Motor Connect
J1
5V
PHOTO
GND
Dial Zero
J8
5V
SERVO
SERVO-PO
GND
Handle Servo
Current
Sense
GND
Power
12V
GND
12V
INSERT
SPARK X
Safe Cracker
Motor
Control
12V-SENSED
X10
Btn
Photo
MOTOR-BLK
Motor
ENC
MTR
RED
GND
Display
Handle
BRN
WHT
BLK
RED
WHT

Problem Domain:

- 100^3 combinations
- 10 seconds per test
- 115 days (worst case)

Combinations:

100^3 combinations

Exploits

Combinations:

~~**100^3 combinations**~~

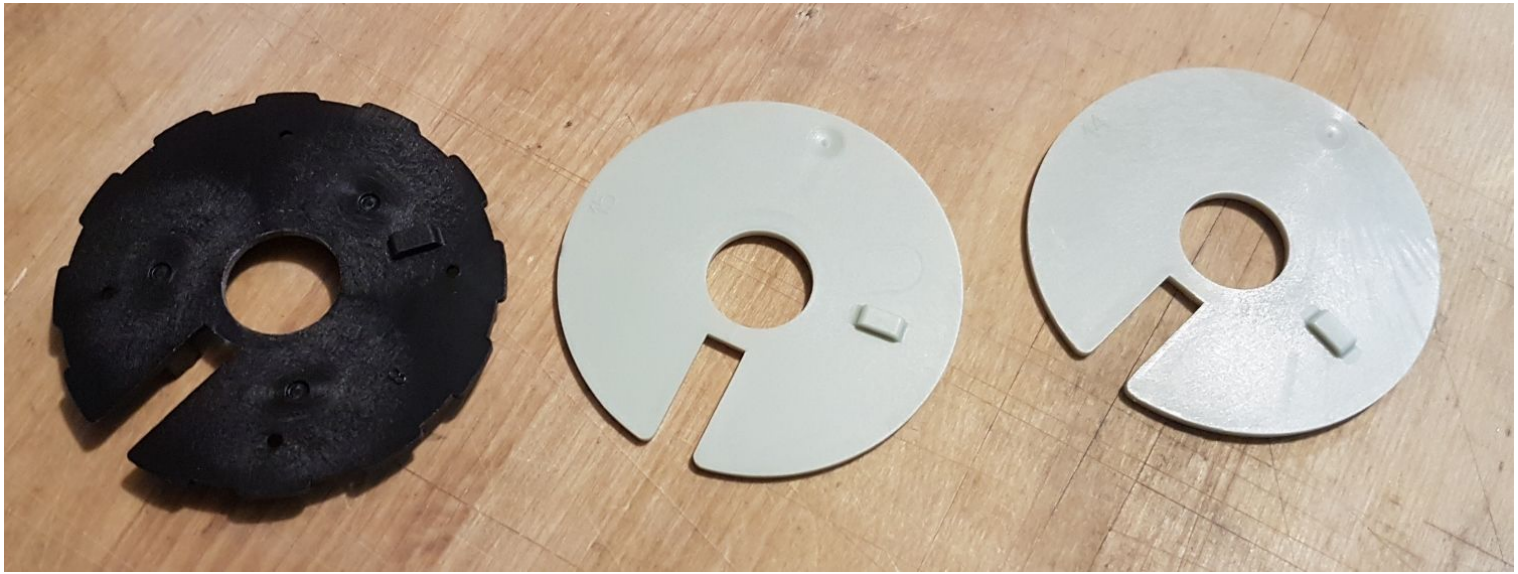
33^3 combinations = 4.15 days

Exploits

Combinations:

- ~~100^3 combinations~~
- ~~33^3 combinations = 4.15 days~~
- Disc C has 12 indents
- $33^2 * 12 = 1.5$ days

Exploits



Exploits

Disc C:

- Outer diameter: 2.815” (55.5mm)
- Width of solution slot: 0.239”
- Width of 11 indents: 0.249” +/- 0.002”

17.69” (Circumference) / 8400 ticks

0.0021” / tick

~5 ticks smaller

Exploits

Combinations:

~~100^3 combinations~~

~~33^3 combinations = 4.15 days~~

~~Disc C has 12 indents~~

~~$33^2 * 12 = 1.5$ days~~

Disc C has a skinny indent

$33^2 * 1 = 3$ hours

Exploits

Test Time:

Resetting Dials = 10s / test

Exploits

Test Time:

- ~~**Resetting Dials = 10s / test**~~
- **‘Set testing’ = 4s / test**
- **1.2 hours**

Exploits

Test Time:

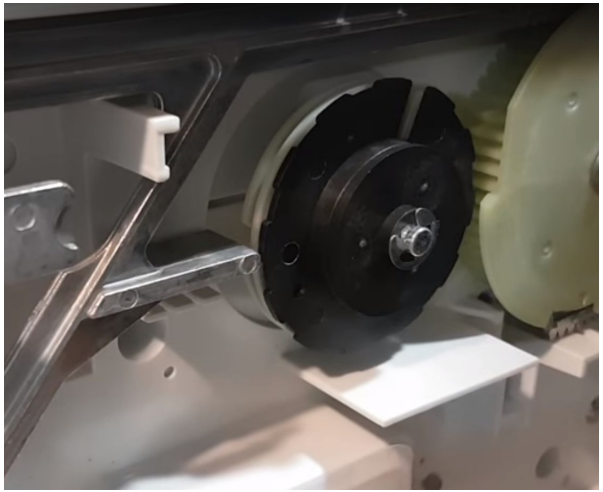
- ~~**Resetting Dials = 10s / test**~~
- **‘Set testing’ = 4s / test**
- ~~**1.2 hours**~~
- **45 minutes!**

~~**Exploits**~~ **Luck**

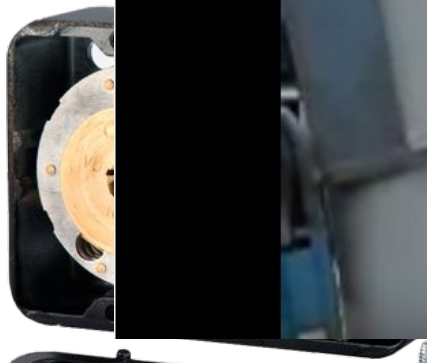
Animation:
How Set Testing Works

How do I protect myself!?

One of these is not like the others...



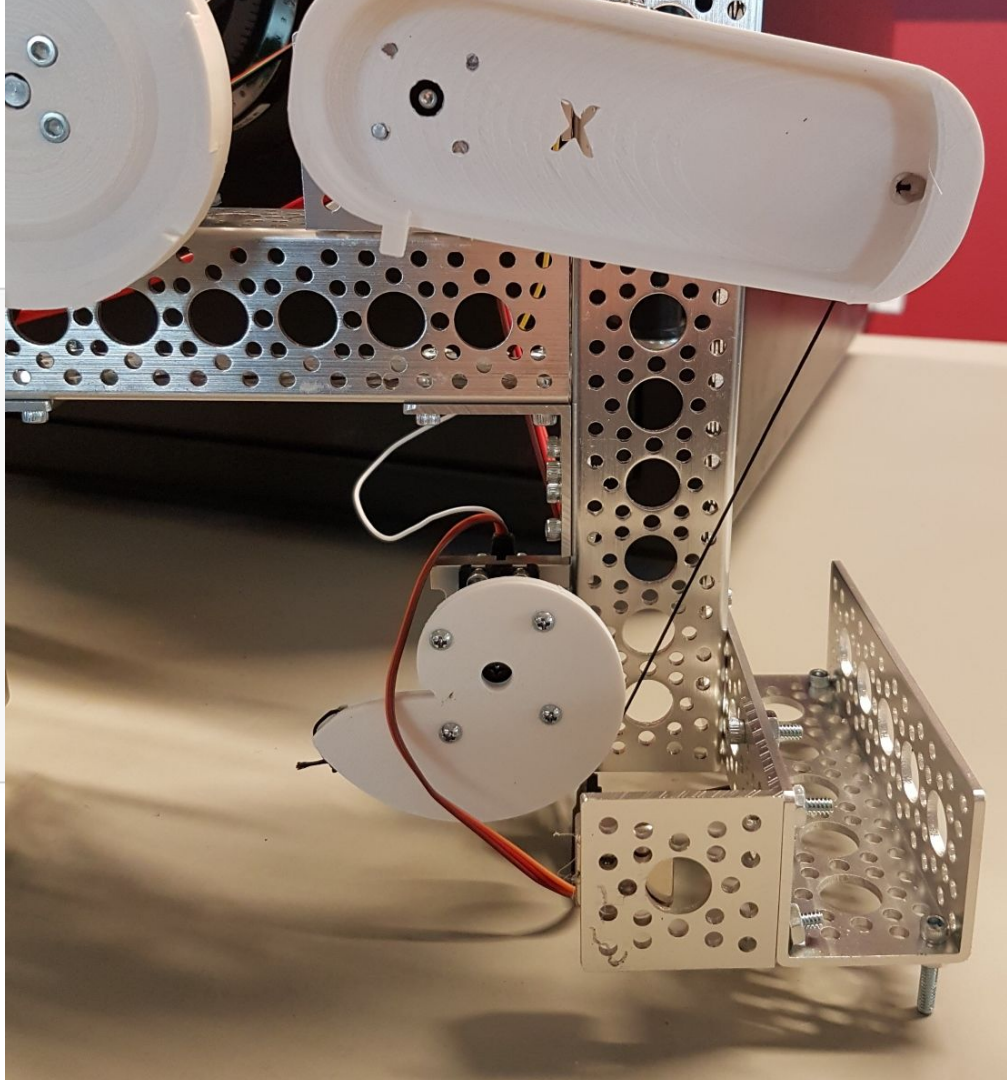
The S&G 6741 … can be dialed up to 1.25 digits above or below the actual set number and still open, essentially giving you a 2.5 digit window to hit. The S&G 6730, however, has only a +/- .5 dialing tolerance, essentially giving a 1 digit window to hit. While many locksmiths might prefer the S&G 6730, it can be notoriously difficult to open and very unforgiving to human error. In addition, slight alterations to the lock (for example, if the dial or the dial ring was bumped during shipping) can shift the combination, rendering the lock unusable.



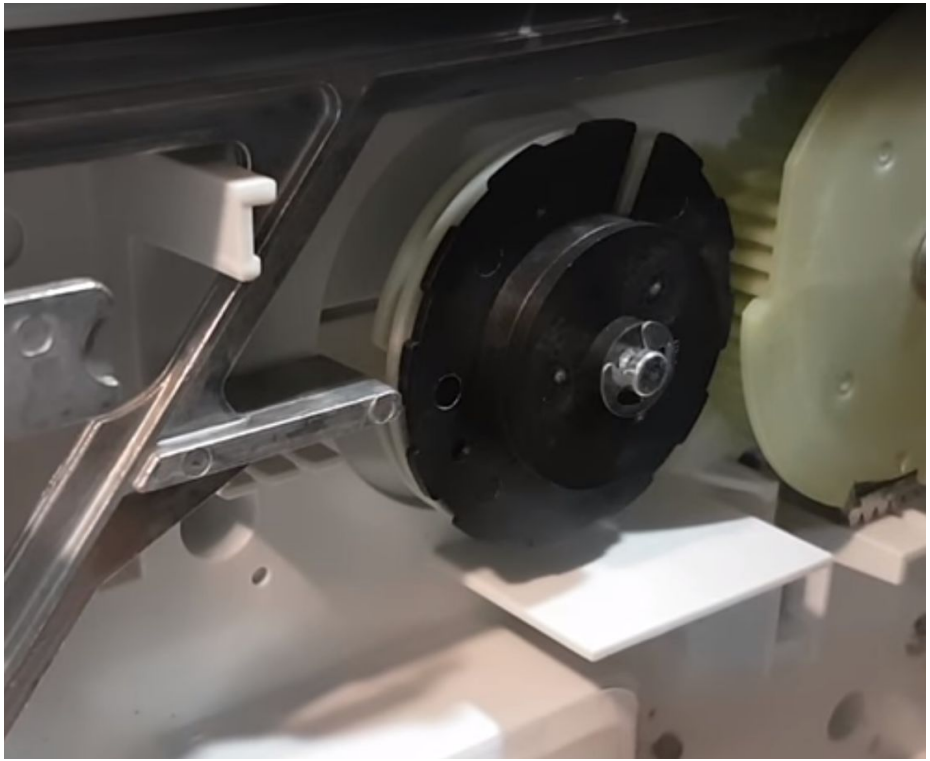
o 1.25 digits
er and still
it window to
nly a +/- .5
a 1 digit
might prefer
difficult to
n error. In
for example,
ed during
endering the

Future Research

```
Measuring complete
Smallest to largest width [Width]/[Depth]
Indent 8: [1911] / [1130]
Indent 1: [1925] / [1122]
Indent 3: [1953] / [1091]
Indent 0: [1955] / [1099]
Indent 11: [1966] / [1105]
Indent 2: [1992] / [1100]
Indent 9: [1994] / [1126]
Indent 7: [2011] / [1098]
Indent 10: [2036] / [1096]
Indent 4: [2077] / [1109]
Indent 5: [2083] / [1100]
Indent 6: [2114] / [1096]
```



Future Research



Future Research

Is it open yet?

nathan@sparkfun.com