

BAND-BEESTEN

THE LEGACY CONTINUES



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PREVIOUS DESIGNS



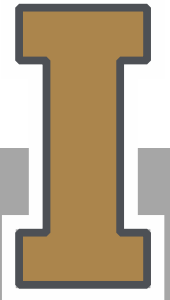
2012-2013



2013-2014



Fall 2014



PROJECT GOALS

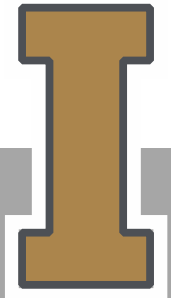
Mobility → all-wheel, omni-wheel drive

Safety → fault detection and response

Frame Redesign → enhanced field presence, reconfigurable, rapid set-up/tear down

Controls → reconfigurable micro-controller

Visual Impact → reactive lighting



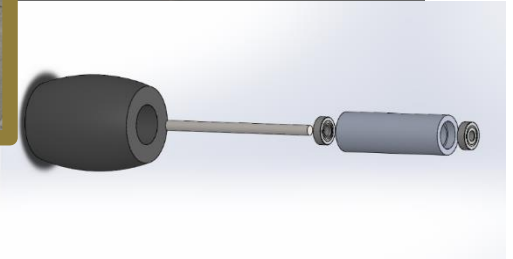
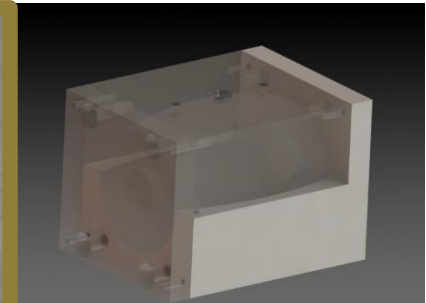
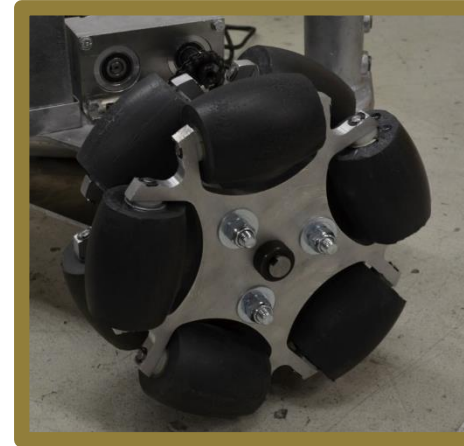
MOBILITY – WHEELS

Move away from Ball-Bot



Omni-Wheel Design

- Leveraged Online Robot
- Modeled in SolidWorks
- Created a Perfect Circle with the Double Wheels

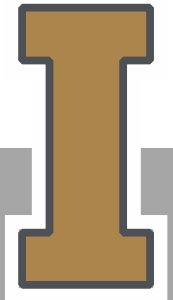
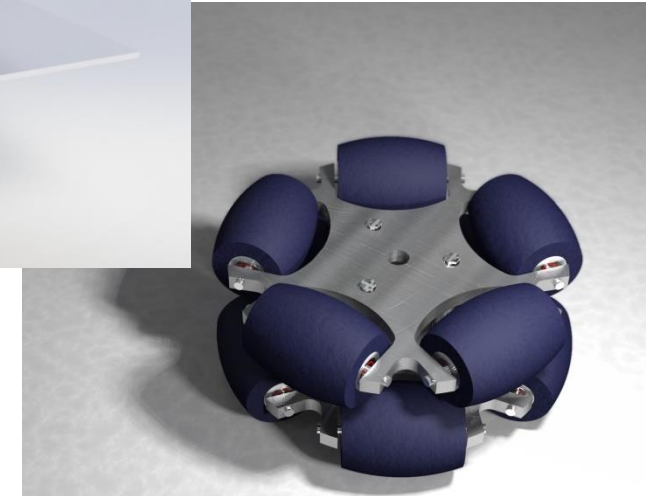
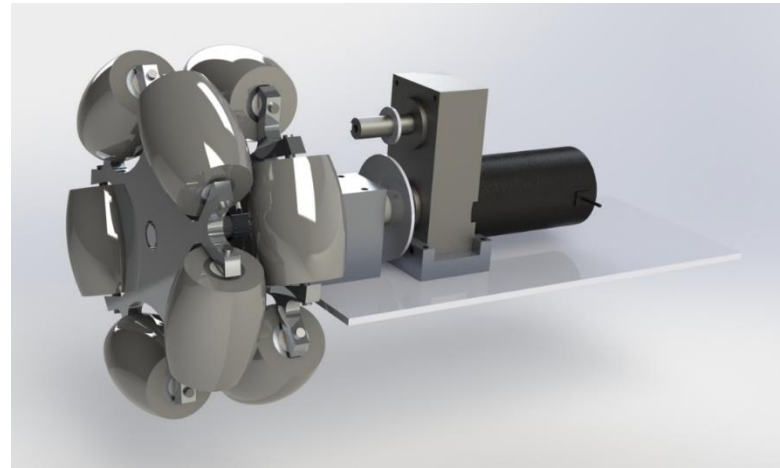
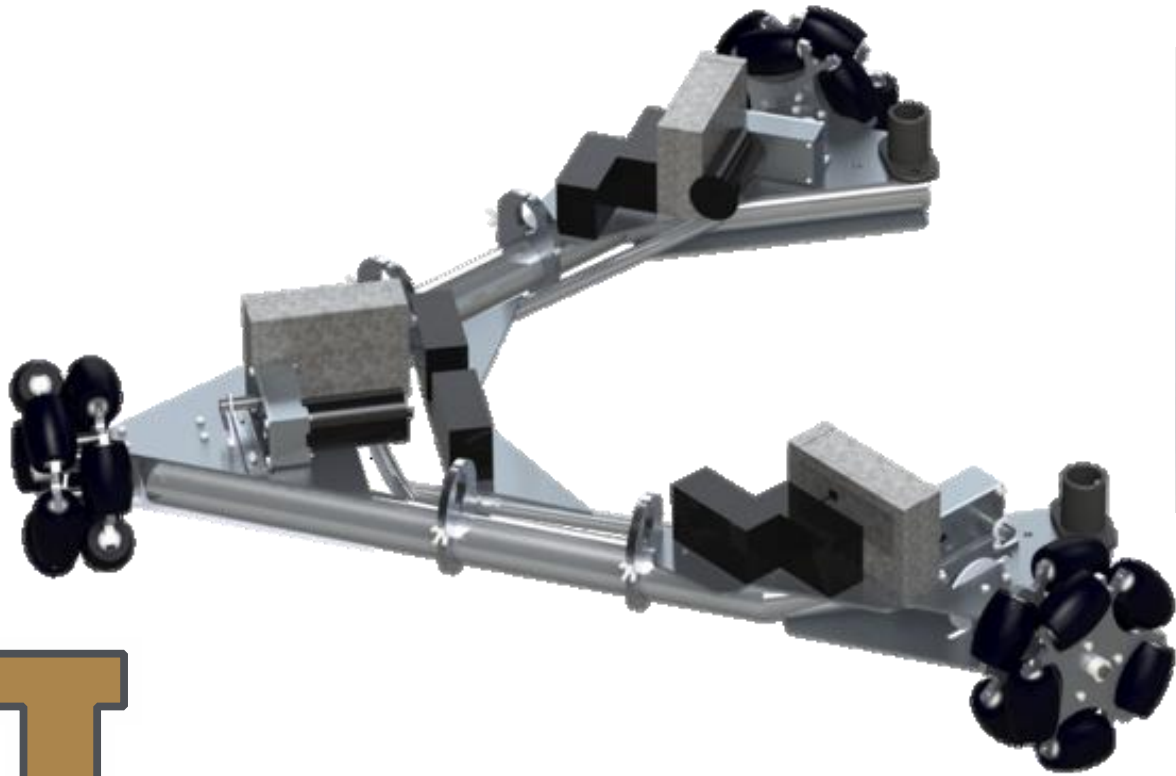


Machined Hubs
Molded Urethane rollers

- Exact dimensions
- Affordable



MOBILITY – MOTORS AND WHEEL INTERFACE



MOBILITY – MOTORS AND GEAR REDUCTION

Road Load Test

- RPM – 113 RPM
- Torque – 589.5 in*lbs

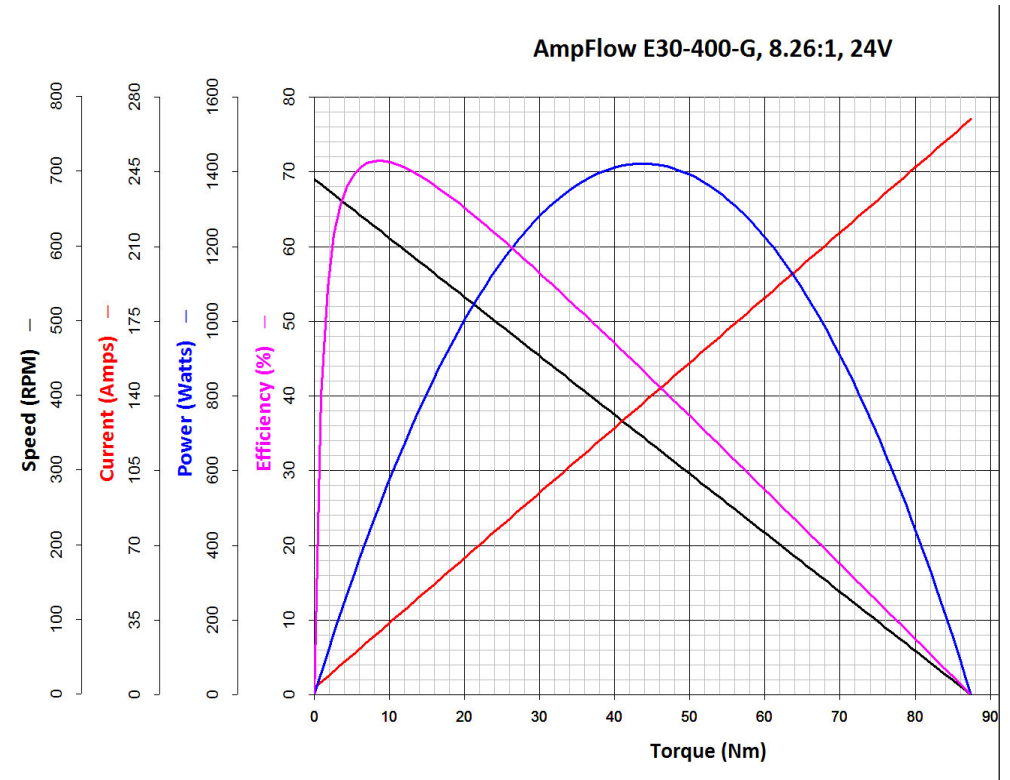


Motor Selection

- AmpFlow E30-400 Motor with Speed Reducer

Gear Reduction

- Supplemental 3:1 reduction
- RPM – 113 RPM
- Torque – 1167 in*lbs



MOBILITY – BATTERIES AND CONTROL

Battery Selection

- 2 12V 7AH batteries in Series per motor
 - Average Life: 31 min
 - Average Current: 8.3A



Control Selection

- ToqueMaster BR-XL Motor Controller
 - Voltage: 24V
 - Motor Directions: Forward and Backward
 - Amperage Rating: 80A
 - Input: PWM Signal



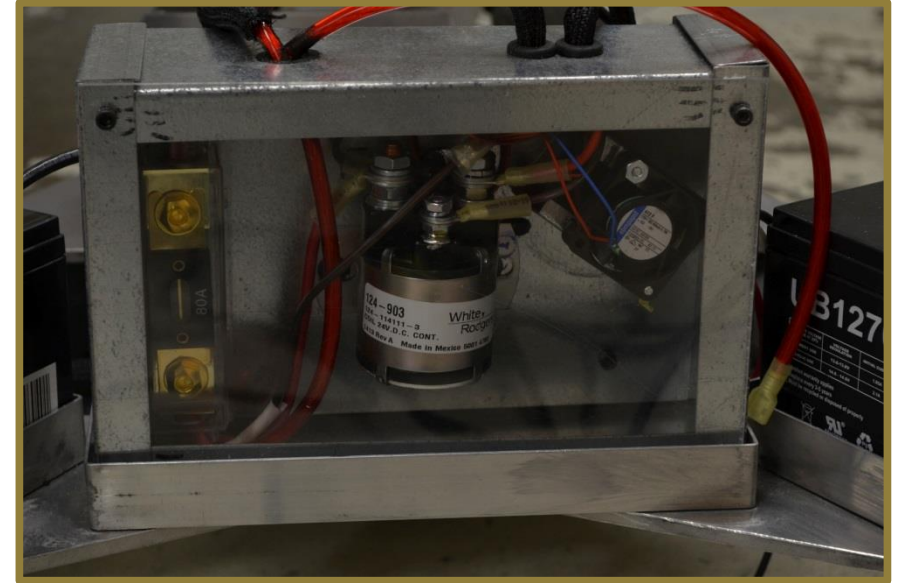
SAFETY – EMERGENCY CIRCUIT

Circuit Requirements

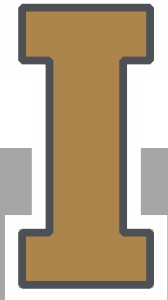
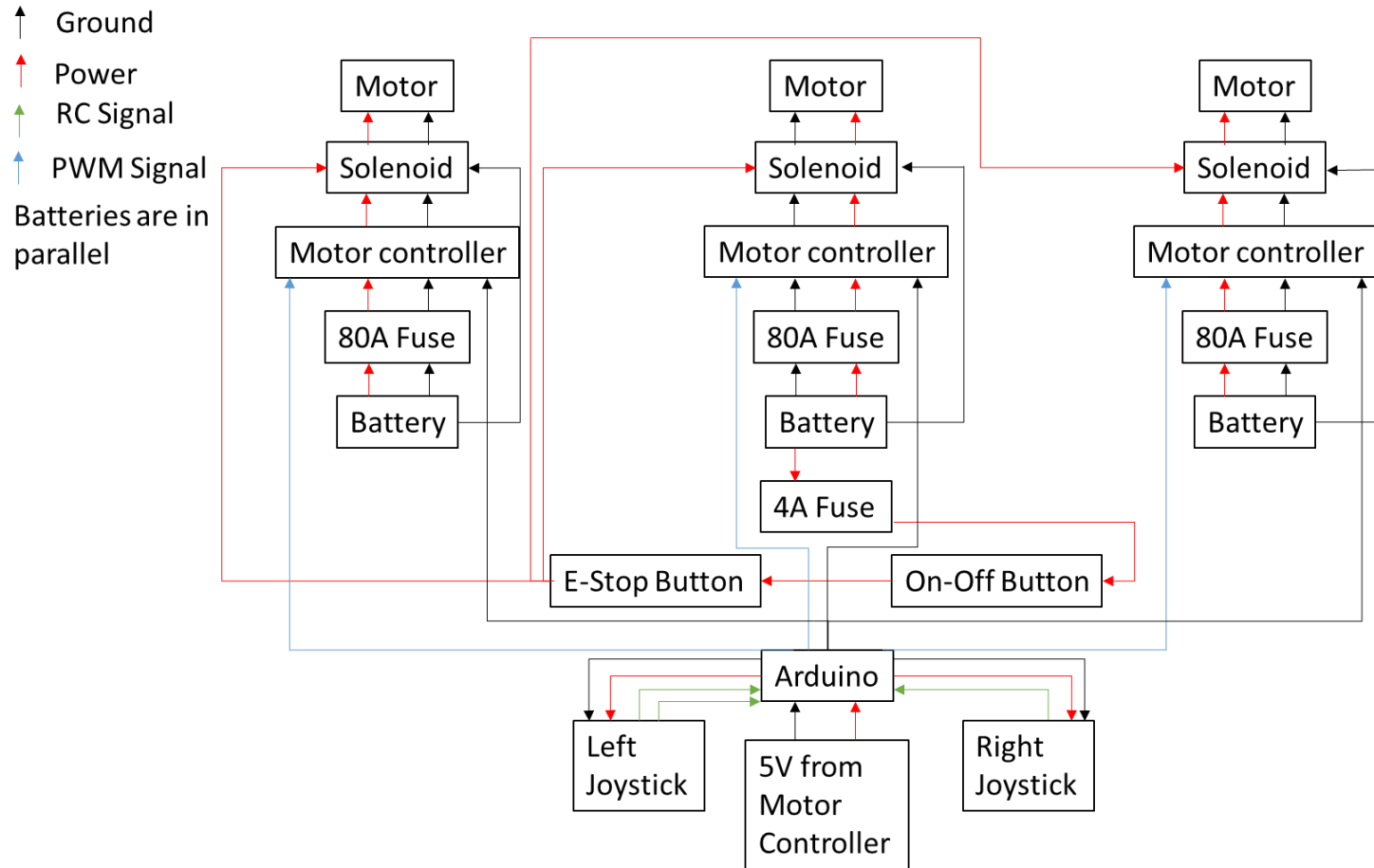
- Max Current: 80 Amps
- Voltage: 24V
- Quick response

Circuit Selection

- 80A Fuse
- Protects against current spikes
- White – Rodgers 24V 100A Solenoid
- Protects against user error



MOBILITY/SAFETY – WIRING



FRAME REDESIGN

Before

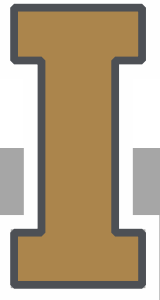


After



Frame Design

- Drum Mounts
- Specified drum mount locations
- Quick and easy to mount
- Canopy
- Cymbal mounts
- Connects to base
- Houses electronics
- Multiple instrument configurations
- Dismantle in 3 min by 3 people (7 pieces)
- Weight: 300lbs
- Number of tools: 1



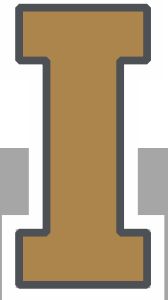
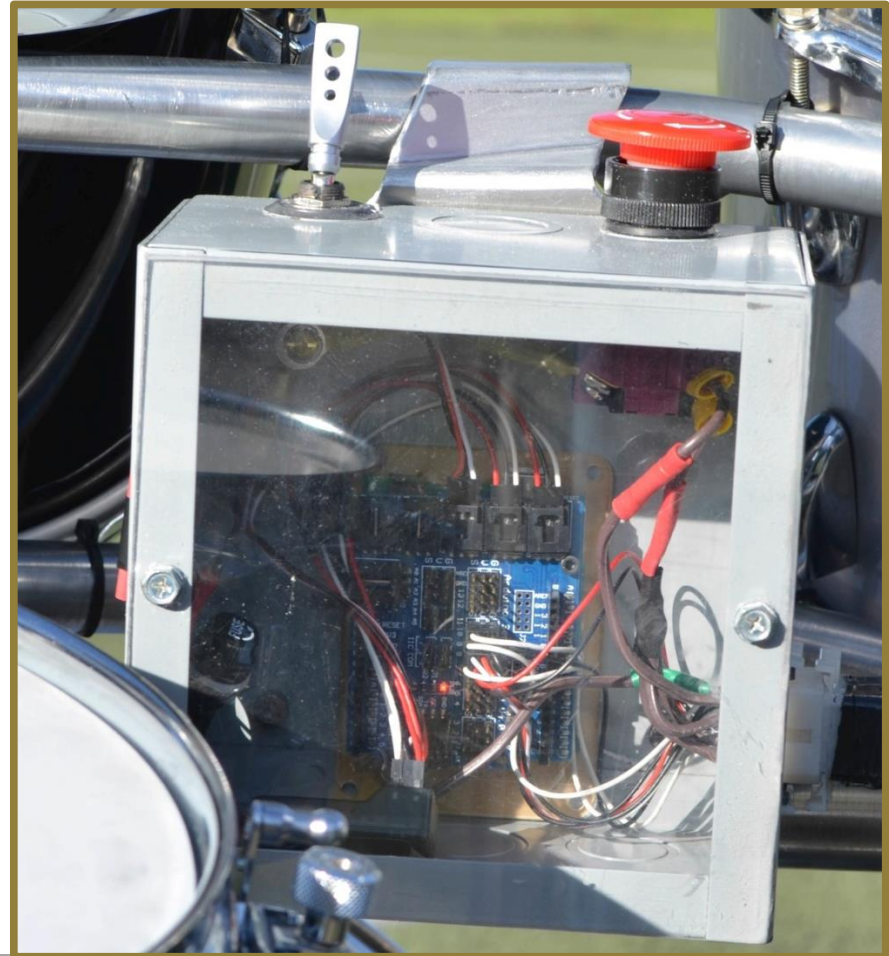
CONTROLS - MICROCONTROLLER

Microcontroller Requirements

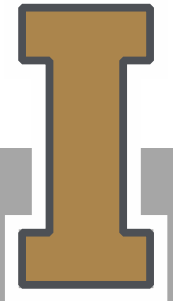
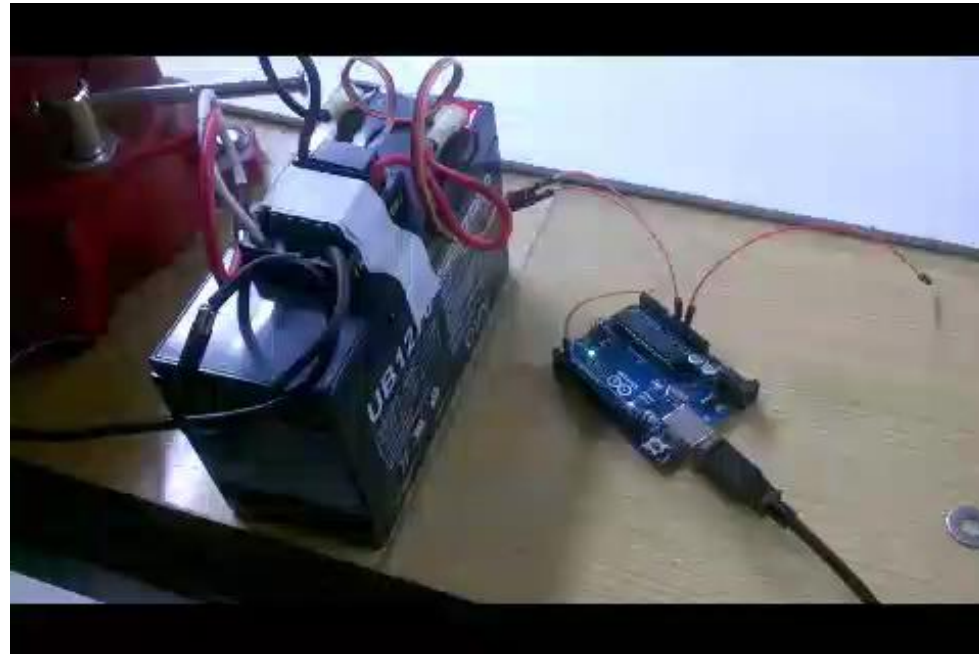
- Voltage: 5V
- Input: RC Signal
- Output: PWM
- Programmable

Microcontroller Selection

- Arduino Uno
- Voltage: 5V
- Input: RC Signal
- Output: PWM
- Programmable

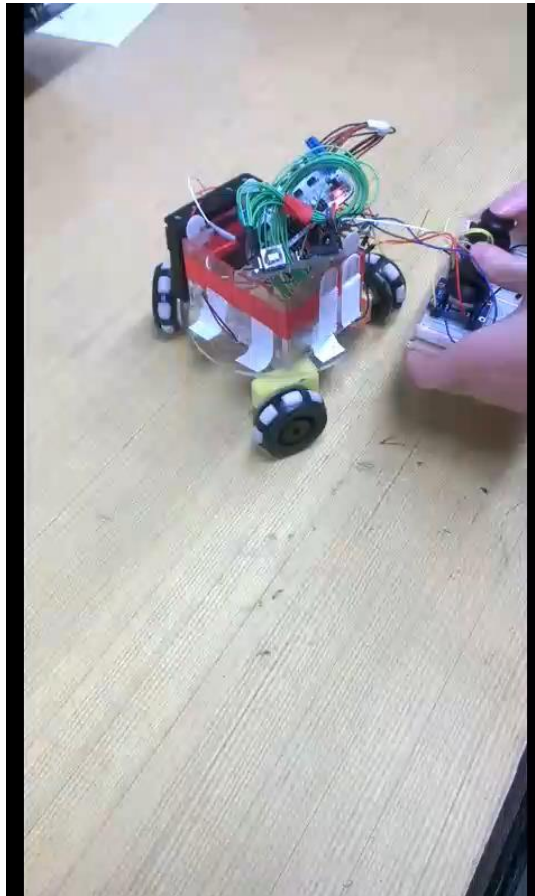


CONTROLS – MOTOR TEST

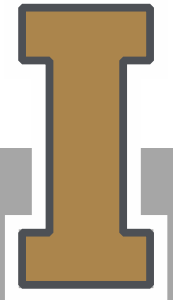
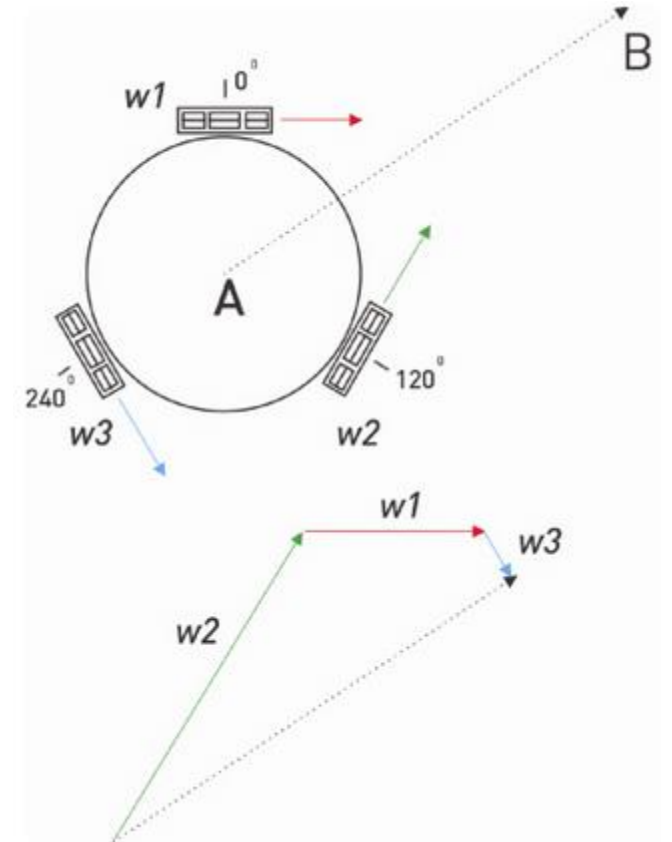


MOVEMENT TEST

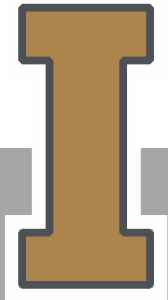
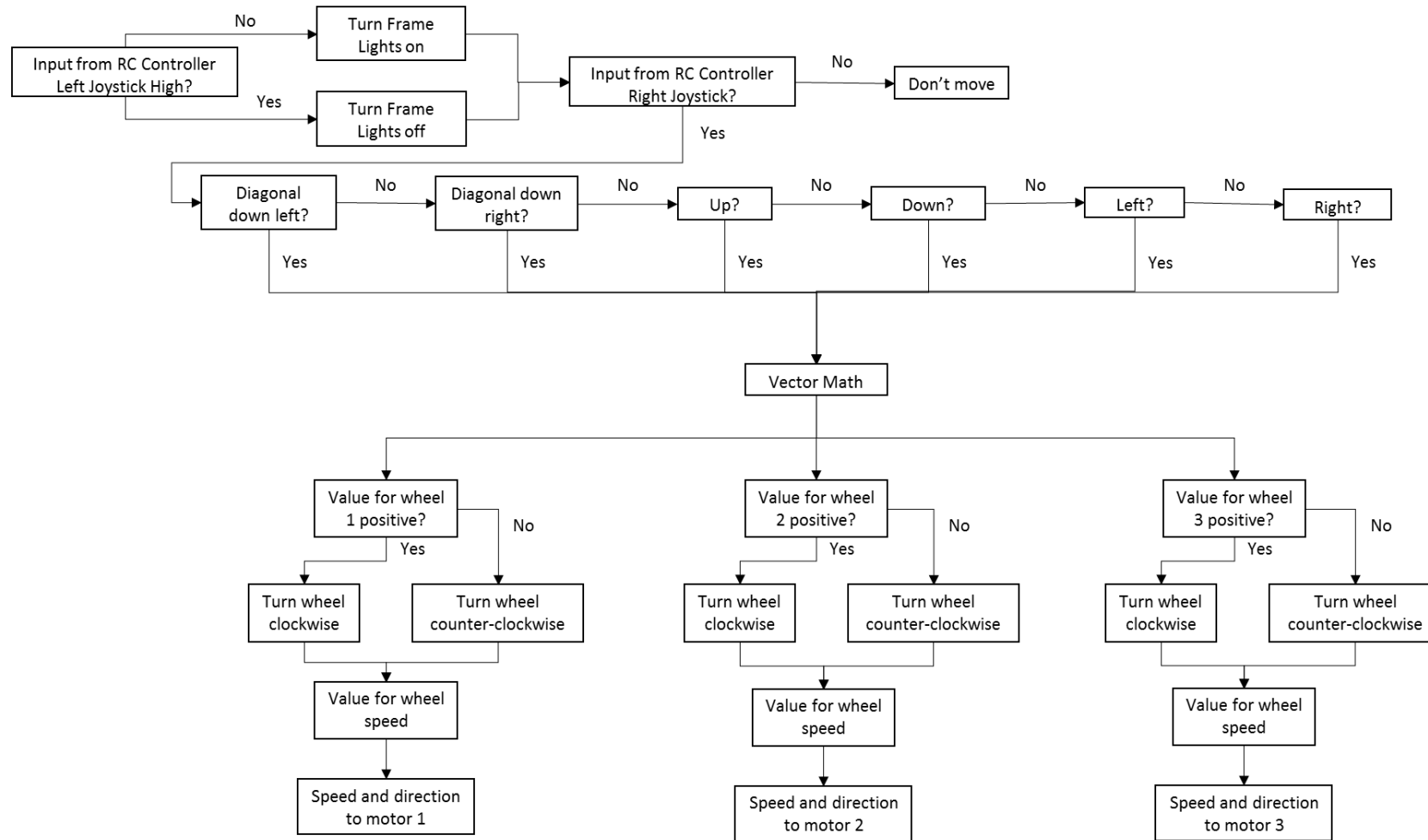
Concept test for code.



Vector breakdown.



BEAST AND MINI_ME LOGIC



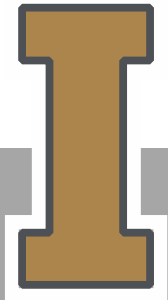
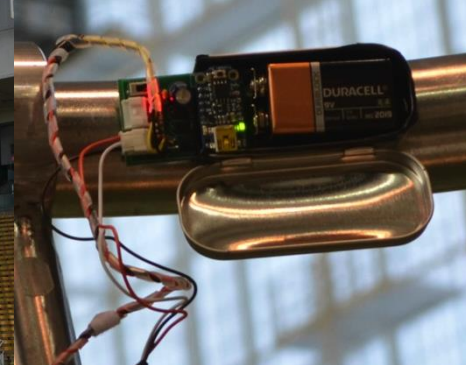
VISUAL IMPACT - LIGHTING

Lighting Requirements

- Multiple Colors
- Various Patterns
- Performance controlled
- Off-the-shelf batteries

Lighting Selection

- Adafruit Neopixel lights
- Arduino Trinket
- Piezoelectric sensor
 - Drums light up when hit
- 9V batteries
- Linear power regulator



LIGHTING LOGIC AND WIRING

