Intake Alignment Device

Midterm Presentation 2

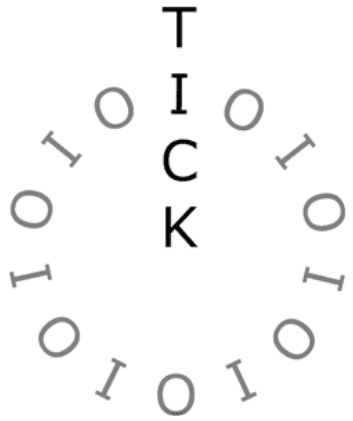
Team 3:

William Bridges
Matthew Burst
Landon Kipker
Ferriez Johnson
Troy Placid

Sponsor: Dr. Michael Hays, Cummins Inc.

Advisor: Dr. Eric Hellstrom

The Problem



- **Engine must be rebuilt within 20 minutes**
- **Takes 30 seconds to align intake manifold (bad)**
- **Time is extremely precious!!**

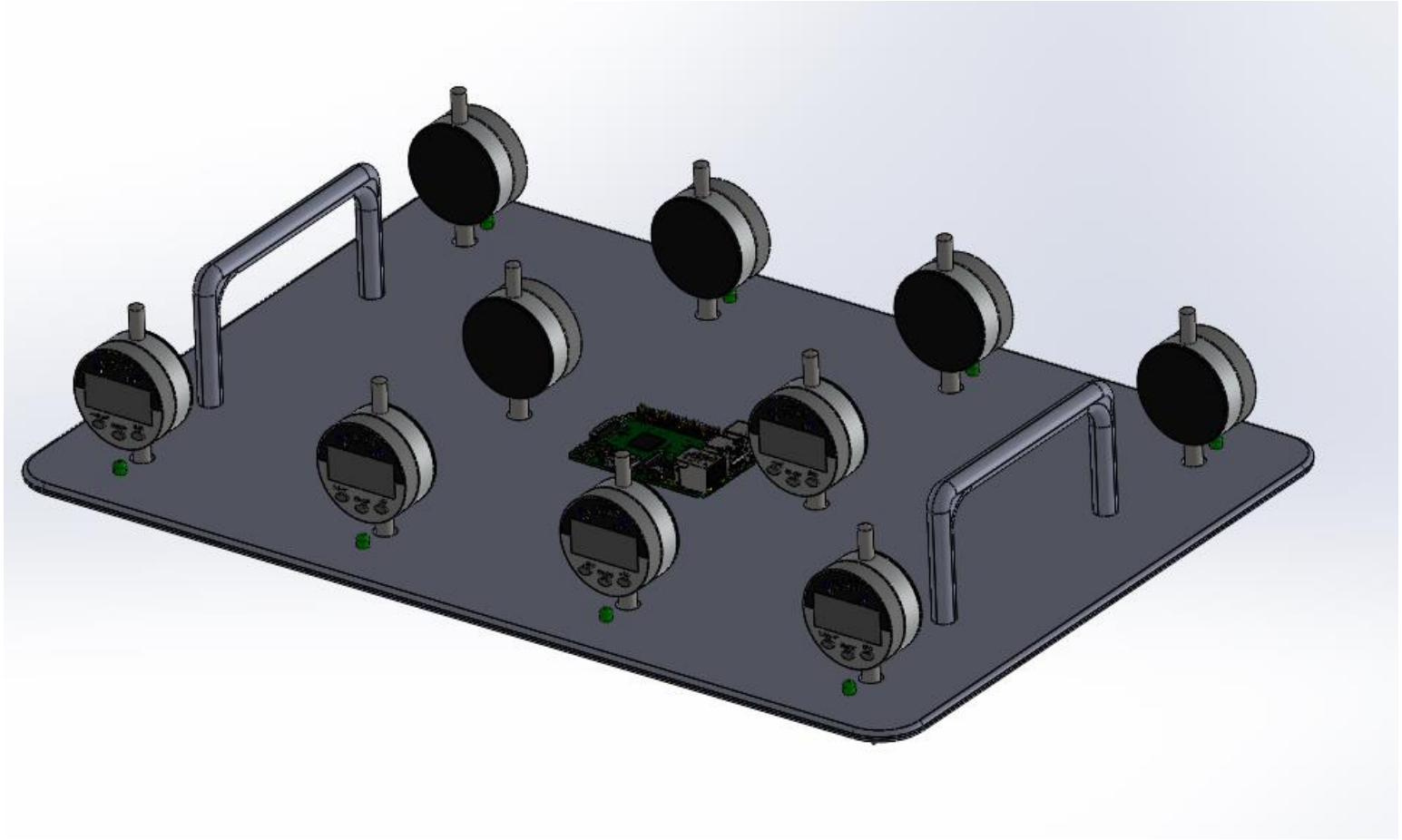
Objective

- Build a device that can help align the intake manifold to the engine block on a NHRA Top Fuel Drag car engine
- Accurate to 0.005”
- Fast Operation
  - Reduce the time
- Standalone Tool

Safety

Competition

Cad Drawing



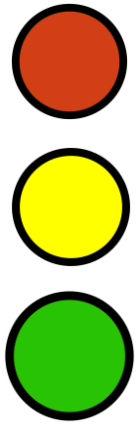
Use of device

- Calibrate the device on the engine mount
- Place the intake manifold on top of the device
- Place the device on top of the intake manifold
- Follow the RGB indicators

LED indicator

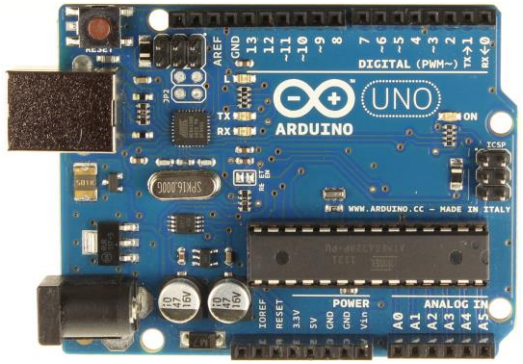
- Red light – Tighten
- Yellow light – Continue to tighten with caution
- Green light – Stop
- Flashing red – Too tight, loosen with caution

Insert image of led legend



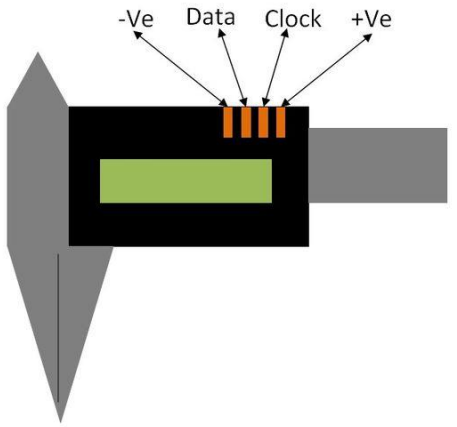
Test Rig

- Connect Digital Calipers to an Arduino and the Arduino to a computer
- Develop the basis for our custom software

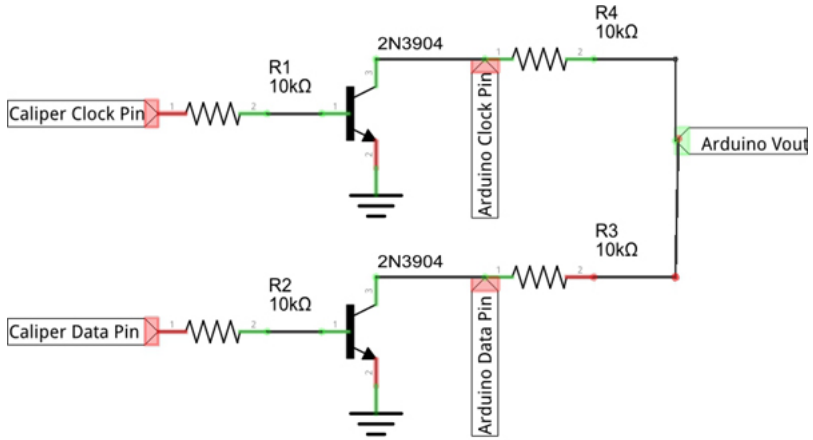


Test Rig Design

- Solder wires to the pin outs on the calipers



- Convert the 1.5V signal to 3.0V



Test Rig Logic

- Using serial monitoring on an Arduino the data from the caliper can be recorded
- Thus functions can be performed with this data

Avoiding Errors

- Build Quality
  - Machining
    - Accurate Angles
    - Accurate Dimensions
  - Material Selection
    - Sturdy
- Voltage Regulation
  - Batteries
  - Surges
- Calibration Method

Cutting the Time Down

- Easy for the operator to understand
  - Cut down on human error
- The device must be fast
- The algorithm of the unit must be effective

Summary

- Goal:
  - Reduce time it takes to align the intake manifold to engine block
- Method:
  - Use digital indicators over connection screws
- Progress:
  - Currently working on a test rig
- Roadblock:
  - Waiting for engine to arrive

References

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Questions?