

# Position Sensing and Imitation

## Final Presentation

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July 29th, 2015

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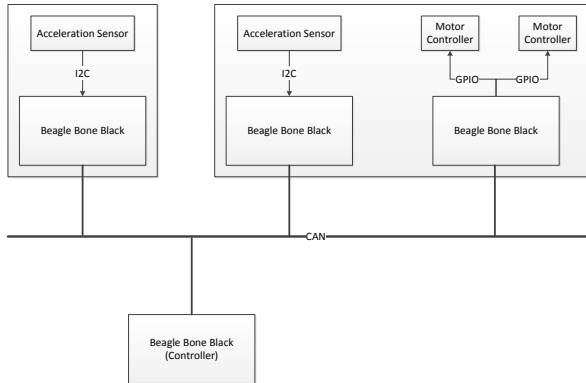
# Introduction

# Reminder: Goal Statement

- **Goal:** Mimic position and motion of a plate
- **Sensing:** 3D MEMS attitude sensor embedded in a plate
- **Communicating:** Implement industrial bus
- **Actuating:** Rotate a plate using motors

# System Specifications

# Functional Overview



**Figure:** Diagram of the Functional Specification

# Bus

## Bus specification

- EtherCAT could not be implemented due to
  - Unsuccessful installation of SDK on Linux
  - Problems with Ethernet NIC incompatibilities
- Using fallback option CAN
  - All nodes are BeagleBone Blacks
  - CAN controller: SN65HVD230

# CAN

## Bus Design

### Reminder:

- **Timing goal:** Move plate to desired position within 1 second
  - Actuation takes up to 500 ms
  - Sensors report mean value every 100 ms
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- Required cycle time: 100 ms
  - Sensor values are periodically fed to the Controller from a buffer
  - Controller computes movement commandos and sends them to the drivers

# Message ID Descriptions

Node Name	ID / Priority	Master / Slave
Controller	1	Master
Source Sensor	2	Slave
Target Sensor	3	Slave
Stepper Driver	4	Slave

**Table:** Nodes in the network



# Message Description

## Bus Option 2

Description	Data Request	Length
Sensor Position	Allowed	6 Bytes
Motor Status	Allowed	4 Bytes
Rotation Command	Not Allowed	3 Bytes
Reset Command	Not Allowed	3 Bytes

**Table:** Possible messages in the network

# Message Sequence Charts

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# Discussion

Thanks for your attention!

Questions? Ideas? Suggestions?