**OVERVIEW**

- **table**
  - *noun*
  - 1. a piece of furniture with a flat top and one or more legs, providing a level surface on which objects may be placed, and that can be used for such purposes as eating, writing, working, or playing games.

  **synonyms:** stand, dining table, kitchen table, coffee table; More
OVERVIEW
PLANT: THE TABLE ITSELF

TOP VIEW

BASE

Electromagnet

Infrared Distance Sensor

Electromagnet

Electromagnet

Electromagnet
PLANT: THE TABLE ITSELF

TOP VIEW

TABLETOP

2-Axis Accelerometer*

Bismuth Ring
INPUTS

- Desired Height is set by the user with switch 4 through 0
- Actual Height, X_Tilt, and Y_Tilt are read by the sensors
- Calibration allows you to edit the default values
PID CONTROLLER

Height Error

ThetaX Error

ThetaY Error

sK_{dh}

K_{ih}(1/s)

K_{ph}

sK_{dxy}

K_{i_{xy}}(1/s)

K_{p_{xy}}

Amp1

Amp2

Amp3

Amp4
**PWM TRANSMITTER**

- Receives a voltage PWM wave and converts it into current.
- Controlled the output force of electromagnet

![Diagram of PWM Transmitter with 400mA input, PWM (V) input, Z1, Z2, and Electromagnet]
CONTINGENCY: SERVO BASE

- Replace the magnetic base with a servo one where servos hold the table at some desired height
- Servos still use a PWM input so overall design change is minimum
GOALS FOR THE PROJECT

• Goal 1: Have a Table float and maintain a height given weight and disturbances
• Goal 2: Have the table be height adjustable by the user
• Goal 3: Add accelerometer to have table adjustable
• Stretch Goal: Add a display that will allow you control the height and tilt.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Order Magnets, Bismuth,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and Sensors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Build Spice of PWM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transmitter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Build Table and Test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transmitter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test Sensors, Magnets,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and build ADC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Build and Test Controller</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debug System</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
QUESTIONS, COMMENTS, AND CONCERNS
SOURCES