# Mechanical Overview

**Year:** 2017 **Semester:** Fall **Team:** 15 **Project:** Super Susan
**Creation Date:** September 21st, 2017 **Last Modified:** September 22, 2017
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**Assignment Evaluation:**

| Item | Score (0-5) | Weight | Points | Notes |
|---|---|---|---|---|
| **Assignment-Specific Items** | | | | |
| **Commercial Packaging Analysis 1** | | x2 | | |
| **Commercial Packaging Analysis 2** | | x2 | | |
| **CAD Model Illustrations** | | x4 | | |
| **Project Packaging Specifications** | | x2 | | |
| **PCB Footprint Layout** | | x2 | | |
| **Writing-Specific Items** | | | | |
| **Spelling and Grammar** | | x2 | | |
| **Formatting and Citations** | | x1 | | |
| **Figures and Graphs** | | x2 | | |
| **Technical Writing Style** | | x3 | | |
| **Total Score** | | | | |

**5: Excellent 4: Good 3: Acceptable 2: Poor 1: Very Poor 0: Not attempted**

**Comments:**
*Comments from the grader will be inserted here.*

## 1.0 Commercial Product Packaging

### 1.1 **Product #1:** Rotadine Electric Lazy Susan

**Figure 1: Rotadine**

The Rotadine Electric Lazy Susan has a cylinderical outter shell, removable top, periodic buttons along its side to serve as an interface, and fairly large size to accommadate a table full of items [1]. Its clean, white-and-glass exterior give it a modern, or futuristic sort of troph to its appearance. Powering the Rotadine is an internal battery that allow it 12 hours of life outside of charging.

Susan shares few design elements with our desired packaging. Rather than have a distributed interface of many buttons, the user will interface using a single dial and button on one side. The Susan's design will present a more "Classic" look, having either a stained wood or lament top and brushed silver sides. The Rotadine is much larger, and the Super Susan will benefit in being less bulky and less heavy in comparison. To lower the effort on the user in maintenance, there will be an external power chord rather than battery. Similar in design concept is that the Super Susan will feature a removeable top for easy cleaning.

### 1.2 **Product #2** Prime-Spin 12” Electric Turntable

**Figure 2. Prime-Spin 12” Electric Turntable**

Besides color, the Prime-Spin has a shape and size that compares to the Super Susan quite closely. The Prime Spin is flat, round, metal, and 12" wide. Its motor components inside are powered by an AC power cable connected to the wall [2]. Its minimalist design is rather aesthically pleasing, and its quiet operation put it out of direct attention, useful for photography or videography.

The Super Susan will likewise have an external power cord and cylinderical frame. The idea of a smooth surface will be emphasized in the design, though the need for an LCD screen and interface to the user provide challenges in this front. The top of the Super Susan, in contrast to the Prime-Spin, will feature slots for the spice bottles giving its look more texture overall.

## 3.0 Sources Cited

[1] Rotadine (2017). Rotadine Electric Lazy Susan. [Online]. Available: http://www.electriclazysusan.com/about-our-electric-lazy-susan/

[2] Amazon (2017). Prime Spin Professional 360 Degree Electric Rotating Turntable for Photography. [Online]. Available: https://www.amazon.com/Prime-Spin-Professional-Turntable-Photography-Capacity/dp/B00TQCM1XM

## Appendix 1: CAD Model Illustrations

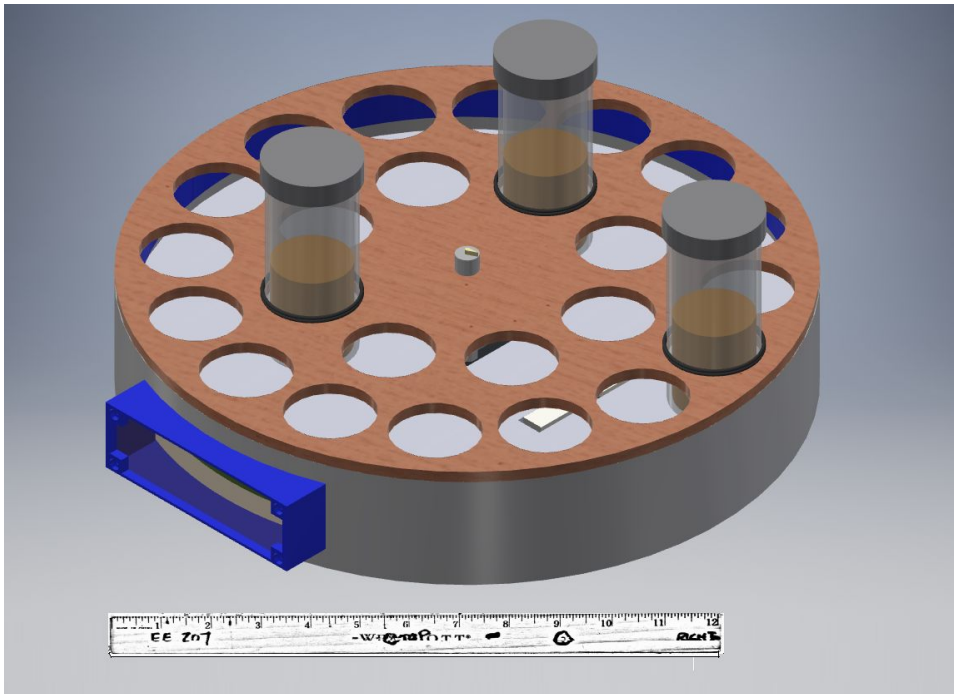

**Figure 3: Super Susan w/ Ruler**
pan diameter is 14", bottle diameter is 1.88 ", head piece and face plate (front left) are 5.1",

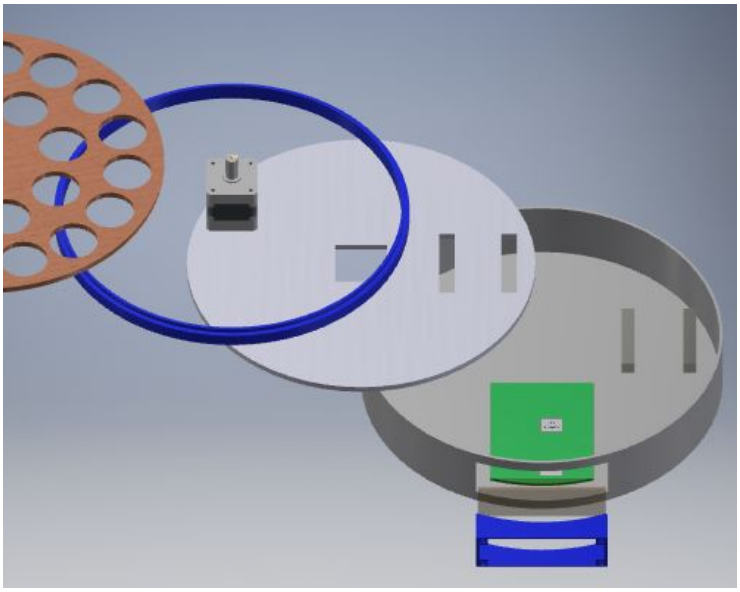

**Figure 4: Exploded View (Lateral)**
from left: cover, bearing track (blue, 8 pieces), motor, surface, pan. outside: curved head piece and face plate

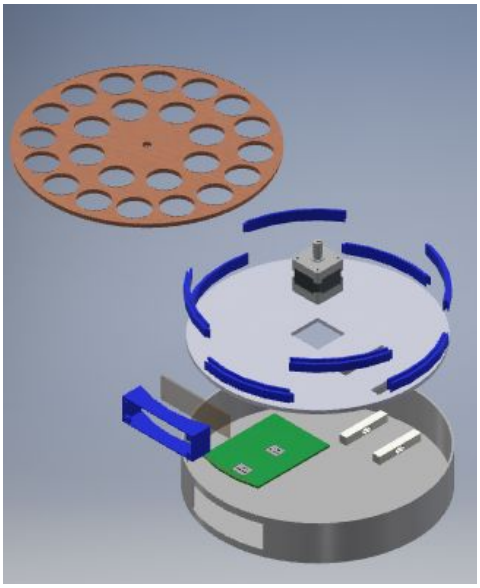

**Figure 5: Exploded View Vertical**
exploded view of bearing track.

(screws in head piece and bearings in ring on top of track not included).

interior: motor mounted to center, motherboard, and 2 weight sensors - fit into slots in cover

## Appendix 2: Project Packaging Specifications

| Material | Tools | Required | Weight Cost |
|---|---|---|---|
| Anodized Aluminum | Table Saw, Drill/Drill Press, Adhesive, Buffer | 3.0 lb | $20.00 |
| Baltic Birch | Table Saw, Drill/Drill Press, Adhesive, Buffer | 0.8 lb | $15.00 |
| Screws | Screwdriver | 0.2 lb | $4.00 |
| Stand-offs | Screwdriver | 0.2 lb | $5.00 |
| Ball Bearings | N/A | 1.9 lb | $4.50 |
| Printed ABS Resin | 3D-Printer, Drill/Drill Press, Adhesive | 0.2 lb | $13.00 |

**Table 1. Materials, Tooling, Weight, and Cost**

| Number of Bearings: | | | Weight of Bearings | | |
|---|---|---|---|---|---|
| Circumference: | 14" * π | = 43.95" | Weight: | 247 * 0.00783 lbs | ~= 1.93 lbs |
| Conversion: | 4.5mm (diam.) | = 0.177" | | | |
| N Bearings: | 43.95" / .177" | ~= 247 | | | |

**Table 2. Bearing Calculations**

## Appendix 3: PCB Footprint Layout

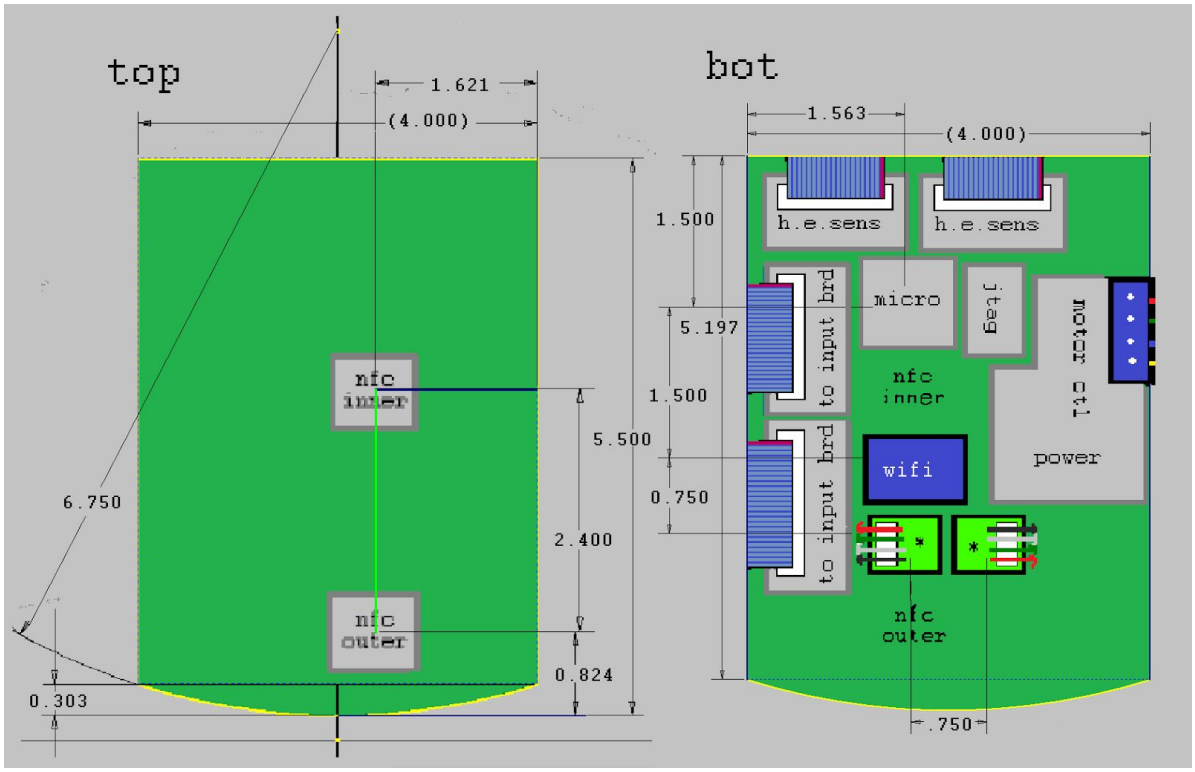


**Figure 6: Motherboard w/ Dimensions**

Top of board has only NFC chips in order to minimize vertical space between the top of the NFC chips and bottom of NFC tags above the surface level (center). Board will be printed as rectangle and trimmed with nibbler tool to maintain curvature.

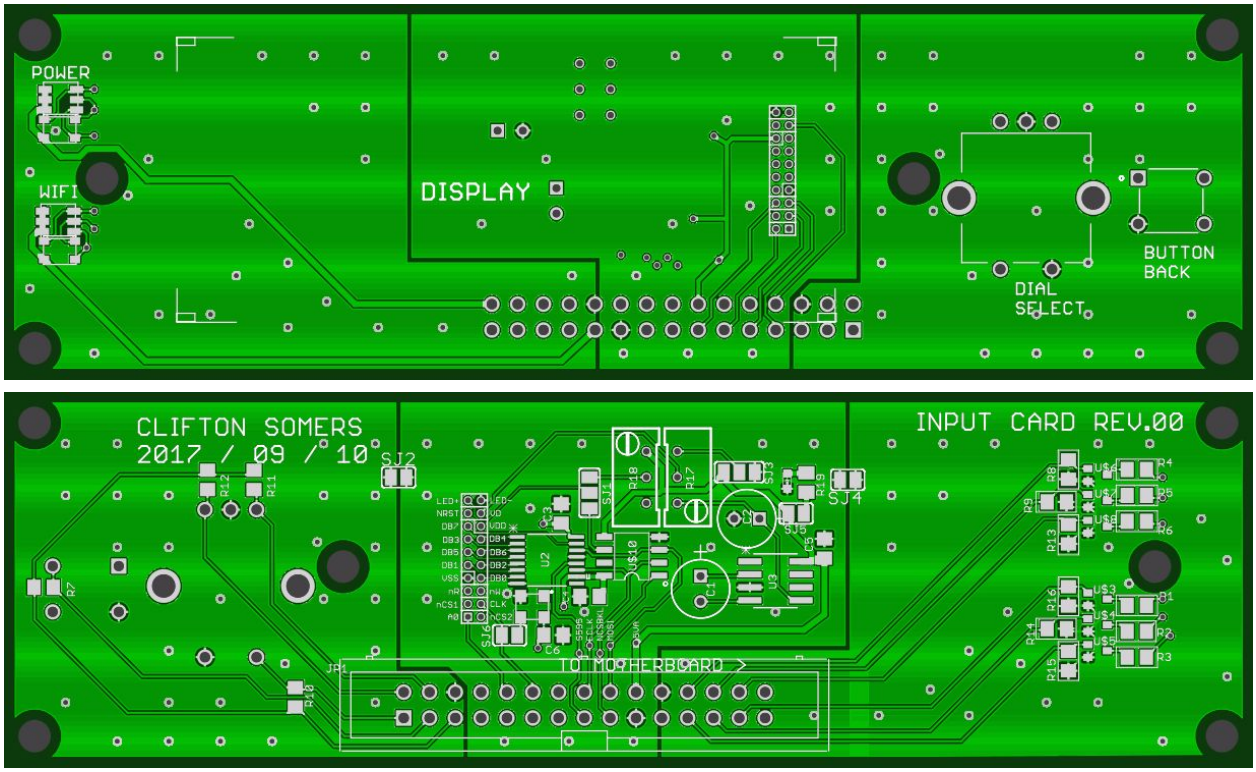


**Figure 7: User Interface Board Layout**

The user interface includes: LEDs, far left; an LCD screen, "DISPLAY"; and button-dial interface to the right. A cable socket exists on the bottom to ship signals back to the motherboard. Dimensions are 1.45" wide, 4.84" long.