Terminal Development

Overview
The group was assigned the task of developing a “fixture system that will partially encase a tablet computer,” in addition to a credit card reader and a receipt printer. The purpose of creating this fixture was for use as a terminal used for “automated order and payment” in a restaurant or retail setting, replacing the traditional service person behind the counter. Deliverables included CAD models, physical prototypes, and recommendations about manufacturing.

Objectives
The team spent time in the beginning of the semester developing various concepts, eventually narrowing down the optimal design to meet the specifications. Each team member then took individual responsibility for one part of the prototype design and created both the CAD model of the design and then the physical prototype, while working closely with each other to ensure a quality finished product.

Approach
- Researched similar terminal products, such as Sheetz ordering system
- Created multiple initial concept sketches and debated pros and cons of each design
- Requested further input from sponsor and generated final design
- Assigned responsibility of different components to different team members
- Created CAD models of tablet, credit card swiper, and receipt printer
- Created CAD models of different terminal components
- Fabricated prototype of front tablet housing using 3D printing machine
- Fabricated all other prototypes using combination of wood, fiberglass, and bondo
- Assembled final model
- Tested model physically to ensure it met design and usability criteria

Outcomes
- Designed unit for simplicity, ease of use, and ease of assembly
- Created CAD models and physical prototype
- Total unit cost of fabricated fixture system $170 (under the $300 limit)
- Built stand, for areas without available counter space, with a cost of $75
- Recommended injection molded manufacturing process with Acrylonitrile Butadiene Styrene (ABS) plastic material