

Design Exercise #1. Design of Controller Box

Assigned: 10/9/13, Due Date: 10/11/13 (final draft)

Grading:

- 15 points (style, grammar, organization),
- 20 points (quality of drawings),
- 5 points (Design Content: Functional Requirement-Design Feature Mapping),
- 5 points (Design Content: Cost Estimates)
- 55 points (Design Content: Design Quality, Completeness, Buildability)

The second level functional requirements for your design will be

- A) a container to hold the electronic control components (Vex microcontroller, Radio Shack circuit boards, electrical connectors, panel switches) allowing access to the components & viewing of the lights and protecting the components from environmental conditions (such as water, shock & vibration, and impact).**
- B) A frame to provide stiffness for the steering wheels, drive wheels, and to hold the controller box (A)

This design exercise is to develop a design to fulfill functional requirement A.

Constraints:

- A) Buildable out of in-the-lab materials and components**
- B) Mounting to frame should be through four 10-32 screws at the edge of the box.**

Identify the third level functional requirements for FR A (call them A1, A2, ...).

Design Output:

Produce a report that includes the mapping of Functional Requirements to Design Features.

Discuss special features or design decisions so as to facilitate the selection of your device for the group's build.

Provide **assembly drawings** to illustrate your design concept. Assembly drawings to illustrate a design idea typically include both assembled, 3D shaded views to illustrate what the idea looks like as well as exploded views to see how the design assembles.

Provide detailed engineering drawings **of all parts to be fabricated**. Do not provide engineering drawings of purchased parts.

Provide an inventory of parts that need to be purchased, along with part numbers and suppliers and cost (put it in a table please).

In particular, pay attention to the mounting configuration of the circuit boards. They must be stood up above the bottom so as to avoid shorts & allow head room so that components mounted on the boards will not interfere with the top.

Parts to be Contained

Vex microcontroller (www.vexrobotics.com, P/N: 276-2170)

Vex battery pack (www.vexrobotics.com, P/N: 276-2036)

Four Soldered Breadboard (www.radioshack.com, Model: 276-170)

One panel connectors (www.digikey.com, P/N: A1384-ND)

One SPST switch (from old computer case)

Top material, 6 mm x 12" x 12" fluorescent polycarbonate