Driver Controls Hardware Design Project

Project Team: Frank Wang (Lead), David Zane

(Winter 2018) - (End Quarter)

[Image of Project]

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# Project Goal:

Update the Driver Control Boards

## Overview of Project:

The Driver Controls manage many important functions on the car. We updated the design to work with the new car.

## Current Status:

We finished soldering all the parts to the board and need to test it now.

## Project Timeline:

Example:

|  |  |  |  |
| --- | --- | --- | --- |
| # | Task | # of Hours | Person(s) responsible |
| 1 | Test boards | 8.75 | David |
| 2 | Wiring to the car | 8.22 | David |
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## 

## Components/Tools Needed for Project:

[A list of all the software and hardware needed for your project]

### Hardware Components:

|  |  |  |  |
| --- | --- | --- | --- |
| Component (and purpose, if unclear) | Number in Stock | Specific Location | Anticipated Cost (if team doesn’t currently have) |
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### Software Components:

|  |  |  |  |
| --- | --- | --- | --- |
| File Name | Description | Link | Well-Documented? |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

### Special Tools Needed:

-Laptop with \_ installed?

-Soldering?

## Design Process/Decisions:

-[Status of project when you started it]

-[Major design choices you made to get it to where it was now]

-[Failures along the way]

-[Other information that would be useful to a future member doing this project]

## Related Projects:

(Projects that this project depends on/Projects that depend on this project)

* MPPTs - Power point trackers that optimize the amount of solar energy being
* Battery pack
* BMS

## Regulations:

What rules relate to your project? Check out the race regulations here:

<http://americansolarchallenge.org/regulations/ascfsgp-2018-regs/>

## Links to Project (if not saved in folder)

## 

## 

## Record of Emails with Major Parts Supplier:

[Only applies to big projects like array, etc]

### Example: Notes from Email Thread with D2 Solar

Location: [team@nusolar.org](mailto:team@nusolar.org) email.

Subject: “Inquiry about encapsulation process availability”.

People:

* D2 Solar
  + Duncan Harwood ([duncanharwood@d2solar.com](mailto:duncanharwood@d2solar.com))
    - CC’d:
    - Mike Rowell <mike.rowell@d2solar.com>,
    - Shandor Daroczi <shandor.daroczi@d2solar.com>
* Alexander Martin, 2016-2017 Project Manager
* Fellipe Sebastiam, 2017-2018 Project Manager
* Sylvia Fu, 2017 Electrical Lead
* Frank Wang, 2017-2018 Array Design Lead

Initial Contact with Duncan: March 2017

Inquiry to perform encapsulation service for 400 cells for Winter 2018 using Sunpower

cells. Need a clear laminate material for encapsulation. Duncan said it should be pretty “straightforward” and asked about materials selection for layup.

Material Selection and Sample Encapsulation: April-June 2017

Got some open-market Sunpower cells from Amazon/eBay

D2solar and Sunpower got us solar cells

Samples looked good, but the backing was really thick and stiff. Unsure if backing was part of encapsulation or for shipping structure. Email the dimensions for the different thicknesses of encapsulation offered?

Size of Cells after encapsulation: June-August 2017

Lead time is a couple of weeks, depending on layout/construction.

Documentation: They’d like preferred layout and the locations of connections/outputs.

Thicknesses for E60 SunPower cells after encapsulation (thinnest dimensions possible):

* 0.05mm ETFE front + 0.2mm EVA, + 0.15mm cell, + 0.2mm EVA, + 0.05mm ETFE rear.
* With ribbon interconnects, the total thickness would be around 0.8-1.0mm

Size of cells after encapsulation:

* Sunpower cells are 125mm pseudosquares
* Spaced by 2mm (approx), can be made to be uniform

Array Design: September-November 2017

D2 sent a revised array design on November 19th.

Photo info: (The shades of grey are to make the strings easier to see)-there’s no distinction between them.

…. (add more documentation if necessary)

## Other Notes:

Depends on the voltage drop if there is shadow.

FSGP, it shouldn’t be a major concern. Shadows will be coming from canopy.

Ribbon Tab: How to keep this from breaking

These metal stubs come out of the top of SC6. The tab to wire

Supplementary array hasn’t been discussed with them at all, but should be easier,

Cost:

Feel like both designs will work. Just a question of efficiency.

Check when the topshell will be finished.

Non-laminate diode: Pick a shottky diode (because of low voltage drop) and go from there. Low voltage drop.

Diodes:

-Laminated diode datasheet is available. Wu doesn’t like the

-Non-laminated diode. Easier to replace, more work. Less reliable, because we

-D2, Frank, Wu have given input.

-Ben, Spencer might not have valuable input.

-Johnny Sun unknown

Already completed is \_\_\_\_. Link to that is \_\_\_\_.