New LCD Solution Proposal - TSV

ECE 492 - Spring 2015

Abstract

The previous LCD solution used by sp-14 team needs to be replaced due to size and computer change. This document puts forth a new LCD purchase proposal and outlines the reasons why we chose this part.

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Background

The LCD module used by LFEV-sp14 needs a replacement due to mechanical redesigns and embedded computer changes that are necessary to conform with the competition rules and cut down our budget. The newly selected embedded computer, TS-7400-V2, no longer provides the previously used LCD parallel output port. Thus, we need to seek out a smaller, more affordable, and more configurable LCD solution.

Proposed LCD Solution

The LCD Module

We propose that we use the I2C/TWI LCD2004 Module (link) for the new battery packs. The module has a range of desirable properties including:

- I2C Address: 0x20-0x27(0x20 default)
- Number of Characters: 20 characters x 4 Lines
- Blue LED backlight with white char color
- Adjustable contrast
- Supply voltage: 5V(via Pin) 3.3V(via IDC10)
- Interface: IIC/TWI x1,IDC10 x2
- View direction: Wide viewing angle
- Dot size: 0.55 x 0.55 mm
- Dot pitch: 0.60 x 0.60 mm
- Character size: 2.96 x 4.75 mm
- Character pitch: 3.55 x 5.35 mm
- Size: 98x60x24mm

Communication

Due to the lack of a dedicated LCD port on the TS-7400-V2, it is critical that we choose the most flexible and easy to configure mode of communication between the TS-7400-V2 and the LCD. The I2C/TWI LCD2004 Module provides us with an I2C interface that can be added to our I2C network, which is already used by the AMS boards. The I2C/TWI LCD2004 Module also provides a range of programmable I2C addresses to minimize the risk of overlapping other devices' addresses on the network.

Maintainability

We picked out the I2C/TWI LCD2004 Module from DFRobot over the other similar modules offered by smaller vendors to ensure better maintainability.

Considering the DIY nature of many of the parts we purchase, it is crucial that we find a vendor that provides professional and reliable data sheets and has good reputation and likely to exist for the next 10 years. DFRobot was founded in 2008 and has developed more than 900 products and cultivating an active online community with a variety of hands-on resources. They are now a well-known provider of open-source DIY electronics and their very goal is to support STEM education needs.

The data sheets about the I2C/TWI LCD2004 Module can be found here and here.

Mechanical Compatibility

One consequence of choosing an LCD module with different dimensions compared to the previous design is that it requires a new mechanical design. Since the mounting brackets are already manufactured, we will need to either update and remanufacture new mounting parts or we have to adapt the new module to work with the already made mounting mechanism. This issue will be resolved as one of our deliverables in conjunction with mechanical engineering students.