**CP320 Exploration Project**

*Michael Kirkpatrick, Asad Bari, Vibhav Dindyal*

**Overview**

 Whilst trying to achieve basic operation of the TM1637 during the integration project we looked through quite a few online resources. Some of them included python libraries, C libraries, operation explanations, and the TM1637 datasheet itself. The largest challenge we encountered was just figuring out the core of how to communicate with the device. Following that, we wanted to decipher how to provide our own custom hex values to the device to produce a display that wasn’t included in any of the libraries. Thus, we believe that a clear explanation of how to display custom values was the best option for our exploration project and thus that is explained through words and diagrams on the GitHub page listed under the Software section of this report, as well as explained at the end of the video.

 As a bonus, just to push the library a tad further, we included some new functionality as well. Firstly, we changed how bytes were interpreted and written to the device so that if we used the Python “None” value, it would simply ignore that display and light nothing. It makes the code more readable in our opinion and much easier for new users to understand.

 Second, we created a new function named “ShowScroll”, which allows users to display an integer value that will first appear on the right, and then scroll to the left until it disappears entirely. We believe this provides two important features to the library. The first is that it gives users a new way of displaying in a “flashier” manner. The second and more important point is that it allows a user to display an integer larger than 4 digits long.

 The library that we used and modified in the end can be found here: <https://github.com/timwaizenegger/raspberrypi-examples/blob/master/actor-led-7segment-4numbers/tm1637.py>

 The first C library that we found and gave us a good start on how the TM1637 operated can be found here: <https://github.com/reeedstudio/libraries/blob/master/DigitalTube/TM1637.cpp>

 An article that got us started on how to use a python library very similar to ours can be found here: <https://raspberrytips.nl/tm1637-4-digit-led-display-raspberry-pi/>

 Lastly, the datasheet we used to confirm all the operation methods after we had gained a better understanding can be found here: <http://denethor.wlu.ca/pc320/datasheets/Datasheet_TM1637.pdf>

**Software**

The GitHub page created contains the test file, the modified library, and a fairly concise explanation of how to operate the TM1637 displays for those looking to expand even further upon our work. It can be found here: <https://github.com/Michael-Kirkpatrick/tm1637-pi-python>

**Video**

The video explanation can be found here, and is also linked from the GitHub repo listed above: <https://www.youtube.com/watch?v=IoSwCAQD2_o&feature=youtu.be>