

CSE4355/5355/6351 (Fall 2023)

Lab #8 (LIDAR)

This lab is due on December 3, 2023.

- 1.** Connect the A1M8 LIDAR assembly using 5 cables to the white board. Apply power to the 5V input (RED) from Vbus and ground (BLACK) from GND. Connect the PWM input (WHITE) to a GPO to enable the motor.
- 2.** Power on the TM4C123GXL board and output a short pulse on PWM to turn the motor on and then off again.
- 3.** Connect the TX output (BLUE) to U1RX and the RX input (VIOLET) to U1TX.
- 4.** Write code to initialize UART1 to 115,200 baud, 8N1.
- 5.** Send a STOP command to the LIDAR sensor.
- 6.** Send an INFO comment to the LIDAR sensor and verify that the information in the response is as expected and display on UART0.
- 7.** Turn on the motor and wait until it reaches the correct speed.
- 8.** Send a SCAN command (or an advanced version) to the LIDAR sensor.
- 9.** Verify that the response is as expected.
- 10.** Enter an endless loop to read the bearing and distance data from the sensor until a full data set is created (one full rotation of data).
- 11.** Send a STOP command to the LIDAR sensor and turn off the PWM signal to stop the motor.
- 12.** Calculate the total room area on the TM4C123GXL board and display on UART 0.
- 13.** Output the data set in a tabular format on UART 0. Take the terminal data and import into a spreadsheet and display as a polar plot. Verify the image as expected, noting that the window and open door may appear a bit unusual at first in the scans.
- 14.** Document the results in a brief 2-4 page document (with pictures and data), along with your code, and email to the TA for the course.