

Lab 8 – Collecting Distance Data– Prelab Report

Sunday, March 23th, 2025

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As a future member of the engineering profession, the student is responsible for performing the required work in an honest manner, without plagiarism and cheating. Submitting this work with my name and student number is a statement and understanding that this work is our own and adheres to the Academic Integrity Policy of McMaster University and the Code of Conduct of the Professional Engineers of Ontario.

1. Briefly describe how the VL53L1X ToF sensor works to obtain a distance measurement. [10 marks]

The VL53L1X sensor uses a laser to measure distance. It sends out a laser pulse, and when the pulse hits an object, it bounces back to the sensor. The sensor measures how long it takes for the light to return (time-of-flight). Using this time, it calculates the distance to the object. The equation for the distance is the travel time/2 times the speed of the light.

2. What units does the VL53L1X ToF sensor return? [5 marks]

The VL53L1X sensor returns the distance in millimeters (mm). This is the standard unit for the distance measurement.

3. How many bits is one distance measurement for the VL53L1X ToF sensor? [5 marks]

The VL53L1X sensor provides distance measurements as a 16-bit value. This allows the sensor to measure distances ranging from 0 to 65,535 millimeters.

4. How many data bits can be transmitted at once using UART serial communication? [5 marks]

In UART communication, 8 data bits are typically transmitted per frame. This is the standard size for most UART communication setups, although it can sometimes be configured to send 9 bits.

5. How does the UART transmitter/receiver send/receive data that is bigger than one serial package will allow? [5 marks]

When the data is bigger than the size limit of a single UART packet, it will be divided into multiple packets or frames. The UART transmitter sends each frame one at a time, and the receiver reassembles them back into the complete message. This process ensures that large data can be transmitted over serial communication.