DATA TRANSFER USING LIGHT – FIDELITY TECHNOLOGY

Harshali Chopade BITS ID: 2015CY93014

Introduction

- Light Fidelity (Li-Fi) refers to a bidirectional, high-speed and fully networked wireless communication technology similar to Wi-Fi.
- The term was coined by Harald Haas in Global Ted talks.
- It is a form of visible light communication and a subset of optical wireless communications (OWC) and could be a complement to RF communication (Wi-Fi or cellular networks), or even a replacement in contexts of data broadcasting

Problem Statement

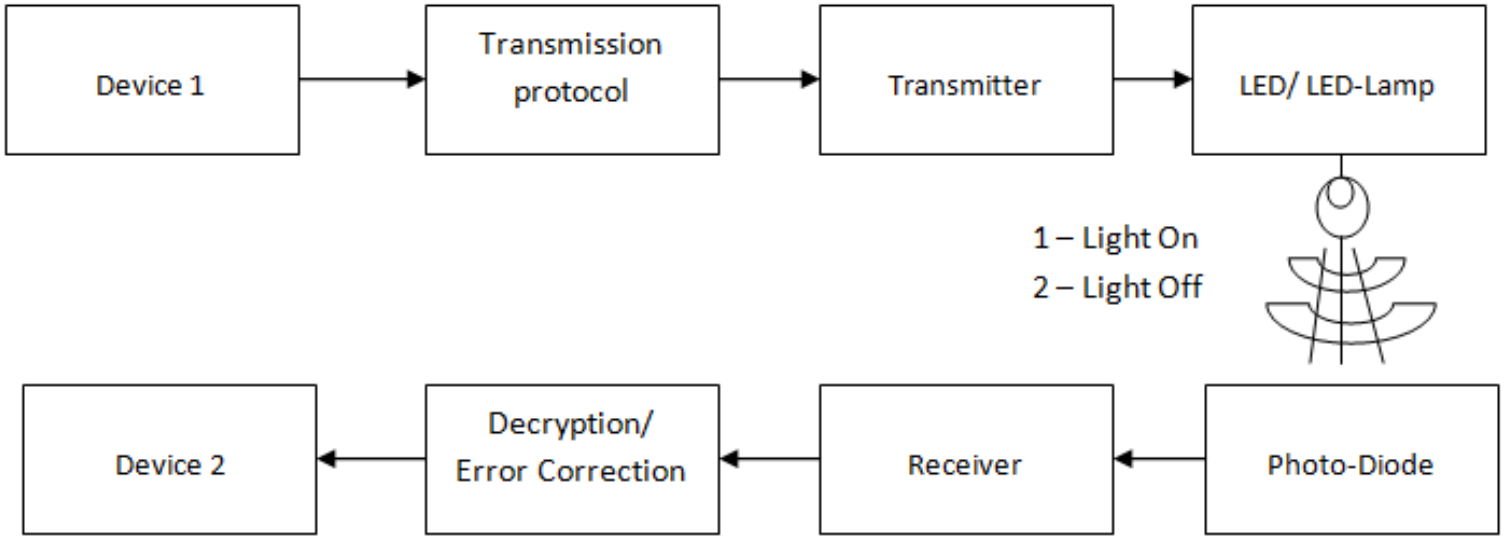
- Design and build a prototype which can transfer data using Li-Fi technology.

Objectives

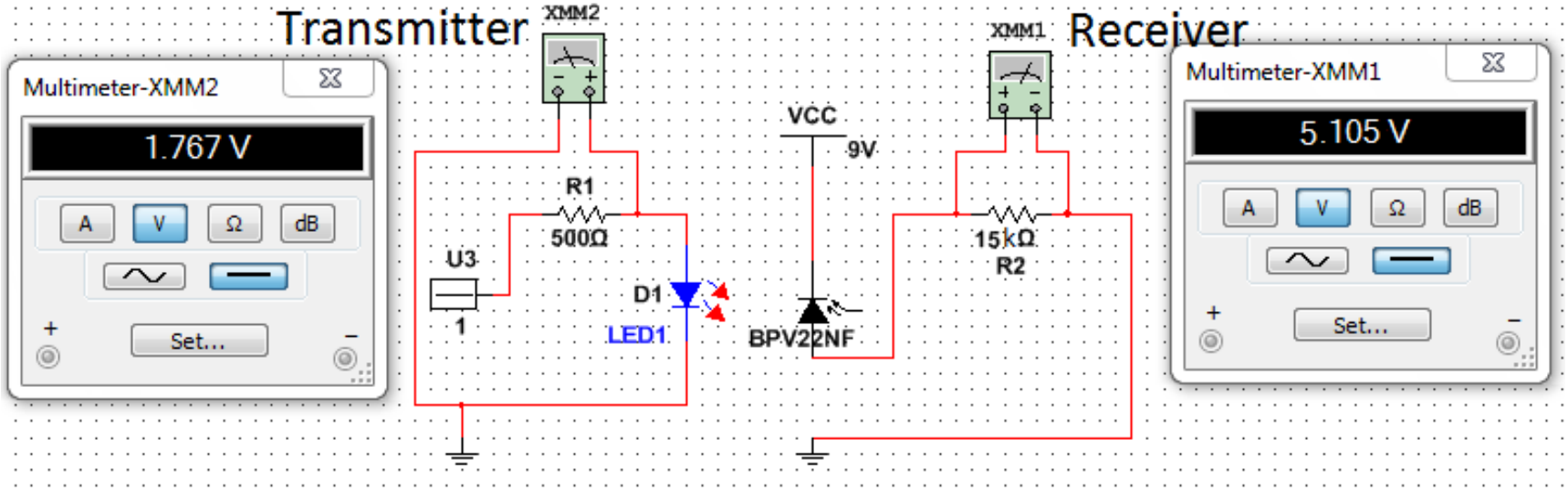
- Demonstrate that light can be used to transfer data using Li-fi technology.
- Create a prototype that transfers data using Li-fi technology.
- Create end to end application for data transmission and reception

System Architecture

Working principle

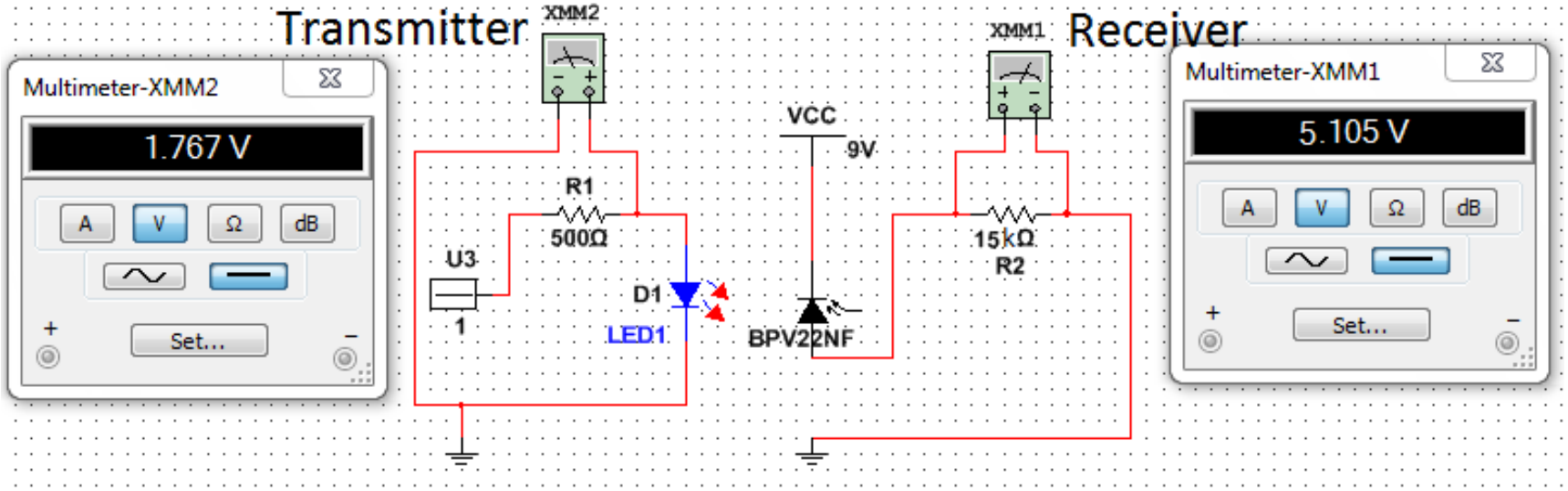


Design – Circuit Diagram



Design – Circuit Diagram

- The transmitter and receiver circuit diagram simulation is done by using MultiSIM The results suggests that when data stream bit is '1' the voltage at receiver end is 5V which can be used by micro controller. When the data stream bit is '0', the receiving voltage will be 0V.



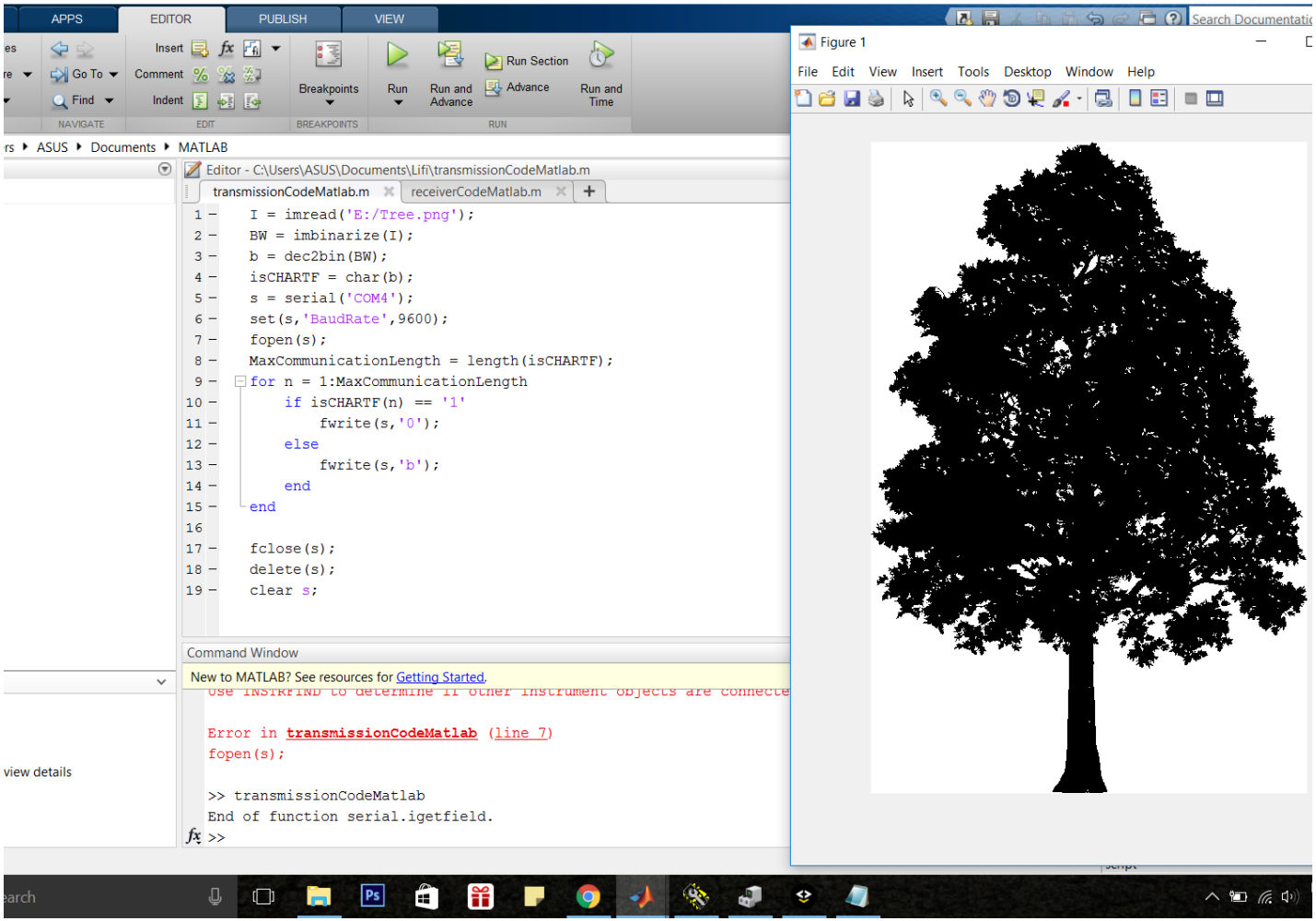
Resources

- Hardware
  - MSP430g2553 micro controller launch pad
  - LED
  - Photo-Diode
  - Device
  - Batteries
  - Resistors
  - Devices
  - Computer
  - Mobile
- Software

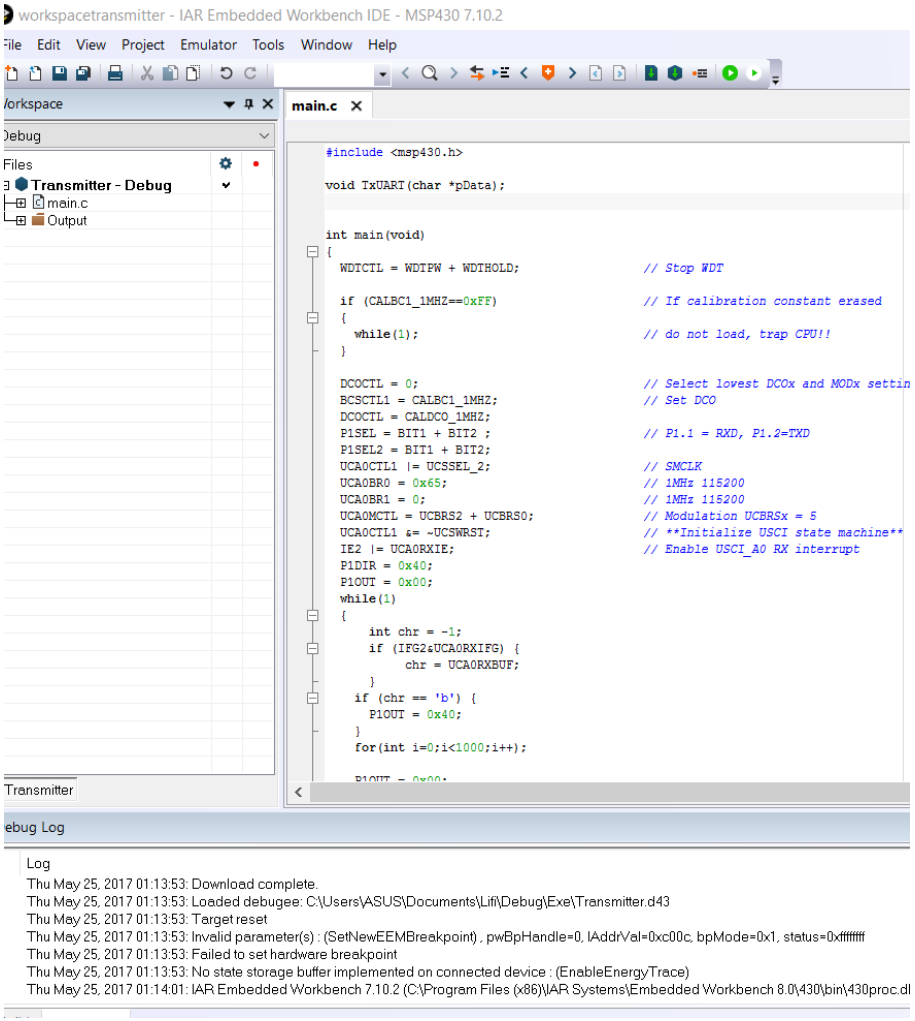
Results & Conclusion

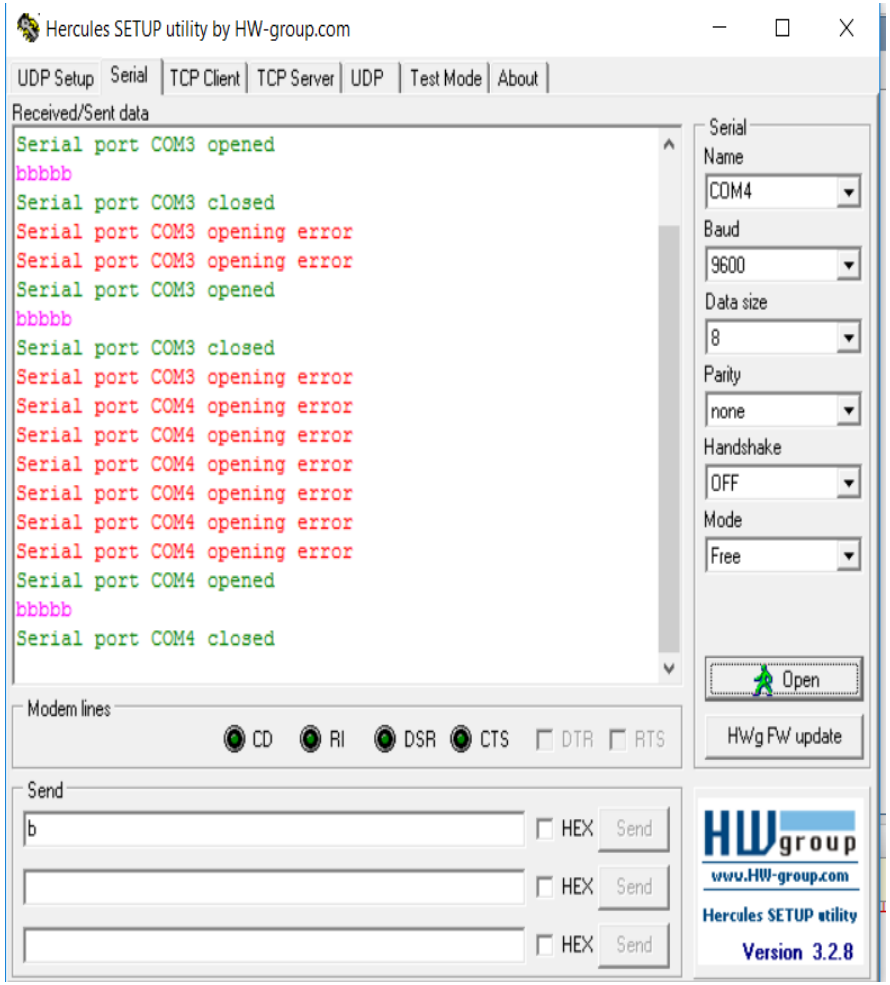
- Photo Diode and LED have been interfaced with MSP430 and results were analysed.
- The main focus of mid-sem was on designing and simulation of circuits for transmitting and receiving data (stream of '1' and '0').
- NI Multisim was used for simulation of circuit designed for transmitting & receiving data.

Transmitter

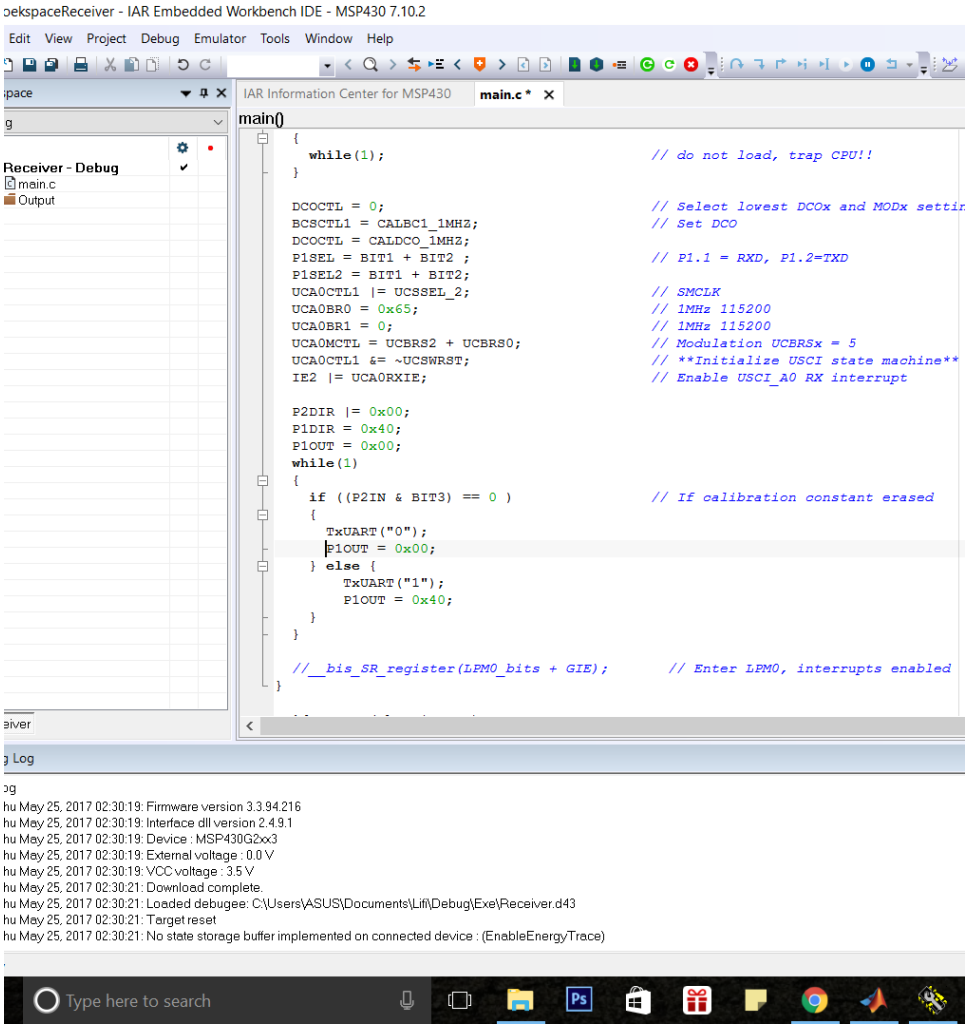


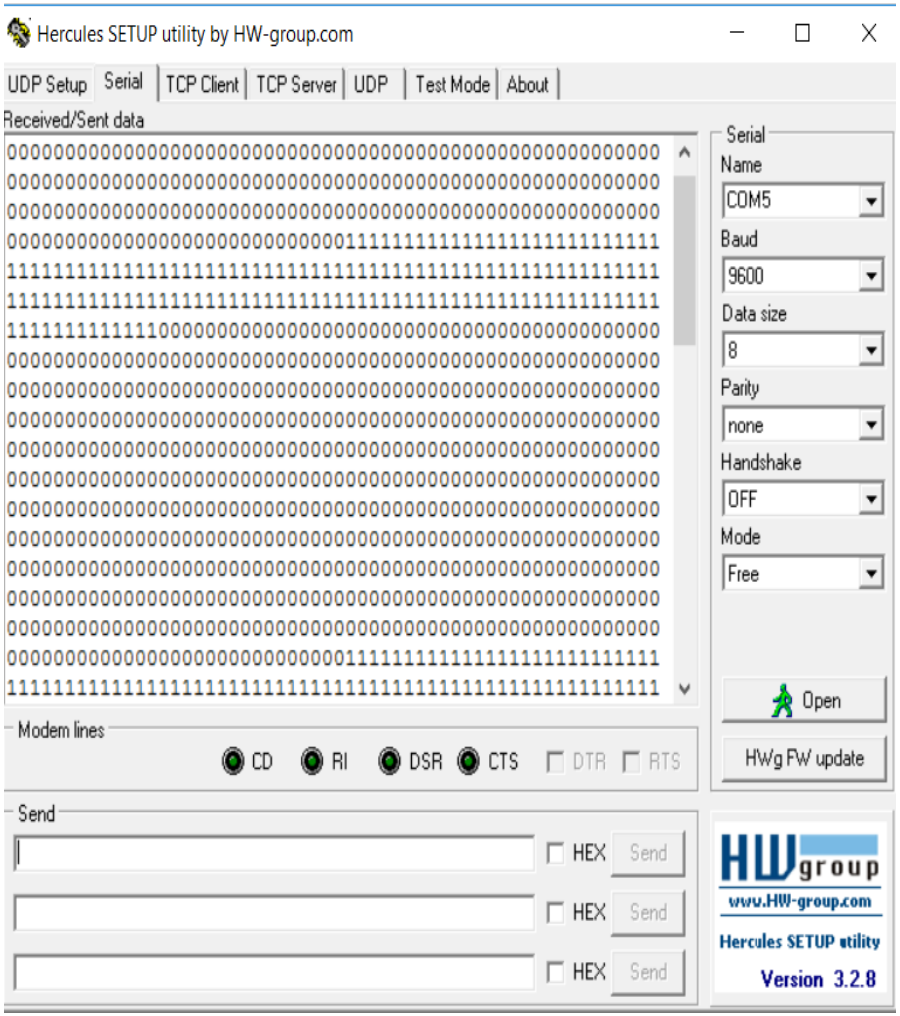
Transmitter & Debugging





Receiver & Debugging





Problem faced

- During receiving data, the reception data stream does not match with stream that was transmitted, but it showed a pattern.
- The sensitivity of receiver should be increased and this can be done using feedback op-amp at receiver.
- The internal frequency should be same at transmitting and receiving end.

Future Scope/Work

- Create application for transmission of data.

References

- Harald Haas, Liang Yin, Yunlu Wang, and Cheng Chen. What is lifi? Journal of Lightwave Technology, 34(10):1533 - 1544, 2015.
- S. Hossain, S. Islam, and Z. Abadin. Methodology to Achieve Enhanced Data Transmission Rate using LiFi in VLC Technology. International Journal of Engineering Research, 2014.
- Chris Nagy. Embedded Systems Design Using the TI MSP430 Series. Embedded Technolgy Series, Newnes, USA, 2003.
- S Chatterjee, S. Agarwal, and A. Nath. Scope and Challenges in Light Fidelity (LiFi) Technology in

Thank you