ABSTRACT

In the era of technological development, it showed a significant increase, especially in the field of communication. This study implements a communication system using VLC which is a wireless communication technology that utilizes visible light for communication media that works in the 390-700 nm range using light amplification with LASER and LED. In measuring optical signals as a need for researchers, research and industrial development, it is still very minimal and limited. Therefore the Optoscope measuring device was created which can capture optical frequency signals and then convert them into binary signals which are then displayed on the Oscilloscope monitor.

In this final project, a transmitter and receiver is designed using the Raspberry Pi with the OOK-NRZ modulation technique and Arduino Uno using UART communication. The Raspberry Pi transmitter converts from text form to binary form after which it transmits the information signal using the KY-008 Laser as well as the Arduino Uno. The Raspberry Pi receiver uses the BPW21R while the Arduino Uno uses the Photodiode module which functions as a receiver for the signal sent.

There are several testing processes in this study. Testing the Raspberry Pi with the distance parameter where the Laser can transmit information signals where the maximum results are at a radius of 617-meters using the KY-008 Laser. Bitrate testing evaluates the effect of delay, namely the delay of 0,5 (2 bit/s), 0,1 (10 bit/s), 0,05 (20 bit/s), and 0,01 (100 bit/s) where the longer the bit, the worse the result . The best Error Rate value is obtained at a delay of 0,5s at all tested distances therefore there are no bit errors, which results in a perfect SNR value when testing at a delay of 0,5s. Arduino testing using solid black packaging causes the light to be excessively saturated on the receiver side when brought closer. The distance parameter can only transmit messages as far as 50 cm for a maximum of 2 characters where the ER value is 0,045 for one character as well as the resulting SNR value with a delay of 0,01s

Keywords: Optoscope, OOK-NRZ, UART, VLC