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Robust Visible Light Communication with FPGAs

While wireless communication systems have been in use for nearly a century, very few have utilized the visible light spectrum due to its line-of-sight nature and physical constraints. Even with such drawbacks, visible light technology has uses in areas such as underwater technologies and aerial in-flight communication. We seek to circumvent the disadvantages of visible light comms by using a buffering system that will allow streaming data (such as music, radio, video) to be interrupted yet still output in real time.

In accord, we propose constructing a visible light communication infrastructure with FPGAs.

We will utilize AV02 Fiber Optic Transmitter and Receiver modules as the physical communication interface between two FPGA's. Essentially, one FPGA will transmit the message through the AV02 Transmitter, which will blink with a certain frequency according to the bits of the message being transmitted. The second FPGA will receive the message using the AV02 Receiver circuit, and will decode it while checking for errors using CRC/FEC or another comms standard.

Our main goal is to achieve seamless visible light communication; hence we will be engineering a communication infrastructure that has interruption control. Accordingly, we will output the received data with a certain lag so that the information received is buffered. In the end, the lag will ensure a robust communication infrastucture within the lag timeframe.

Time permits, we will focus on sending file types such as pictures as a reach goal.