Optical Communication System
EEL 5500 - Digital Communications I

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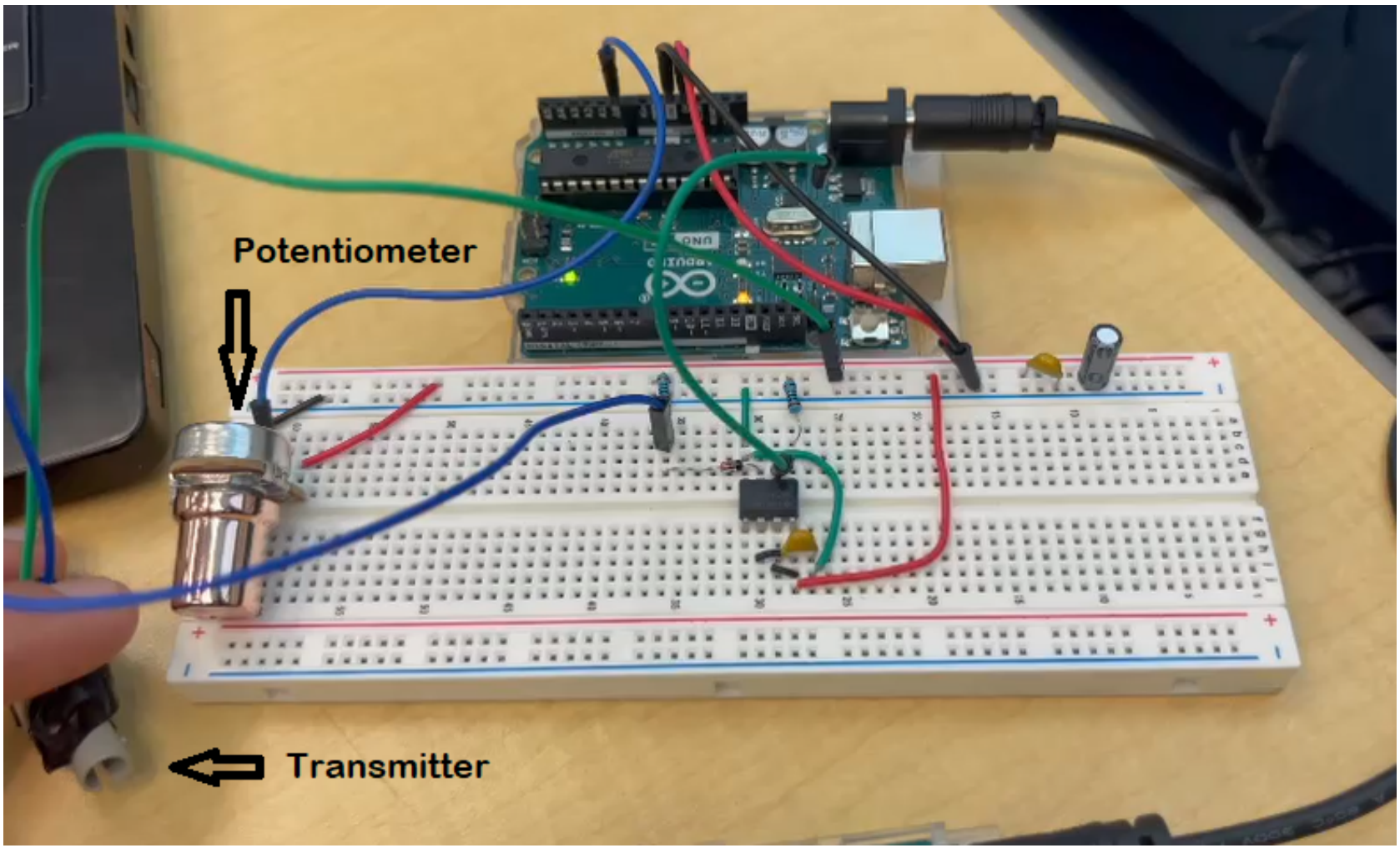
Project Description

- Create a communication channel that transmits and receives data via Amplitude Shift Key (ASK) modulation of electromagnetic carrier waves.
- We will adjust a potentiometer to a resistance value of R and this value will be transmitted via fiber optic cable and displayed on an LCD screen connected to the receiver part of the system.

Project Description



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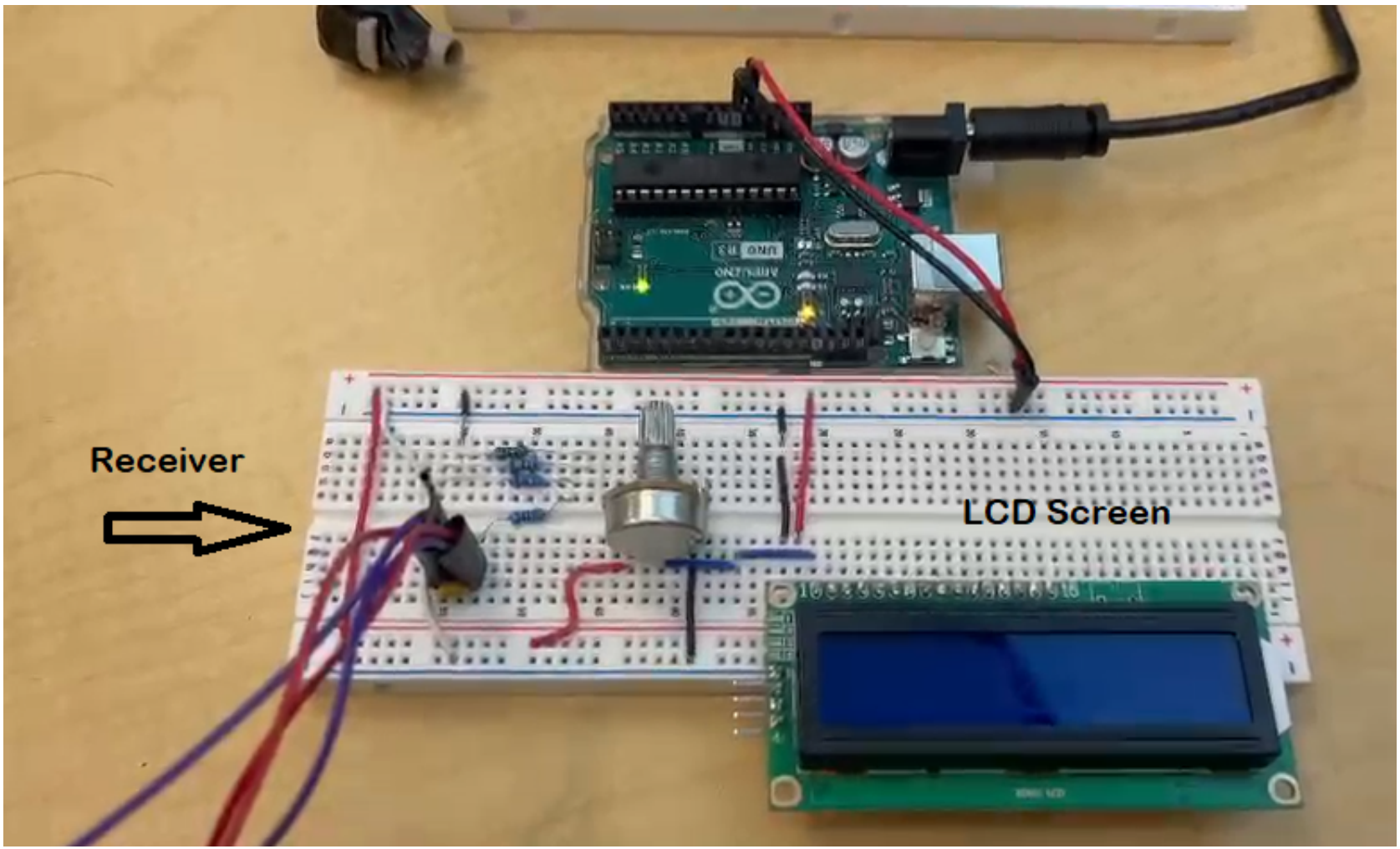
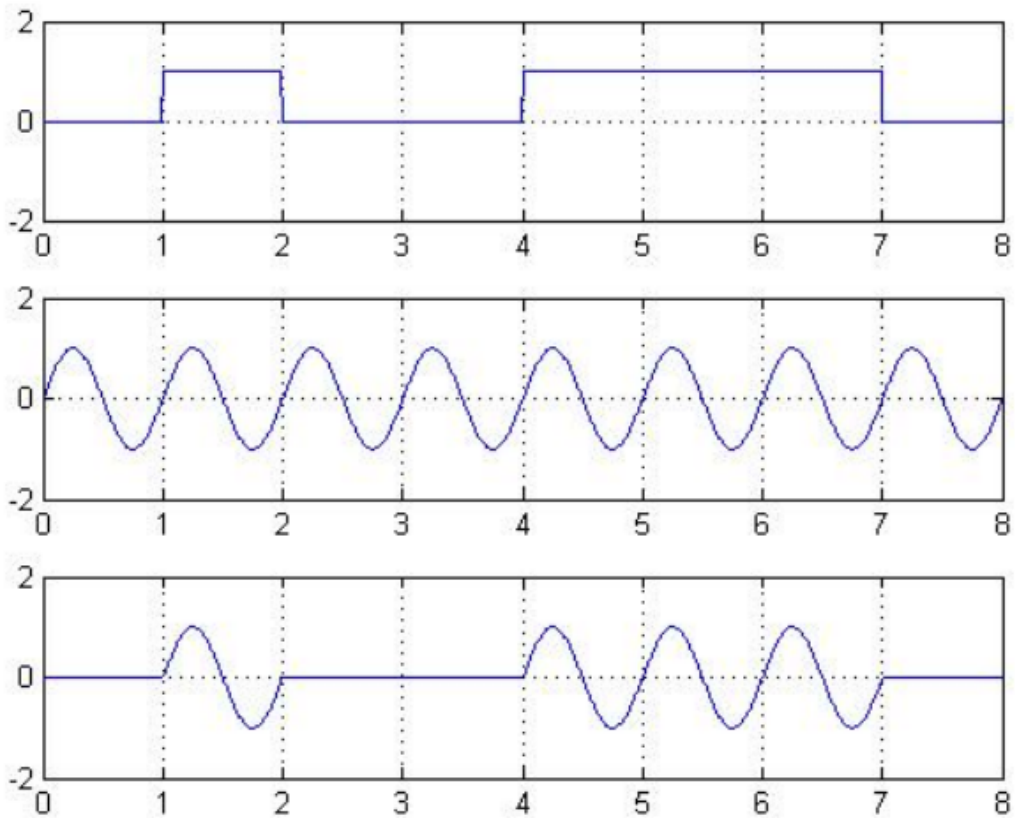


Amplitude Shift Key Modulation (ASK)

- Maps bits 1 and 0 to voltages of V_+ and $V_-(= 0V$ typically).
- Using a carrier wave with frequency ω and normalized intensity, waveform outputs $V_+ \sin(\omega t)$ and $V_- \sin(\omega t)$ are created.

Amplitude Shift Key Modulation (ASK)

- For example, sending the bit stream 01001110 ($V_+ = 1, V_- = 0$)



Demodulation

- The photodiode inside the receiver module will drive a current that is proportional to the intensity of the light signal, which will then be amplified and converted into a logic-level signal.
- RH-ASK library in C is used to code envelope detector that decodes the binary sequence and translates it to character values.

Project Progress

- Need to polish code for Transmitter and Receiver arduinos to send, encode, transmit, and display the resistance value R.
- Finish wiring the receiver system.
- Perform bandwidth, power, and noise analysis.