

# ADC: Final Project Proposal

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## Hardware Platform

We plan on using a laser to send data from an audio source to a destination platform at least 25 inches away from the transmitter. The block diagram in Figure 1 shows the proposed setup for this project. An audio signal will be 'digitized' and sent to an Arduino. From the Arduino, a control circuit will bump the signal up or down to the required voltages for the laser diode. The diode will be pulsed according to the signal and transmit the data to the photodiode. The photodiode will recover the data and pass it to an error correction block (most likely software) which will perform so error analysis before the signal is output to a speaker.

## Target Data Rate

Because our goal is to send a musical signal, a minimum data rate for our project is 128 kb/s. This is a commonly used sound rate for average quality musical tracks. However, we would theoretically like to approach 1,411 kb/s the theoretical lossless bit rate for music. While not entirely useful, since the human ear has difficulty perceiving the difference between the two, it would be a stretch goal we hope to reach.

## Error Rate

Sources say that a rough error rate of 0.0001 (1 in 10,000) is usually acceptable in audio streams. We will strive to achieve this but our minimum goal is 0.001 (1 in 1000). To achieve our higher rates, we will attempt to implement error correction in our system. With proper error analysis and correction, the acceptable rate should not be hard to achieve.

## Link Length

The minimum length of the link that we will be attempting is 25 inches. Once that goal is met, we plan to try to greatly increase this distance in stages. With each stage, we will analyze the rise in error that occurs and try to discover our maximum achievable distance.

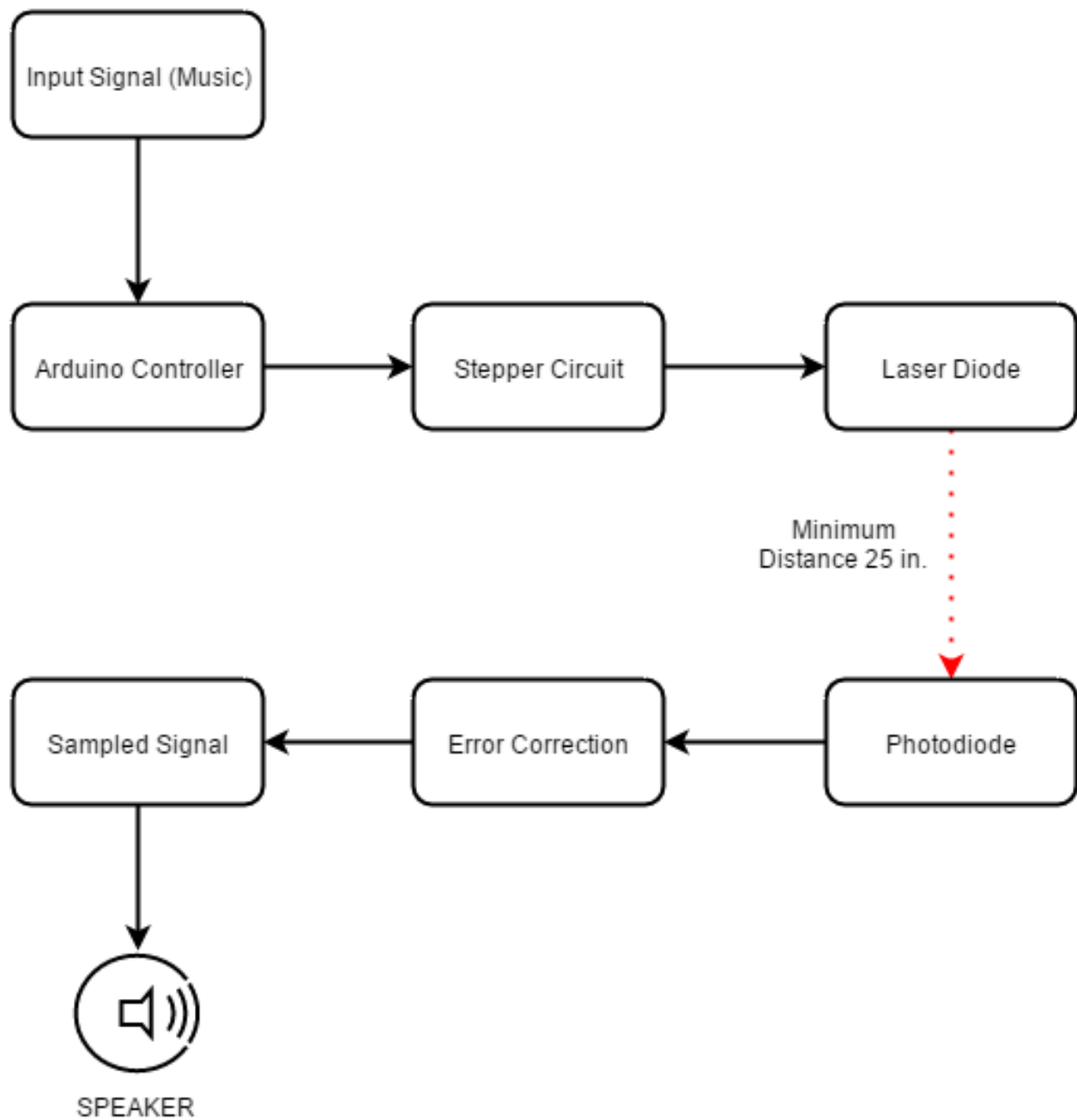


Figure 1: The Block diagram showing our system setup.