

Automated Juvenile Fish Counter

Design Team: Quint Foggin, Symone Griffin, Josh Walewander

Industry Mentor Team: Matt Bleich, Andy Ollenburg, Ernest Wooldridge

Faculty Mentor Team: Tai-Chang Chen, Aaron Marburg, Andy Stewart, Howard Chizeck, Yana Sosnovskaya



ELECTRICAL ENGINEERING
UNIVERSITY of WASHINGTON



Problem

Tacoma Power utilize a fish collector to complete the migration cycle of Sockeye Salmon. Unfortunately, the pens overcrowd and create dead zones, suffocating and killing the fish in the process. Debris also builds up and creates a wall blocking the fish from entering the pens, thus stranding and killing them



Fish Recognition

- Raspberry Pi 3 and Pi NoIR Camera
- Raspberry Pi runs Camera Python Script automatically at startup
- Camera mounted with a pole into the water channel
- Camera oriented perpendicular to the water channel for profile view of fish



Image A: Underwater Camera System



Image B: Underwater Camera System

Debris Recognition

- Banner Engineering QS30 Series Infrared Sensors
 - Transmitter and receiver
 - Output of receiver is high when there is nothing between the sensors, low when there is something between them
- Logic computer reads the output of the receiver
- Mounted in the side of a channel



Image C: Debris System

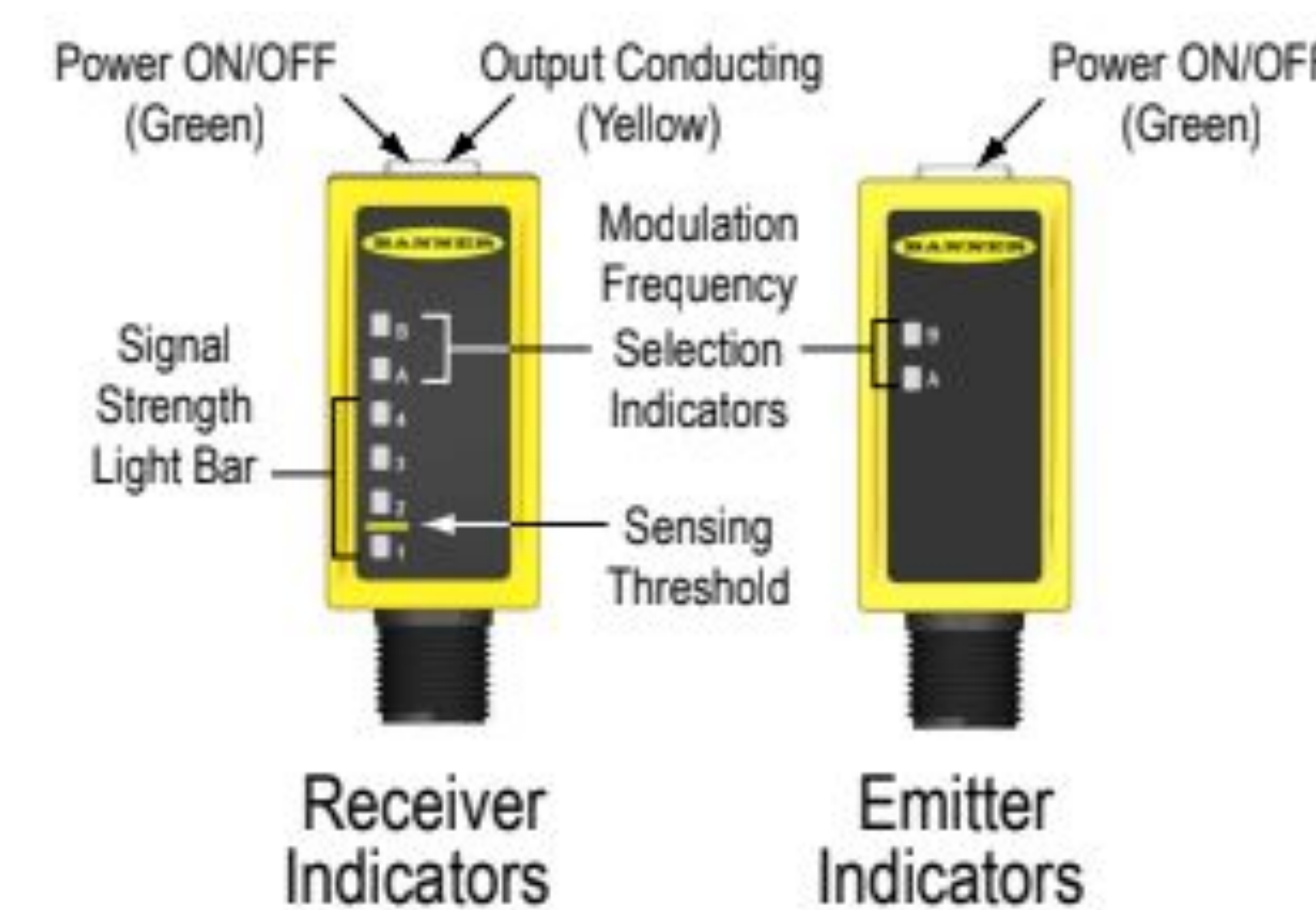


Image D: Sensor Indicator Lights

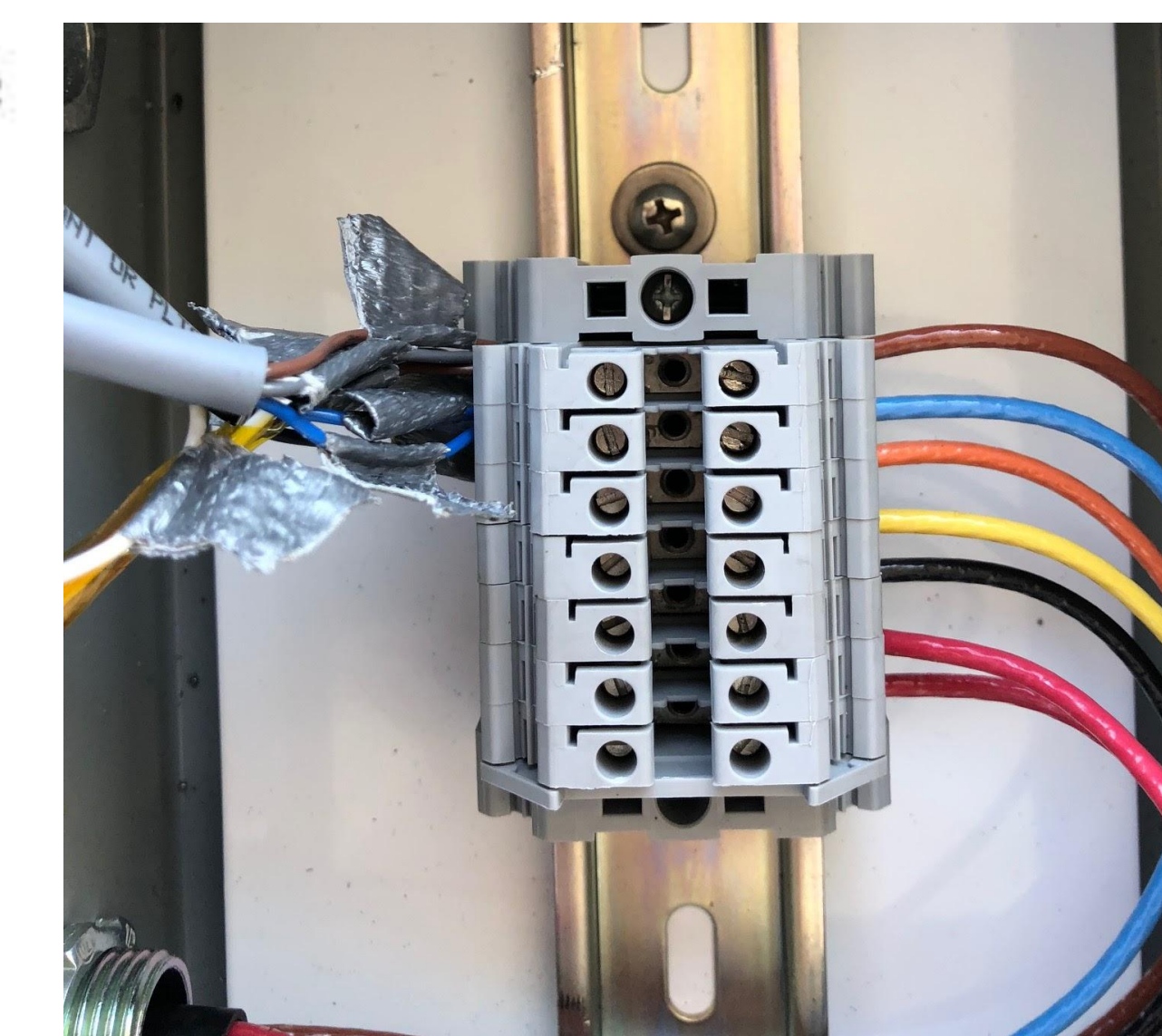


Image E: Logic Computer Junction Box



Image F: Testing System

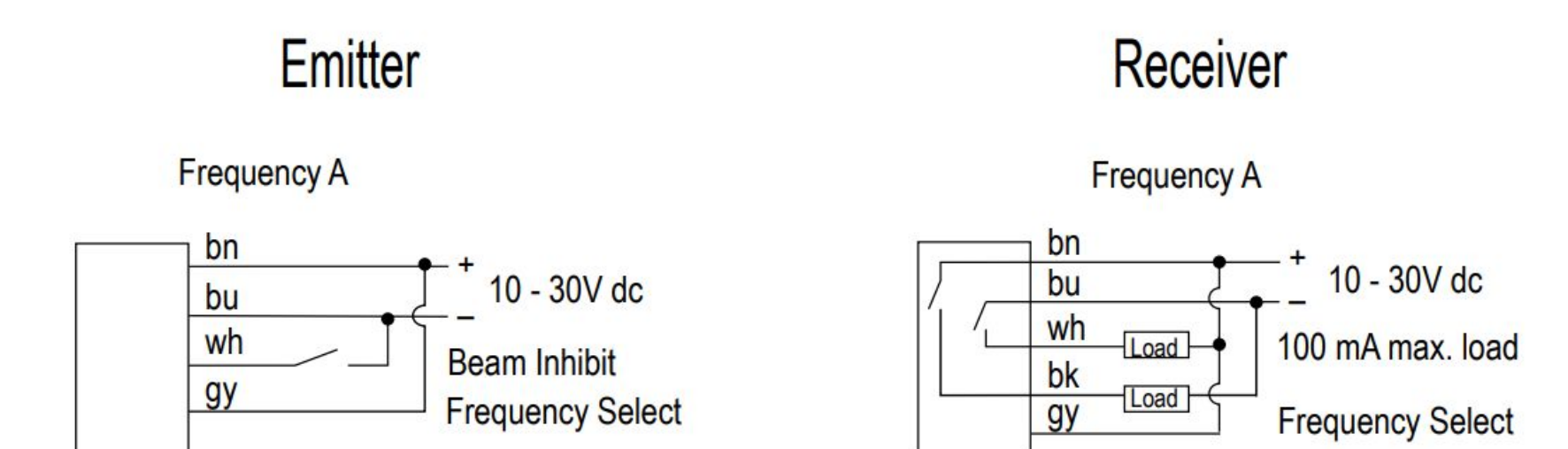


Image G: Emitter and Receiver Pinout



Image H: Sensor-Tube Interface

Results

Fish Recognition System:

- The video created for the object recognition algorithm appears clear
 - Uploads the data to a thumb drive
- The algorithm itself is still a work in progress
 - Steps were taken to set Tacoma Power up for success with future work on this project

Debris Recognition System:

- Successfully sends a signal when the debris buildup reaches the limit where a wall is built and inhibits fish from passing through
 - ~2 inches