

Checkpoint #4

Full Function Demonstration

Demo Due: 12/02/2022

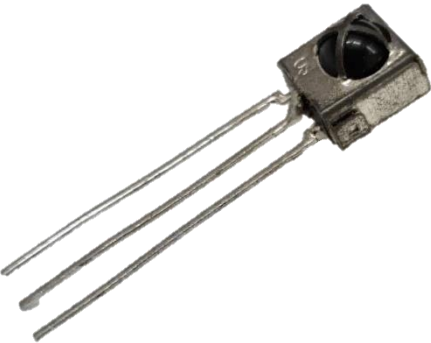
Report Due: 12/09/2022

Outline

- CP 4 Supplies Check
- Checkpoint #4
- Introduction to IR receiver
- Goal Seeking
- Checkpoint#4 Grading Policy

CP 4 Supplies

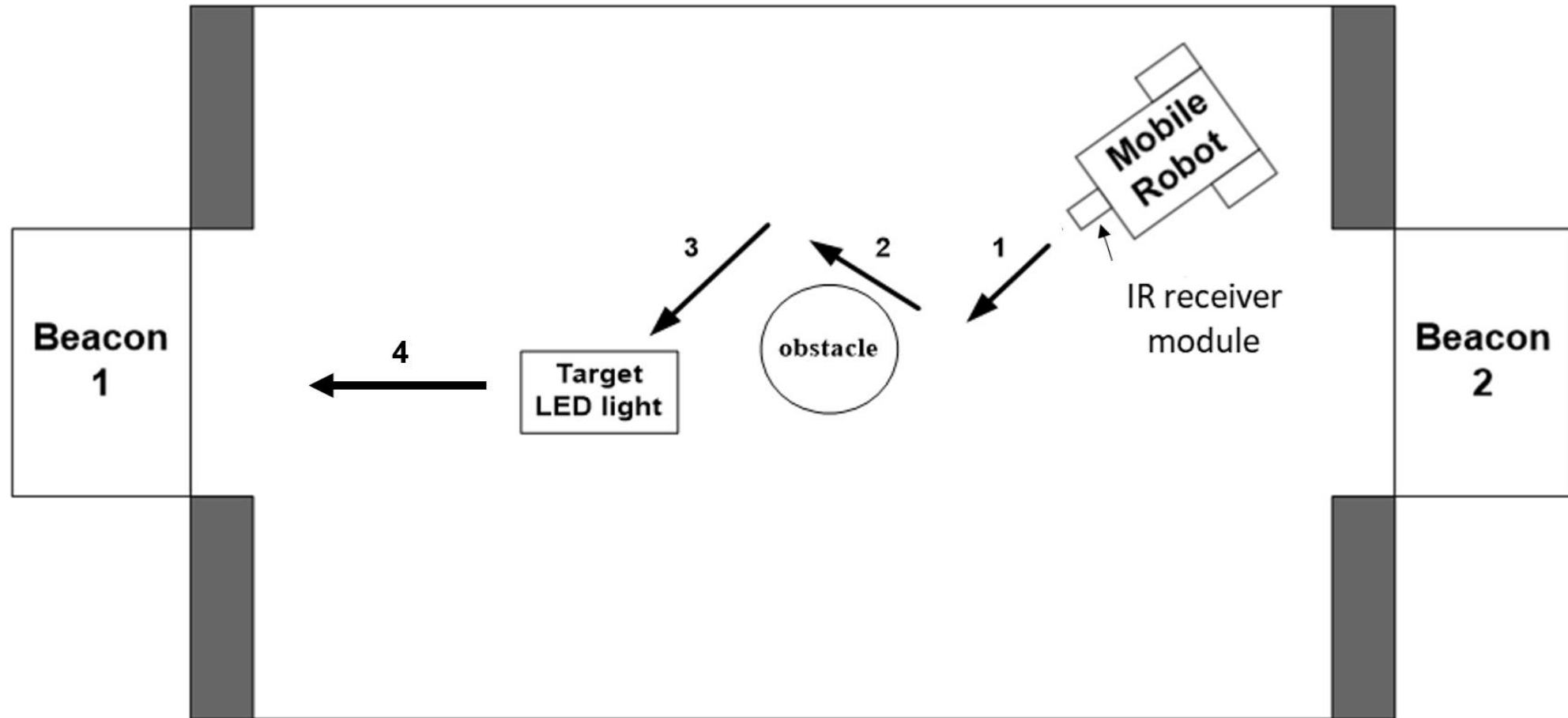
Checkpoint#4 Material List	
1	PIC-428LM IR receiver x1
Team _____	



Checkpoint#4 Assignment

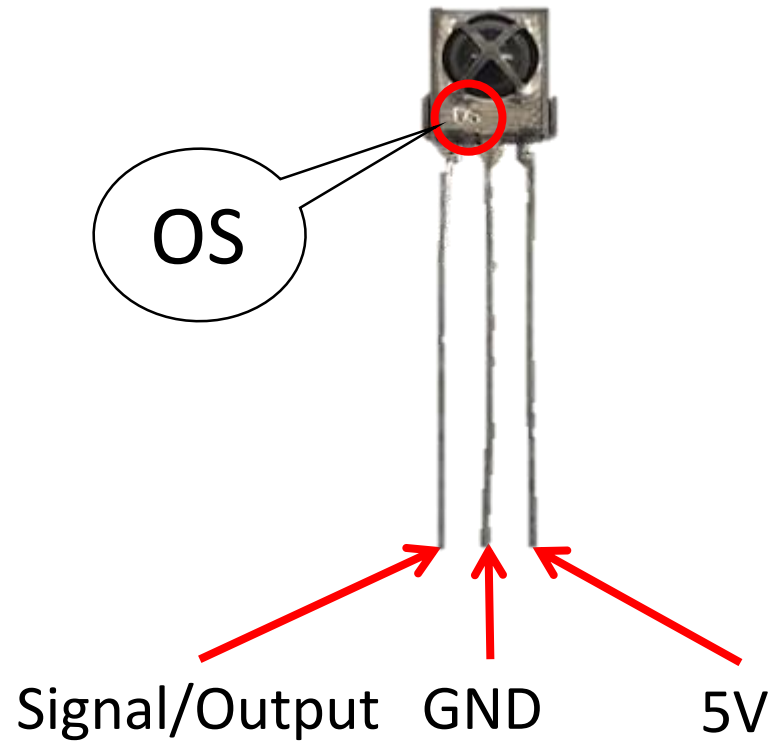
- Mobile robot can detect beacon signals and move towards it.
- Combine all the function together for robot hockey contest.
 - Obstacle avoidance
 - Hockey puck seeking (Light-ball detection)
 - Goal seeking (IR signal receiving and moving toward goal)
- Two infrared diodes will be set up at opposite ends of an arena. Each diode will be emitting light modulated at 38 KHz, but their pulse widths are different when received by IR receiver module.

Arena



IR receiver

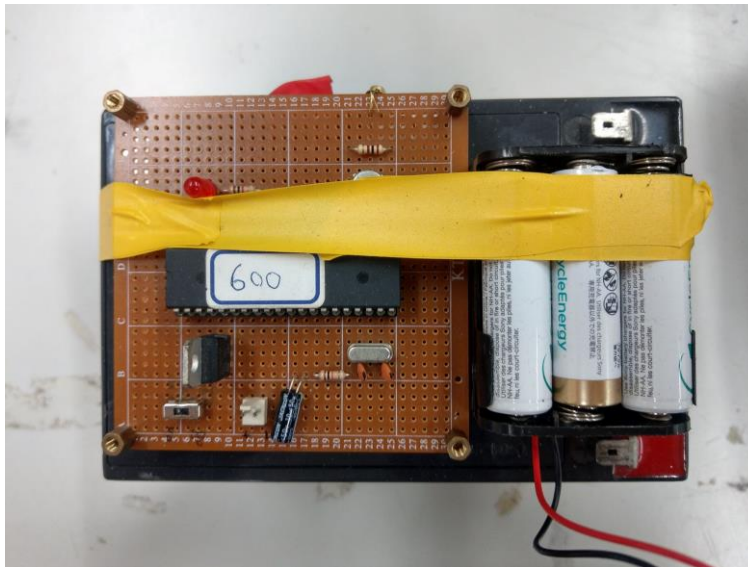
- Using IR receiver on board the mobile robot to find each of **beacons(Beacon-1 600 and Beacon-2 1500)**, which are the goals set up in the arena.



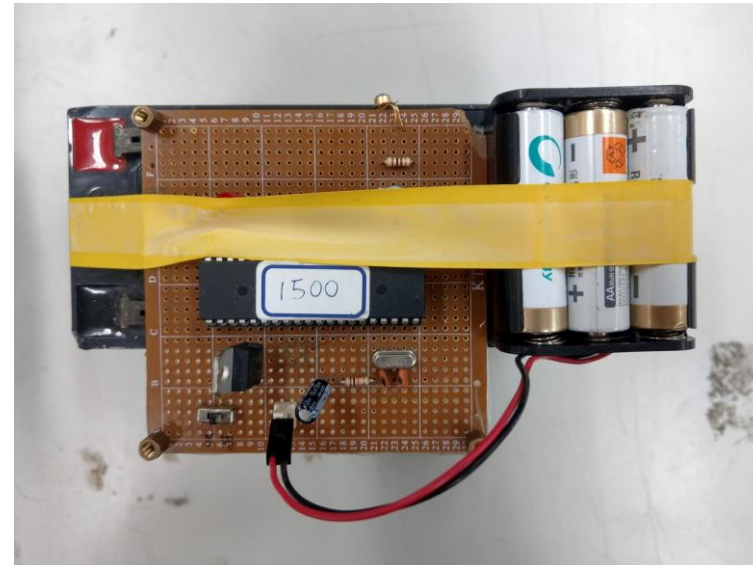
Beacon (Provided by TA)

- Two infrared diodes are set up at opposite ends of the arena.
- Each Beacon will emit light modulated at 38KHz, but their pulse widths are different when received by the IR receiver module.

Beacon1
600

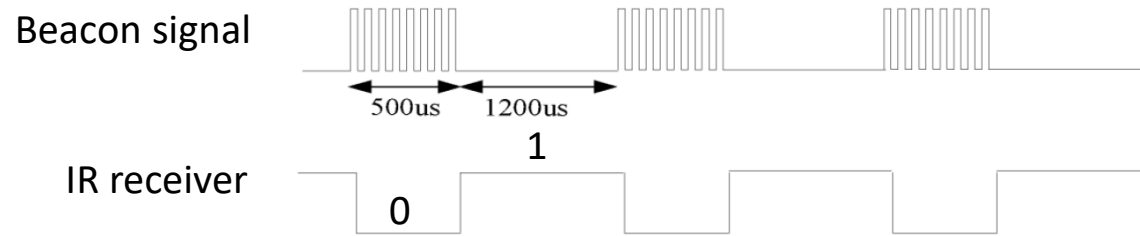


Beacon2
1500

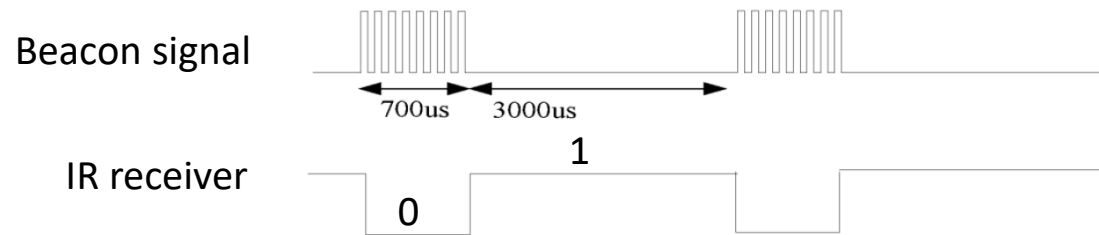


Beacon

- Beacon-1 600



- Beacon-2 1500



- Receive IR data for a period of time(≥ 0.1 seconds) and calculate the pulse proportion.

$$\text{Ratio} = \frac{\text{number of 0}}{\text{total data(include 0 and 1)}} \begin{cases} \text{If your goal door is Beacon1_600, the ratio is between 0.27 and 0.32.} \\ \text{If your goal door is Beacon2_1500, the ratio is between 0.17 and 0.22.} \end{cases}$$

Grading Policy

- Have the ability to avoid all the obstacle in the arena. (10%)
- Capture the hockey puck. (10%)
- Your robot should be able to find **two different beacons (Beacon1_600 and Beacon2_1500)** and move to the specified beacon in the arena. Robot brings the puck into the goal, respectively, of Beacon1 and Beacon2. (50%) (For any first Beacon : 40%; for the second one 10%)
- The time to complete the goal of **Beacon1_ 600** or the goal of **Beacon2_1500 (30%)** (The fastest) . Should complete the mission for any one goal in 60sec.

Deadline

- Checkpoint#4 Demo : 12/02
- Checkpoint #4 Report : 12/09