

Table Tennis Ball Machine

Members: Matthew Tran and Ryan Niu

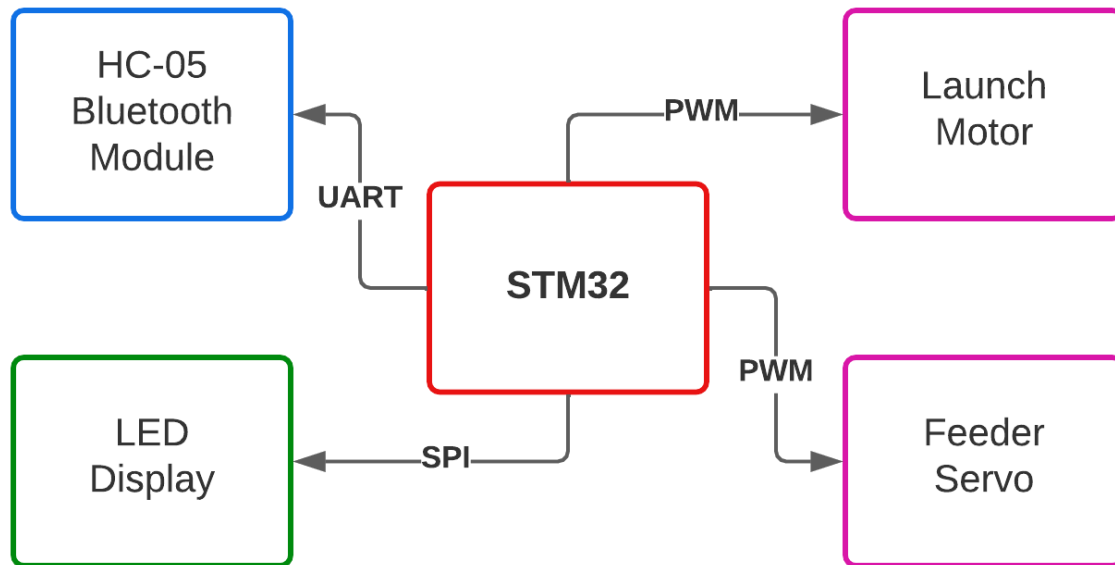
Project Overview

For this project, our goal is to create a table tennis ball machine that is controlled from a phone over Bluetooth. This machine will have three ways to customize the way it serves balls to you: number of balls served, speed of balls served, and frequency of balls served. A phone will be used to send user inputs to the controller to customize their practice. An LED display will also be used to display how many balls are left to be served by the robot. For the ball launching part of the machine we will use two motors to launch the balls. In order to launch multiple balls, we will use a servo to feed balls into the launching motors. This will allow for the robot to launch multiple balls without needing the user to manually reload it.

Peripherals/Serial Interface Protocols

- HC-05 Bluetooth Module (UART)
- LED Display (SPI)
- DC Motors (PWM)
- Servo Motor (PWM)

Block Diagram



Team Members

- Matthew Tran
 - Responsibilities: Bluetooth communication, LED display

- Ryan Niu
 - Responsibilities: Ball shooter mechanism (DC and Servo Motors)

Software Structure

- HC-05 Bluetooth Module
 - Set up a UART connection between the HC-05 bluetooth module and the STM32 board in order to receive bluetooth signals via Termité on a laptop or another application on a phone. This will allow user input of how they want to customize the serves of the machine.
- LED Display
 - Set up an SPI connection between the LED display and the STM32 board in order to update the display whenever a ball is shot. The board will know if a ball is shot based on a timer interrupt set up based on the user input via bluetooth.
- Launch Motor
 - Set up a PWM connection between the DC motors and the STM32 board in order to adjust the speed of the balls being launched. The speed of these motors will be adjusted based on the user inputs received via bluetooth.
- Feeder Servo
 - Set up a PWM connection between the servo motor and the STM32 board in order to feed the balls into the launch motors at the correct interval. The frequency of the servo feed will be configured based on user input via bluetooth.

Website Link

<https://sites.google.com/view/ece-153b-ryan-niu-matthew-tran/home>