FloatEngine MATE Competition

Overview

This repository contains the source code for the FloatEngine designed for participation in the MATE (Marine Advanced Technology Education) competition. The FloatEngine system is intended to control a motorized clock mechanism for underwater applications. It utilizes an Arduino microcontroller, a real-time clock (RTC) module, and an HC-12 wireless serial communication module.

Components Used

- Arduino microcontroller
- RTC module (DS3231)
- HC-12 wireless serial module

Dependencies

- **SoftwareSerial.h**: Library for serial communication on digital pins.
- **Wire.h**: Library for I2C communication.
- **RTClib.h**: Library for interfacing with the DS3231 RTC module.

Pin Configuration

- `dirPin`: Pin connected to the direction control of the motor.
- `dirPin2`: Secondary pin for direction control.
- `lSwitch`: Pin connected to the limit switch for motor position detection.
- HC-12 module is connected to digital pins 8 (RX) and 9 (TX).

Operation

1. **Initialization**: The system initializes all necessary components including pins, serial communication, and the RTC module. It sends the clock signal repeatedly for 15 seconds during the setup phase.

2. **Main Loop**:

    - The system continuously performs the profile operation and sends the current time over the HC12 module.

3. **Profile Operation**:

    - The motor moves down, transmitting a clock signal for 6 seconds.
    - It waits for the limit switch to be triggered, then stops the motor and waits for 30 seconds.
    - The motor then moves up, transmitting a clock signal again for 6 seconds.
    - It waits for the limit switch to be triggered once more, stops the motor, and waits for another 30 seconds.

4. **Transmission**:

- The `transmit` function allows for the transmission of a clock signal for a specified duration.

5. **Motor Control**:
    - `up()`: Moves the motor up.
    - `down()`: Moves the motor down.
    - `rotate()`: Rotates the motor in the specified direction.
    - `stopMotor()`: Stops the motor.

6. **Clock Transmission**:
    - The `sendClock` function retrieves the current time from the RTC module and transmits it over the HC-12 module in the format "Orcas EX05 HH:MM:SS".

Usage

1. Ensure all components are properly connected to the Arduino board.
2. Upload the provided code to the Arduino.
3. Power on the system.
4. Monitor the HC-12 module for clock signal transmissions.

Notes

- Adjust `downDelay` and `upDelay` variables to customize the delay between motor movements.
- Modify the `transmit` function to change the duration of clock signal transmissions.
- Ensure proper wiring and setup of the limit switch for accurate motor position detection.

For any inquiries or assistance, please contact me.