Control System for Hubsan x4 Drone using an Arduino Uno

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1. Executive Summary

This project is associated with creating a control system for a Hubsan x4. The objective is to replace the controller for the Hubsan x4 by an Arduino. The steps we have taken to approach the project are building the transmitter circuit of A7105, coding to bind and fly the Hubsan x4, and controlling through keyboard inputs on a webserver. The benefit of this project is for users whose controller is not working. In addition, it is for users who want to hack into the Hubsan x4 system using an Arduino.

2. Project Objectives

Project will meet the following objectives:

- Achieve proper circuit work with the code using Arduino Uno
- Develop and program the server/client architecture for the drone
- Program the radio transceiver for communication between the drone and Arduino Uno
- Implement the command controls for the drone

3. Project Approach

We will develop the control system in three different phases. In the first phase we will be modifying the Coptermanager library written by andihit. By modifying this library we will be able to program the server/client architecture for the drone and the Arduino Uno application that communicates with the drone. In the second phase, we will establish a connection between the Arduino Uno and the drone through proper circuit work and programming of the radio transceiver. In the last phase we will implement the command controls for the drone.

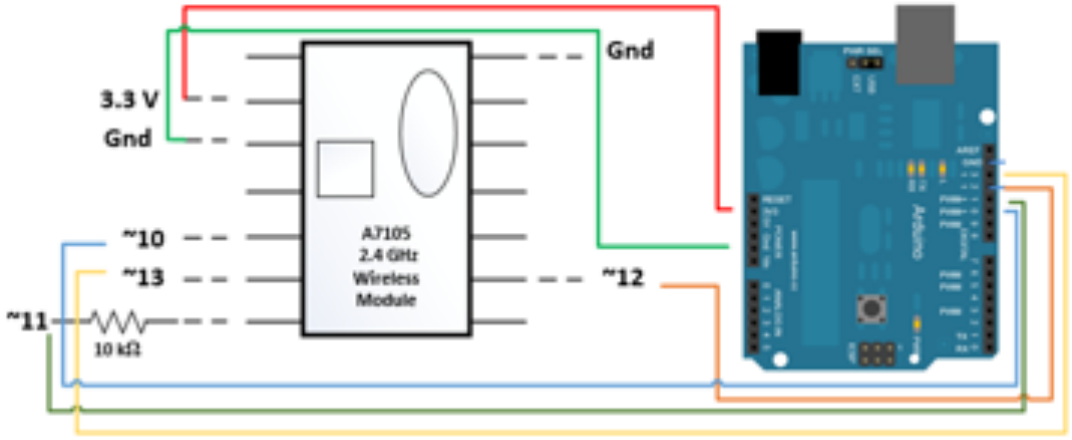
4. Design Details

The following tools and technologies used are:

- Hubsan x4 Drone
- Arduino Uno
- Amic A7105 Wireless RF 2.4GHz Transceiver Module 2400-2483M 3.3V FSK GFSK
- Breadboard
- 10 kΩ Resistor
- Jumper wires
- Solder Equipment
- Computer and Keyboard

5. Project Description

A7105 Transciever Connections **Arduino Uno Connections**



Command Control **Hubsan x4 Drone**

6. User's Manual

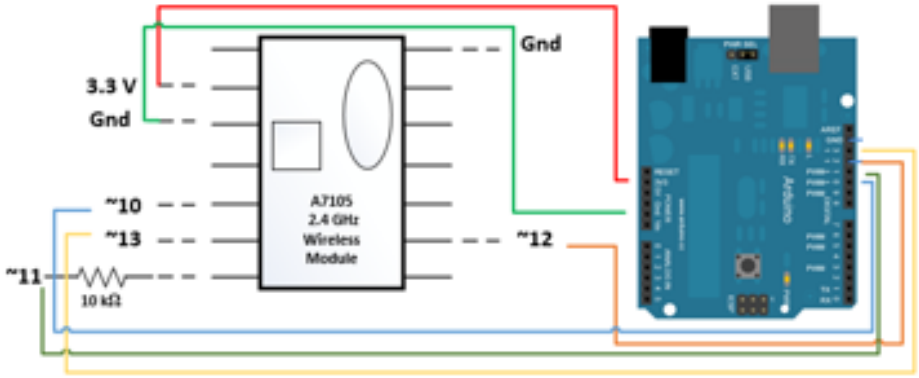
Instructions to deploy:

1) Connect Arduino Uno with the Transmitter station to the computer using USB cable
2) Upload the code to the Arduino Uno
3) Once upload is complete open the Serial Monitor
4) In the Serial Monitor enter "000101" to bind the hubsan x4 drone (Bind is complete when the blue leds stop flashing and maintains still).
5) Then enter any of the commands to fly the drone. For example: "0102AA" (More commands can be found in the documentation of where we referenced from: https://github.com/napsternxg/coptermanager-arduino).
6) To disconnect enter: "010B00"

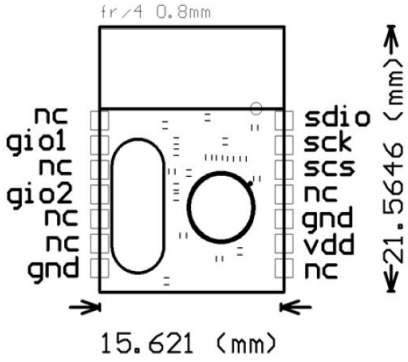
7. Programmer's Manual

Follow the assembling:

A7105 Transceiver Connections



A7105 Pin Reference



For more information please refer to the video and the code in the submission.

8. References

[1] https://smexyyweby.wordpress.com/2015/04/06/flying-hubsan-x4-using-arduino/
[2] https://github.com/andihit/coptermanager-arduino
[3] http://www.instructables.com/id/Easy-Android-controllable-PC-Interfaceable-Relati/step5/Building-the-Arduino-driven-radio/
[4] https://github.com/napsternxg/coptermanager-arduino/wiki
[5] https://github.com/andihit/coptermanager-simple