

RC Plane

Project Title: 4-Channel RC Plane with Arduino Controller

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1. Introduction

This document describes how to build a simple radio-controlled (RC) plane using an Arduino microcontroller and standard RC components. The plane is controlled via 4 channels: **Throttle, Rudder, Elevator, and Aileron**. This project is ideal for learning the basics of aerodynamics, servo control, and embedded systems in aviation.

2. Components Required

Component	Quantity Description	
Arduino UNO or Nano	1	Microcontroller
4-Channel RC Transmitter	1	With corresponding receiver (FS-i6, etc.)
Servo Motors (SG90/Metal)	3	Controls rudder, elevator, aileron
Brushless Motor + ESC	1 each	For throttle (propulsion)
Propeller (6x4, 8x4)	1	Choose based on motor compatibility
LiPo Battery (3S 11.1V)	1	Power source
Foam Board / Balsa Wood	As reqd.	For airframe construction
Jumper Wires	8+	Servo and ESC connections
Battery Connector (XT60)	1	Battery to ESC

3. Assembly and Connections

3.1 Receiver to Arduino (Input)

Connect the signal wires from your RC receiver channels to the Arduino:

RC Channel Arduino Pin

CH1 (Throttle) D2

CH2 (Rudder) D3

CH3 (Elevator) D4

CH4 (Aileron) D5

Ensure all GND pins are shared (Receiver and Arduino).

3.2 Arduino to Servos/ESC (Output)

Function Arduino Pin Connected Device

Throttle D9 ESC (Throttle output)

Rudder D10 Servo motor

Elevator D11 Servo motor

Aileron D12 Servo motor

Use an external power source (like BEC from ESC) to power servos via VIN/GND.

4. Arduino Code (Control Logic)

The Arduino reads PWM signals (1000–2000 µs) using `pulseIn()` and outputs them directly to servos and ESC via `writeMicroseconds()`.

Core Functionalities:

- Reads each channel's signal
- Maps signal to servo/ESC PWM range
- Minimal latency control

Refer to the code titled **Rc Plane Controller** for full implementation.

5. Testing Procedure

1. Power up receiver and transmitter (bind them first)
2. Power Arduino using USB or BEC
3. Upload code from Arduino IDE

4. Move sticks on the transmitter to test movement:

- Throttle stick: Motor spins via ESC
- Rudder stick: Rudder servo rotates
- Elevator stick: Elevator servo moves up/down
- Aileron stick: Aileron servo moves left/right

5. Adjust trims in transmitter or code for tuning

6. Troubleshooting

Issue	Cause	Solution
Servo not moving	Wrong pin / low power	Check wiring / supply from ESC
Receiver not responding	Not bound to TX	Rebind and power cycle
ESC not arming	PWM range mismatch	Calibrate ESC / verify pulse width
Delayed response	Code blocking / low baud rate	Optimize loop timing / add filter

7. Future Enhancements

- Add flight stabilization with gyroscope (MPU6050)
 - Add autopilot with GPS for waypoint navigation
 - Convert to FPV (First-Person View) with video transmitter
 - Design 3D-printed or CAD-based airframe
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8. Summary

This RC plane project demonstrates real-time control using Arduino and basic RC components. It's an excellent foundation for those looking to enter drone development, aeromodelling, or embedded control systems.

For collaboration, improvements or support, contact Jaywing Technology at support@jaywingtech.in.