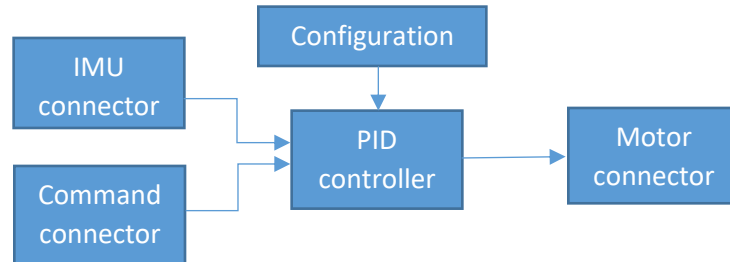


BirdFC - Modular Flight Controller

Design Review



PID Controller

Proportional, Integral and Derivative controller. It takes the input from the IMU sensor and applies the commands data to calculate the motors values. It requires configuration to select the flight mode (X or +) and to match the propellers to the outputs.

IMU connector

It reads the IMU sensor and returns pitch and roll in degrees and yaw values in degrees per second. Pitch is a float, range goes from -180 to 180, where negative values are nose down values, positive are nose up values and 0 is flat. Roll is a float, range goes from -180 to 180, where negative values are roll counter clockwise values (looking the drone from behind), positive values are roll clockwise values, and 0 is flat. Yaw is a float, range goes from -180 to 180, where negative values are yaw speed counter clockwise values (looking the drone from above), positive values are yaw speed clockwise values, and 0 is static.

Command connector

It returns the commands to be executed in float values:

- **bf: Backward-Forward**
 - Range:-1 to 1
 - -1 full backward, 1 full forward, 0 static
- **lr: Left-Right**
 - Range:-1 to 1
 - -1 full left, 1 full right, 0 static
- **du: Down-Up**
 - Range:-1 to 1
 - -1 full down, 1 full up, 0 static
- **ccc: Counter clock-Clock**
 - Range:-1 to 1
 - -1 full counter clockwise turn, 1 full clockwise turn, 0 static

Motor connector

Receives the values for each motor in a float array. Each value goes in range 0-1 where 0 is off and 1 maximum power. The motor connector oversees communicating the values to the motors electric speed controllers.

Extending BirdFC

Each module can be replaced by a hardware specific version, allowing new hardware and applications to leverage the flight controller.

Autonomous flight

The Command connector can be replaced to operate without human intervention.