

## Firmware configuration

The “silverware” quadcopter software has a number of settings that can be changed by the user. The settings are placed in file **config.h**. After changing the settings, the project should be compiled again (build) and flashed to the quadcopter. Note that compiling the code also saves the changes to files automatically.

The settings are broken down into a few categories:

- Settings that affect flight control, such as rate , expo, and switch assignment
- Settings that control features
- settings that control quadcopter hardware, such as motor type and frequency

This info is for the H8 mini code, some settings may differ slightly in some builds.

## Flight control settings

This settings comprise of rate control, high and low, expo, if needed to be performed by quad itself ( for stock tx) and switch config, mainly for level mode switching.

### Rate

The rate is changed by the following lines in control.h file. The unit is degrees / second, and is for low rates. So on low rates (stock tx) the quad will perform a 180 degree turn in 1 second at maximum control deflection.

```
// rate in deg/sec
// for low rates ( acro mode)
#define MAX_RATE 180.0f
#define MAX_RATEYAW 180.0f
```

High rates are controlled by a multiplier, which is applied to the low rates above.

```
// multiplier for high rates
// devo/module uses high rates only
#define HIRATEMULTI 2.0f
#define HIRATEMULTIYAW 2.0f
```

## Switches (auxiliary channels)

In this firmware, the switches/buttons control quadcopter functions such as level/acro mode , headless, dual rates and flips.

This functions can be assigned to any channel, if using a devo or a module. The number of channels depends on radio protocol specifications.

For the stock tx, only some buttons can be used. The H8 tx supports only the rate button (called

expert here) and using the trims as switches. The flip button can only be used for flips.

```
// level / acro mode switch
// CH_AUX1 = gestures
// 0 - flip
// 1 - expert
// 2 - headfree
// 3 - headingreturn
// 4 - AUX1 ( gestures <<v and >>v)
// 5 - AUX2+ ( none )
// 6 - Pitch trims
// 7 - Roll trims
// 8 - Throttle trims
// 9 - Yaw trims
// 10 - on always
// 11 - off always
// CH_ON , CH_OFF , CH_FLIP , CH_EXPERT
// CH_HEADFREE , CH_RTH , CH_AUX1 , CH_AUX2 , CH_AUX3 , CH_AUX4
// CH_PIT_TRIM, CH_RLL_TRIM
#define LEVELMODE CH_AUX1
```

## Devo tx

In the above code the level function is set to “CH\_AUX1” which is the “gestures channel”. This is the default, since it works with any tx. For a devo, you could set it to “CH\_RTH” instead, for example (return home channel)

The devo channels are assigned as follows in the devo itself:

```
CHANNEL1      // Aileron
CHANNEL2,     // Elevator
CHANNEL3,     // Throttle
CHANNEL4,     // Rudder
CHANNEL5,     // Leds / Inverted
CHANNEL6,     // Flip
CHANNEL7,     // Still camera
CHANNEL8,     // Video camera
CHANNEL9,     // Headless
CHANNEL10,    // Return To Home
CHANNEL11,    // Calibrate
```

The quad firmware supports “Flip”, “headless” and “return home”

## What Gyro filters do

written by silverxxx

Unfortunately, with all the filter options, there can be a few combinations, which makes it hard to test all of them.

I usually set the 88hz second order filter, because I found that it does not usually need a pid change.

The hardware filter seems to not work well on zero setting ( 260 Hz), but it works fine on 1 and higher( 180 Hz). But I am not sure if changing from 3 to 1 would allow a perceivably improved response.

The hw filter lag saving is 3ms from 3 to 1 , and 2ms from 3 to 2, but I am not sure if it translates to higher usable D term, and hence improved response.

You might get higher response by turning off the D term filter in the pid file, also, turning the motor filters off could reduce lag. Both of this filters filter less than the software filter, so it's possible that they are largely redundant with the software filter on.

**to be continued**

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Last update: **2016/05/09 00:36**

