

## Attacking Motor Noise

### Symptoms:

- A. Rough flight performance (micro jitters = jello)
- B. Jitters (uncommanded motion in the quad)
- C. Hot motors with a reasonably low D Term

### Step-by-Step Troubleshooting:

The below step-by-step guide assumes you have enabled the **Dynamic Notch filter** in Betaflight/Cleanflight.

1. Replace props (even if brand new)
2. Check motors for vibration in Betaflight/Cleanflight Configurator
  - See <https://youtu.be/CMSaprNu9EY?t=2m48s> for example.
  - < 0.03 – awesome
  - > 0.03 and < 0.08 – OK
  - > 0.10 is a noisy motor and could be an issue.
  - If you have a bad motor (off balance, bent, or bad bearings) replace it/them.
3. Soft mount flight controller  
(See <https://www.youtube.com/watch?v=zdE1BidMwNU> for advice)
  - a. ReadyMadeRC (US): <https://goo.gl/54TxD9>
  - b. Banggood (International): <https://goo.gl/Av8AyU>
  - c. Global Industrial (US): <https://goo.gl/v6lXr3>
  - d. Multirotor Mania (US): <https://goo.gl/GWkbe7>
4. Soft mount your motors  
(See [https://www.youtube.com/watch?v=97-z5B\\_CCG](https://www.youtube.com/watch?v=97-z5B_CCG) for advice)
  - a. Banggood (International): <https://www.banggood.com/search/vibration.html>
  - b. Global Industrial (US): <https://goo.gl/v6lXr3>

These steps  
DO NOT  
add latency.

Complete Each Step, if not fixed move to next step.

# Betaflight\Cleanflight

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5. Consider lowering your Gyro and PID loop speed to 4k/4k

Adds latency.

6. Turn on your “Notch” Debug Mode and record a Blackbox log of a 2 to 3 minute flight (with a steady hover at points, punches, flips, rolls, etc...). Post log to RC Groups or FB.

a. To turn on your Notch Debug Mode:

i. In the BF CLI, type:

“Set Debug\_Mode=Notch” [enter]

“Save” [enter]

b. Facebook Blackbox Group -- <https://www.facebook.com/groups/291745494678694/>

c. RC Groups BB Analyzation Help Thread -

<https://www.rcgroups.com/forums/showthread.php?2386267-Blackbox-log-analyzation-help-thread>

d. RC Groups BB Log Video Responses -

<https://www.rcgroups.com/forums/showthread.php?2484202-Blackbox-Log-Video-Responses>

7. If noise (rough flight ... aka jello) is consistent across the flight spectrum, consider adding capacitance (capacitors).

### Recommendation:

a. Recommendation = 25+ volt 340uf capacitors to each ESC lead.

b. Alternative = 25+ volt 1000uf capacitor to the battery lead for all-in-one ESC boards.

8. Tune your Static Notch Filters

(requires Blackbox Log Analysis)

9. Consider lowering your Low Pass Filter

(requires Blackbox Log Analysis)

Adds latency.

10. Consider getting a new flight control board with a MPU6000 gyro (vs. MPU6500 or IMC gyro)

Complete Each Step, if not fixed move to next step.