Green Hornet

Quick Start and Setup Guide

by Patrick Byars

IFLIGHT
USA REPAIR CENTER

Disclaimer and Safety Guidelines

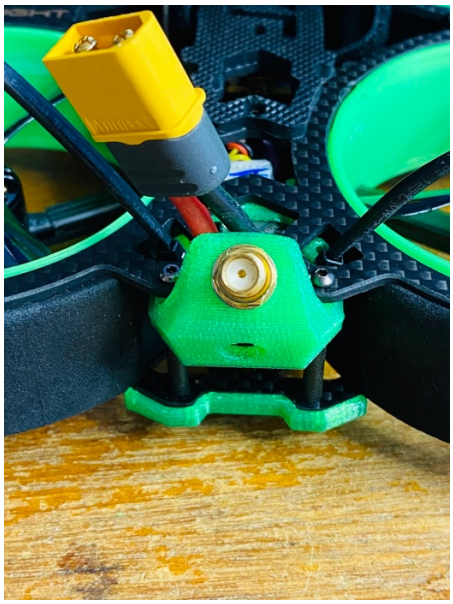
1. Store the flight battery in a dry and ventilated place away from direct sunlight to prevent the battery from overheating.
2. To avoid possible injury and damage, please fly in good weather conditions and in a safe environment.
3. Please return as soon as possible when there is low battery or strong wind conditions.
4. Please ensure that the power system or other electronic components are soldered correctly, that the power supply works normally and the various components are not damaged before flying, otherwise it may cause the equipment to burn out and other losses or damage to equipment or property.
5. Make sure to operate the aircraft in an open space. Tall steel buildings, mountains, rocks, trees, etc. may interfere with the transmitter signal on the aircraft.
6. To prevent the remote controller from interfering with other wireless equipment, please turn off other WiFi devices.
7. Do not fly near sources of electromagnetic or radio interference. Sources of interference include, but are not limited too, WiFi hotspots, routers, Bluetooth devices, high voltage power lines, high voltage power stations, mobile phone base stations, and television broadcast towers. Otherwise, the wireless transmission performance of the aircraft may be affected by interference and cannot fly normally.
8. Please charge/discharge the battery to a storage voltage of about 3.85V when the battery is not in use.

Caution:

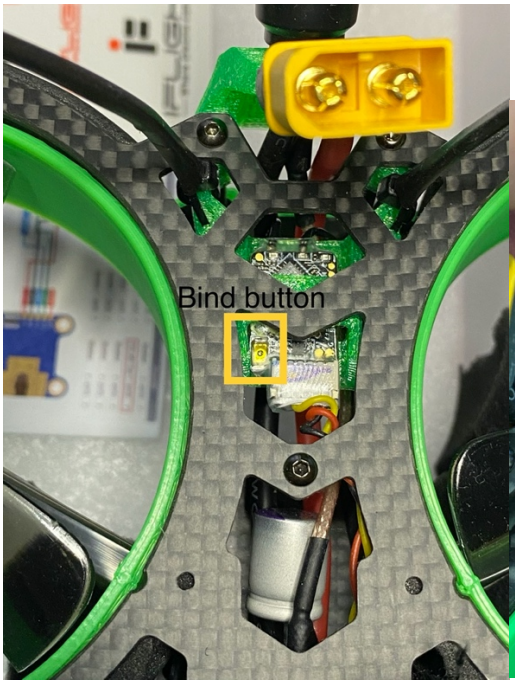
1. Users should ensure that they have a sufficient level of understanding of the aircraft and are aware of all emergency response measures.
2. Users should have a flight plan and do not be reckless, impromptu to fly the aircraft.
3. Please respect the privacy of others when you use aircraft to record video.
4. Stay away from the rotating propellers and motors.
5. After landing, first stop the motor, then turn off the flight battery, and then turn off the remote controller.
6. Turn off power or take off the propellers to prevent motors from high-speed rotation before setting the remote controller channels, upgrading firmware, and setting parameters.

Quick Start and a PSA

- The Green Hornet comes preconfigured and tuned with rates and PIDs and more.
- Only a few steps need to be performed to prepare for your maiden flight.
- Bind your Transmitter to the FrSky R-XSR in your Green Hornet.
- Understanding how your switches are setup.
- Arm and fly…
- **But… (PSA)** do not power up your quad without the VTX antenna attached ever. It will fry the power amps in the video transmitter without the load of the antenna. Always check before plugging in the battery!
- Following the Quick Start chapter is a full setup guide including how to back up your settings, update the firmware, configure the ESCs with BLHeli32 Configurator, and in betaflight setup all pages including mode switches, rates, PIDs and RPM filtering and more.



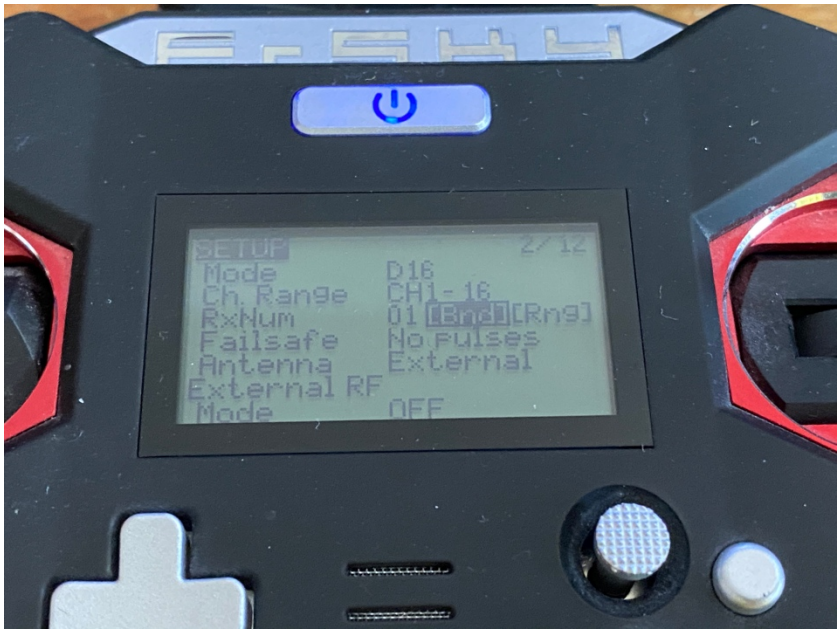
Locating the FrSky R-XSR in your Green Hornet



- Use a blunt (not your fine point tweezers, they are too sharp) tool to press and hold down the R-XSR Bind button.
- Don’t let your quad overheat, a small desk fan can save $ in the long run

Bind your transmitter to your new Green Hornet continued…

- On your Taranis or Jumper/RadioMaster go to the setup menu and scroll up from where you see your model's name (GrnHornet in this case) and over to the [Bnd] field and press enter.
- Your Taranis will start the chirping binding noise. On some like the RadioMaster the chirps will end after 2-3 sounds. On other you need to press enter again or use the exit button to stop and back out of the bind menu. You may not have bars on your Taranis but yet fear not.
- Power down and back up both Transmitter and Green Hornet. You should have a solid green LED on the R-XSR again indicated bound and the transmitter should be showing full bars of signal like the picture ☺
- Power down both transmitter and Green Hornet and let the quad cool off, it's time to #SendIt ☺



After Binding: Your Transmitter switches

- Standard convention for transmitters is all switches should be in up or the forward position which is off when you power off and on the transmitter, this is sometimes called the “safe position”.

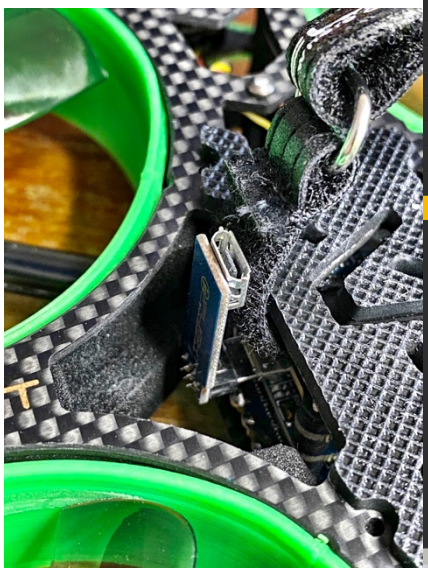
- Your Green Hornet probably came configured with just one control that you can use (arm on SA) and SB set to Angle Mode on always for all positions. I’ll show you how setup a few more later in the guide.

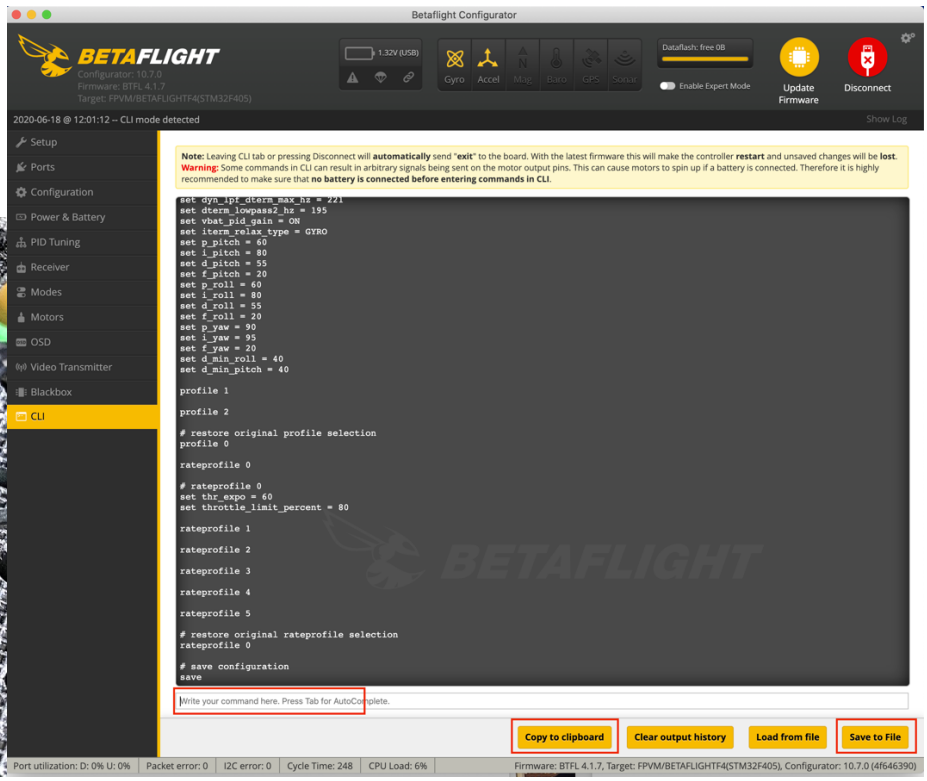
Time to Send It...

- Do not leave your Green Hornet running for a long time prior to take off. let it cool down first if needed.
- Once ready to fly, Power your transmitter and safe all switches in the up or off position. Check that the throttle is in fact at zero.
- SA is your Arm switch, move it all the way down to arm.
- If you don't have your goggles on put them on (unless just flying line of sight (LOS)) and move SA to the down or on position. To take off raise the throttle slowly but not too slowly, you want a smooth take off so give it some gas.
- To land locate the spot you want to land and come in slow and in steady forward and downward motion. Land and move throttle to zero and disarm by move switch SA to up or off position, Congratulaions! Don't forget to disconnect battery from qaud, unplug goggles and turn off transmitter once done flying.
- Following the Quick Start guide is the full Setup Guide including how to back up your settings, update the firmware, configure the ESCs with BLHeli32 Configurator, and in betaflight setup all pages including mode switches, rates, PIDs and RPM filtering and more but you don't need any of that for now, go fly! #SendIt

First thing to do before updating Betaflight

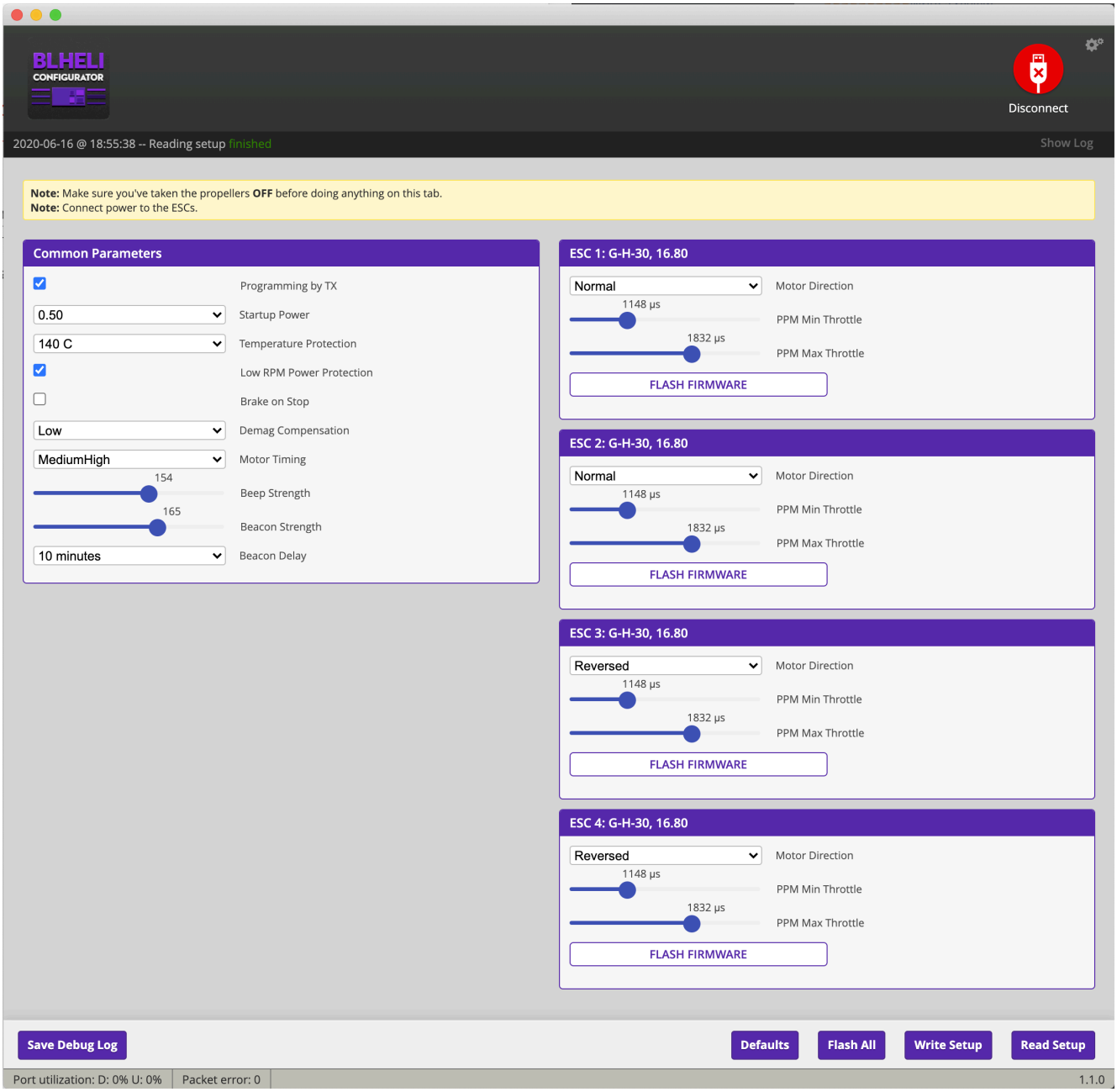
- Install the 90 deg angle micro USB adapter (it is fragile insert correctly and not at an angle into the USB port on the iFlight SucceX F4 flight controller.
- Plug into your PC or Mac (many good videos on how to install BetaFlight and BLHeli Configurator can be found on the internet) and load Betaflight Configurator.
- Following is instructions for everything needed to update in Betaflight, but for now there is only **one task – Back up your settings** BEFORE you update Betaflight. So go to the Tab / Page that says CLI.
- In the black text entry box type **Diff All** and hit enter. Lots of stuff scrolls on the screen, leave be.
- Hit the **Save to a file button** and save somewhere you can find it again. Also rename it to so you know this version from the next one you save. Hit the copy to clipboard button too ;-)



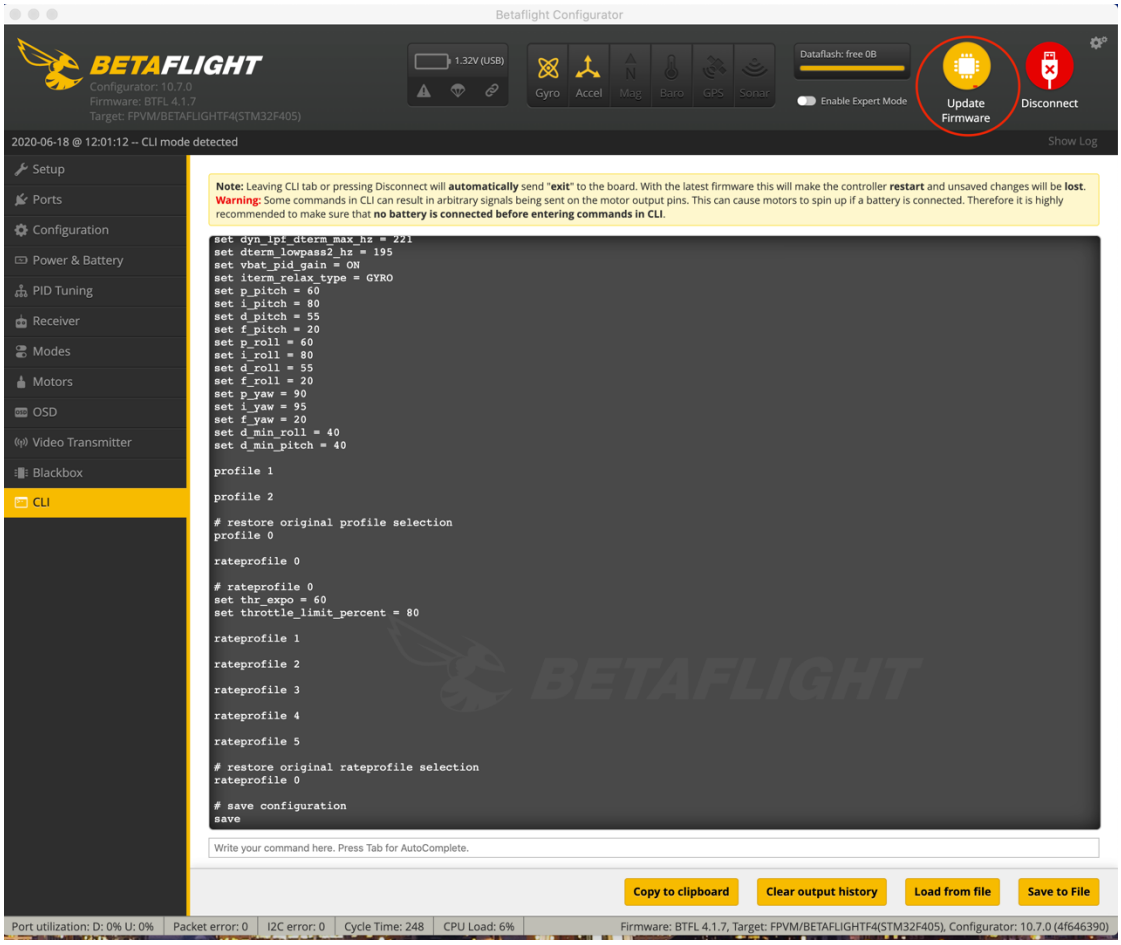


Your Green Hornet BNF comes **pre setup with the latest BLS firmware** 16.80 (currently) you don't need to do anything. Yeah!

- Should you want to update or have a newer version it is easy to do with BLHeli Configurator (not to be confused with BLHELI32, your H3 is running BLS firmware
- I recommend turning up beep and signal volume for startup and lost craft



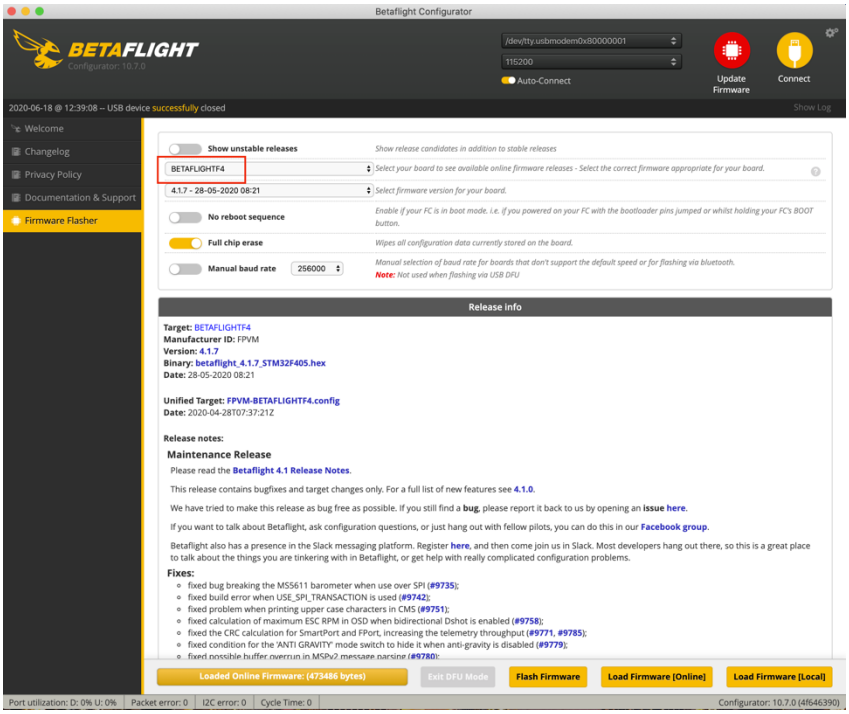
Updating Betaflight to the latest version and complete setup including RPM filtering continued…



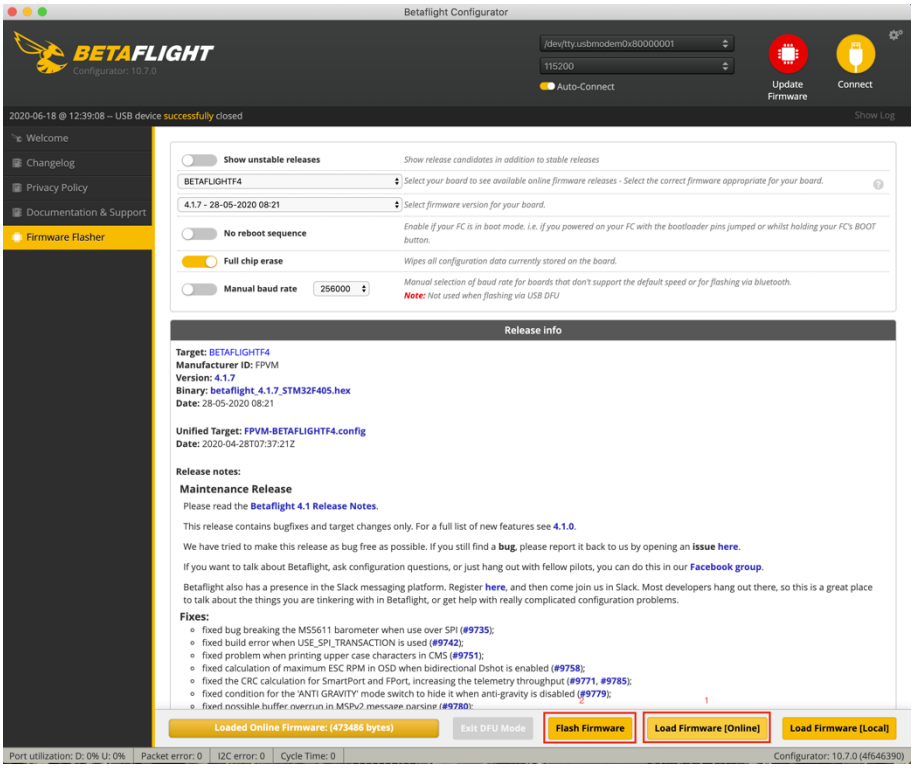
- Clear the screen with the button “Clear output history” and type “**DIFF ALL**” and then enter. The command executes (this can be done with the gui now too) then click the button **“copy to clipboard”**. Also click **save to file button** and save where you can find it again later if you didn’t do prior. But the clipboard is what we need right now.

- Next Click the **Update Firmware** round yellow button in the top right.

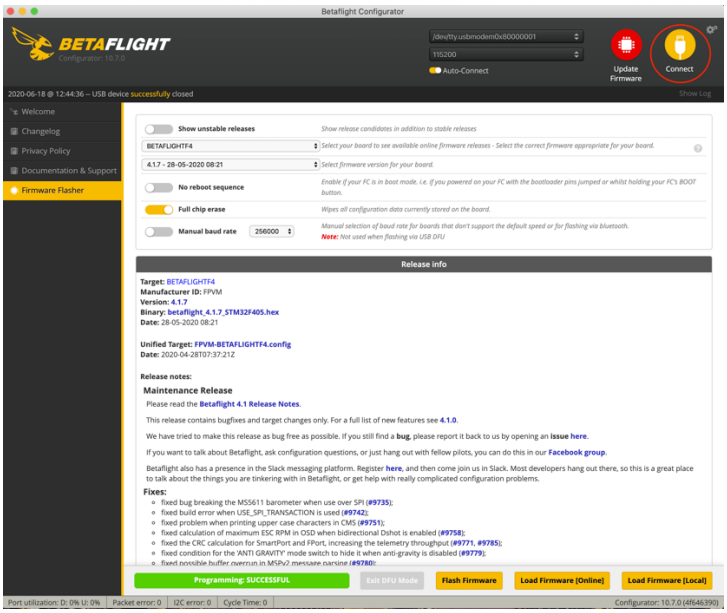
Updating Betaflight to the latest version continued…

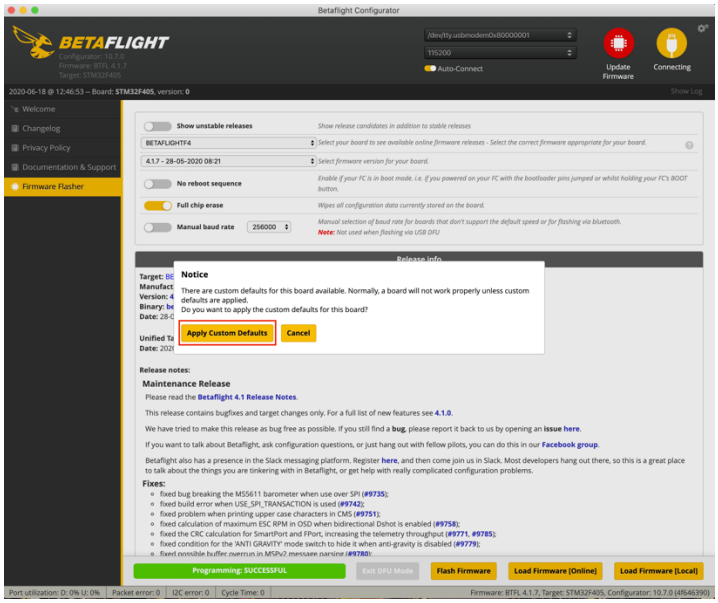


- You should be in the Firmware Flasher section.
- Select the BETAFLIGHTF4 target and the latest betaflight (as of today 4.1.7).
- Click "Load Firmware online" button.
- Click the Flash Firmware button.



Updating Betaflight to the latest version continued…

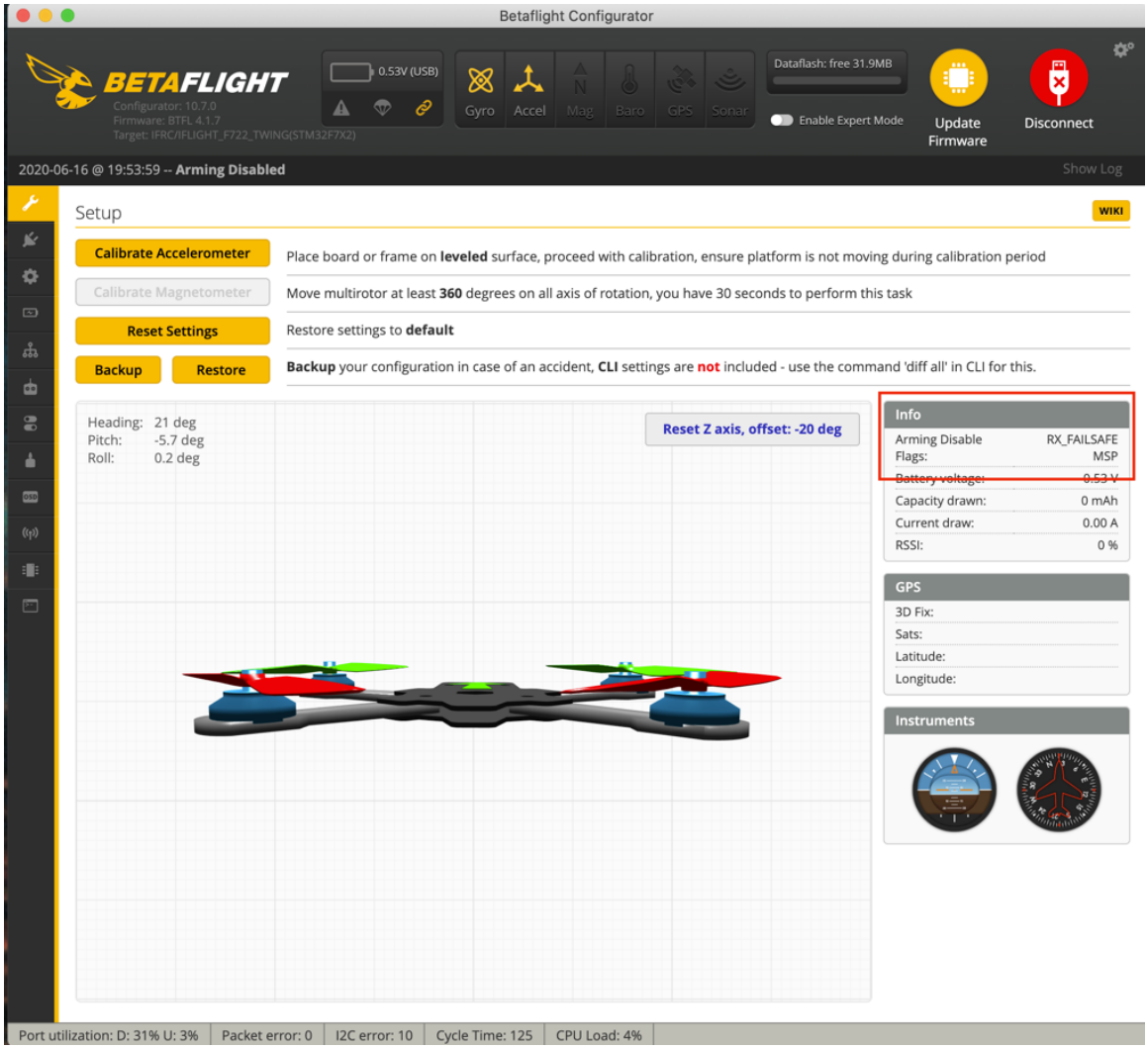




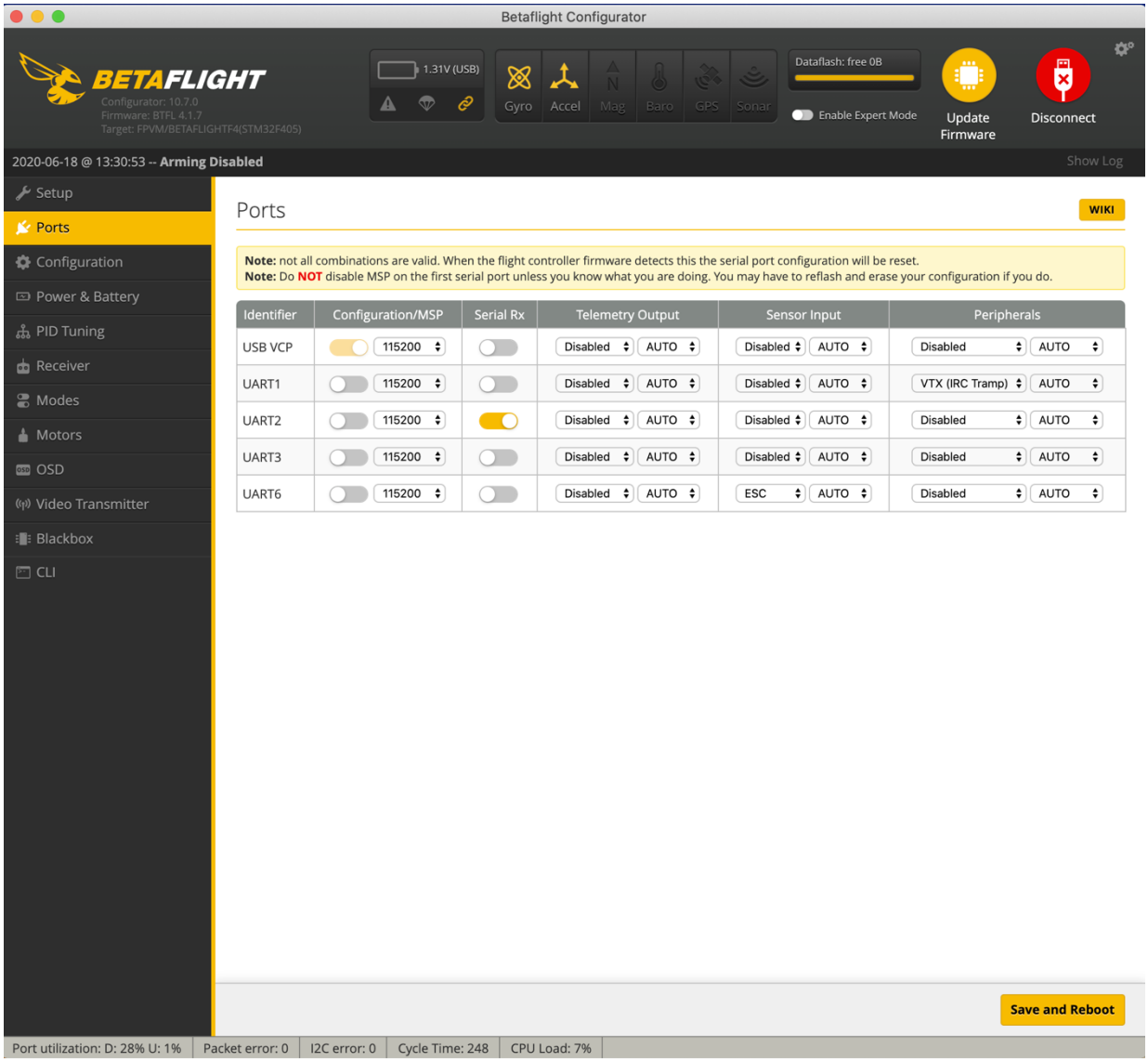
- You are not done yet…. You need to connect and add the config file
- Hit the Connect Yellow Connect Button
- You will get a one time question asking about applying custom defaults. These are your defaults specific to your FC. Yes you want them.
- Click Apply Custom Defaults Button. Quad will reboot and you should see that the Gyro and Accel indicators are lit.
- Go back to the CLI and in the text box paste that clipboard contents your saved from your old Diff All (Cntrl V and then hit enter). It should save automatically and reboot but if it doesn't type SAVE and hit enter. Quad reboots and you are restored to your prior settings.
- Review all the settings and go back and save a new Diff All . Then Send It.

Betaflight setup for Green Hornet (Setup page)

- Let's review each page in Betaflight to see if correctly setup. Everyone is different and setups vary. For this guide I am using my current settings for my personal Green Hornet.
- Setup page: This is probably the most useful and overlooked screens in Betaflight. for example if you cannot figure out why it won't arm, come here while connected and check the "Arming Disable Flags" on the right here. But right now we have two important tasks to perform.
- First, Use the Reset the Z axis button and tilt etc thew quad, does it move the same way on screen as in real life? If not we will later at the Config BF screen need to set the Yaw axis value (hint might need -90).
- Second, is it level? If it is and looking good stop here, but if not you will need to find the most level spot near your PC. Use a level gauge or a smartphone app to find the best spot and put your quad there. Then hit the calibrate Accelerometer button.

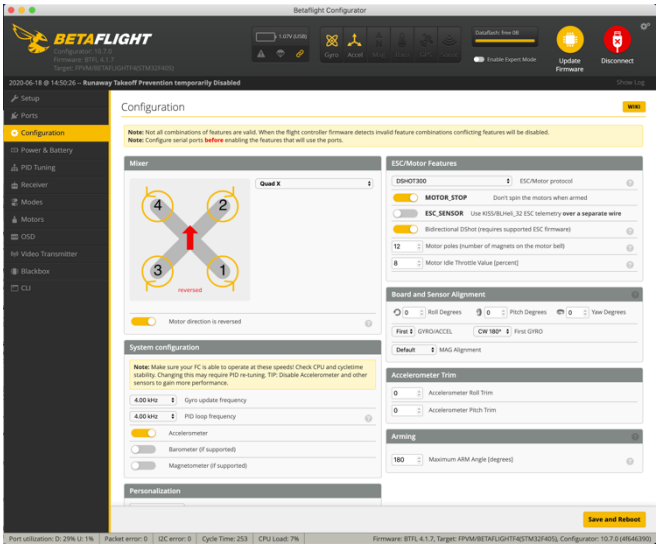


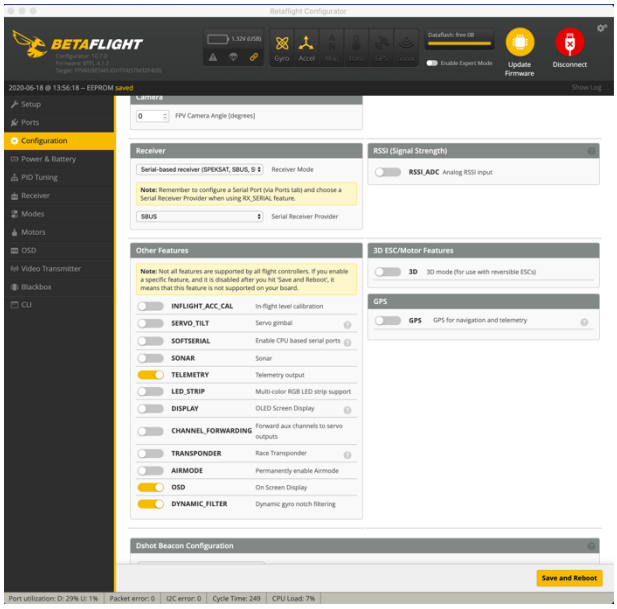
Betaflight setup for Green Hornet (Ports page)

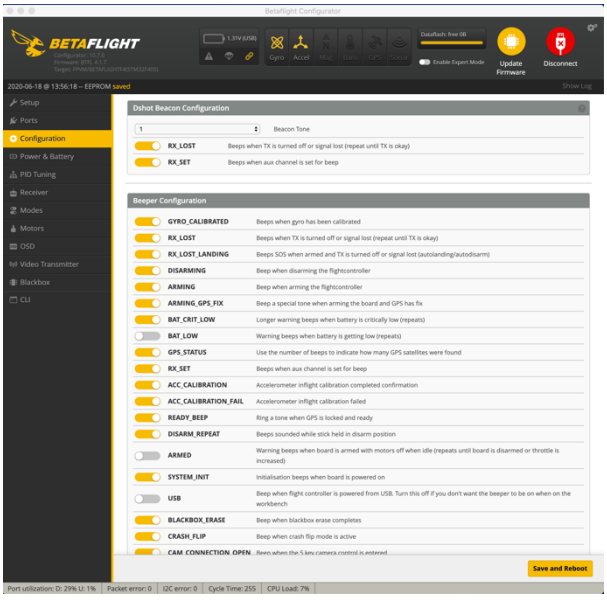


- UART1 is set to VTX (IRC Tramp) in Peripherals
- Serial Rx switch is set for UART2.
- Uart6 is set to ESC in Sensors

Betaflight setup for Green Hornet (Config page(s))

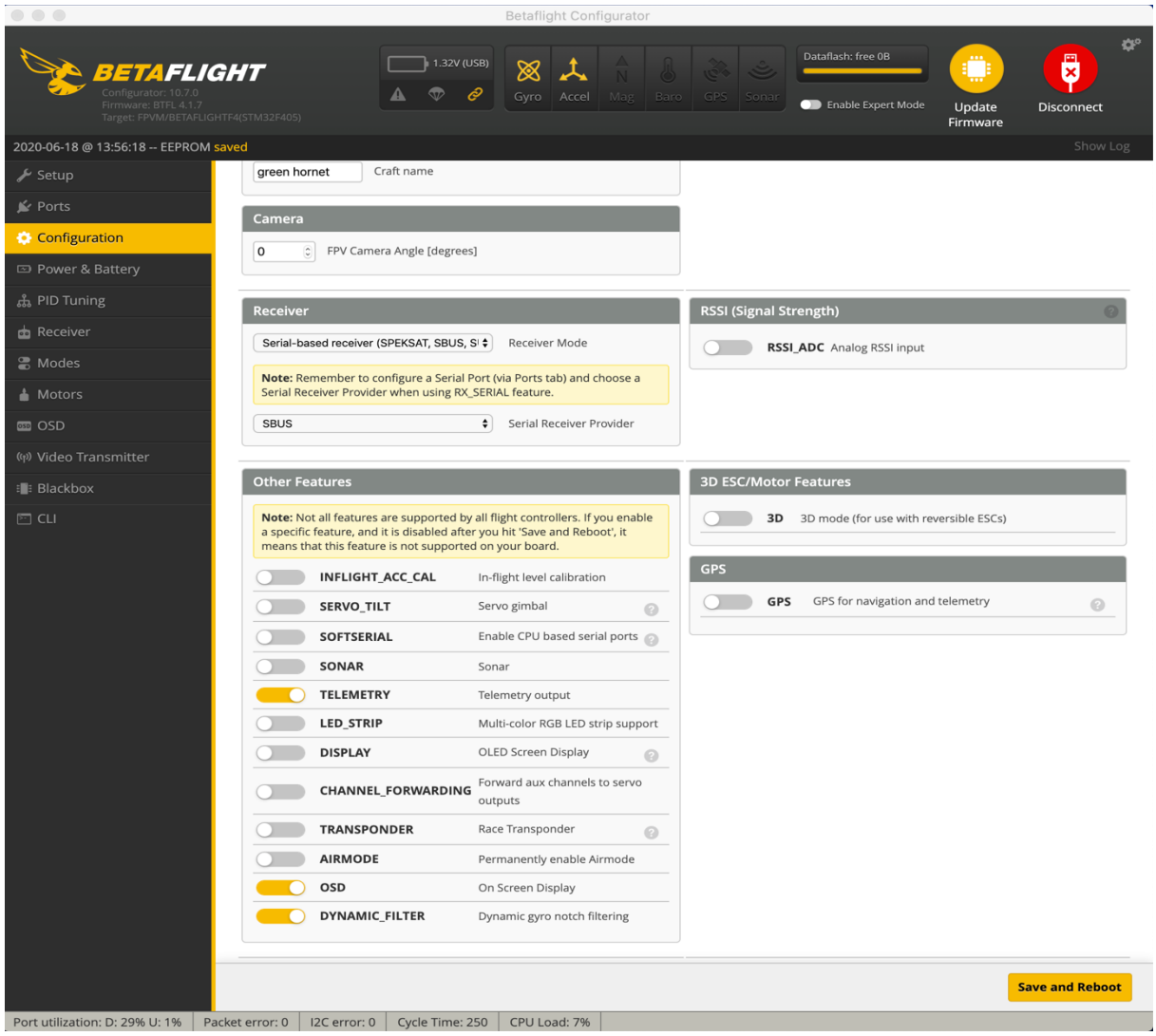






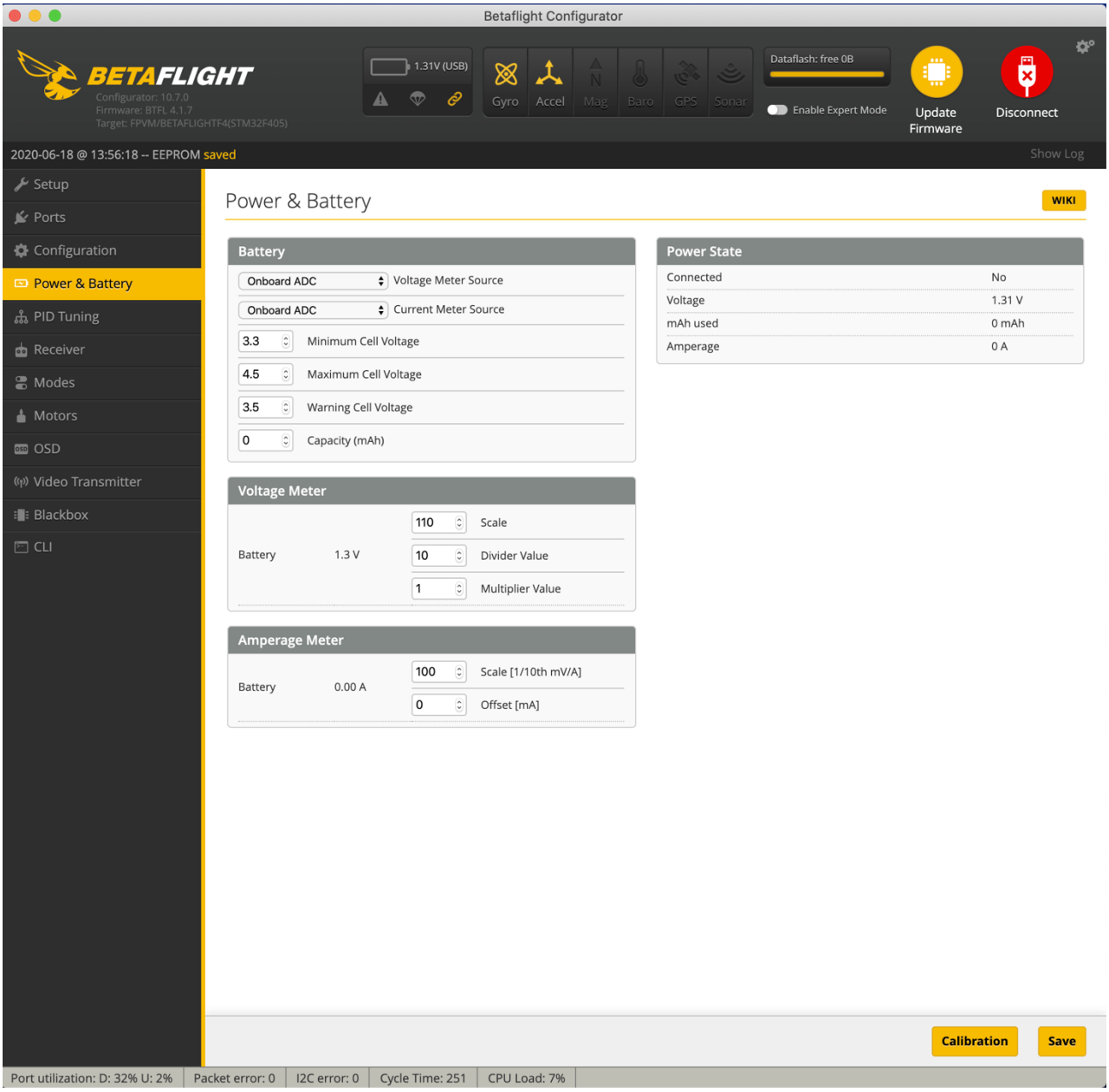
- Lot's of stuff here: check that the motor direction switch is set to **Reversed**.
- ESC Motor Features: **DSHOT600** is selected, and **BiDirectional Dshot** is set to On. 4K/4K Gyro update frequency and PID loop Frequency.
- **Motor poles** should be set to **12**.
- If on the setup page the **quad didnt tilt the same way** that you moved it, you can adjust it in the Board and Sensor Alignment Block on the Config page, 3rd box top row (set **Yaw Degrees**).

Betaflight setup for Green Hornet (Closer look at config pages)



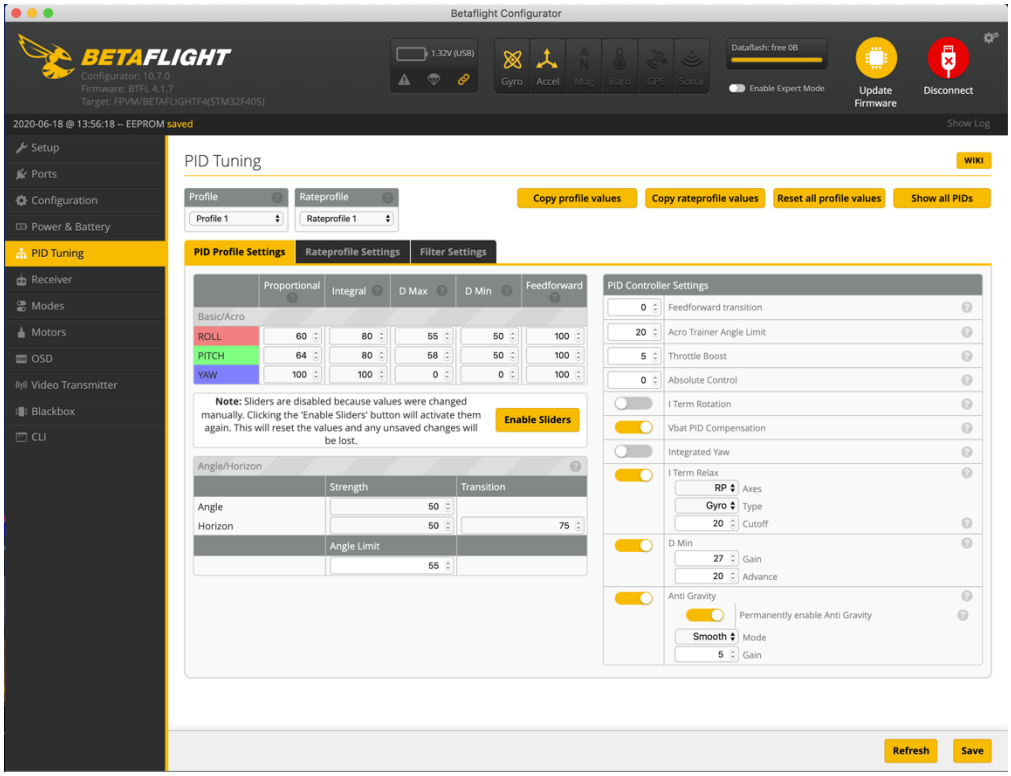
- Receiver is set for serial based Rx's and Serial Rx Provider is set to SBUS.
- RX_Lost is optional.
- But set switch **RX_Set** to on, because we have Dshot so we can use the motors to provide a beep. Useful to tell if transmitter is communicating (make it beep, better than the arm switch) and in lost craft recovery. Set on Uart4 in Modes page to use SD switch to beep.
- I turn off Bat_Low, as you cannot hear it while flying. Bat Critical is on so if after landing the battery is very low and needs a charge soon so it doesn't go below the voltage one can recharge from.
- Air Mode Always On is set to **OFF**. **Motor Stop** at the top is turned **on (this is my config to help new** to intermediate level pilots**)** . This way in Angle default mode, air mode isn't on as it doesn't help angle mode for cine flying and makes landing more difficult for new pilots. Air mode is best and should be always on for Acro flight (the other two positions on SB enable the air mode again).

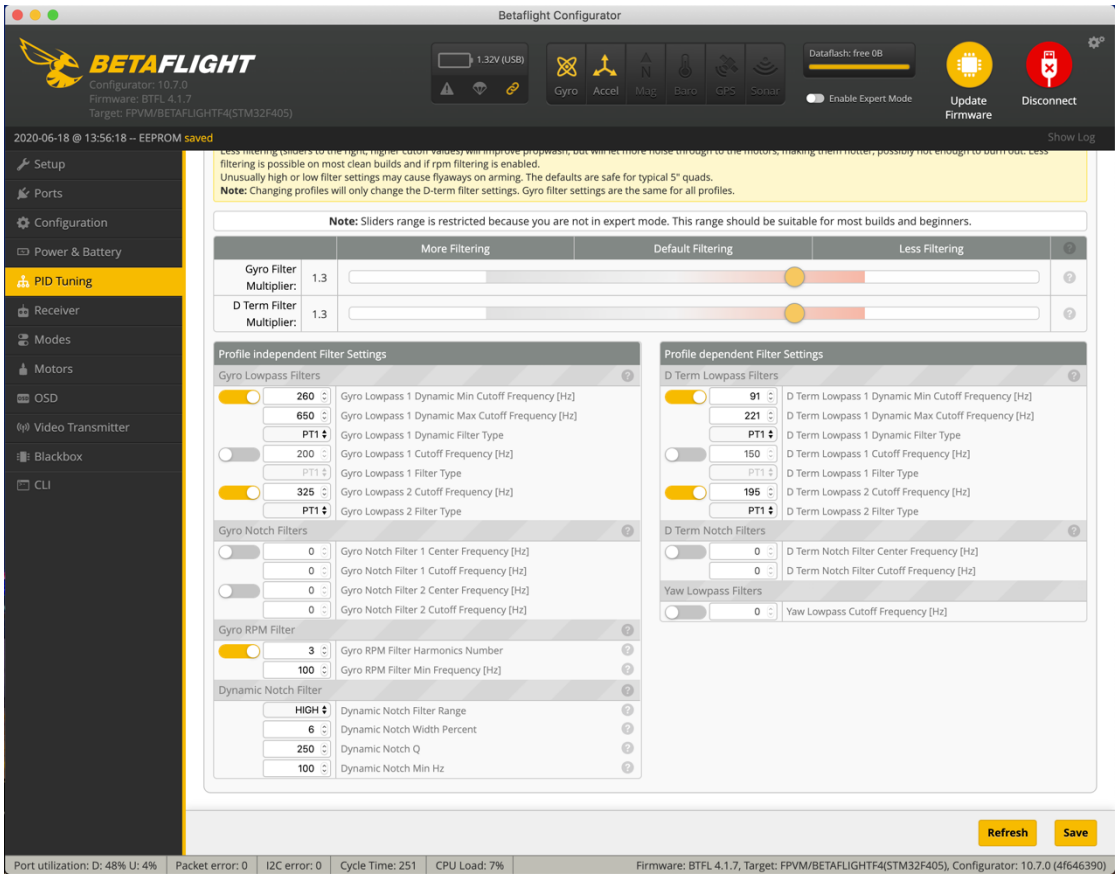
Betaflight setup for Green Hornet (Power & Battery page)



- Defaults are fine for the Green Hornet.
- You can now calibrate your power (need Digital Multimeter) but for now ignore unless there is a problem.

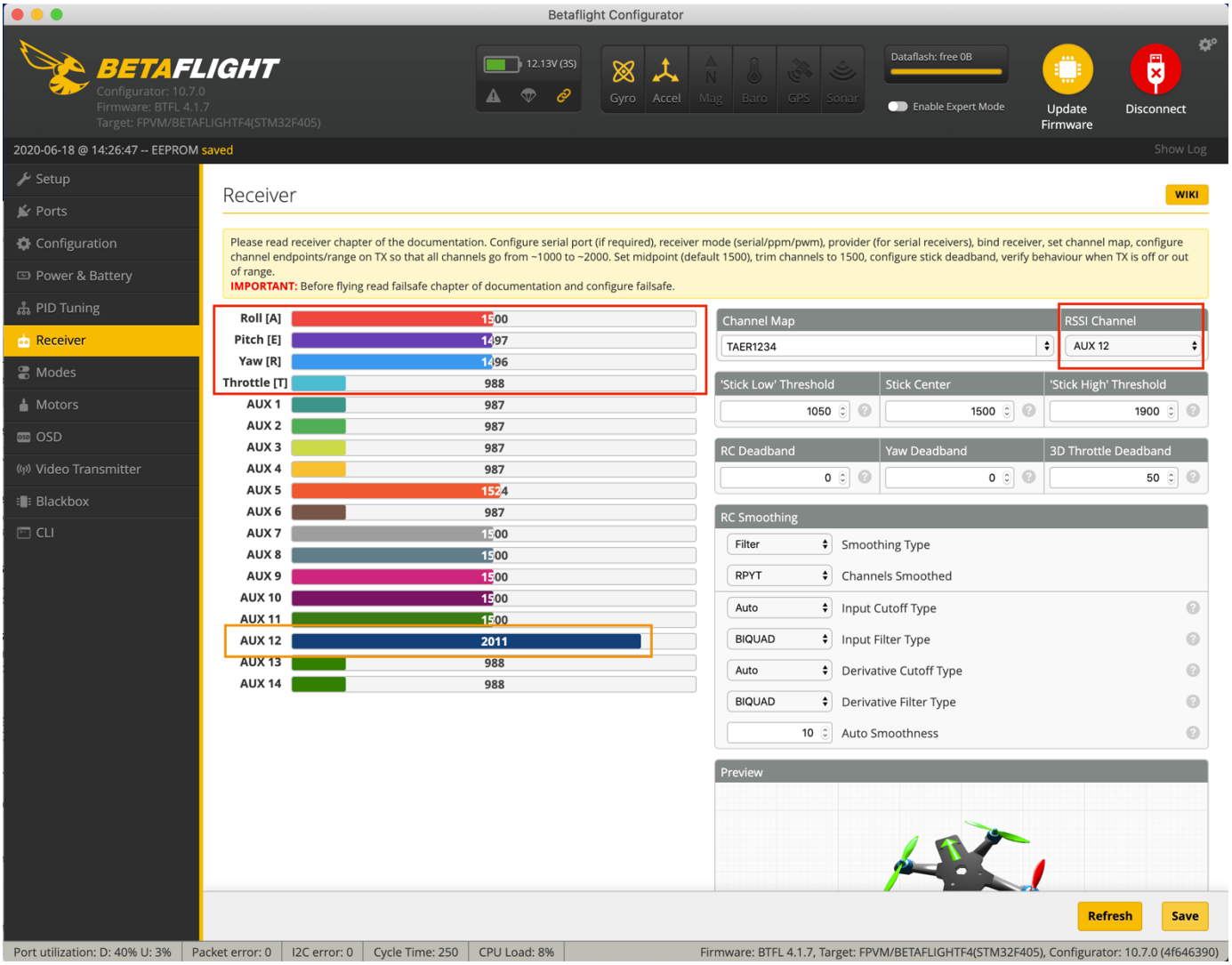
Betaflight setup for Green Hornet (PID Tuning page)





- Factory PID, rates and Filter settings. All setup with RPM Filtering enabled. After mastering your Green Hornet you'll want to come back here and adjust the sliders to your preferences

Betaflight setup for Green Hornet (Receiver page)

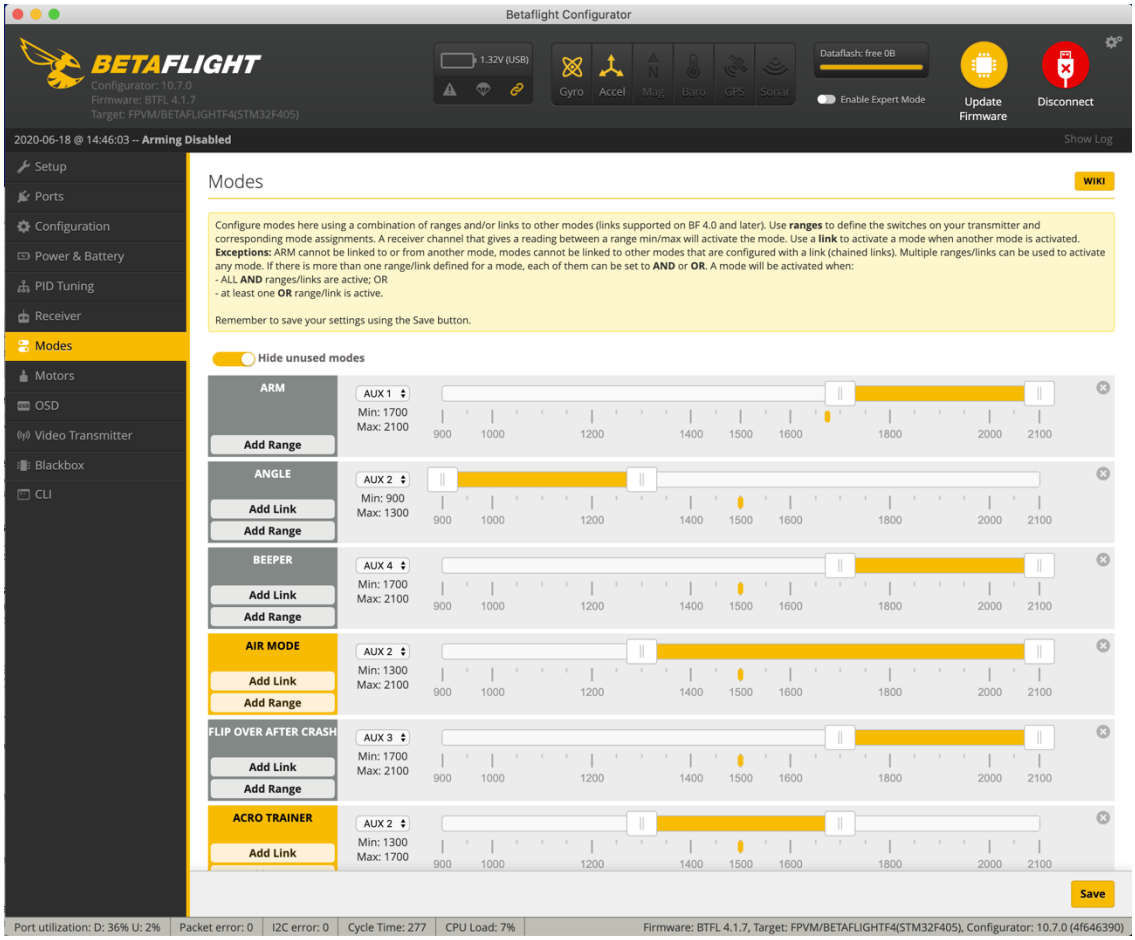


- Connect your Green Hornet to battery, power up your goggles and Transmitter.
- With props off, and the Green Hornet and bound and connected to transmitter as well as betaflight, verify the controls. Does the throttle work the correct control? Same for the rest and do the switches function and move the correct bars?
- If the controls do not respond correctly you may need to change the setting that shows something different to "**TAER1234**" if using Taranis (Jumper T16 default is AETR).
- If you don't see RSSI on the first page check to see if RSSI Channel is set correctly. Note the number are offset by 4 because TAER is the first four channels – your sticks. Hence 16-4 = RSSI on Aux 12.

Betaflight setup for Green Hornet (Modes page)

- Your Green Hornet probably came configured with just one control that you can use (arm on SA). Here I show a much more useful setup for the Modes (Aux Switches SA-SD). First is what switch does what and following that is the modes screen and the #aux settings that you can paste and run in the CLI (don't forget to save) from my settings shown here
- Standard convention for transmitters is all switches should be in up or the forward position which is off when you power on (or off) the transmitter, this is sometimes called the safe position.
- Your three position switches SA, SB, SC, SD respond to their settings in the betaflight firmware in your Green Hornet which has been set as follows:
- Switch A (**SA**) is your **Arm switch**, move to the bottom position to arm the Cinbee. Props will spin if in Air mode at this point.
- Switch B (**SB**) is Flight modes with up being Angle stability mode (default), middle is Acro Trainer Mode (like Angle in many ways but with Acro like feel to start) , all the way down is **Acro with Air Mode** for freestyle. Feel free to swap or change these to your needs.
- Switch B (**SC**) is mouthful, known as **turtle mode or turtle recovery mode**. To use you must first disarm (SA is all the way up) then arm the Turtle (SC all the way down). Use your sticks to flip back over (see youtube videos on this subject to learn to use properly). Disarm Turtle Mode (SC all the way up). Now arm your Green Hornet (SA all the way down) and fly home 😀 .
- Switch D (**SD**) is your **Beeper** that you enabled on the Config page**,** move switch SD down to the bottom position to use the motors to make sounds. Useful to confirm your transmitter is live as well as aid in lost craft recovery. Status beeps too.

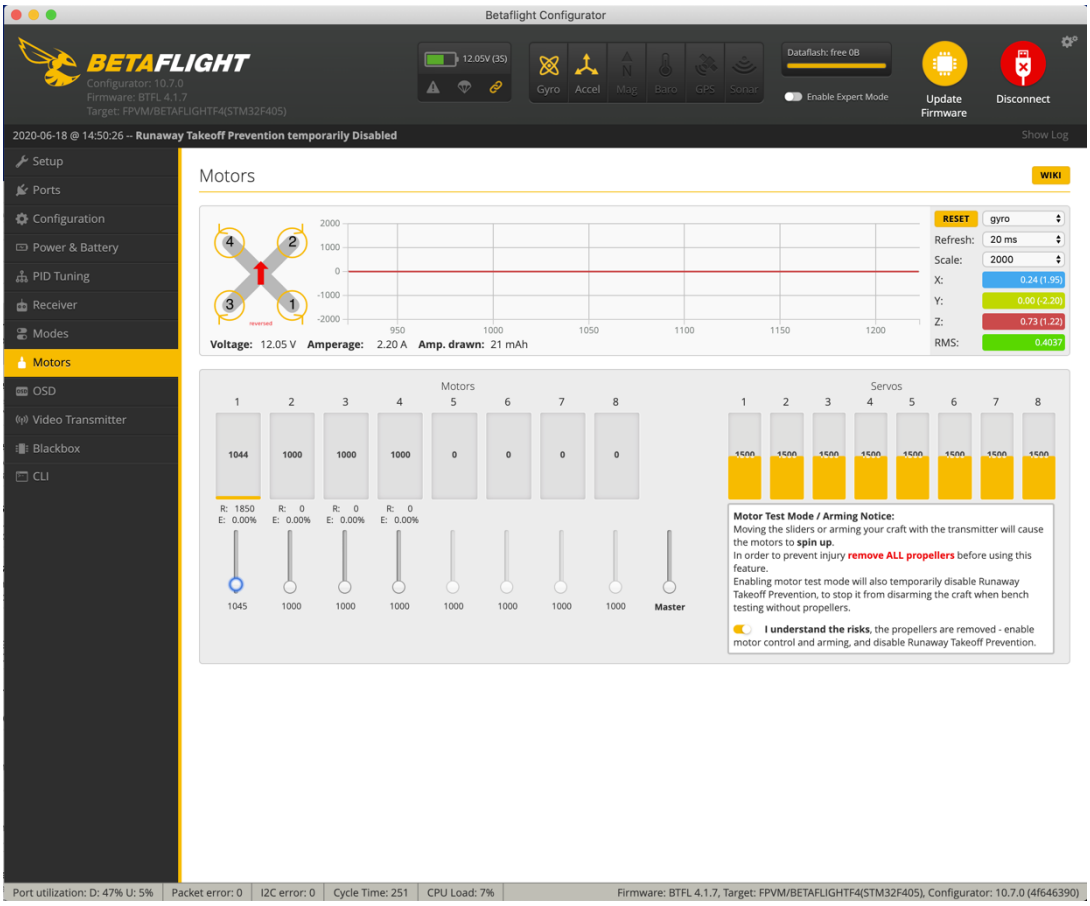
Betaflight setup for Green Hornet (Modes page continued)



- Copy and paste the following #Aux settings to set the modes this way, paste into the CLI, hit enter and don't forget to click **save** button after.
- Or just use the Betaflight GUI 😀 to setup as pictured.

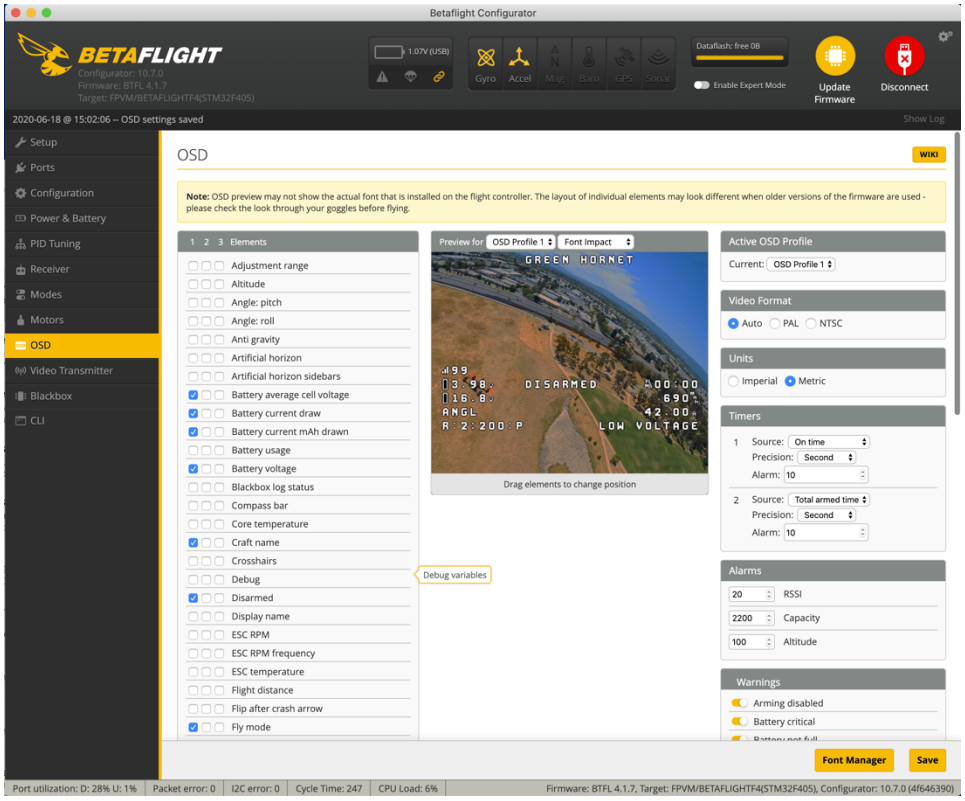
```
# aux
aux 0 0 0 1700 2100 0 0
aux 1 1 1 900 1300 0 0
aux 2 13 3 1700 2100 0 0
aux 3 28 1 1300 2100 0 0
aux 4 35 2 1700 2100 0 0
aux 5 47 1 1300 1700 0 0
```

Betaflight setup for Green Hornet (Motors page)



- **Props off**! or *Fingers off*! You have been warned lol. That's why the big message and a switch on this page. (flip that when stuck in MSP arming flag issue too)
- Note the direction shown for the motors and spin them slowly (just enough to spin) and verify each motor is spinning in the correct direction. If not, go to BLHeli Configurator and correct.
- FYI **DO NOT REV THE MOTORS**! Do not run up above 20% as you do NOT have the resistance from the props and the motors will quickly overheat and burn up fast.

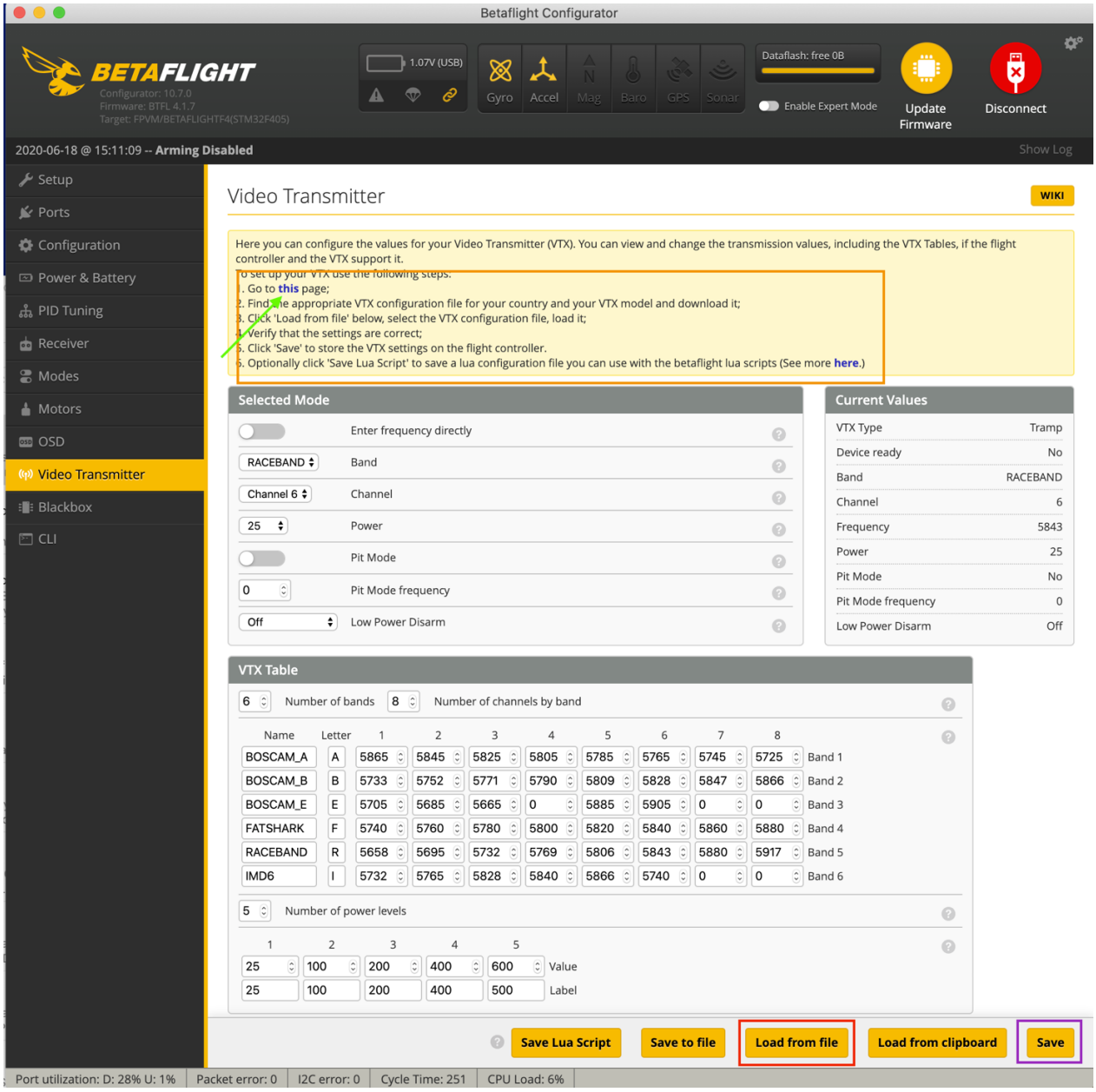
Betaflight setup for Green Hornet (OSD page)



- Cut & Paste these to the CLI and then Save to quickly bring up these settings. Then edit and move around to your liking.

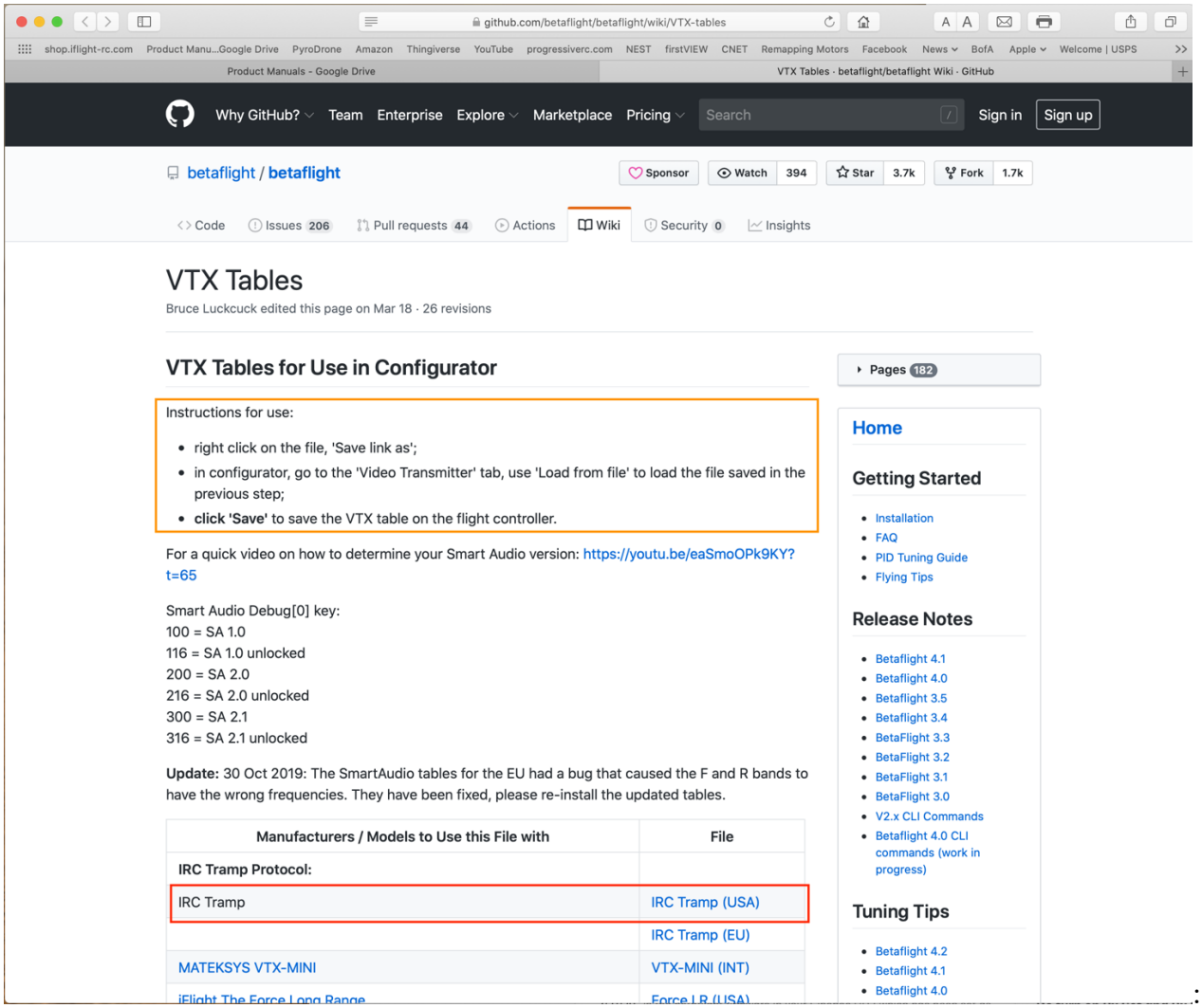
```
set osd_warn_  set osd_warn_rssi = ON
set osd_warn_link_quality = ON
set osd_vbat_pos = 2402
set osd_rssi_pos = 2424
set osd_current_pos = 2453
set osd_mah_drawn_pos = 2434
set osd_craft_name_pos = 2443
set osd_warnings_pos = 14697

set osd_stat_total_time = ON
```

Video Transmitter and loading the VTX table



- When you update the VTX table will be blank and power limited to 25mW. You need to load the correct VTX table clicking the THIS link (see green arrow above)

Video Transmitter and loading the VTX table



- Select the IRC Tramp file and **right click on it**, then download the linked file (file will have .json extension). Load that into the VTX page and don't forget the **save button** after ☺. You are done!

- Go back to the CLI in Betaflight and do a Diff again (you will thank me later).

- **Save** that Diff to a file! It is your new recovery point, give it a unique name.

- This guide is a living document and will be updated over time…

```
# name: green hornet

# resources
resource PULLDOWN 1 NONE

# feature
feature -RX_PARALLEL_PWM
feature -AIRMODE
feature RX_SERIAL
feature MOTOR_STOP
feature TELEMETRY

# beeper
beeper -BAT_LOW
beeper -ARMED
beeper -ON_USB

# beacon
```

```
beacon RX_LOST
beacon RX_SET

# map
map TAER1234

# serial
serial 0 8192 115200 57600 0 115200
serial 1 64 115200 57600 0 115200
serial 5 1024 115200 57600 0 115200

# aux
aux 0 0 0 1700 2100 0 0
aux 1 1 1 900 1300 0 0
aux 2 13 3 1700 2100 0 0
aux 3 28 1 1300 2100 0 0
aux 4 35 2 1700 2100 0 0
aux 5 47 1 1300 1700 0 0

# vtxtable
vtxtable bands 6
vtxtable channels 8
vtxtable band 1 BOSCAM_A A CUSTOM 5865 5845 5825 5805 5785 5765 5745 5725
vtxtable band 2 BOSCAM_B B CUSTOM 5733 5752 5771 5790 5809 5828 5847 5866
vtxtable band 3 BOSCAM_E E CUSTOM 5705 5685 5665 0 5885 5905 0 0
vtxtable band 4 FATSHARK F CUSTOM 5740 5760 5780 5800 5820 5840 5860 5880
vtxtable band 5 RACEBAND R CUSTOM 5658 5695 5732 5769 5806 5843 5880 5917
vtxtable band 6 IMD6 I CUSTOM 5732 5765 5828 5840 5866 5740 0 0
vtxtable powerlevels 5
vtxtable powervalues 25 100 200 400 600
vtxtable powerlabels 25 100 200 400 500

# master
set gyro_sync_denom = 2
set gyro_lowpass2_hz = 325
set dyn_notch_range = HIGH
set dyn_notch_width_percent = 6
set dyn_notch_q = 250
set dyn_notch_min_hz = 100
set dyn_lpf_gyro_min_hz = 260
set dyn_lpf_gyro_max_hz = 650
set acc_calibration = -66,48,-271
set mag_hardware = NONE
set baro_hardware = NONE
set rssi_channel = 16
set serialrx_provider = SBUS
set dshot_idle_value = 800
set dshot_bidir = ON
set motor_pwm_protocol = DSHOT300
```

```
set motor_poles = 12
set vbat_max_cell_voltage = 450
set current_meter = ADC
set battery_meter = ADC
set ibata_scale = 100
set yaw_motors_reversed = ON
set small_angle = 180
set pid_process_denom = 1
set osd_warn_rssi = ON
set osd_warn_link_quality = ON
set osd_vbat_pos = 2369
set osd_rssi_pos = 2305
set osd_tim_2_pos = 2359
set osd_flymode_pos = 2401
set osd_throttle_pos = 368
set osd_vtx_channel_pos = 2433
set osd_current_pos = 2422
set osd_mah_drawn_pos = 2392
set osd_craft_name_pos = 2058
set osd_warnings_pos = 14738
set osd_avg_cell_voltage_pos = 2337
set osd_disarmed_pos = 2346
set osd_stat_endbatt = ON
set osd_stat_battery = ON
set osd_stat_min_rssi = OFF
set osd_stat_bb_no = OFF
set vtx_band = 5
set vtx_channel = 6
set vtx_power = 1
set vtx_freq = 5843
set name = green hornet

profile 0

# profile 0
set dyn_lpf_dterm_min_hz = 91
set dyn_lpf_dterm_max_hz = 221
set dterm_lowpass2_hz = 195
set vbat_pid_gain = ON
set iterm_relax_type = GYRO
set p_pitch = 64
set i_pitch = 80
set d_pitch = 58
set f_pitch = 100
set p_roll = 60
set i_roll = 80
set d_roll = 55
set f_roll = 100
set p_yaw = 100
```

```
set i_yaw = 100
set f_yaw = 100
set d_min_roll = 50
set d_min_pitch = 50

profile 1

profile 2

# restore original profile selection
profile 0

rateprofile 0

# rateprofile 0
set thr_expo = 60
set throttle_limit_type = SCALE
set throttle_limit_percent = 80

rateprofile 1

rateprofile 2

rateprofile 3

rateprofile 4

rateprofile 5

# restore original rateprofile selection
rateprofile 0

# save configuration
save
```