Flyduino KISS Flight Controller Manual v1.03

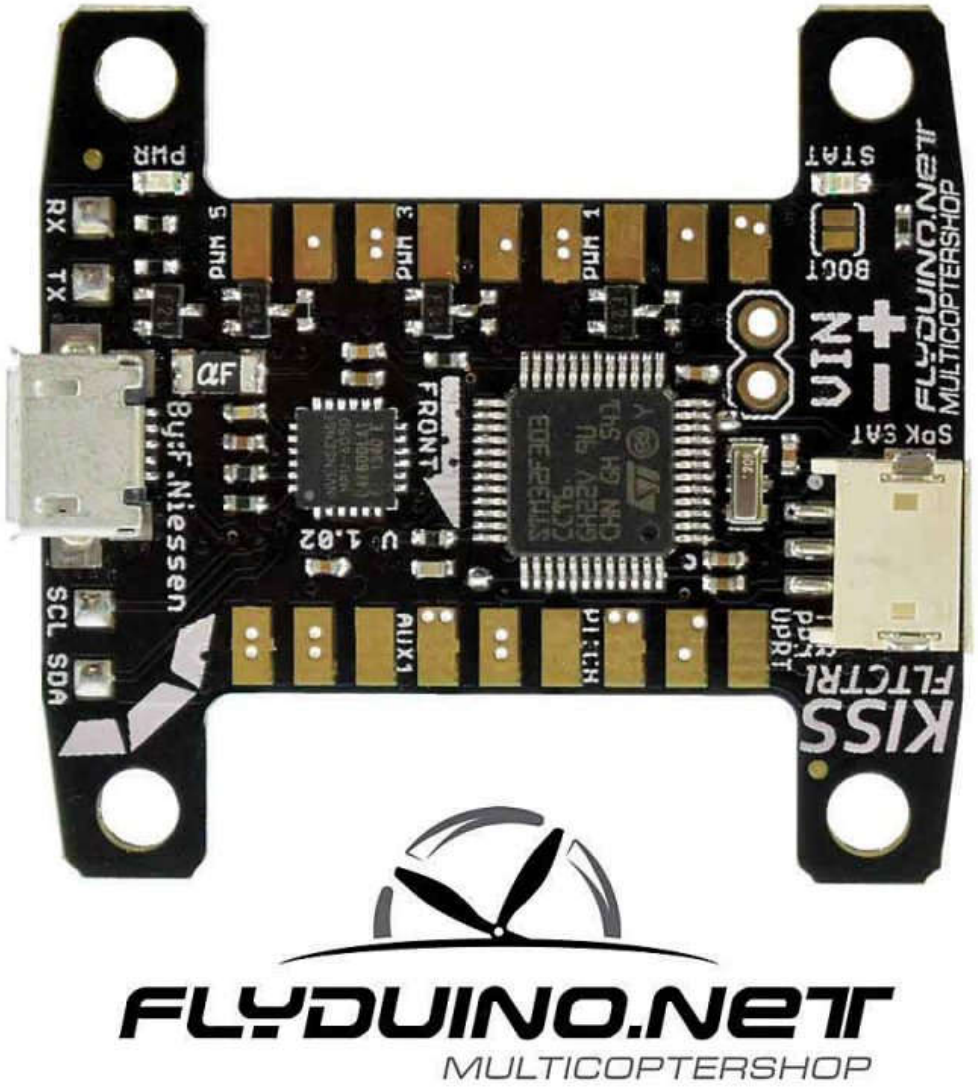


Image: Upper / Top Side

As we felt the need for a modern more simplified 32bit Flightcontroller, we made the KISS FC, which includes a complete own Flight Control Firmware development who get rid of some old ballast, this took some time, but the result is very pleasing.

The Idea was to simplify some things and due to intensive long term testings of some pretty good Pilots we were able to optimize the code to a point where you hopefully get your quad in the air quite quick.

Normally you just need to choose your Airframe in the GUI and are able to fly (at least with KISS ESC), otherwise you can download presets of well known pilots for given configurations and of course you can tweak the PID yourself through the GUI.

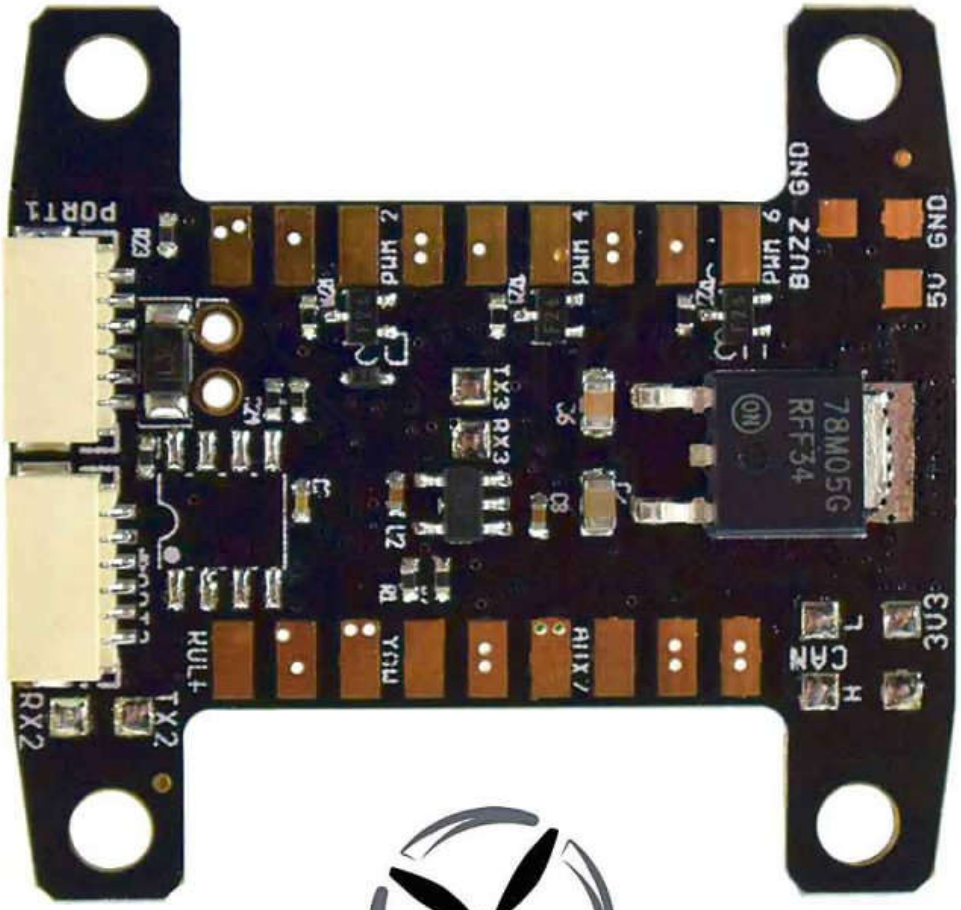


Image: Lower / Bottom Side

The software setup side is reduced as far we can, many things are already taken into account for you, if you have some solid soldering skills you should be able to build your quad pretty quick.

A new feature is also the build telemetry, in combination with our 32bit ESC line its possible to show the live telemetry data via OSD on your FPV live feed or in the KISS FC GUI

This way you get useful informations like the Voltage of your battery, current consumption, ESC temperature and motor RPM.

Other FC firmwares (eg. Cleanflight) can be ported for the use with the KISS FC.

NOTE: Always keep the FC level and firm for at least 5 seconds after you powered it!
If you move it, the gyro calibration might fail, indicated by the blue LED staying solid and the GUI showing the MCU idle of ~55%. **On startup the green LED should be lit and the blue one should be flashing for several seconds, then go solid for a second and if the calibration is complete go off.**

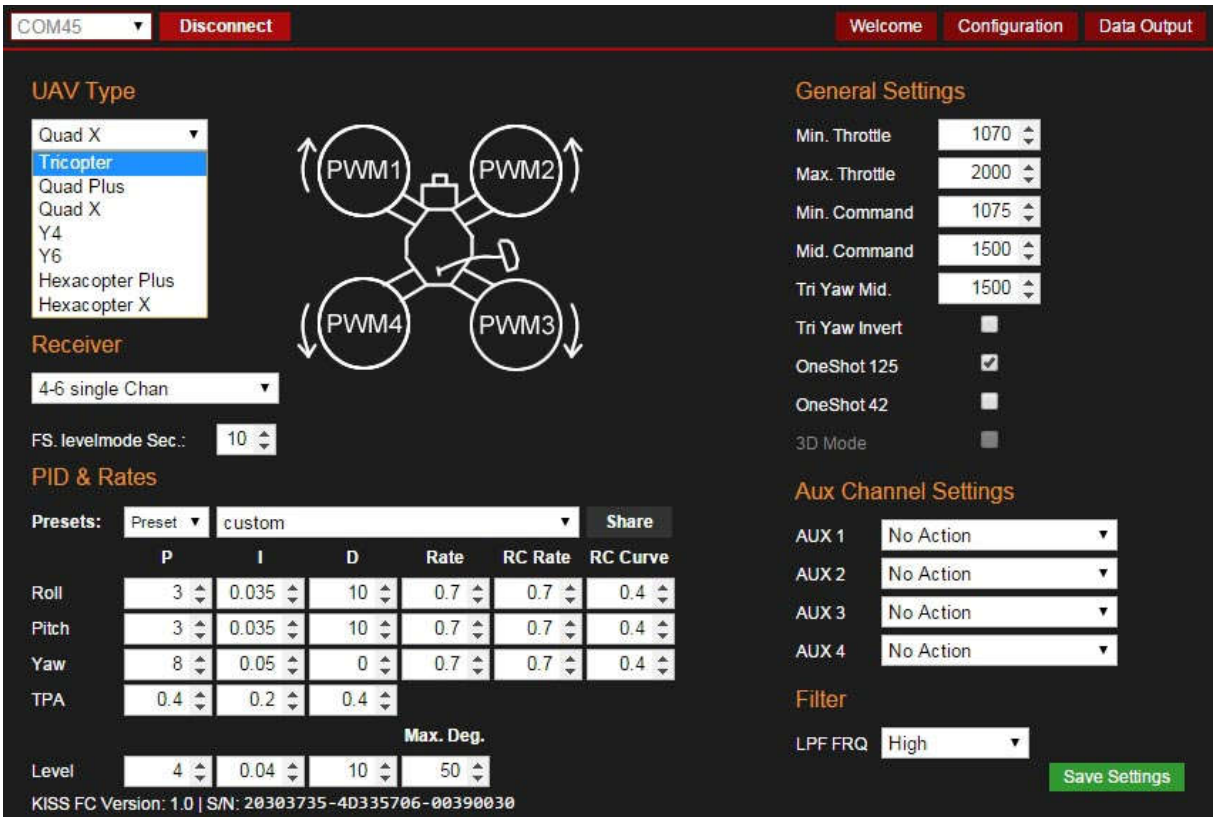
Supported Copter frames:

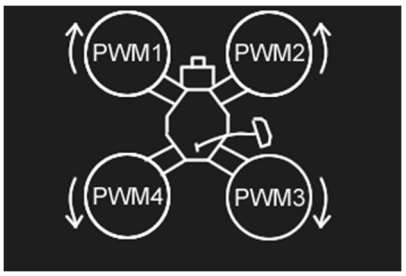
- Tri

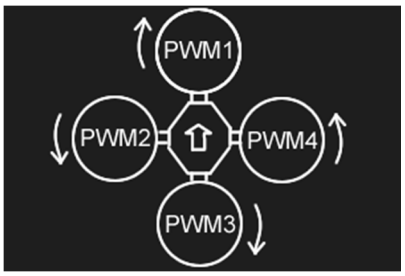
- Y4, Y6

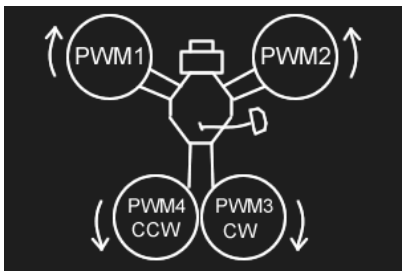
- Quad +/x

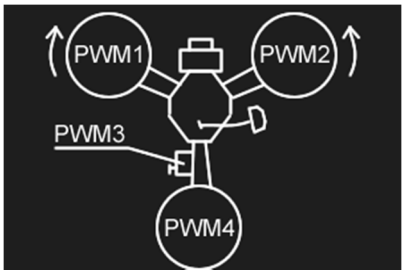
- Hexa +/x

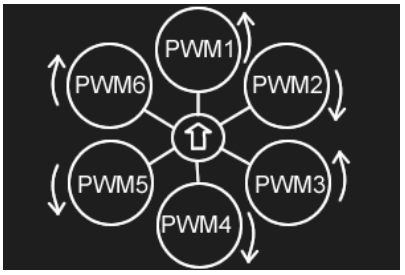


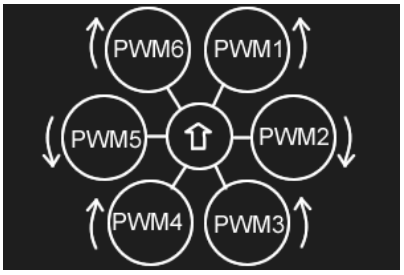




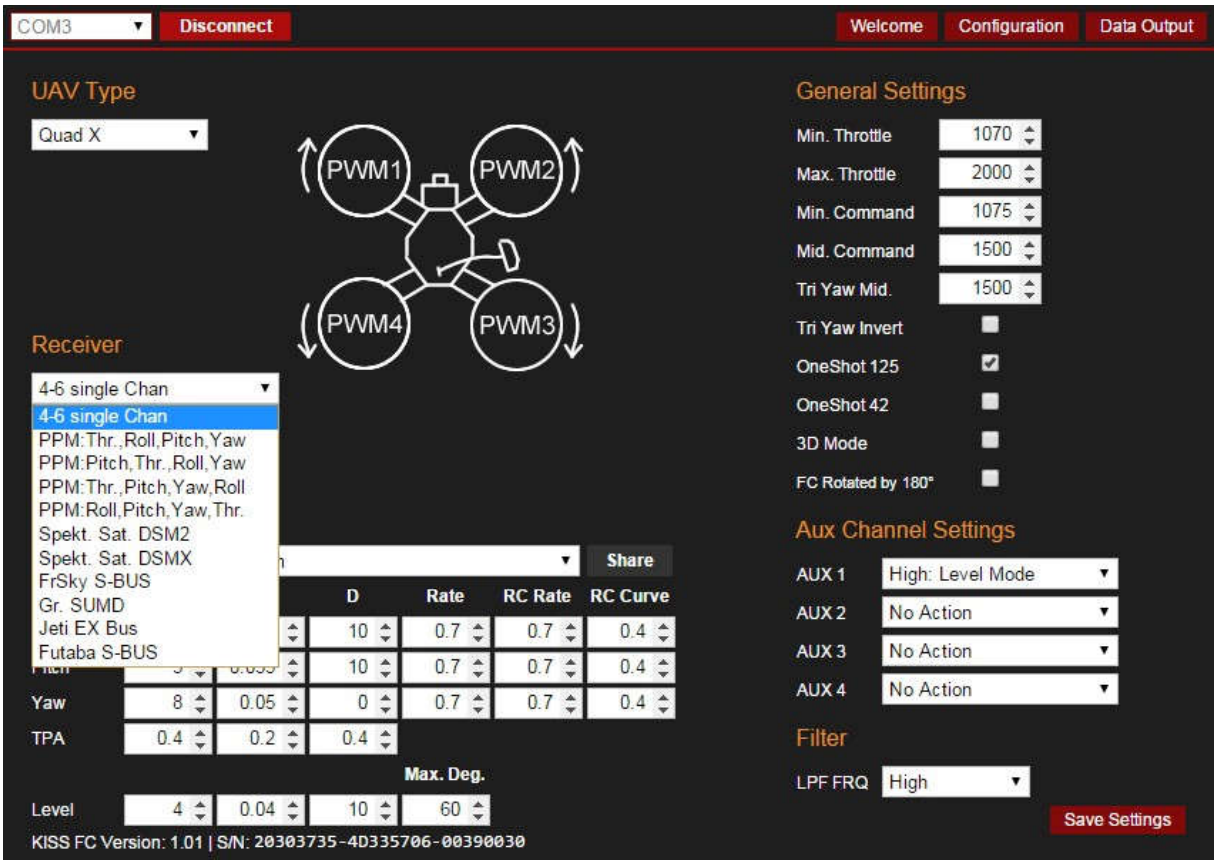








Receiver	PWM	PPM	Digital	Telemetry	Protocols
Spektrum	Yes	Yes	Yes (Spektrum Sat)		DSM2 + DSMX
Futaba	Yes	Yes	Yes		SBUS
FrSky	Yes	Yes	Yes	Yes (X-Series RX)	SBUS + S-Port
Jeti	Yes	Yes	Yes	Yes	Jeti DX + EX Bus
Graupner	Yes	Yes	Yes	Yes	HOTT
Hitec	Yes	Yes			
Klassisch	Yes	Yes			



There are 8 Receiver inputs and channels: 4 for the sticks and 4 AUX channels 1-4

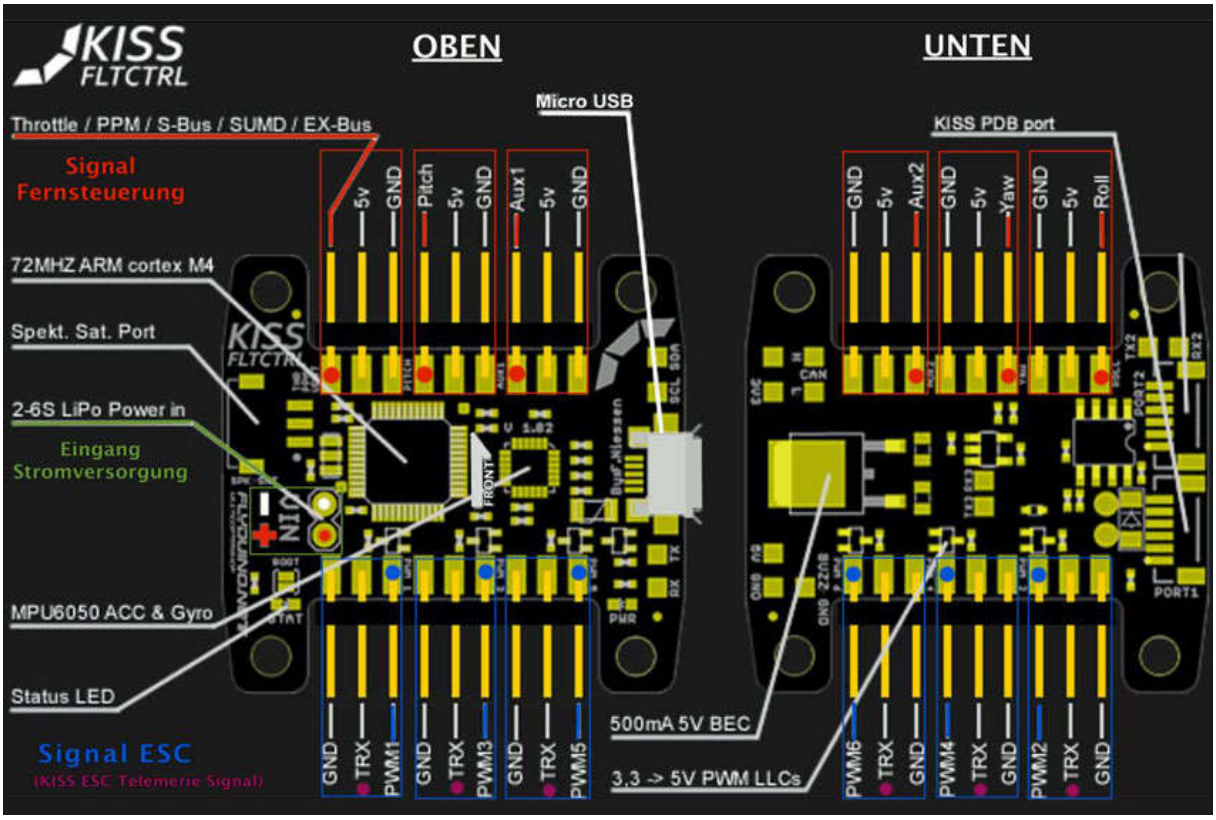
Other Specs & Features

MCU: STM32F303CCT6
IMO: MPU6050
Weight: 4.6g
Mounting Holes: 3x3cm pattern with 3.2mm holes (compatible with most frame types)
Voltage: 2-6S (direct, max. 5s recommended)

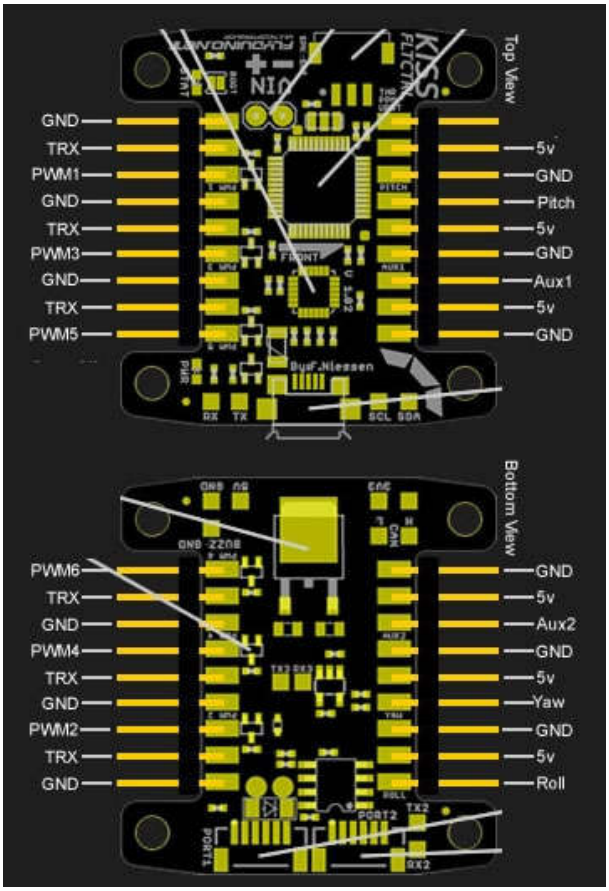
The needed USB driver usually will be installed when you connect the FC for the first time.
It may take several minutes before you can use the FC and connect it to the GUI.

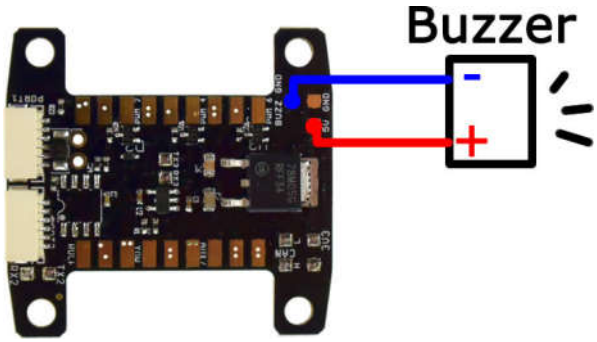
Connections

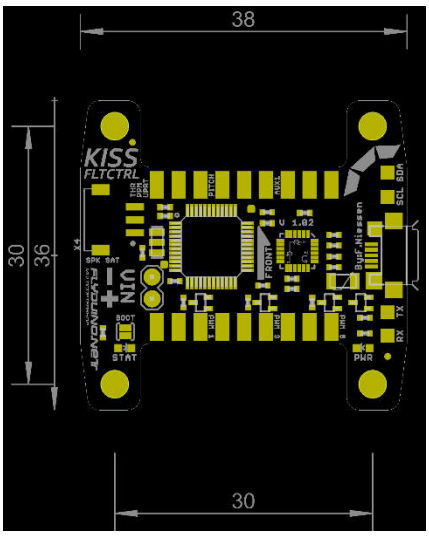
You can find the connection diagram / pinout on the Welcome page of the GUI. **TRX** = Telemetrie In



There are 6 PWM outputs for 2-6 Motors or Servos

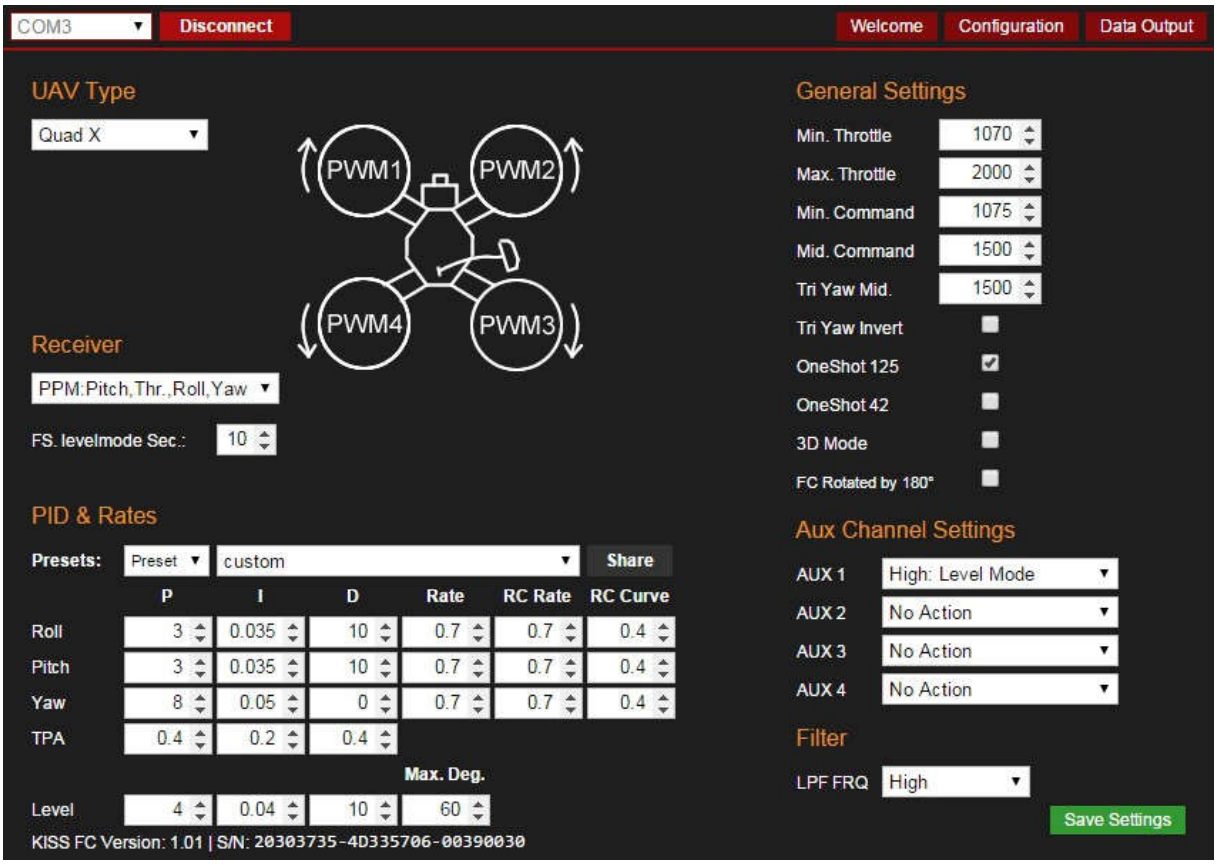


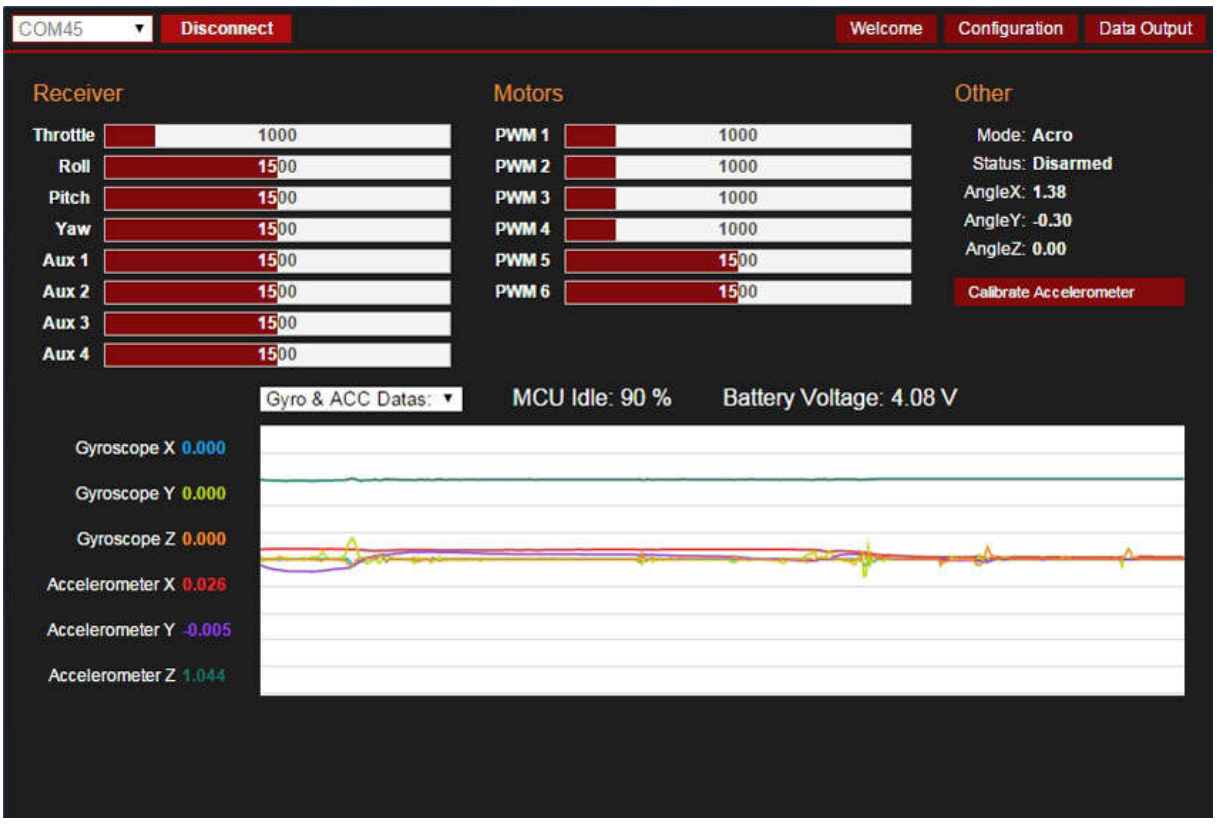




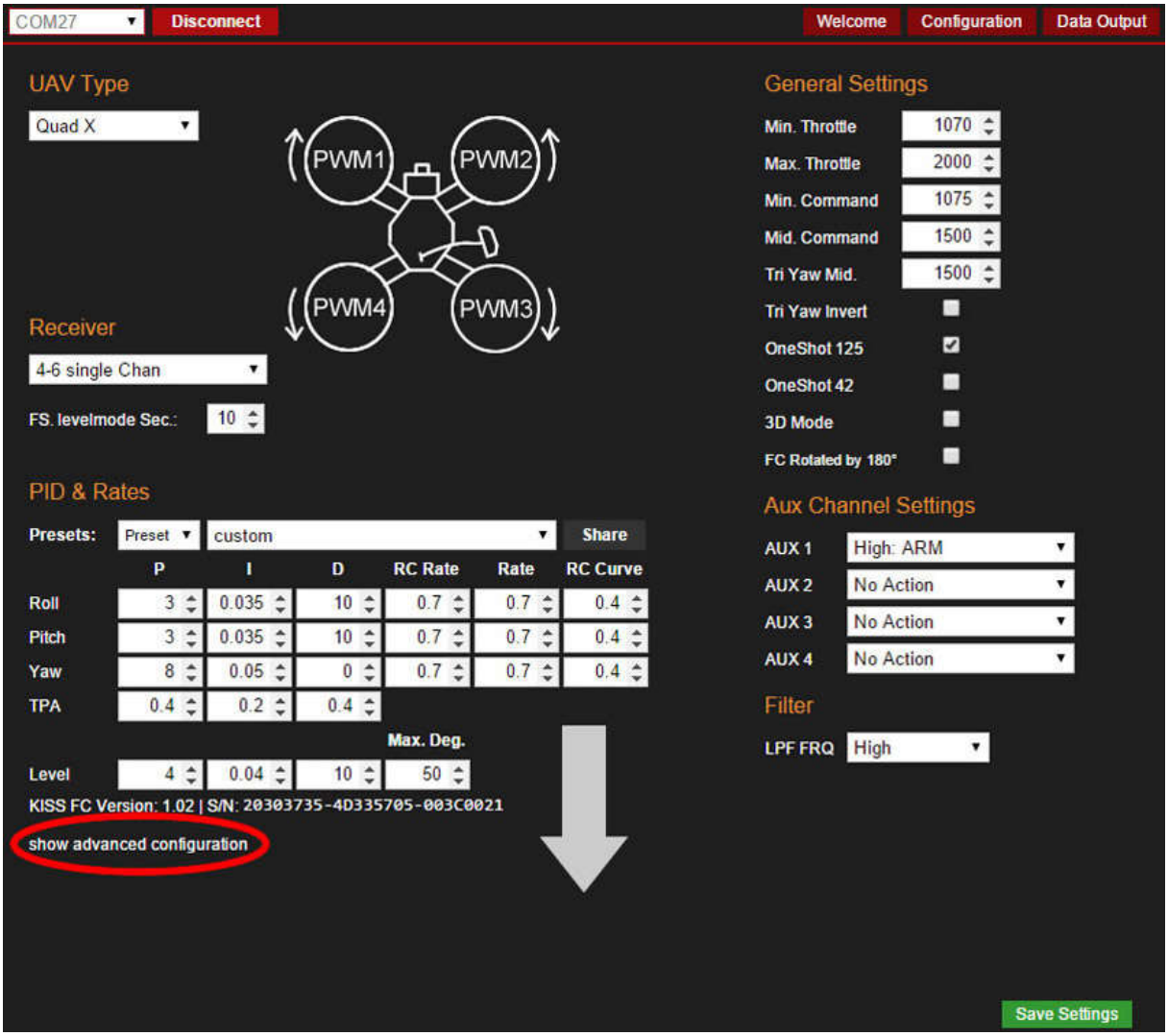
GUI (Graphical User Interface)

The GUI consists of 3 pages: The „Welcome“ page with all connections, the „Configuration“ page for the settings and „Data Output“ for Sensorgraphs.





Advanced Configuration



If you connect a KISS FC with version 1.02x on it you will get a small extra button that can be seen, when enlarging the GUI window in configuration tab.

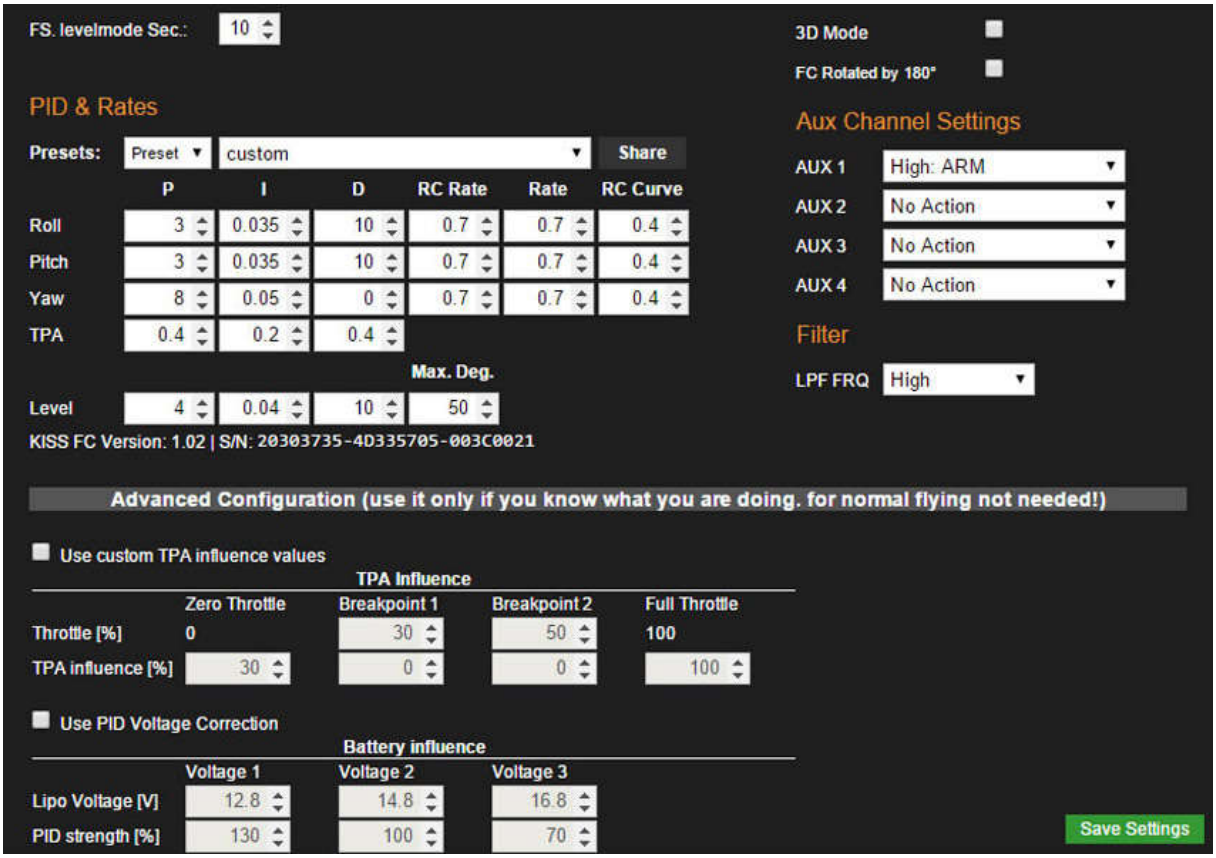
You can setup TPA influence and Battery influence

TPA influence

here you can configure the influence of the TPA values in relation to the throttle.

Battery influence

its ment to decouple the PID values from the lipos voltage. (normaly PID's feel stronger with higher voltage)



Note: If you are already using a previous version of the Chrome App, please uninstall it first and load the actual version (recently v1.03) from here:
https://chrome.google.com/webstore/detail/kissfc/hecmfiemalajlglacajmnplhjmnkinpm

Installation & Setup

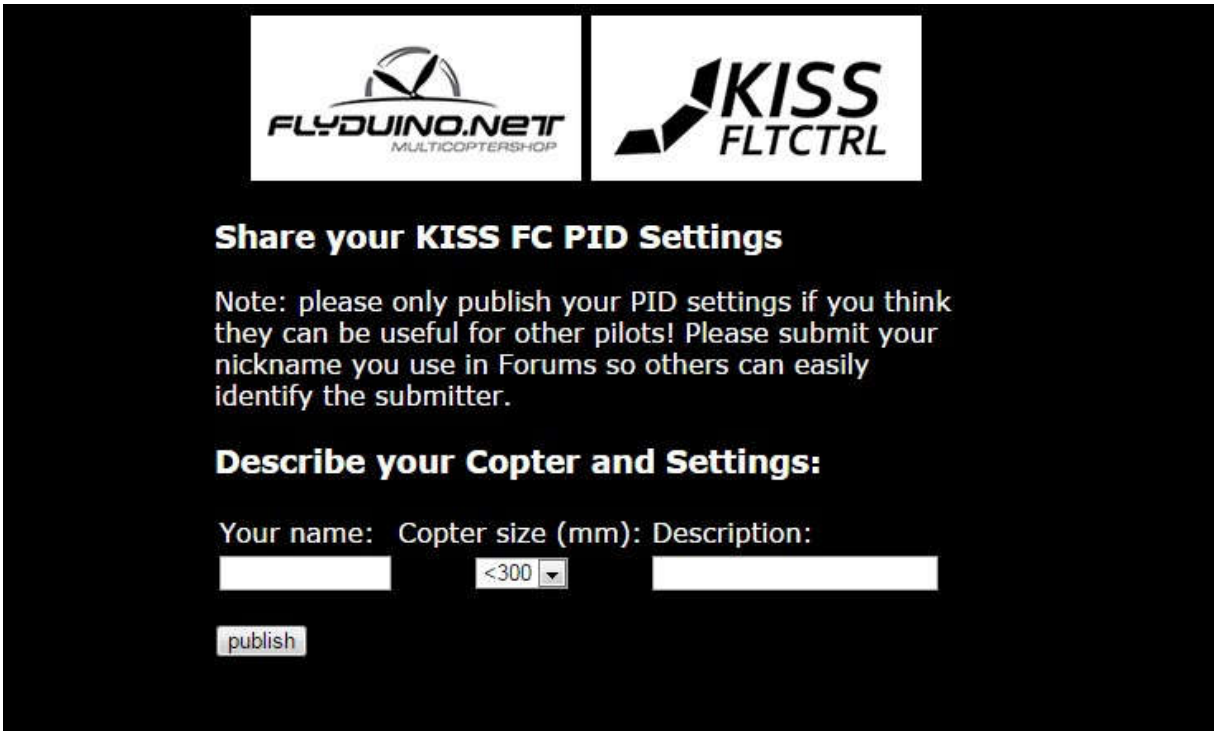
Note: the USB port might get warm during operation. This is due to the used voltage regulator which needs to be able to handle 6s. This behavior should not a problem at all.

Just plug in the FC via Micro USB connection to your PC. Drivers should be installed automatically on WIN7-10.
After the installation is complete, unplug the FC from the USB, plug it in again and hold the FC firm and level for at least 5 seconds!
The green LED will be lit constantly while the blue LED will blink, indicating the Gyro calibration. It will be solid afterwards and go off when the calibration is completed und the FC is ready to go.
Then start the Chrome GUI and select the COM port for the connection. If no port is shown, the driver installation might have failed.

Important! For security reasons the PIDs will only be saved when NO LIPO is attached!

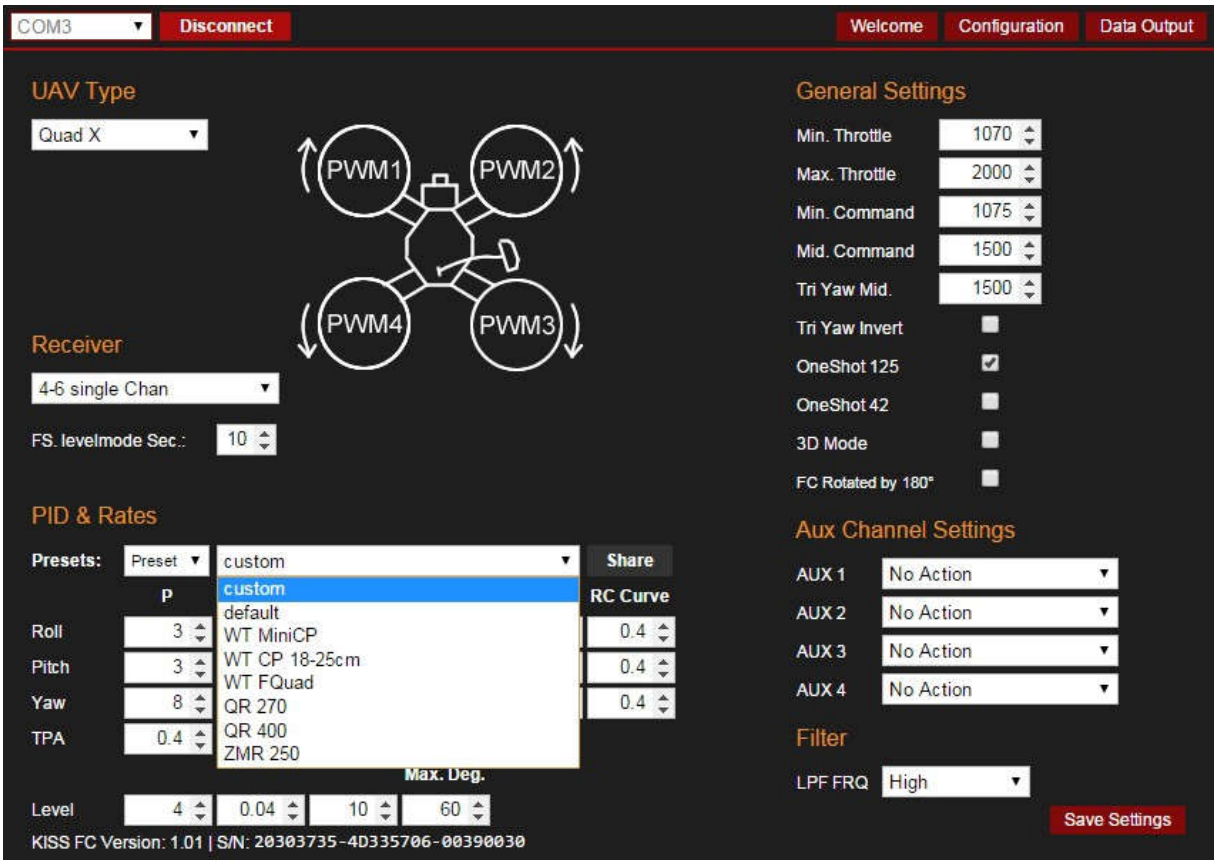
Sharing PIDs

The default PIDs should be good enough for a start. However if you want to tune the FC to the max and squeeze the last bit of performance out of it, you will need to fine tune the settings.
A great feature of the GUI is the “Share” button, where you can submit your PIDs with other users. This can be a good starting point for beginners with similar setups. Please don’t abuse that function!



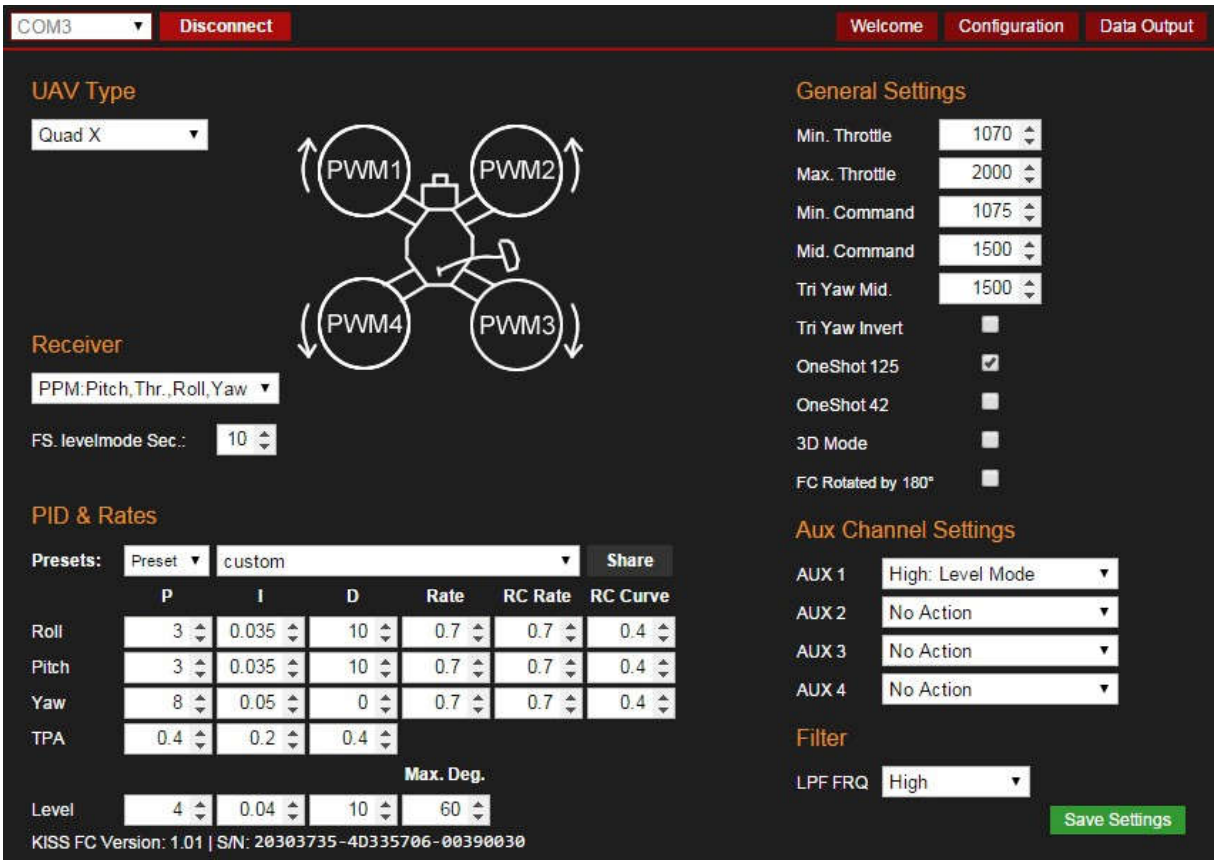
Please submit your nickname used in forums to make it easier to identify the submitter for others. We will refine this function in the future to assure only flyable PIDs make it into the list.

PID Presets



Adjust your settings with care! Only use small steps to increase or decrease the numbers and only one at a time. To make a start easier the GUI offers pre-defined PIDs for several setups tested by skilled pilots. More presets will be available once user share theirs.

PID and Rate Tuning



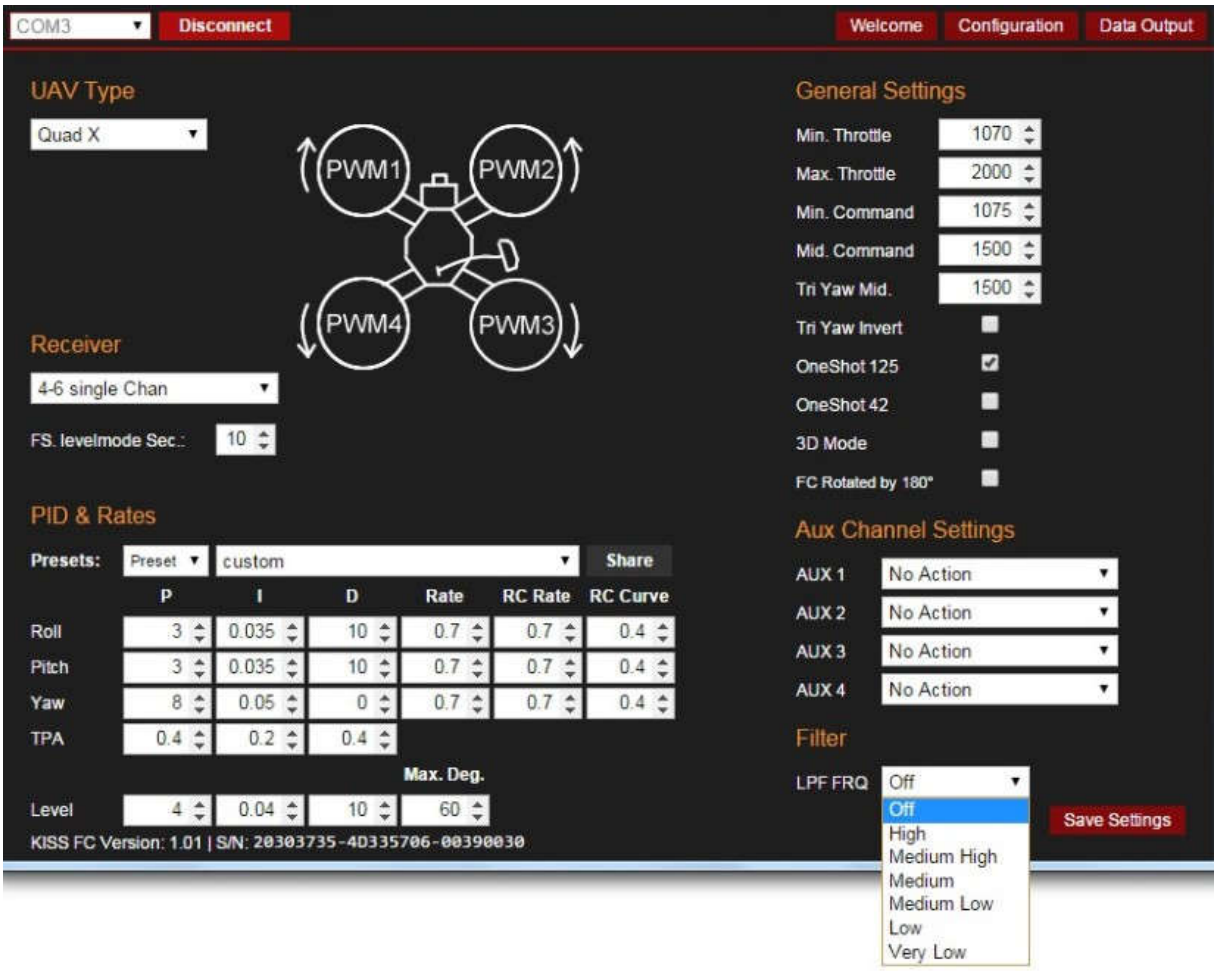
Rate decreases the gyro influence depending on the stick max outputs. E.g. with roll stick at center you will always have 100% gyro influence with rate on 0.00 it will still be 100% with full roll left. But with 0.50 rate it will be 50% gyro influence at full roll left or right.

Rate also gives an Expo like feeling. So to keep the same Expo strength you may lower one if you increase the other.

RC Rate increases the strength of the RC channel signals into the PID controller. so e.g. if you have 0-1000 at RC rate 1.0, it will be 0-2000 with RC rate 2.0

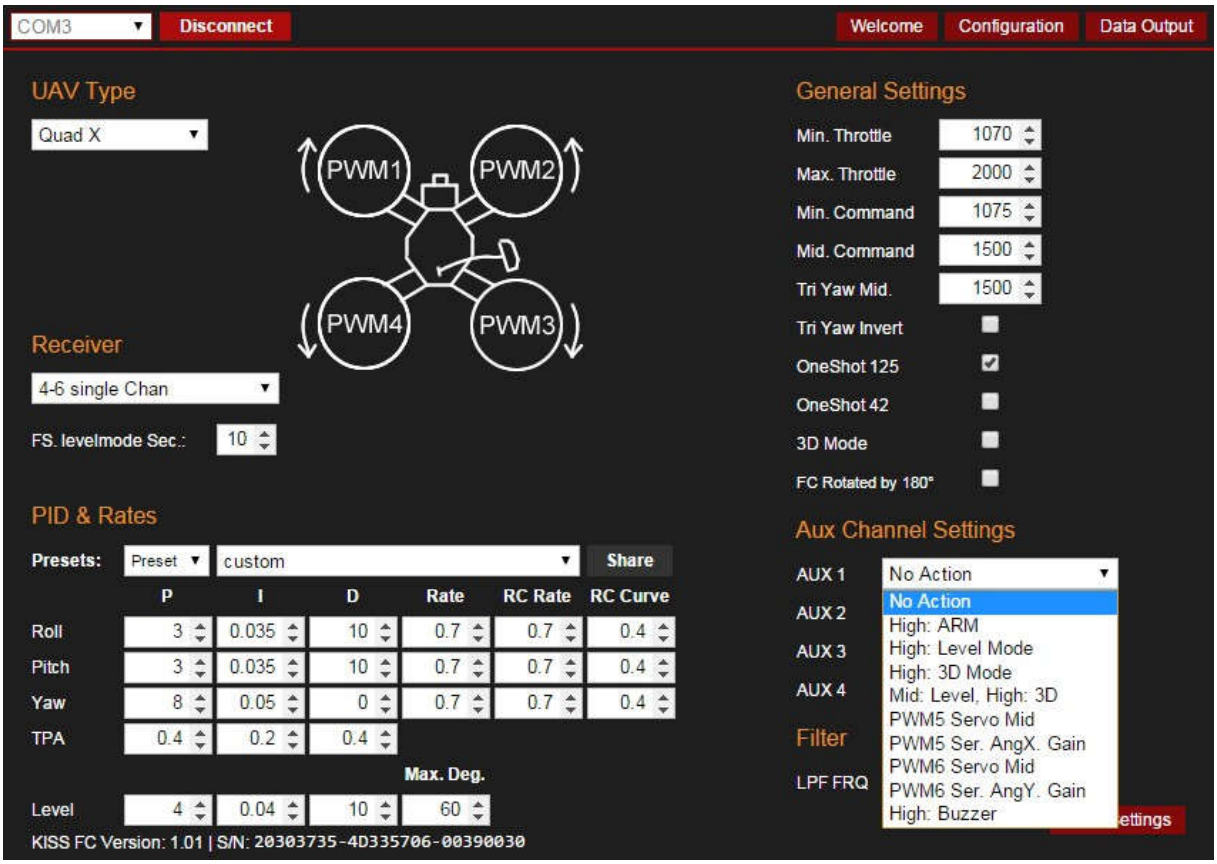
RC Curve is like the Expo on your TX. It lowers the inputs around the middle. You can adjust the RC Curve with 0.01 steps.

Low Pass Filters



The GUI offers presets for low pass filters to get rid of possible oscillations. The lower you choose the frequency, the more filtering will occur. You can either turn filtering off completely or select one of the other presets to match your setup. “Very Low” offers the most filtering, “High” is the least affecting filter.

AUX Channel Settings



The AUX Channels offer access to advanced features, controlled by switches oder faders on the transmitter, e.g. engaging the Level Mode or activating the buzzer like shown above. The Servo features offer functions for gimbals.

ESCs Throttle Calibration

Note: when using KISS ESC 24A you will not need to calibrate the ESCs bc of the precise onboard resonator. **Please always take off the props when using the following procedures.**

"Disarmed" always means 1000 on the KISS FC
- Connect the FC to the USB and set Min Throttle to 2000
- Arm the FC with your transmitter (without Lipo!)
- Only then connect the Lipo (beep)
- Disarm (beep)
- Unplug the Lipo again
- Set Min Throttle to 1070 (or as you need it)

Note: For security reasons the Min Throttle settings will only become active after restarting the FC (repower)

3D Mode

Please be extra cautious when activating the 3D Mode – **always take off props first!**

Flashing the Firmware

You will find online instructions on how to flash the latest firmware onto the FC:
http://ultraesc.de/KISSFC/update_en.html

Air Mode

If Min Command is set lower than TX Throttle cut, the PIC controller won't be shut off
If Min Command is set to 1000 and the Arm function is assigned to a switch on your radio, the Air Mode is activated automatically.

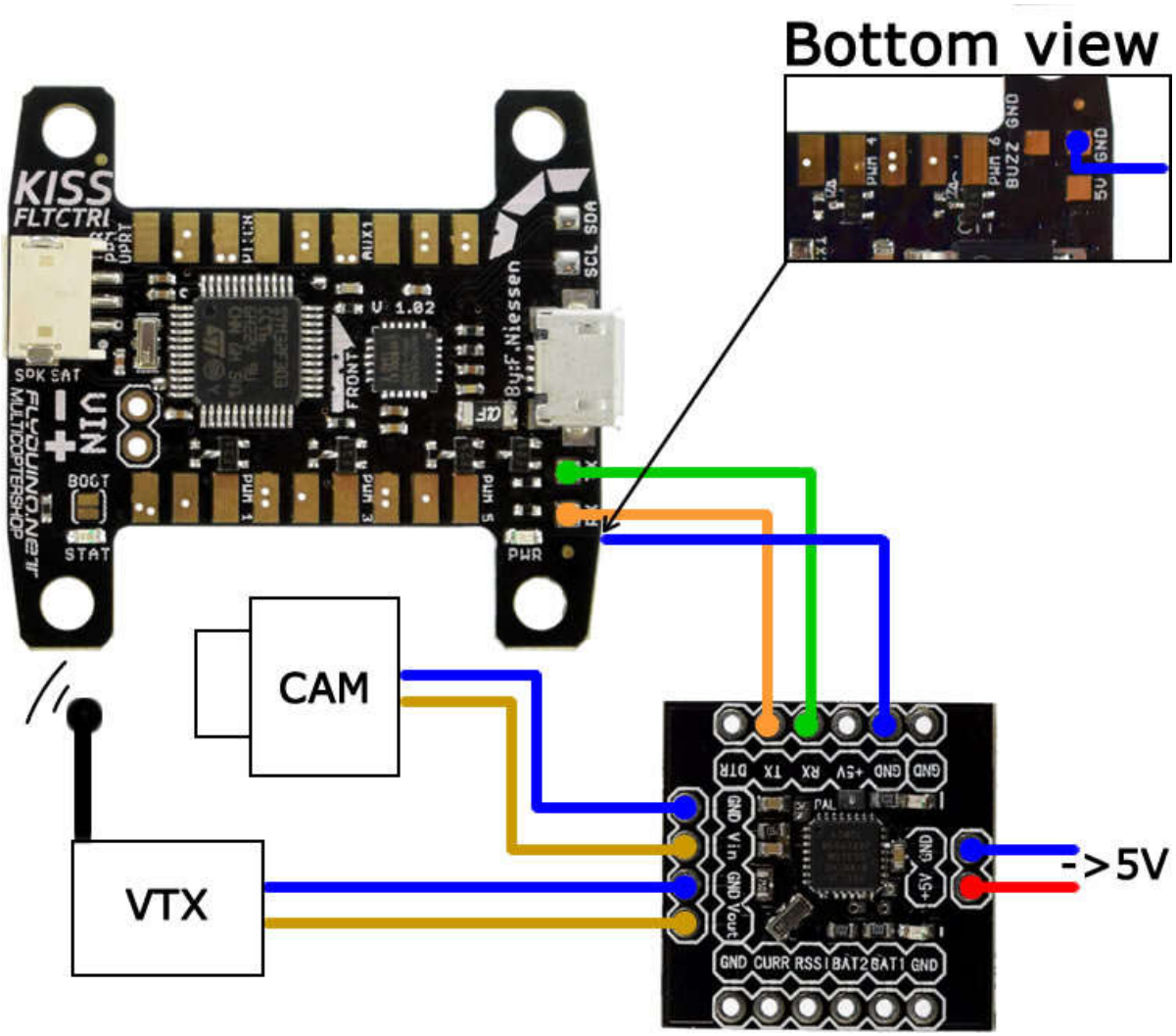
In Airmode on the Ground you might find the FC trying to regulate "something" though it is sitting still. However the Airmode only makes sense in flight.

Telemetrie / OSD

The KISS FC offers various possibilities to use telemetry and OSD functions

- internal Telemetry of the FC via GUI
- external Modules for Telemetry and OSD, e.g. KISS ESC 24A Telemetry via OSD
Telemetry of the KISS FC can be viewed on the „Data Output" page.

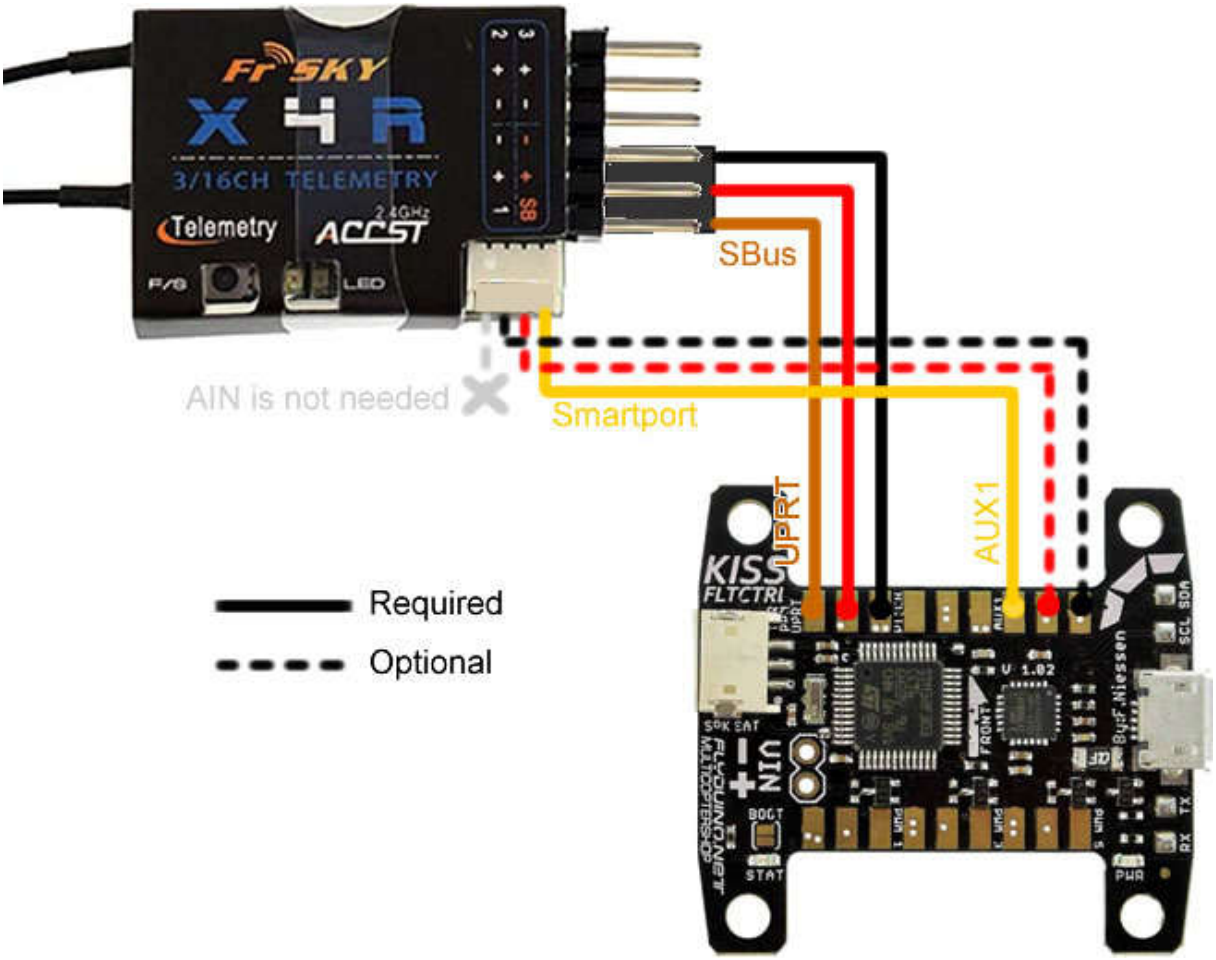
External Modules



Connecting the MinimOSD – special firmware required.

Telemetry for specific RC Transmitters

FrSky Telemetry via S-Port



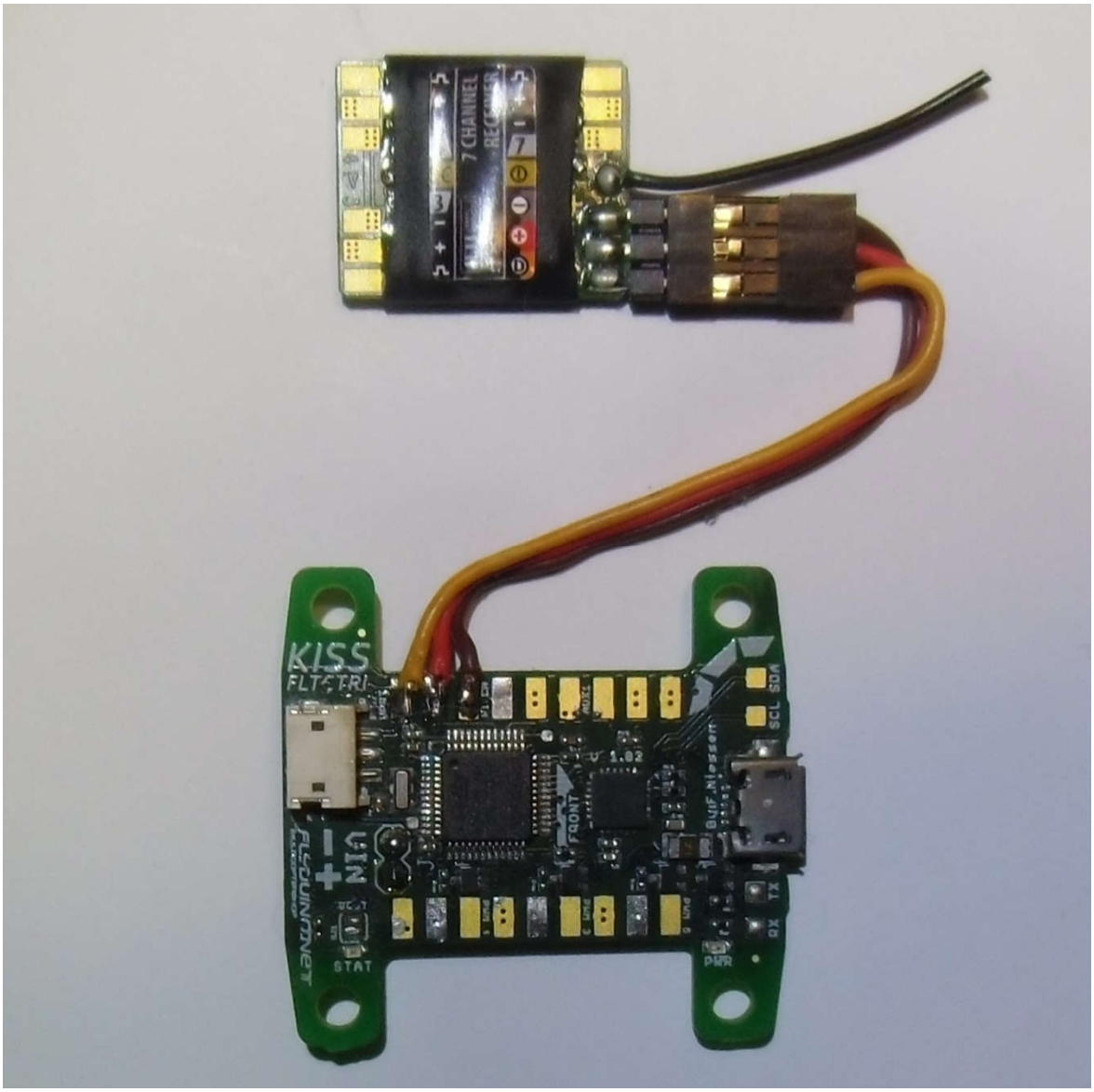
Add Sensors in the Taranis Menu

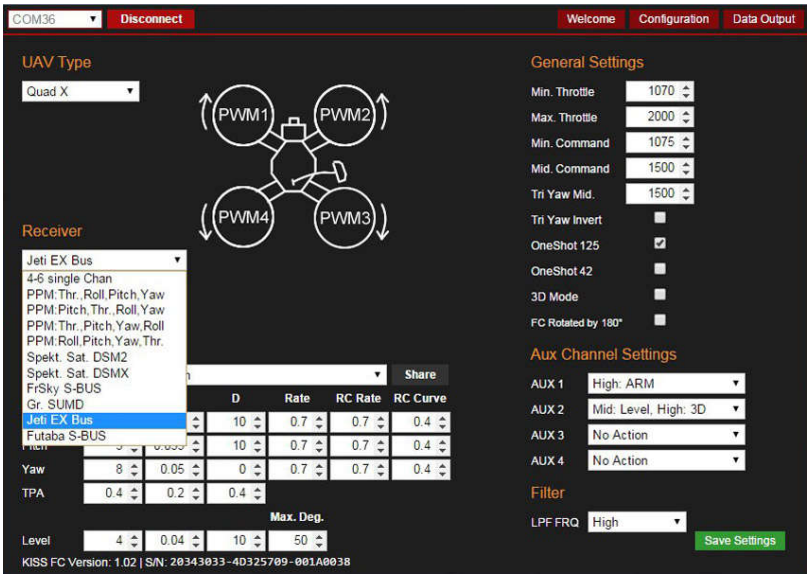
Power the FC and RX (Smartport telemetry is only active as long as FrSky SBus is selected as RX type), go to menu and then press page till you come to telemetry menu. Select "Discover new sensors". You should get beside some others the new sensors:

- VFAS (the lipo voltage in V)
- Current (the total current A)
- Fuel (the used mAh's)

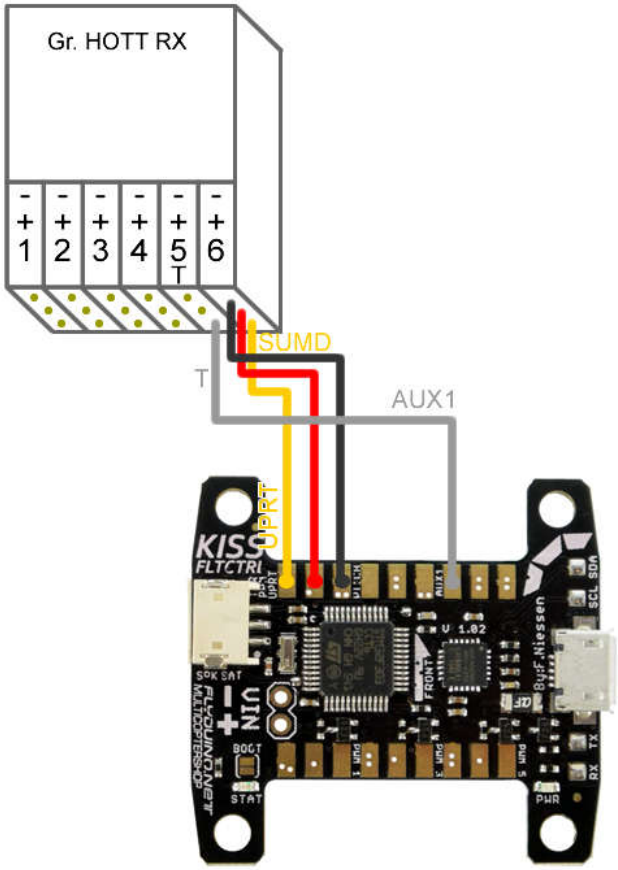
Note: Current and Fuel will stay zero if you dont have supported telemetry ESC's connected (KISS24A for example)

JETI DX


7 CHANNEL RECEIVER
KISS
FLT CTRL
FRONT
STAT
PWR

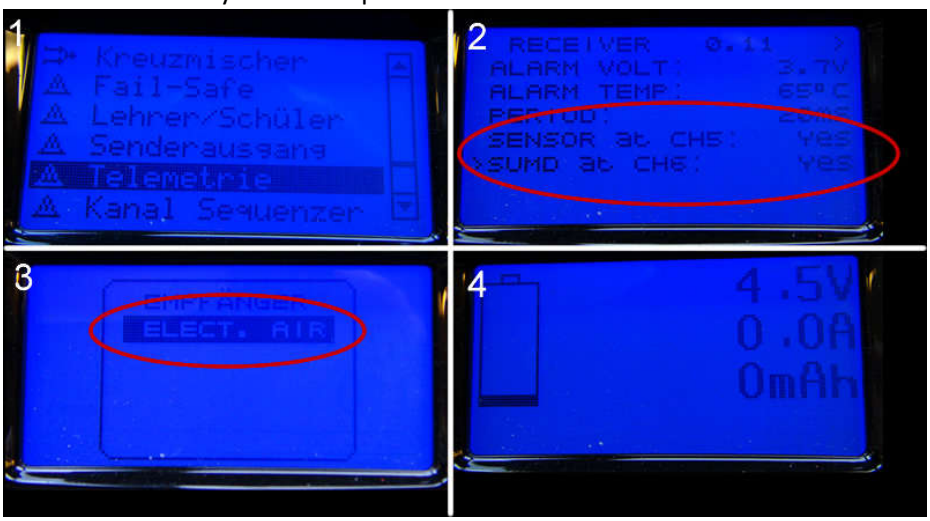

COM36
Disconnect
Welcome
Configuration
Data Output
UAV Type
Quad X
PWM1
PWM2
PWM4
PWM3
Receiver
Jeti EX Bus
4-6 single Chan
PPM:Thr.,Roll,Pitch,Yaw
PPM:Pitch,Thr.,Roll,Yaw
PPM:Thr.,Pitch,Yaw,Roll
PPM:Roll,Pitch,Yaw,Thr.
Spekt. Sat. DSM2
Spekt. Sat. DSMX
FrSky S-BUS
Gr. SUMD
Jeti EX Bus
Futaba S-BUS
Share
D
Rate
RC Rate
RC Curve
Yaw
TPA
Max. Deg.
Level
KISS FC Version: 1.02 | S/N: 20343033-4D325709-001A0038
General Settings
Min. Throttle
1070
Max. Throttle
2000
Min. Command
1075
Mid. Command
1500
Tri Yaw Mid.
1500
Tri Yaw Invert
OneShot 125
OneShot 42
3D Mode
FC Rotated by 180°
Aux Channel Settings
AUX 1
High: ARM
AUX 2
Mid: Level, High: 3D
AUX 3
No Action
AUX 4
No Action
Filter
LPF FRQ
High
Save Settings

Graupner HOTT Telemetry



Setup your Graupner MX-xx

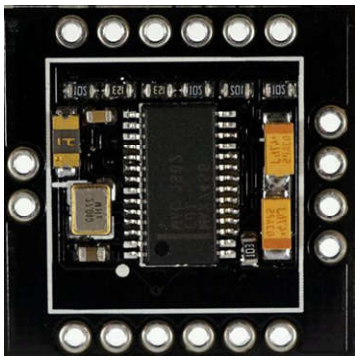
Power the FC and RX (HOTT telemetry is only active as long as SUMD is selected as RX type), go to Menu -> Telemetry -> RX Setup and enable SUMD and the Sensor Pin.



*** Note1:** To let the TX find the sensor, you should power the FC and RX close after turning on your TX. As the TX just searches for some time after it is turned on.

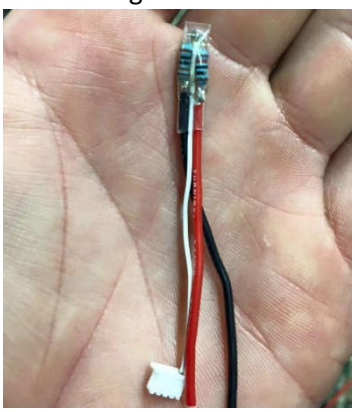
*** Note2:** Current (A) and the consumption (mAh) will stay zero if you don't have supported telemetry ESCs connected (KISS24A for example)

- Micro MinimOSD



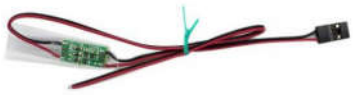
Refer to the connection diagram above. https://flyduino.net/Micro-MinimOSD

- DIY Voltage Divider



How to build a voltage divider: https://www.youtube.com/watch?v=21HhyyQB2RI

- FrSky Voltage Sensor



Can be purchased at various stores online for ~5$, e.g. at Flyduino: http://flyduino.net/Frsky-FBVS-01-FrSky-Battery-Voltage-Sensor_1

For further questions and discussions please follow us on RCGroups:
http://www.rcgroups.com/forums/showthread.php?t=2555204

The whole Flyduino team wishes you great success and a lot of fun with this new FC!

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