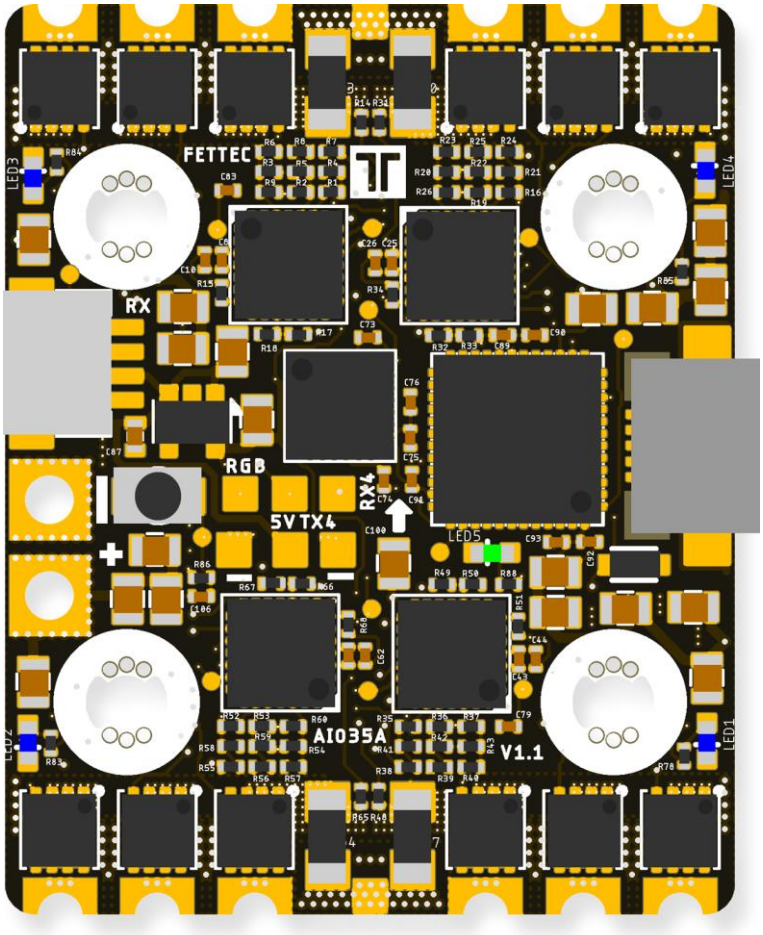
FETtec AIO 35A

Manual



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Introduction

Thank you for purchasing the FETtec AIO 35A.

Features

FC:

- Latest STM32G4 Processor
  - 170Mhz + Math accelerator
  - MPU6000
- Supply voltage 12-25V (3S-6S Lipo voltage)
- 2x dedicated onboard 5V BEC for VTX (max. 600mA each)
  - 5V BEC for RX
  - 5V/16V BEC for VTX (switchable and real Pit*)
- 1x 8 pin connector for solder free VTX, cam connection and OSD or digital systems
  - VCC, GND, Video in, Video out, BEC 5V/16V, VCS/TX3, RX3
- 2x 4 pin connector for receiver and VTX
  - Signal, telemetry, 5V, gnd
  - Gnd, 5V, TX1, RX1
- 5 UART serials
  - UART 1 free
  - UART 2 used for Receiver
  - UART 3 free
  - UART 4 used for onboard OSD, can be set free
  - UART 5 used for ESCs / TLM / Onewire
- Solder pad for RGB LEDs
- Supported ESC protocols
  - PWM, Oneshot125, Oneshot42, Dshot150/300/600/1200/2400, FETtec Onewire
- KISS FC firmware (FETtec Alpha FC firmware flashable)

*real Pit-Mode: A power supply pin which is remotely switchable

ESC:

- Active current limiting @ 35A
- Input voltage: 3s-6s
- High quality 40V MOSFETs
- STM32G071 @ 64MHz
- up to 128 kHz Motor PWM
- Full sine wave control
- Automatic input signal detection
  - PWM, Oneshot125, Oneshot42, Dshot150/300/600/1200/2400, FETtec Onewire
- FETtec ESC firmware

OSD:

- Onboard OSD
  - Graphic OSD (STM32)
  - Full KISS Tuning
  - Filter (PIDs, Rates, Settings)
  - LED control (RGB LED, Racewire)
  - VTX
  - Live data graphs (Voltage, motor rpm, current, motor temp, gyro values, link quality)
  - KISS GPS support + live map
  - Custom graphic pilot logo
  - Stick overlay
  - Custom layout
  - can be deactivated for usage of digital systems

- Maximum outside dimensions: 30 x 37,5mm
  - Mounting hole arrangement: 20 x 20mm with M2 mounting hole (expandable to M3)
- Overall height: 7,9mm
- Weight: 8,9 g
- Connector type: JST-SH-1mm

Safety warning

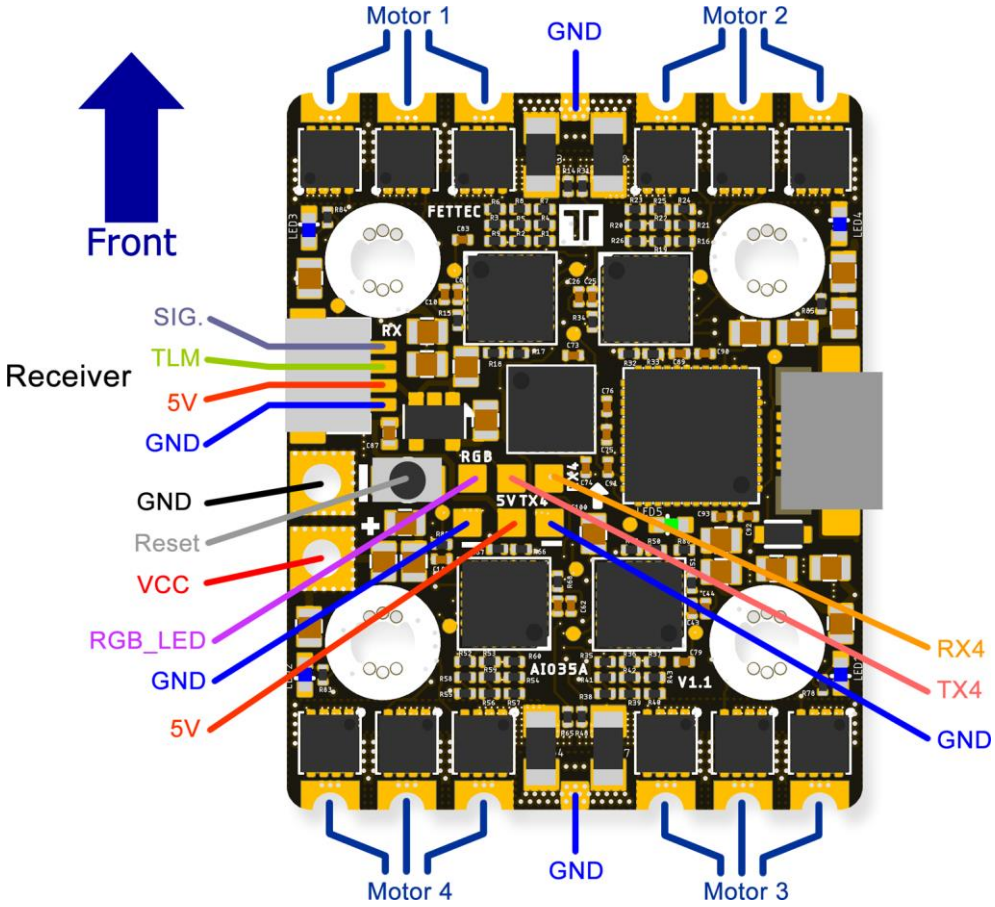
- Remove propeller before flashing and configuration
- always flash latest firmware before operation
- Please check periodically for firmware updates in the FETtec Toolset
- Do not file the mounting holes as this may cause damage

Recommended steps for installation of the FETtec AIO 35A

- Connect to FETtec Configurator and update to the latest firmware (see firmware update and settings)
- Install the AIO in your copter (see Connection diagrams for correct wiring and installation)
- Make sure everything is connected properly and check without propellers
- Connect to KISS GUI/FETtec Toolset to proceed with final configuration of the FETtec AIO 35A (FC configuration)

Connection Diagram

Connection Layout top



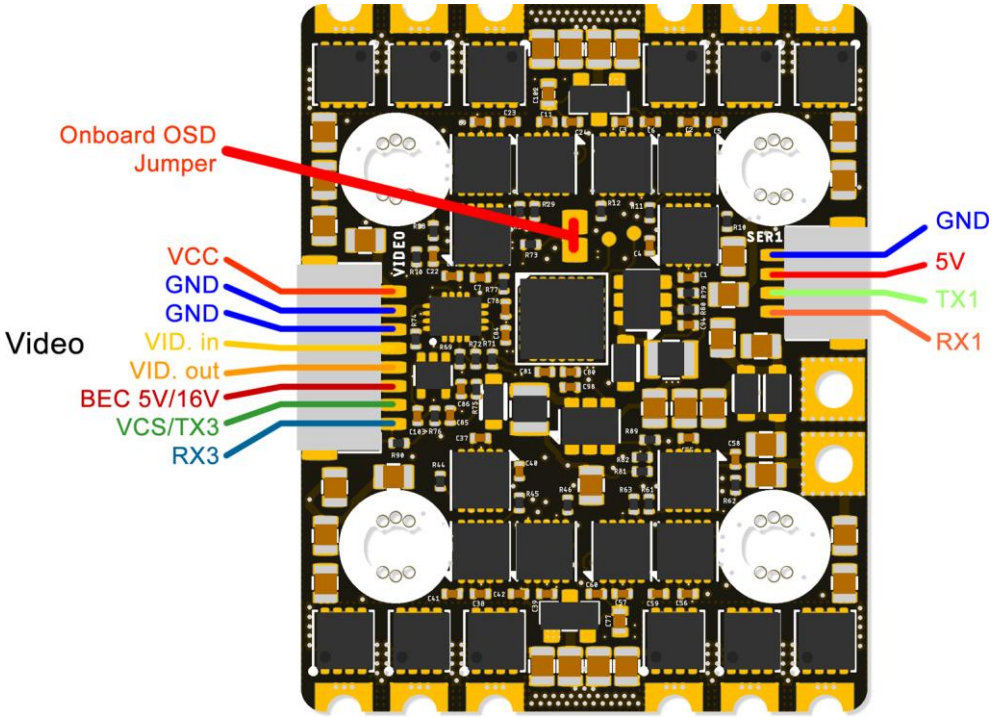
Receiver connector:

- GND
- 5V
- TLM: Telemetry signal to receiver
- SIG.: Receiver signal to FC

Acronym explanation:

- Motor 1 - 4: pads for motor connection
- GND: Reference Signal Ground
- 3-6S - / +: Battery input voltage (12V-27V)
- Reset: Reset button to force the FC in bootloader mode, not needed for normal operation
- RGB_LED: pad for LED connection
- 5V/GND/RX4/TX4: If onboard OSD is deactivated these pads are the connection for another free serial (e.g. GPS)

Connection Layout bottom



The 8 pin connector combines all necessary connections for analog or digital VTX and camera. It includes:

- VCC (Lipo+)
- GND for cam and VTX
- Video in: Analog video signal from cam
- Video out: Analog video to VTX
- BEC 5V/16V: power supply for cam and/or VTX, switchable voltage, real Pit capable
- VCS/TX3: for smart audio / tramp configuration or TX for digital FPV systems
- RX3: for digital FPV systems

4 pin connector:

- GND
- 5V
- TX1: function configurable in GUI
- RX1: function configurable in GUI

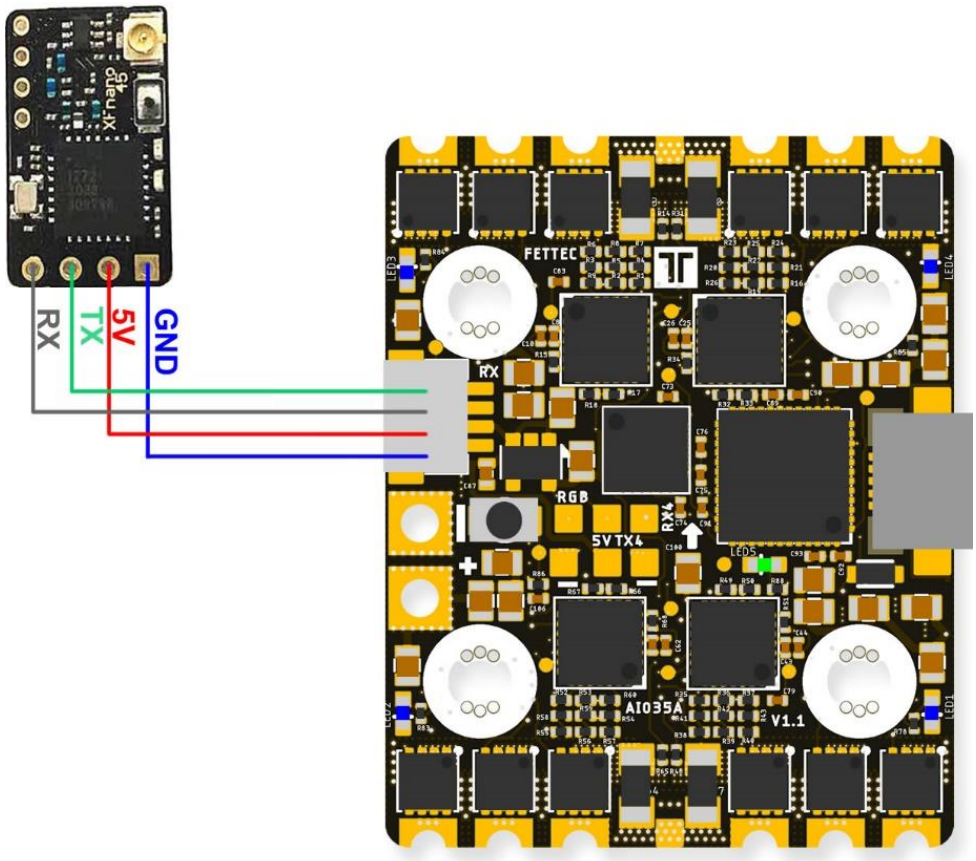
Onboard OSD Jumper: bridge to deactivate onboard OSD and to activate RX4 and TX4

Note: A unit's transmit signal (TX) must match the corresponding receiver (RX) at the other end. It must therefore be wired crosswise in order to transmit a signal

Receiver connection diagram

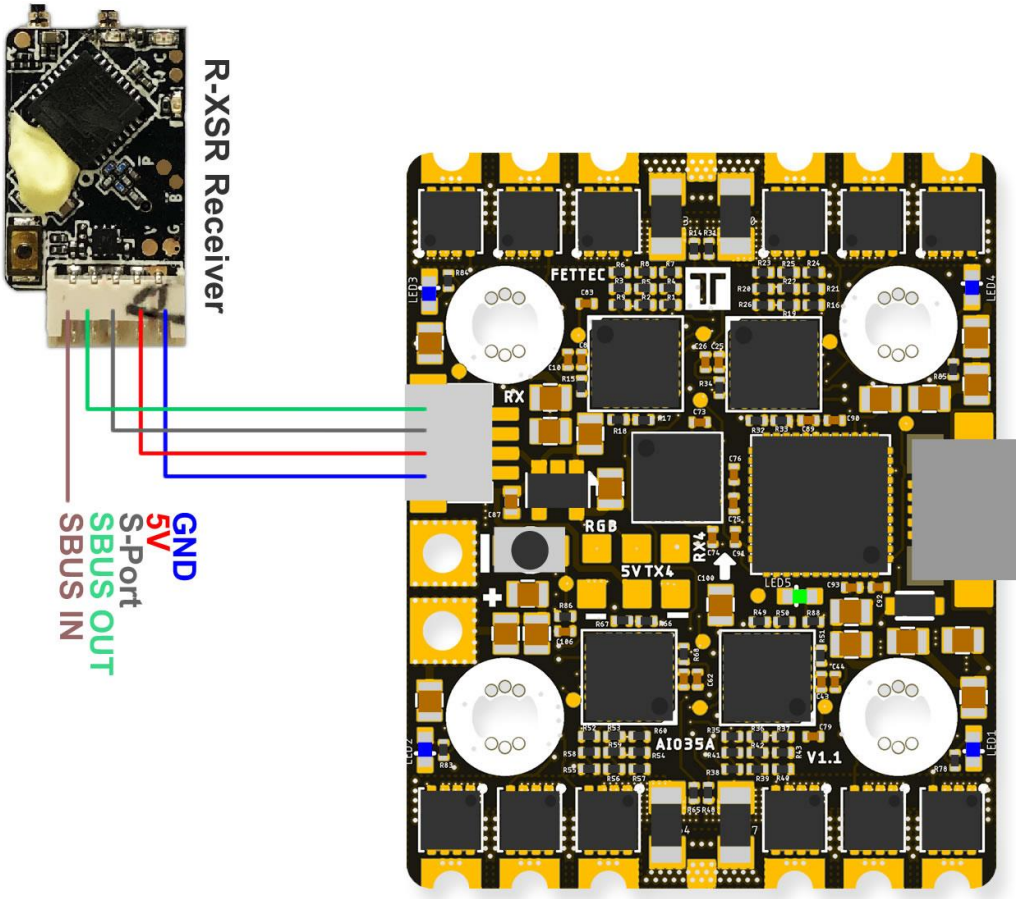
Receivers can be connected via receiver connector (4pin connector) on top side of the AIO

TBS Crossfire

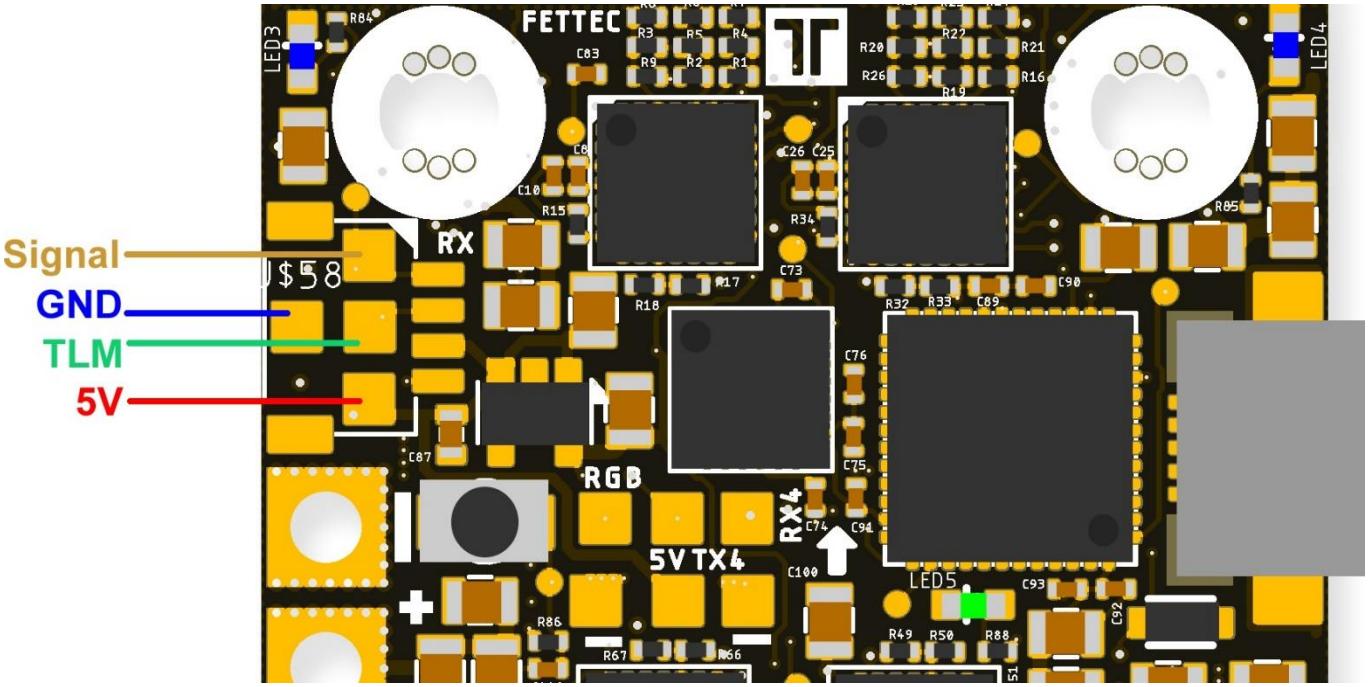


Set available here https://fettec.net/shop/elektronik/sonstiges/tbs-crossfire-nano-rx-se

SBUS receiver / FrSky R-XSR

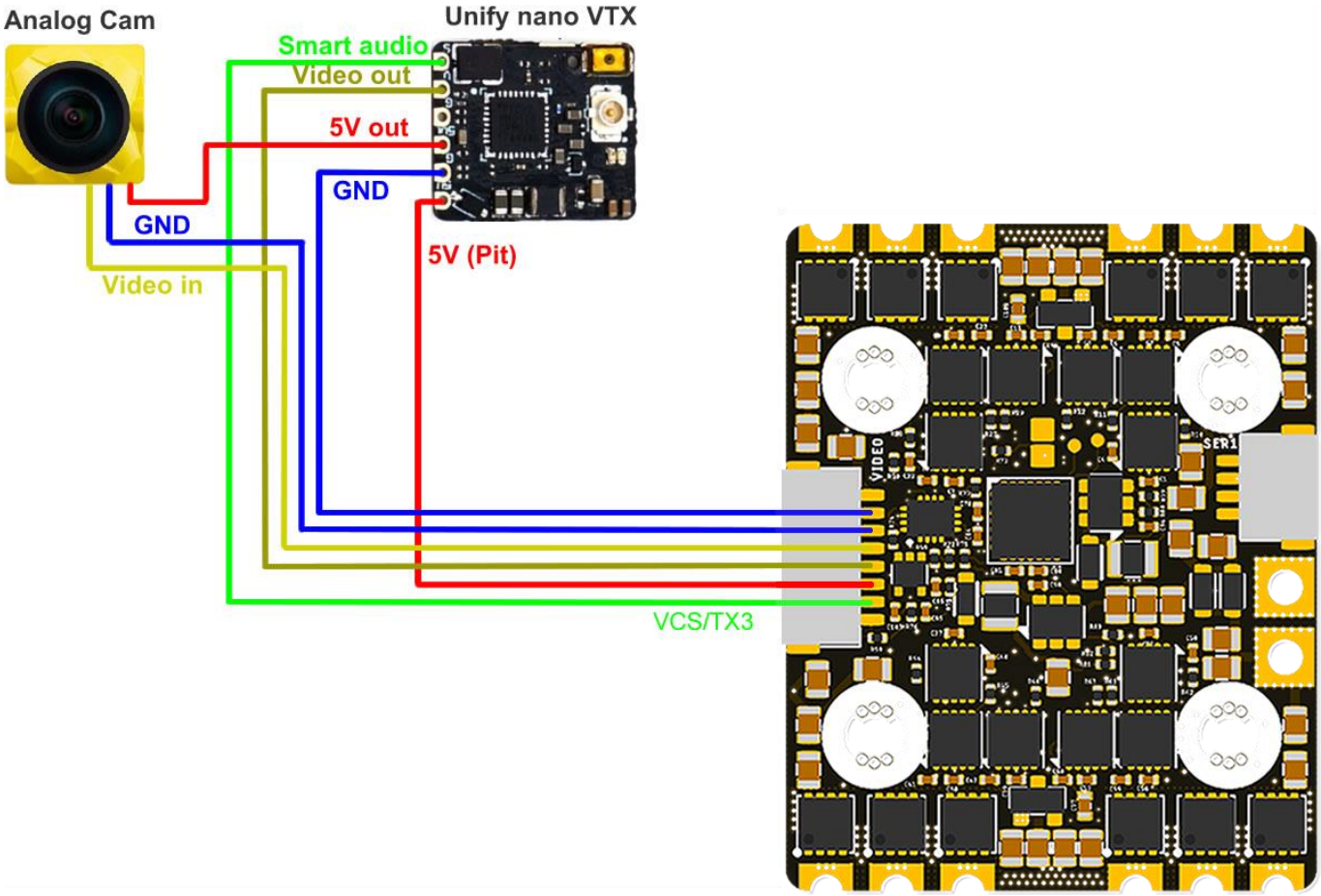


Alternative connection without connector



Analog FPV connection diagram

VTX and cam can be connected via FPV connector (8pin connector) on bottom side of the AIO



Notes:

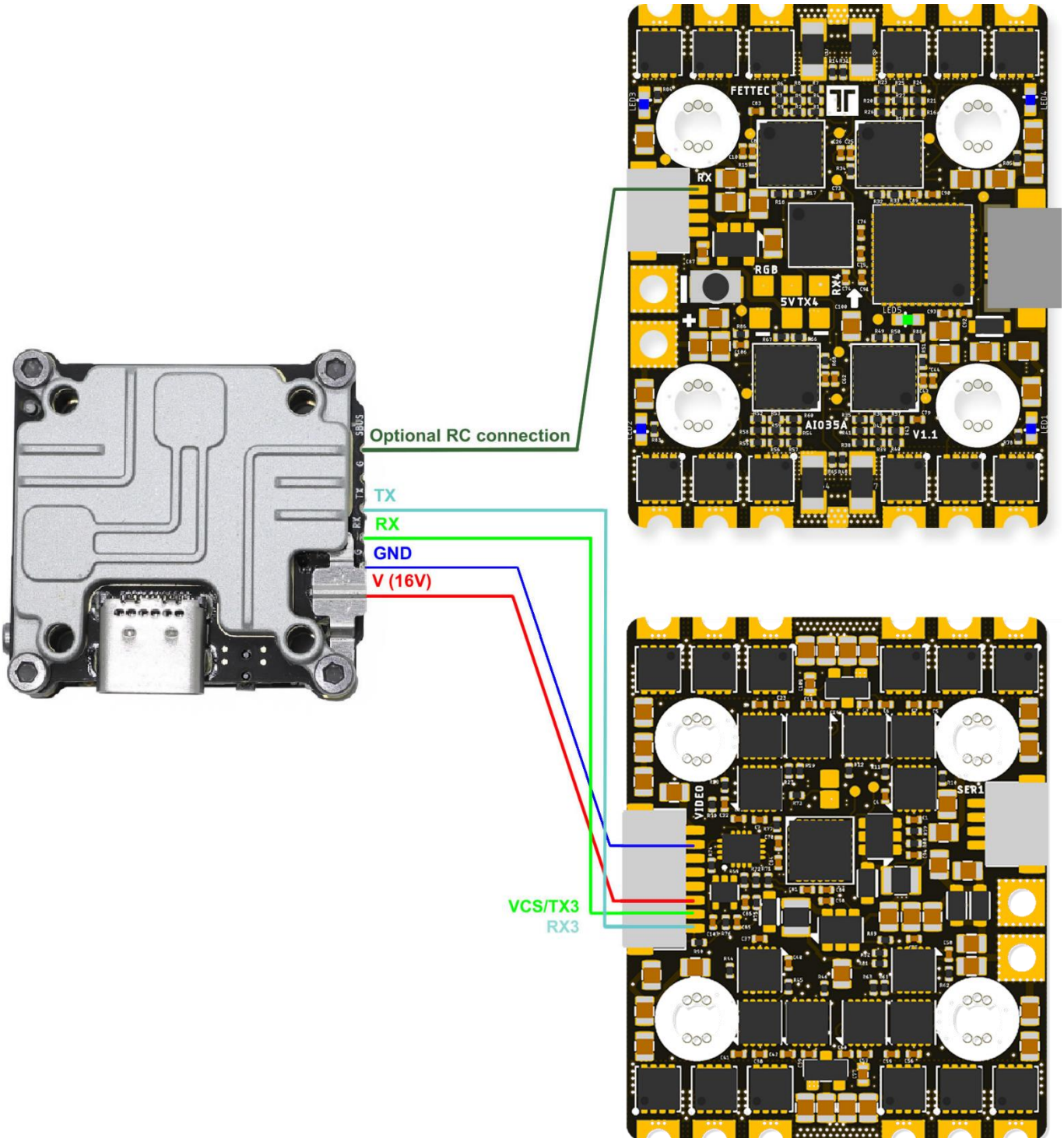
RX and TX connection is only used for cameras which support serial connection.

A unit's transmit signal (TX) must match the corresponding receiver (RX) at the other end. It must therefore be wired crosswise in order to transmit a signal.

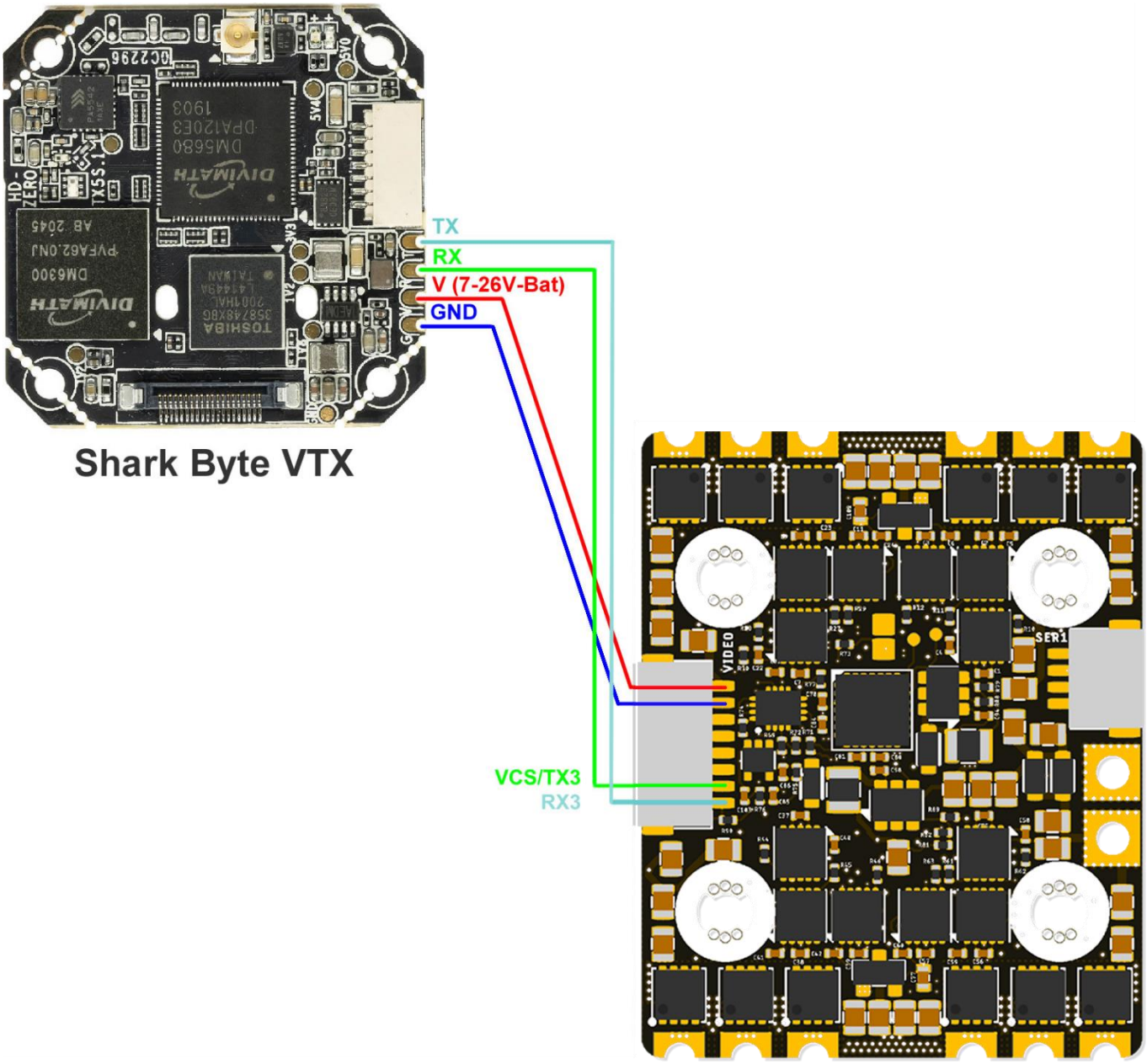
Digital FPV connection diagram

Choose MSP Port on serial 3 in the FETtec ALPHA Configurator → Settings → FC setup → Serial or KISS GUI

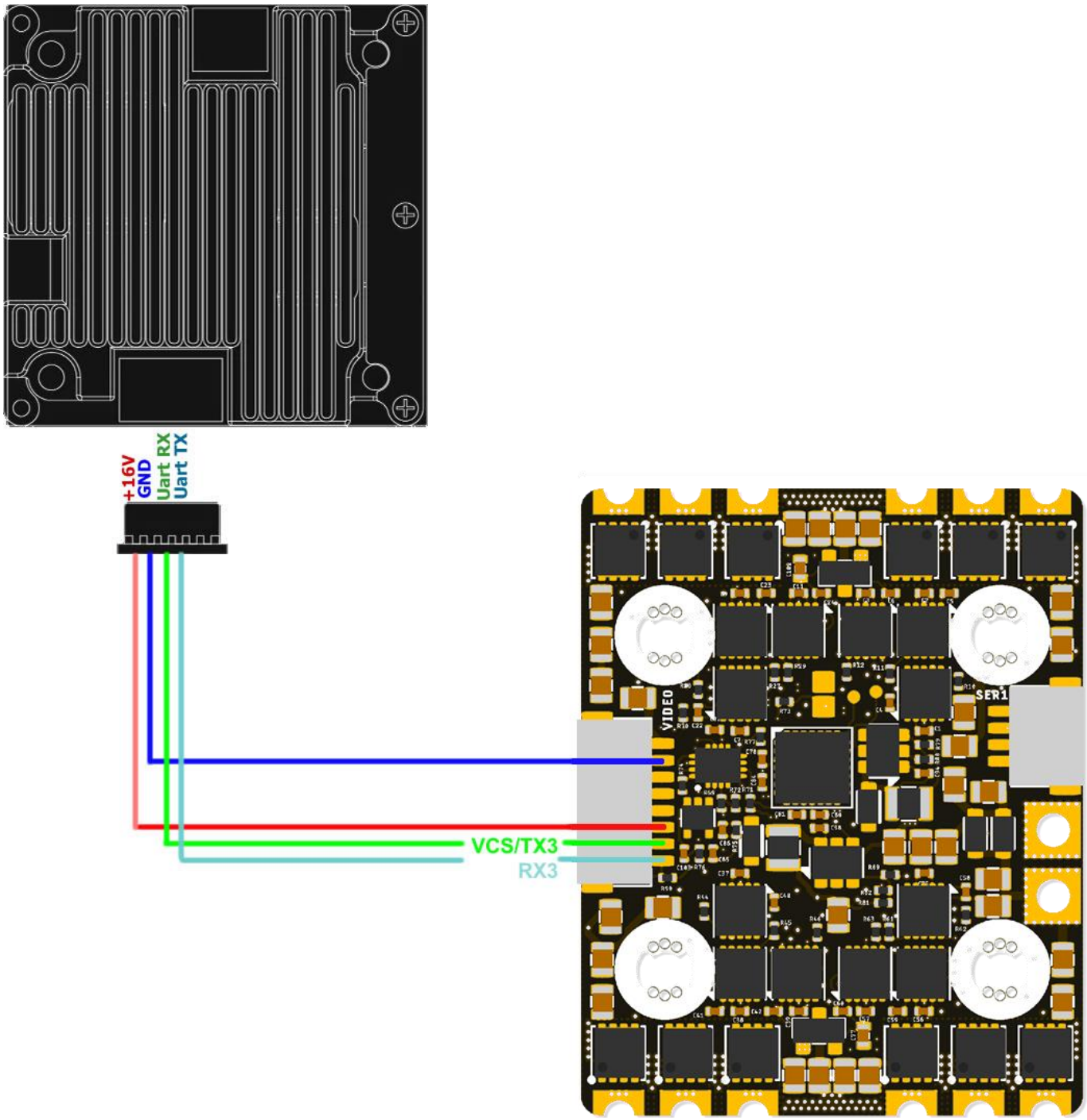
DJI/Caddx/Runcam Vista FPV system



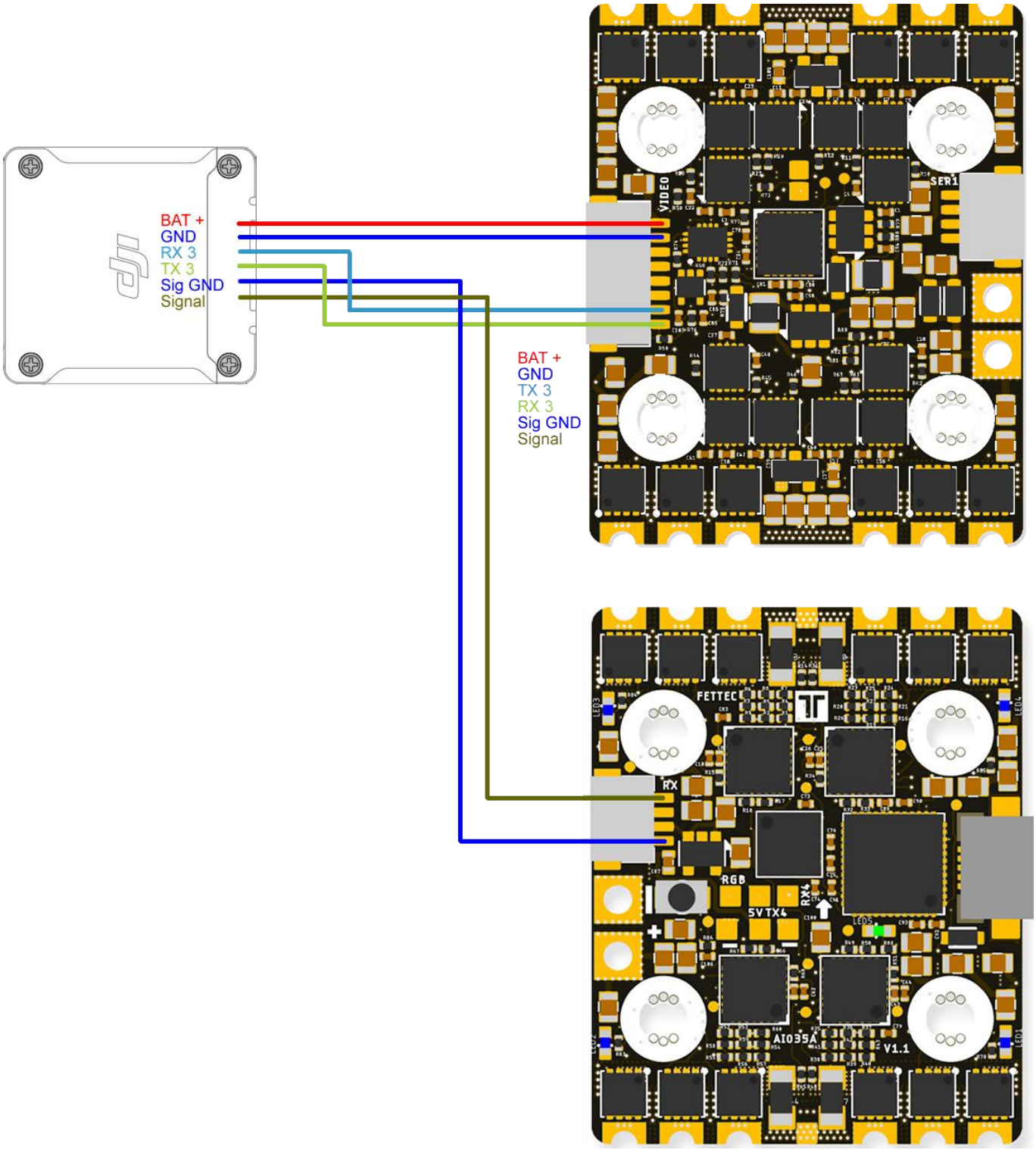
Fatshark Shark Byte system



Caddx Walksnail



DJI O3 Air Unit



Configuration

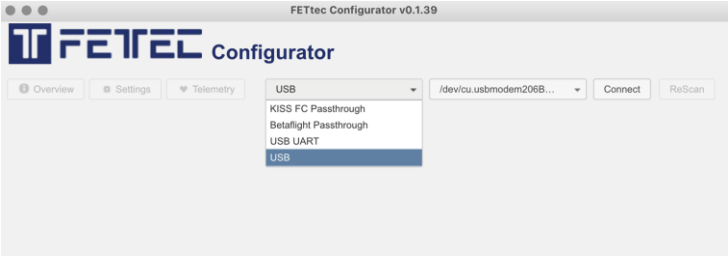
The FETtec AIO 35A works with FETtec KISS firmware version 1.3RC47i or later !

The FC, ESC and OSD of the FETtec AIO 35A Board are flashable over the FETtec Configurator.

Download the FETtec Configurator here: https://github.com/FETtec/Firmware/releases.

Or use the online tool https://gui.fettec.net/.

FC update (KISS)

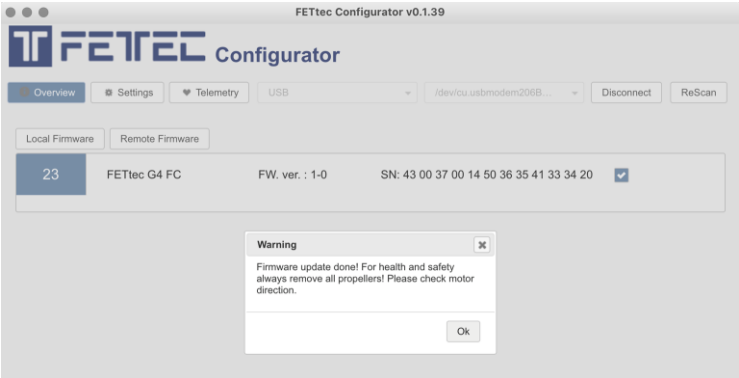


choose USB and select the correct COM Port and press connect.

You should see the FETtec FC G4 as shown.

Click “Remote Firmware” button and select the latest available firmware.

Press “Flash selected!”



FC is flashed now!

Settings can be made in the KISS GUI.

Download: https://github.com/flyduino/kiss-gui/releases

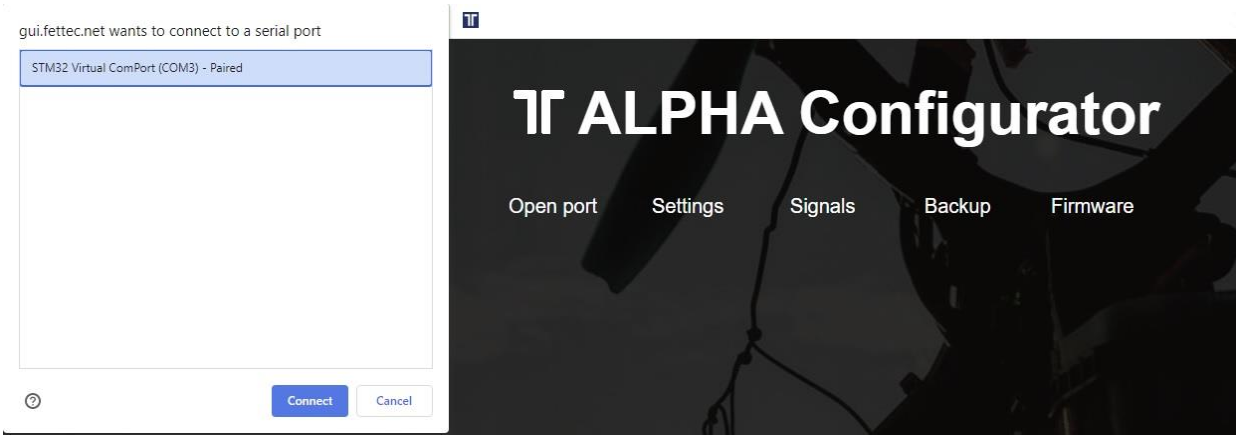
Reconnect USB after this step!

We recommend to always use the latest available firmware to get the best user experience.

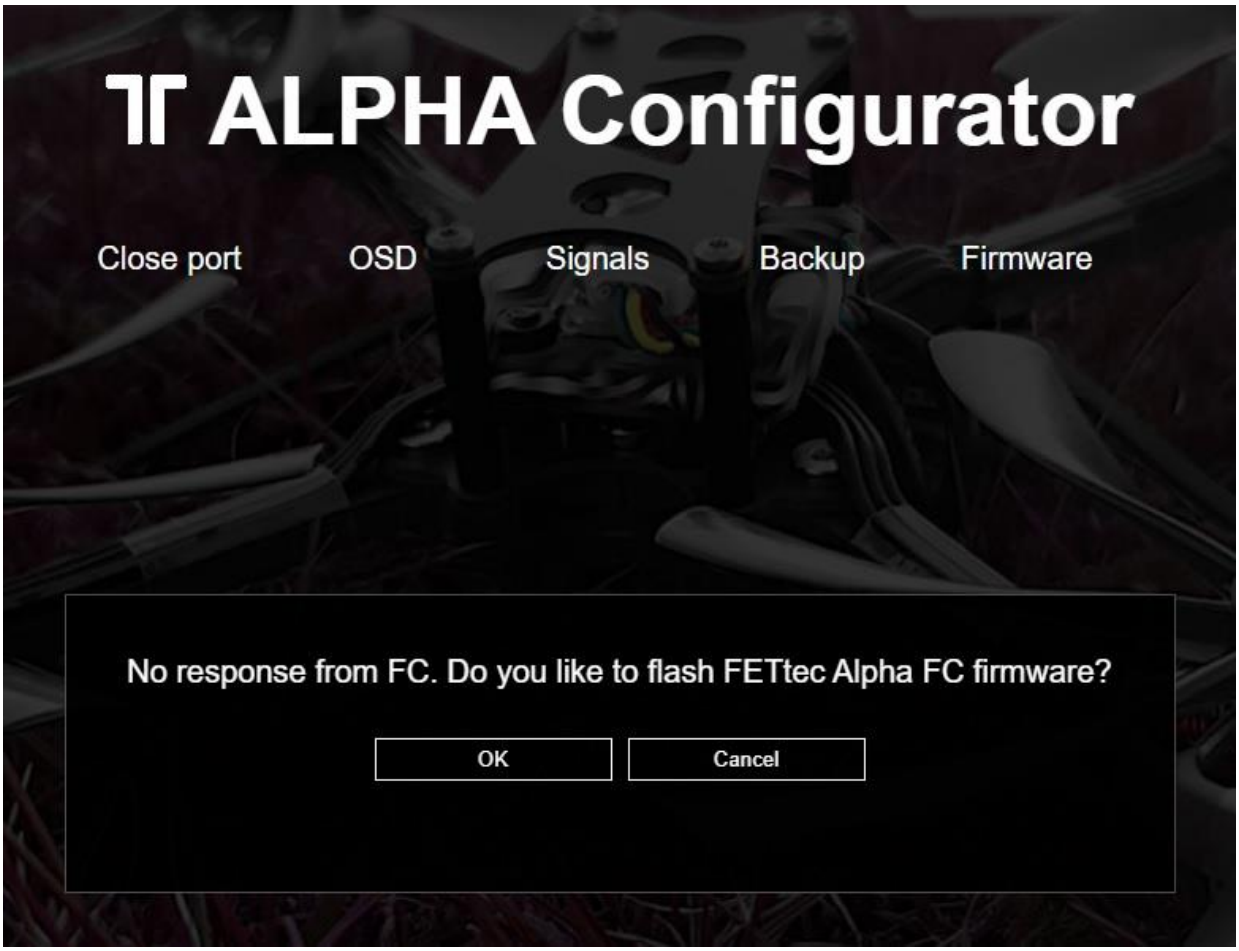
If you like to try new features and firmware developments you can join our Discord channel and download the latest beta firmware to try on your own risk (https://discord.gg/pfHAbahzRp)

FC update and settings (FETtec Alpha FC firmware)

1. Open FETtec Toolset https://gui.fettec.net and choose ALPHA Configurator.
2. Connect the FETtec FC via USB.
3. Open the ALPHA Configurator and select open port. Choose the serial port on which the FC shows up and press connect.



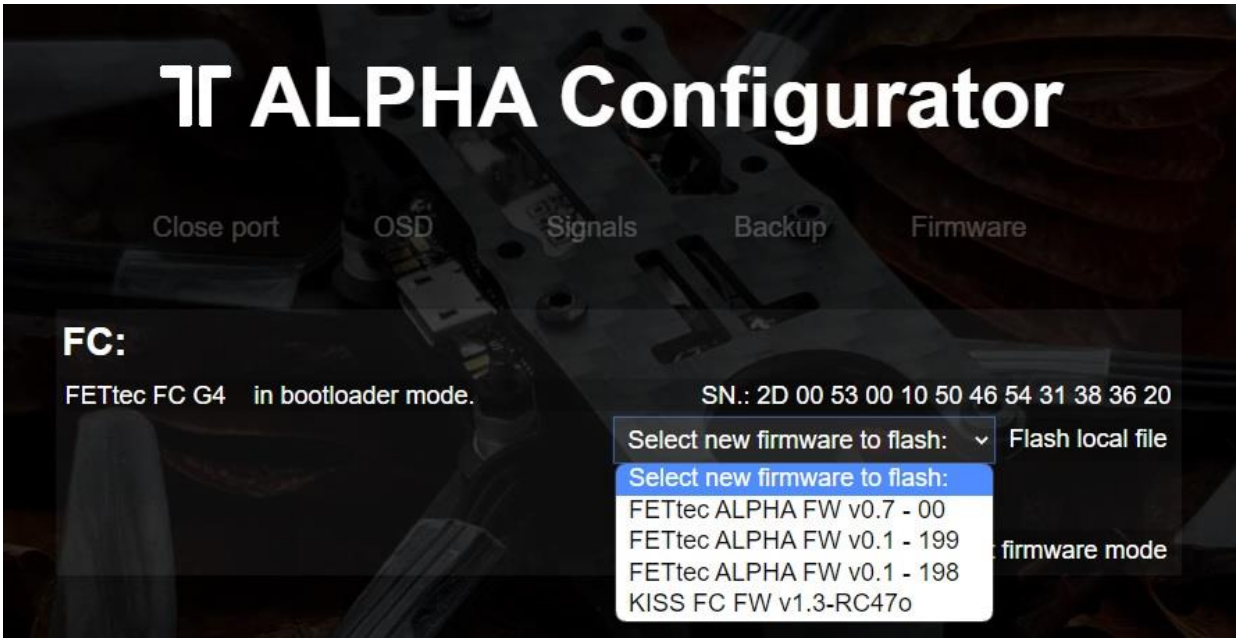
4. If you have KISS FC firmware running on your FC, you will get a warning if you want to flash FETtec Alpha FC firmware. Press “OK”



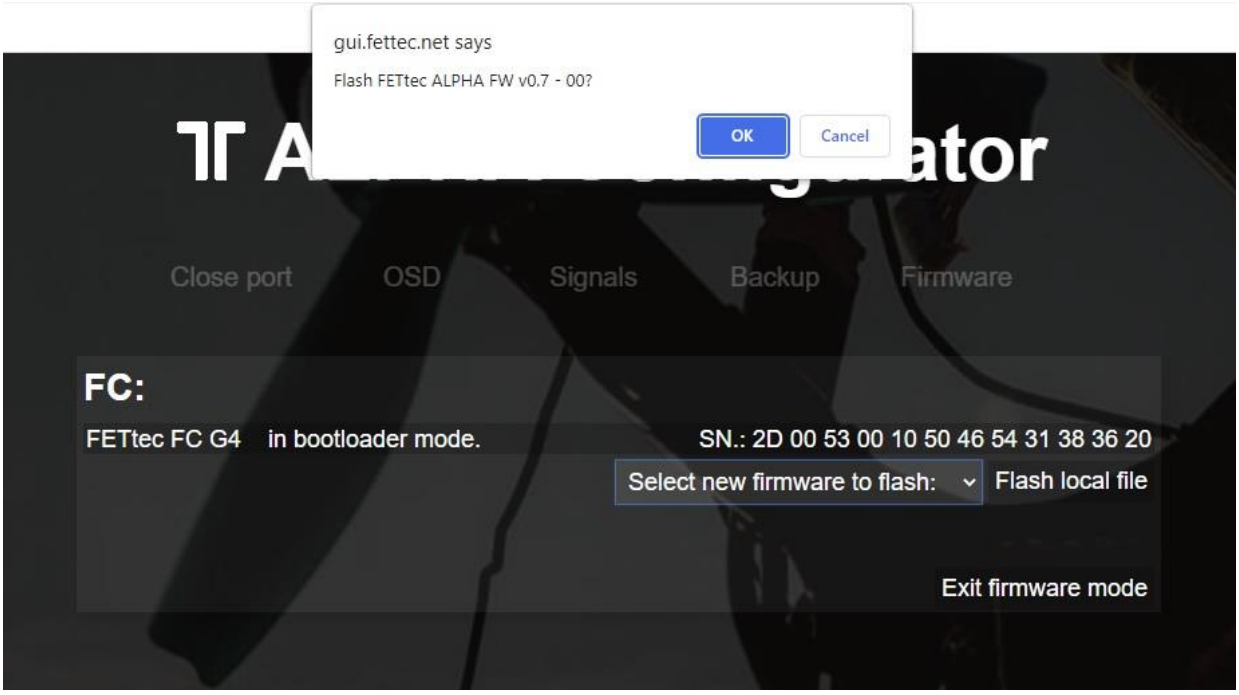
Select serial port again

5. “Select new firmware to flash”.

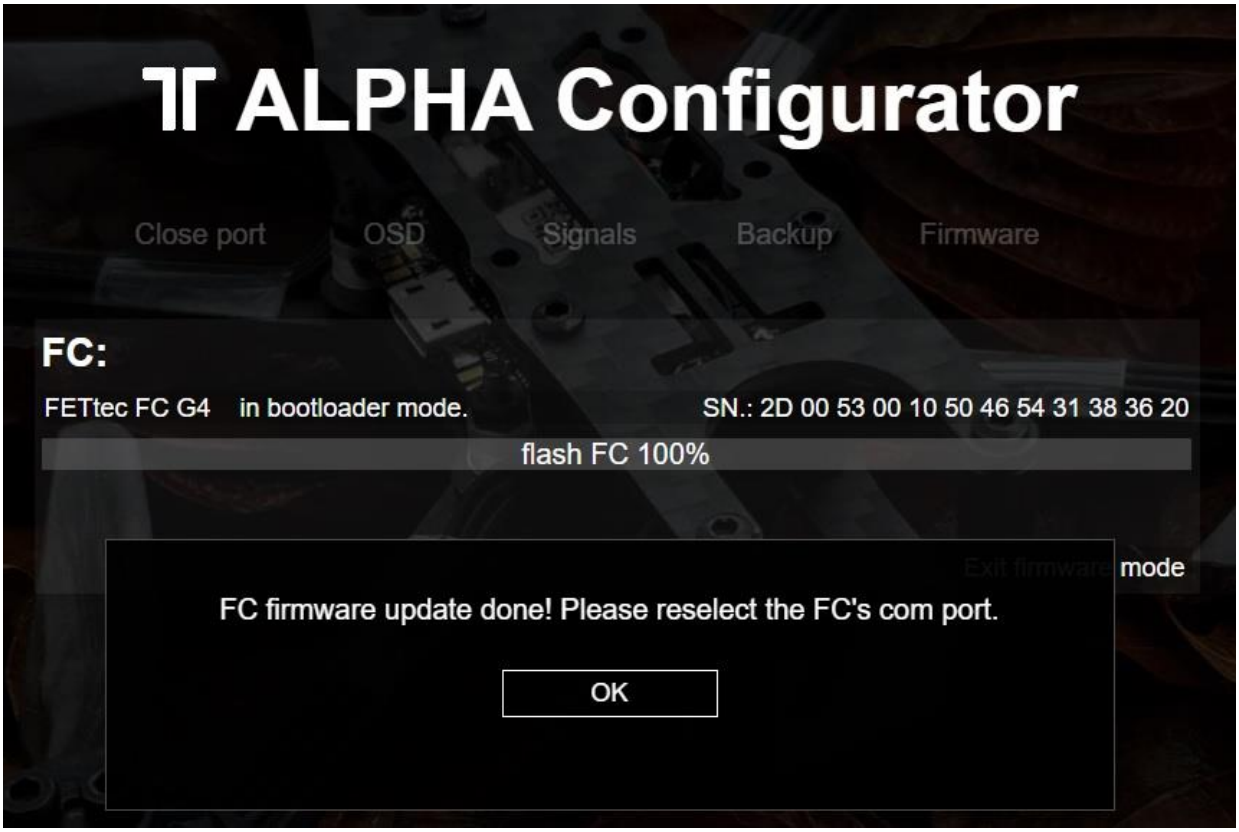
   We always recommend flashing the latest available firmware.



6. Confirm to flash FETtec ALPHA firmware by pressing “OK”



7. FC firmware update is done!



The FC needs a restart after that, therefore the com port is requested to be selected and connected again

Now you can customize everything in the GUI according to your wishes.

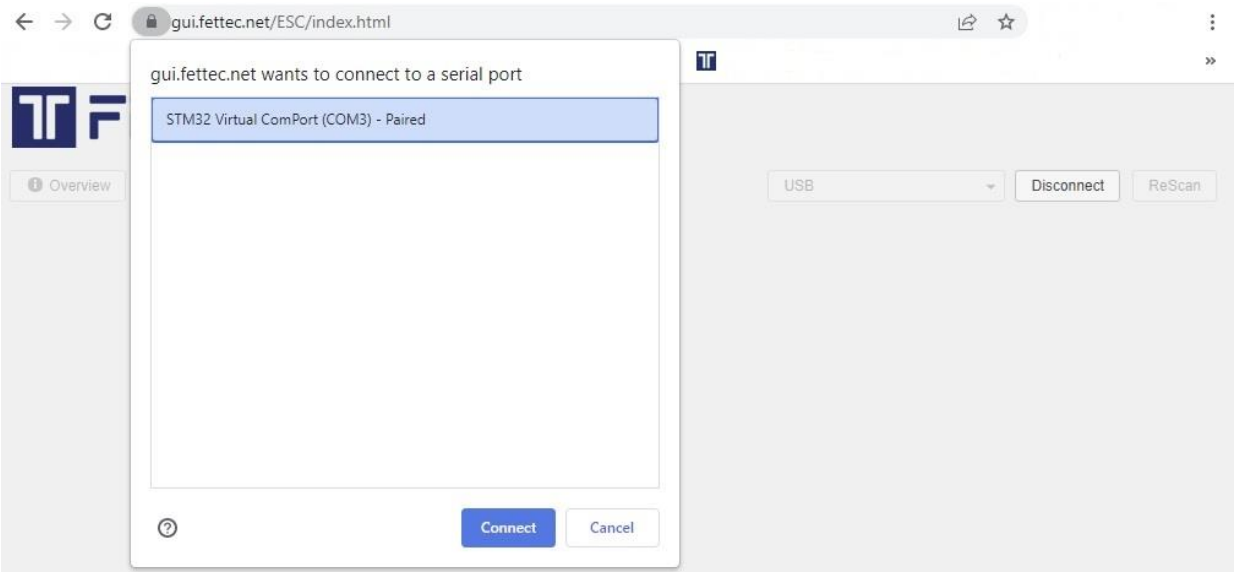
Please connect everything like described in the manual of the FC.

The receiver signal will get auto detected (supported systems are Frsky Sbus+S-Port, CRSFv2 and CRSFv3 and Ghost).

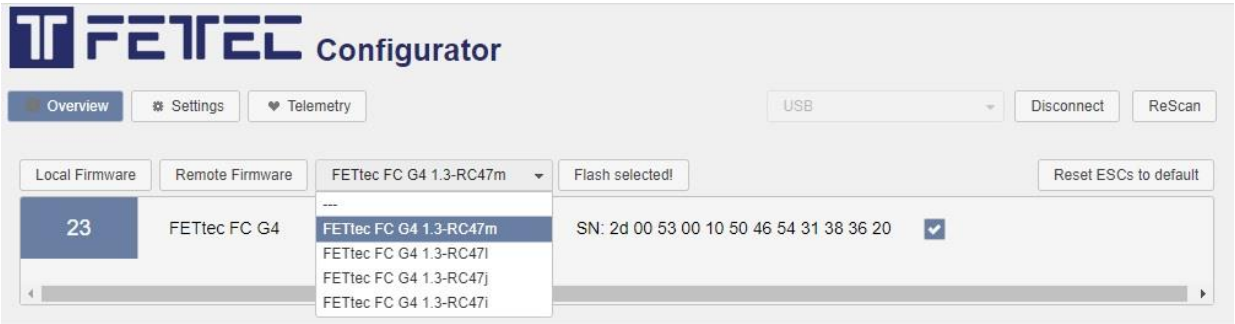
Get back to KISS

If the FETtec Alpha FC firmware is flashed on your FC and you want to get back to KISS firmware, follow these steps:

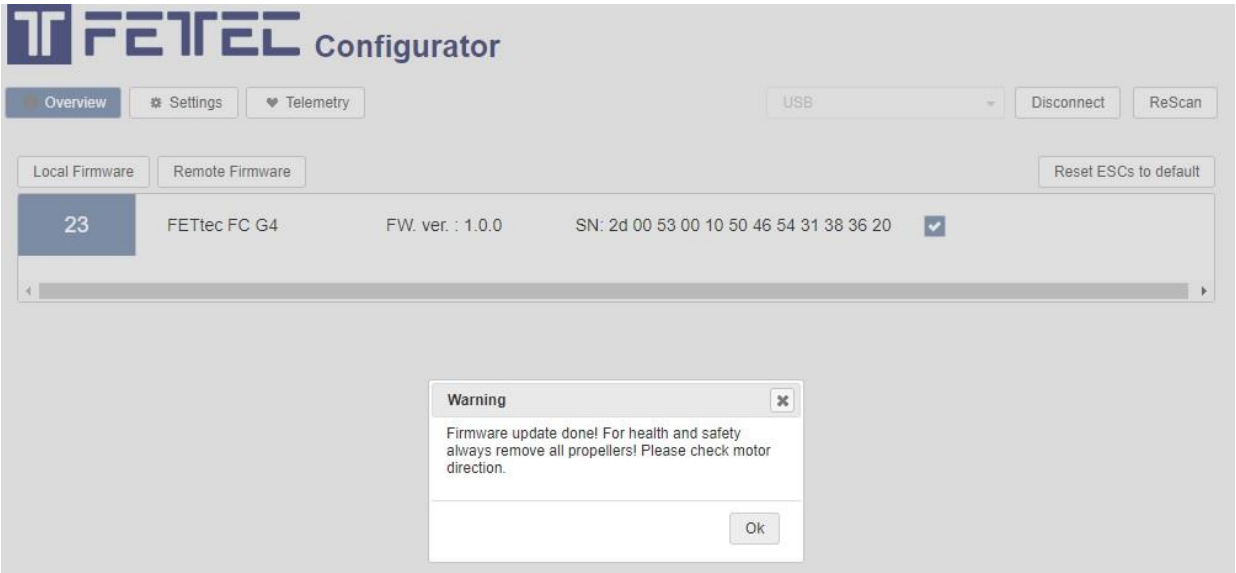
1. Open FETtec Toolset https://gui.fettec.net/
2. Connect the FETtec FC via USB.
3. Press the reset button once
4. Open the FETtec **ESC** Configurator and select “USB” and connect.
5. Choose the serial port on which the FC shows up and press connect.



6. Now the FC shows up and you can select KISS Firmware (FETtec FC G4 1.3-RC47m) in “Remote Firmware” and press “Flash selected!”



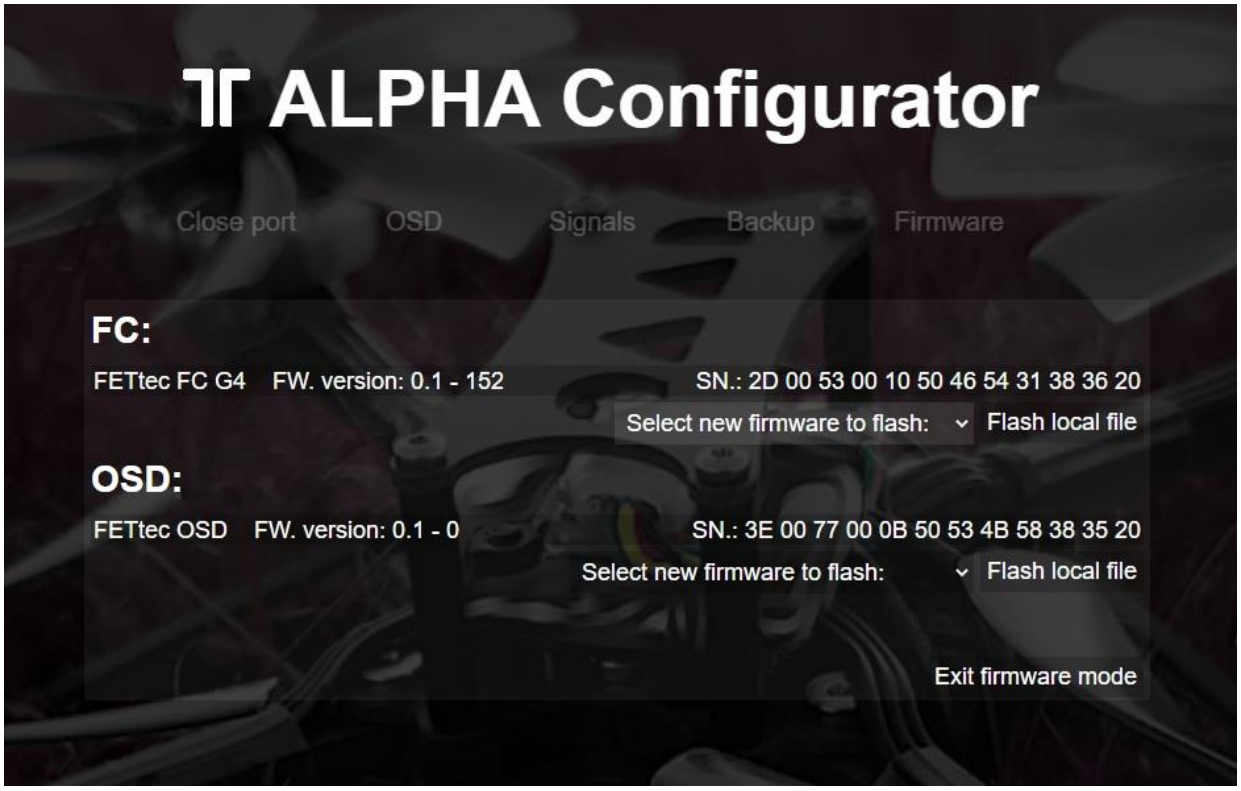
7. Flashing to KISS FC firmware done.



Firmware updates

For firmware updates it is the same procedure as flashing the FETtec Alpha FC firmware.

Connect FC via open port and choose “Firmware”.



Now you can flash the latest firmware update via “Select new firmware to flash” or choose “Flash local file”.

We always recommend to use the latest available firmware to get the best user experience.

If you like to try new features and firmware developments you can join our Discord channel to be always up to date (https://discord.gg/pfHAbahzRp).

Settings

You can set up the FC according to your wishes in the ALPHA Configurator.

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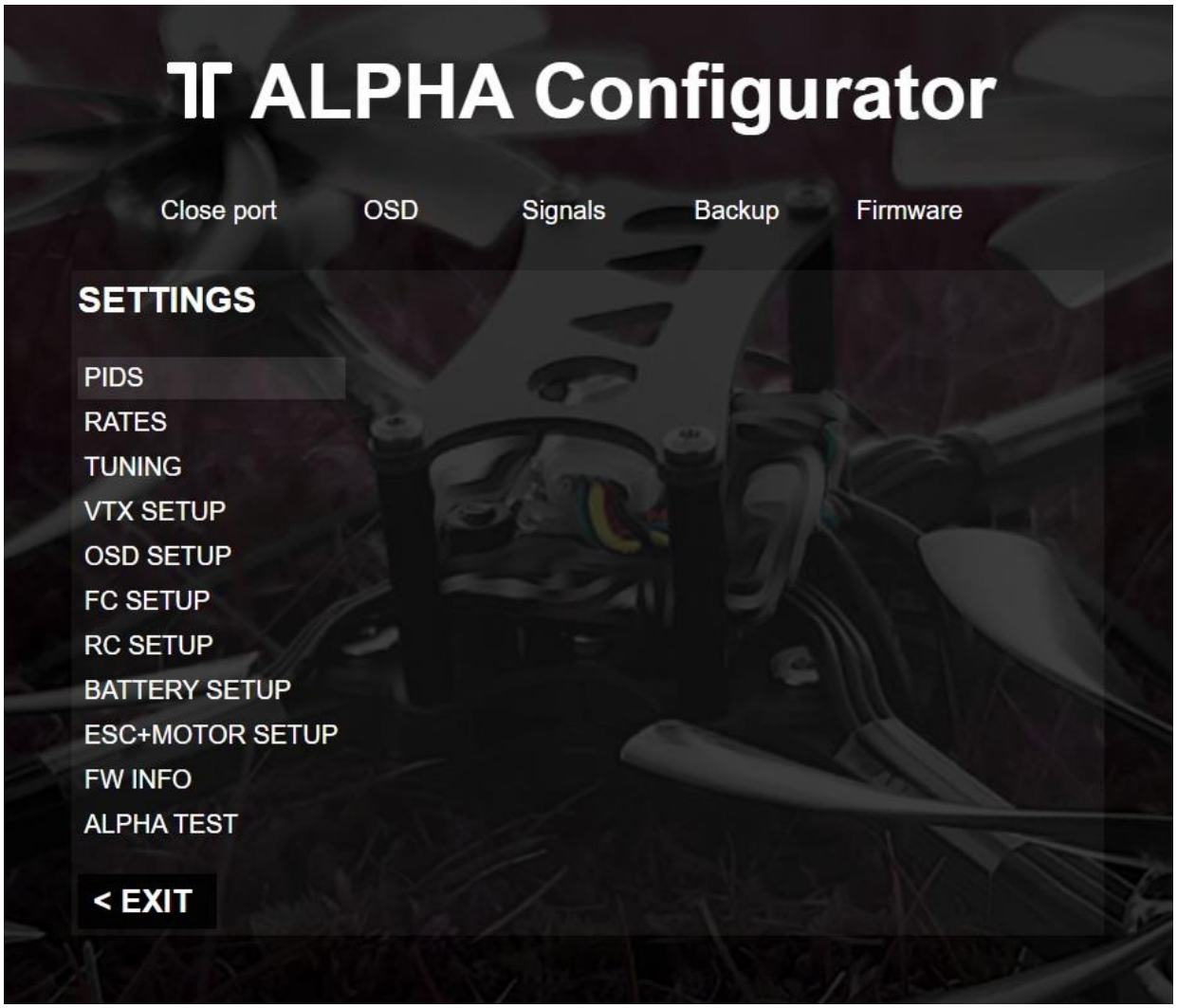
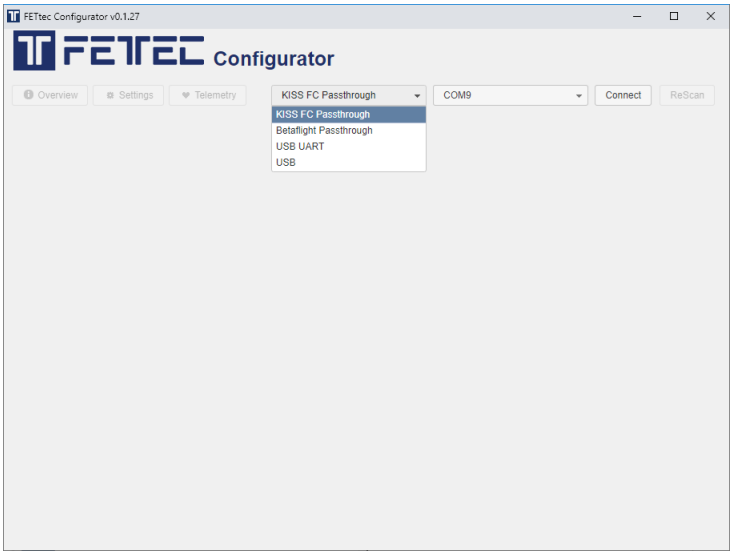


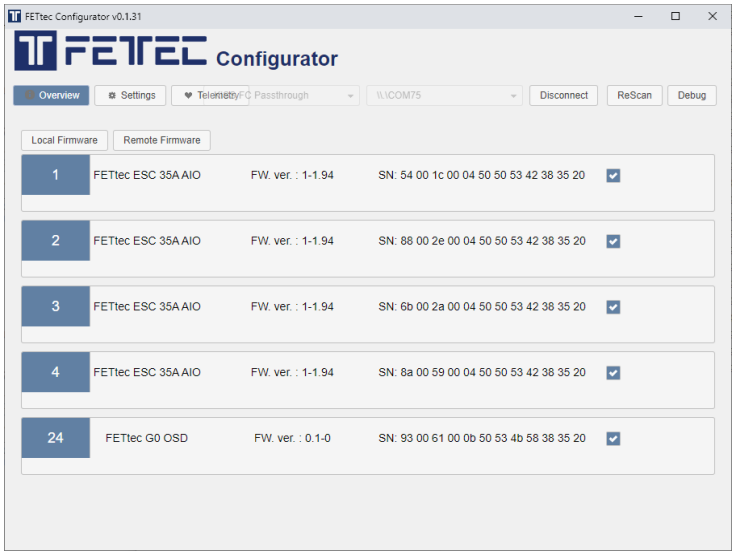
All functions are explained in the respective category.

For more information and help use the FETtec Alpha FC firmware manual available at www.fettec.net/download

ESC update and settings

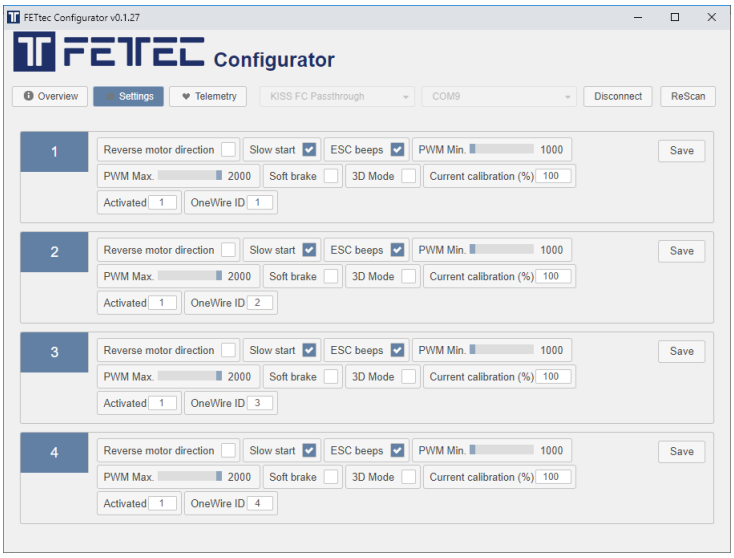


Choose KISS FC Passthrough and press connect.



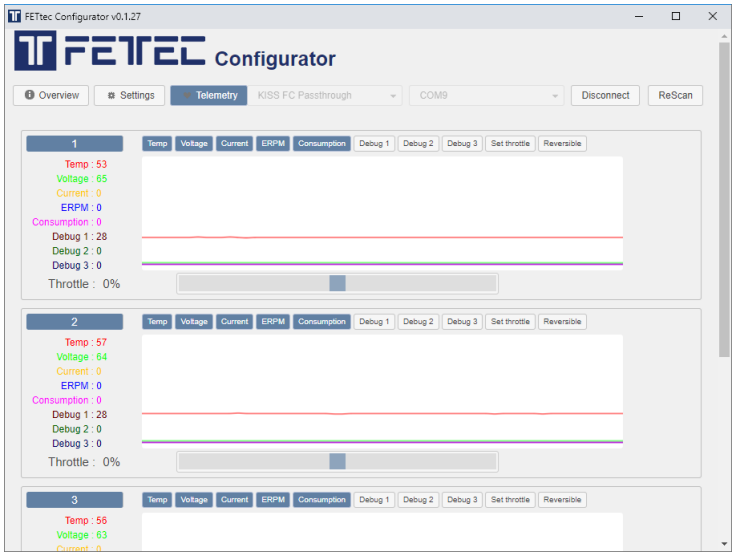
all devices should show up now.

The Overview page allows to flash individual ESCs.



The Setting page allows to adjust all available ESC parameter.

- Reverse rotation direction
- Slow start
- 3D mode
- PWM min & max signal
- ESC Beep enabled
- Current calibration
  - Individual ESC ID (for use on Onewire protocol)



In the Telemetry page you can spin the motors, view and debug the motor telemetry.

OSD

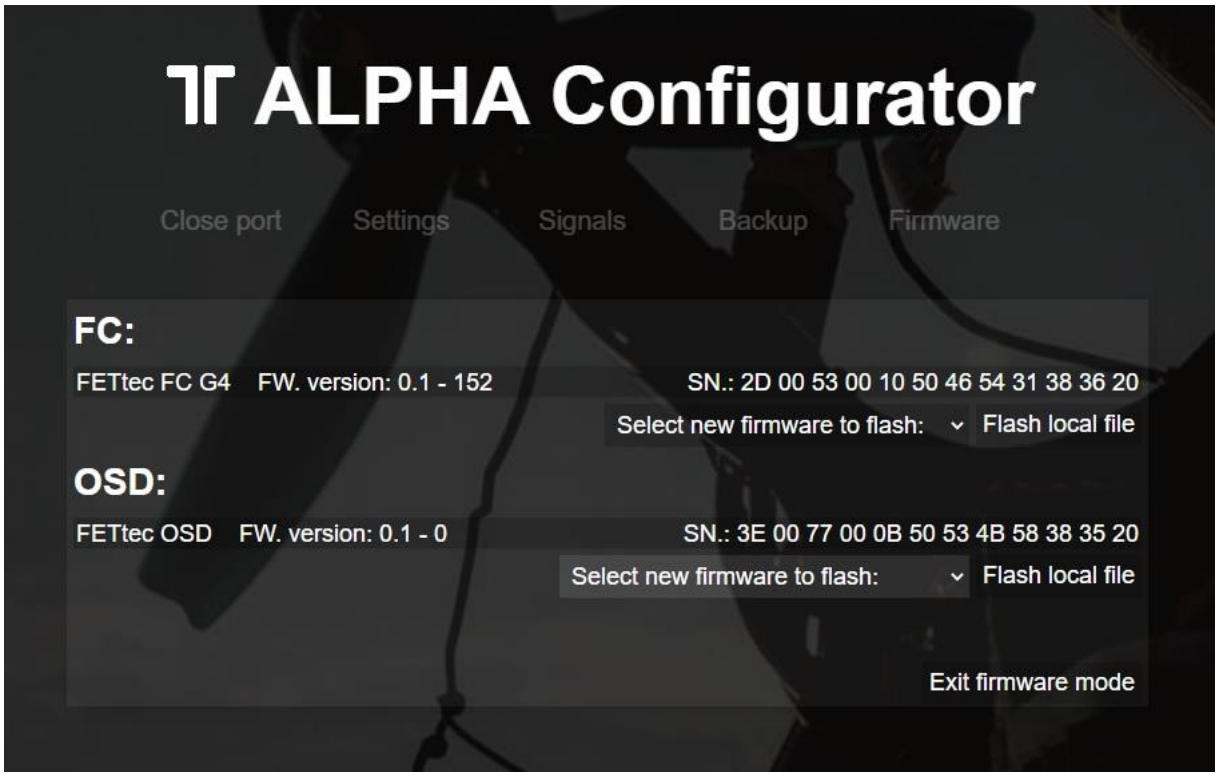
Please use the same respective firmware for FC and OSD (KISS or FETtec Alpha), otherwise it will not work

Firmware update (KISS)

To update the OSD connect to FETtec Configurator and flash via FC passthrough latest firmware.

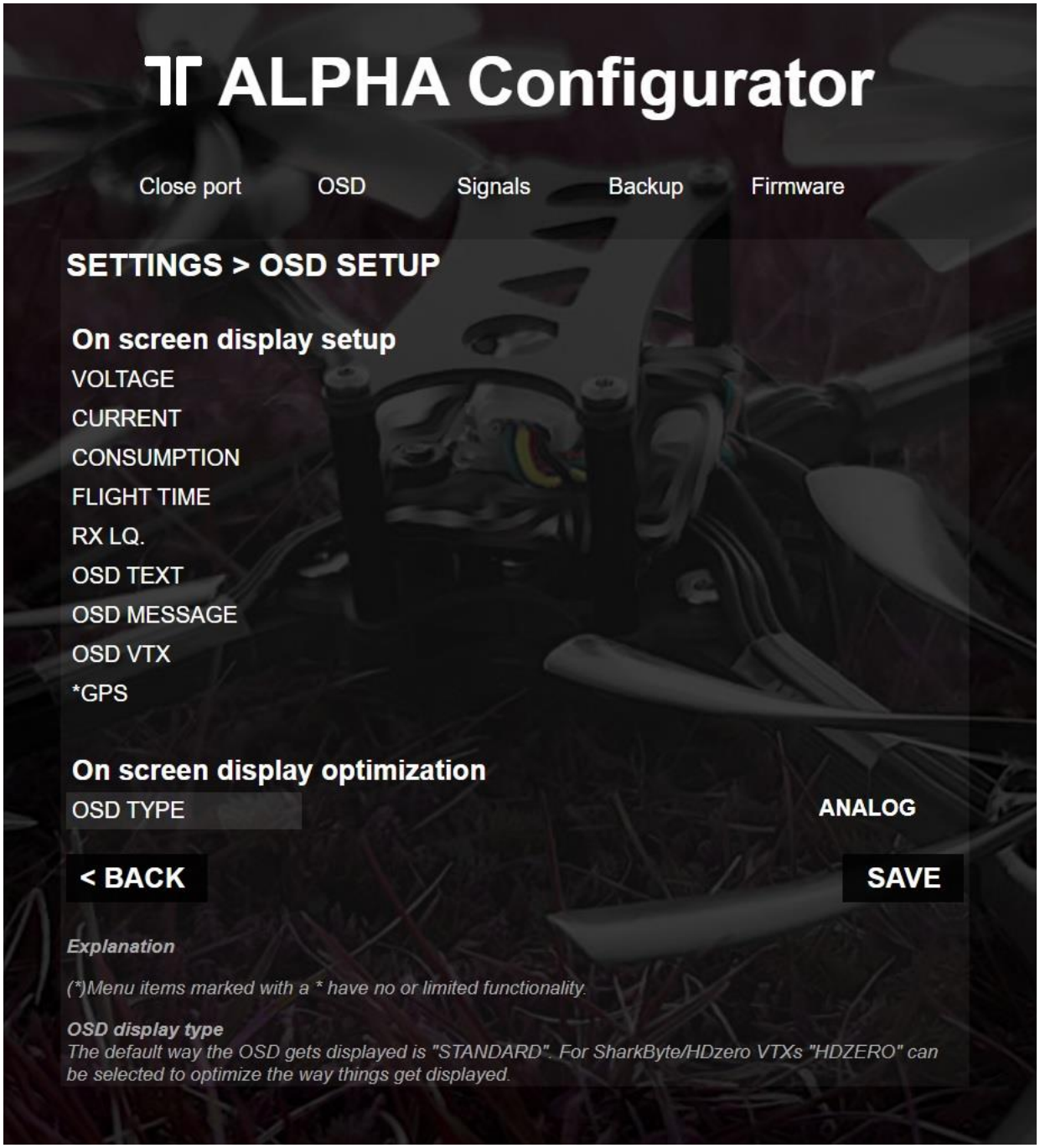
Firmware update (FETtec Alpha)

To update the FETtec OSD connect FETtec AIO 35A to ALPHA Configurator and flash via “Firmware” the latest update.



Settings in the ALPHA Configurator

In the settings of the ALPHA Configurator you can choose “OSD Setup”

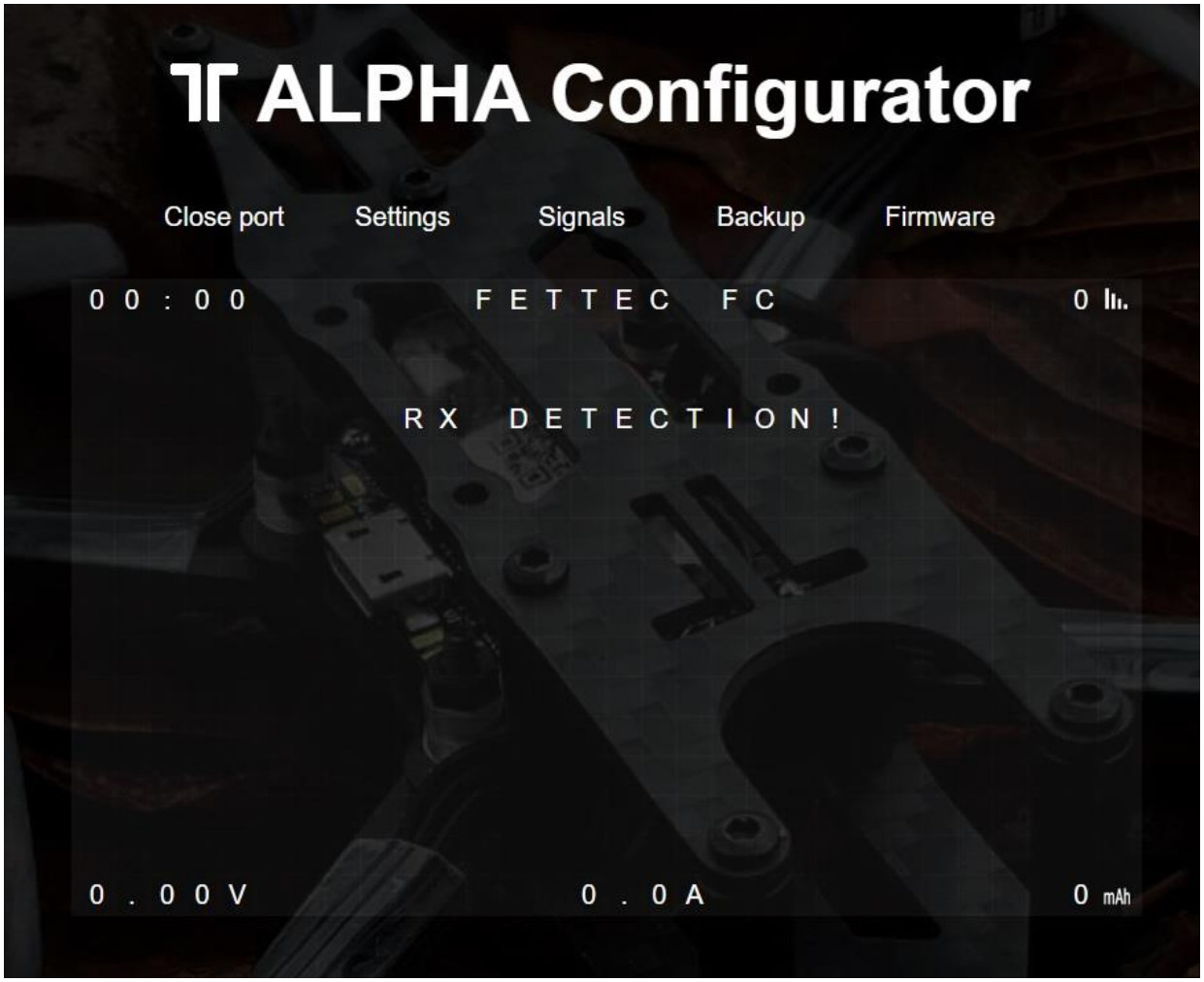


All parts of the OSD can be enabled/disabled and selected in their position.

Please read the explanations in the area below to be sure what the changes do.

All setting can easily be set and checked in the overview “OSD”

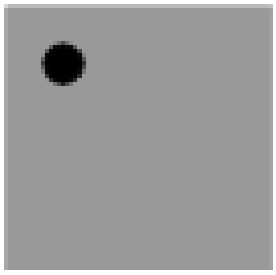
Here you can get an overview of how the selected settings look in the OSD

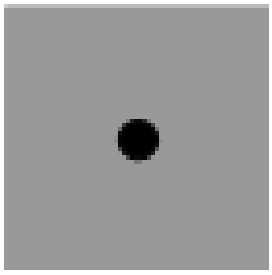


Settings through the goggles

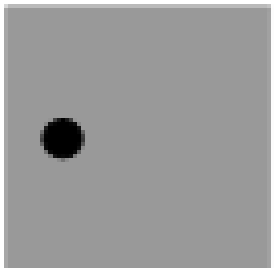
All settings can also be set up directly in the OSD menu through the goggles.
To get in the menu move the sticks in the shown direction at the start:
Throttle 50%, then move Yaw left, Pitch up

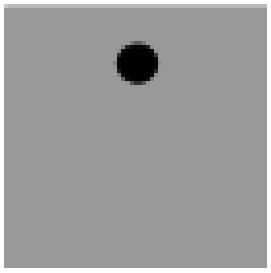
Mode 1:





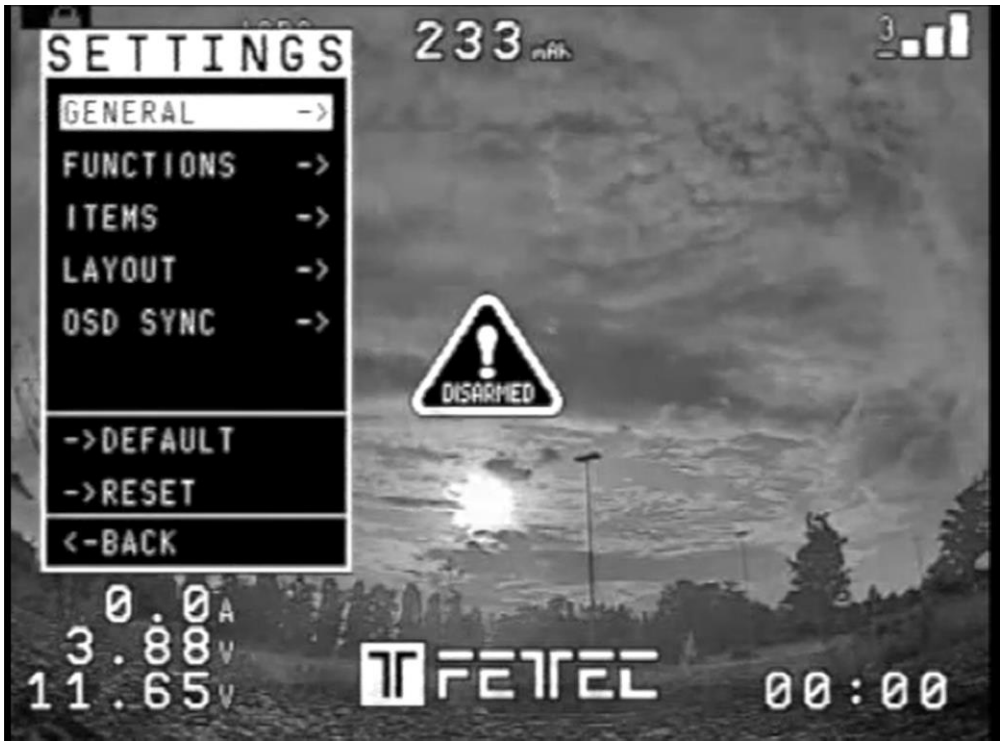
Mode 2:





In the menu:

OSD settings:



Issues in the picture

1. OSD SYNC → AUTO SYNC
2. in case of unsharp lines play with LEFT/WITH values try to avoid WITH values above 400
3. make a PAL/NTSC layout reset

Move elements in the OSD menu

Choose LAYOUT → SET POSITIONS in the SETTINGS.
Now the elements are movable along the grid.
Skip between the elements and select them to set new position.

To exit the ´move menu´ hold stick Yaw left for a few seconds

Display connection

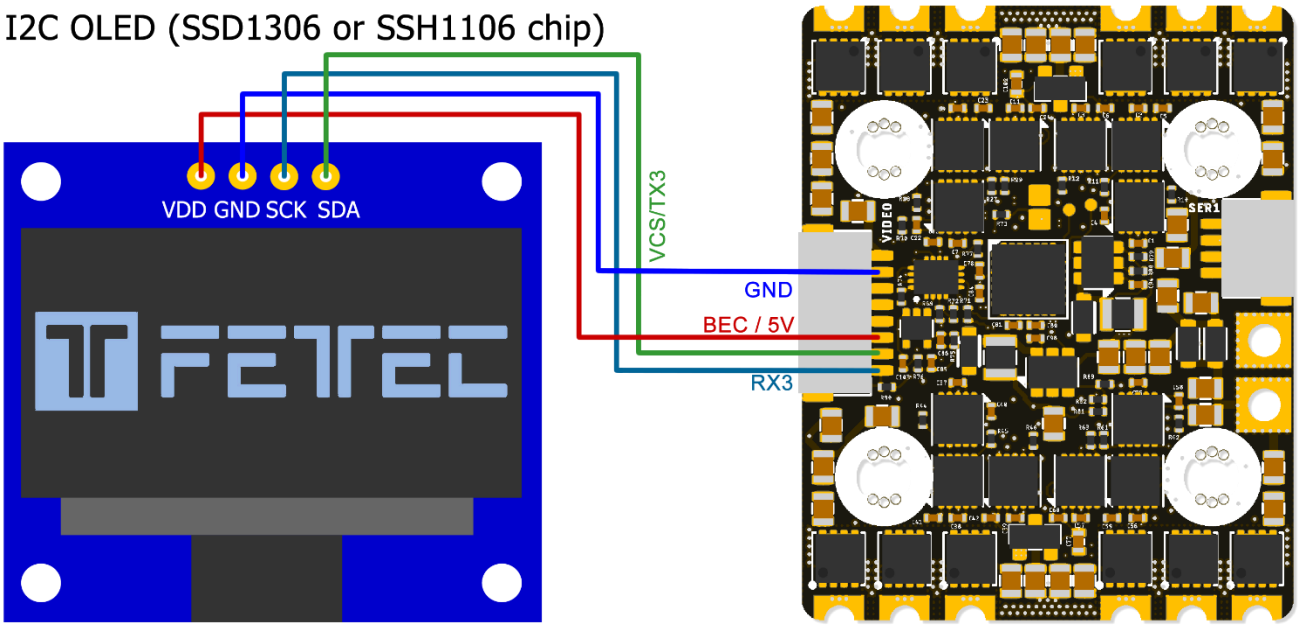
I2C O-LED to FETtec AIO 35A

I2C O-LED display can be used to show the OSD menu and telemetry in order to be able to set up settings without computer or FPV goggles (FPV OSD).

The I2C connection will block serial 3 which is mostly used for digital OSD or analog VTX control (VCS).

The O-LED must be connected on power up to initialize but can be unplugged after set up is done.

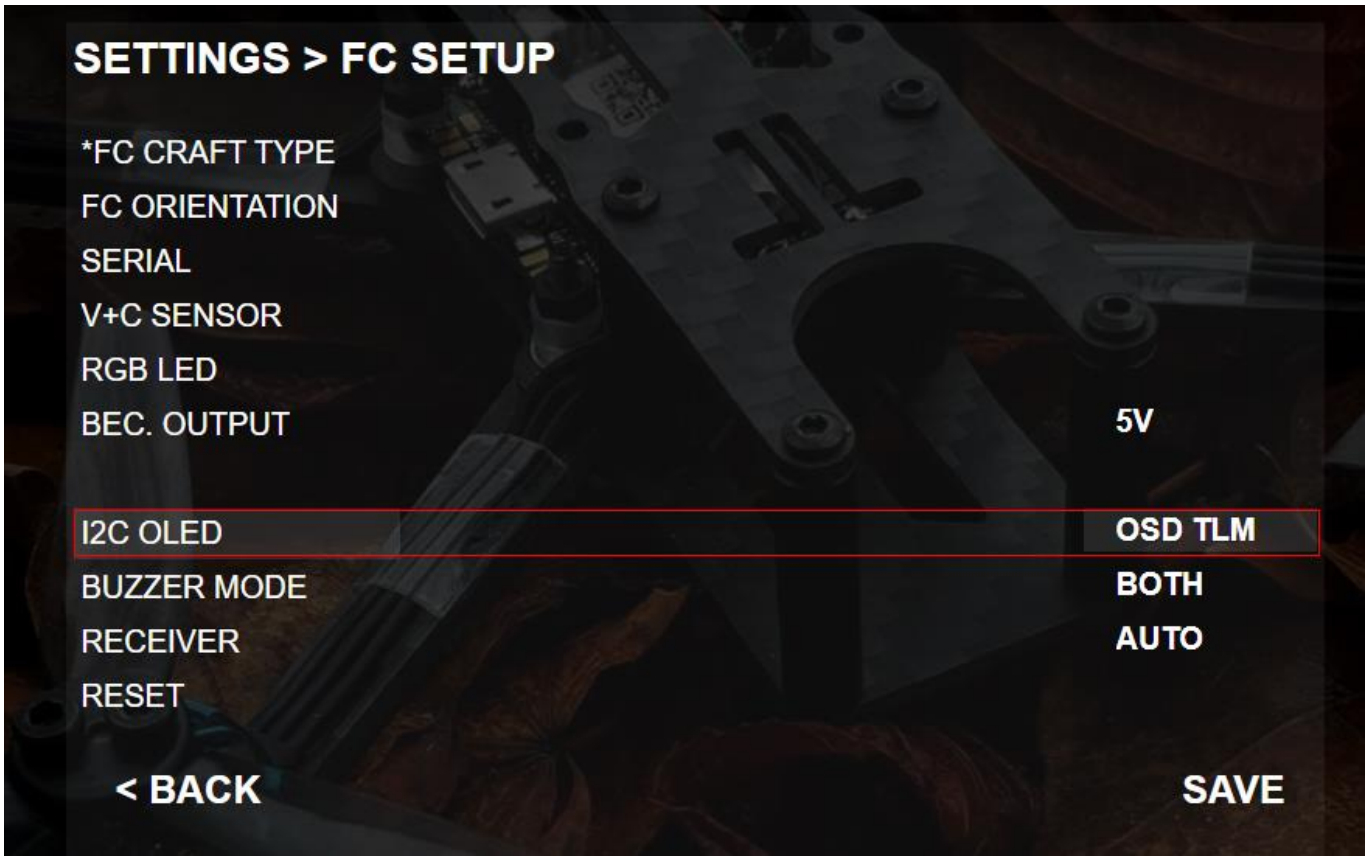
Supported display types:



Required resolution 128 x 64px

We recommend the 1,3” (SSH1106) version as the text size will be very small on the 0,96” (SSD1306) display.

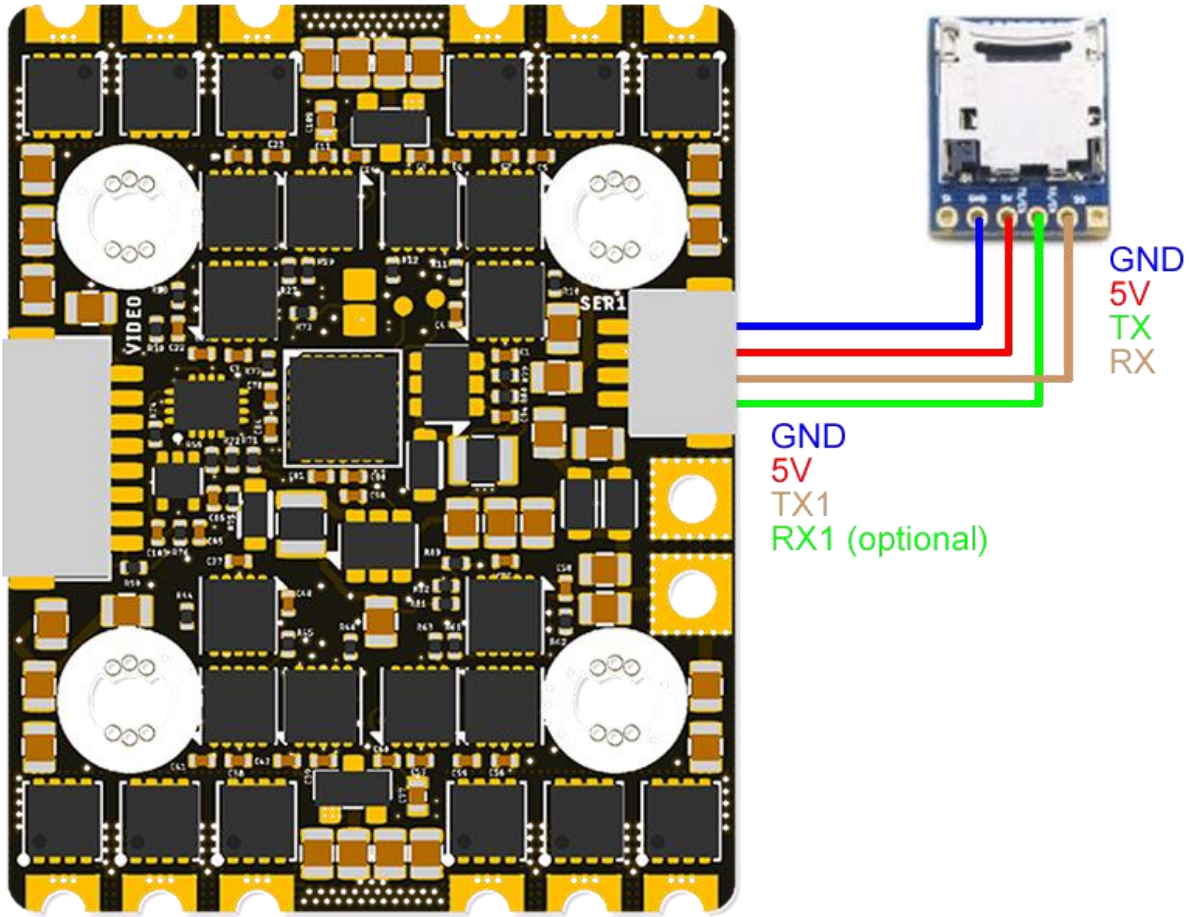
Activation in FETtec Alpha FC firmware



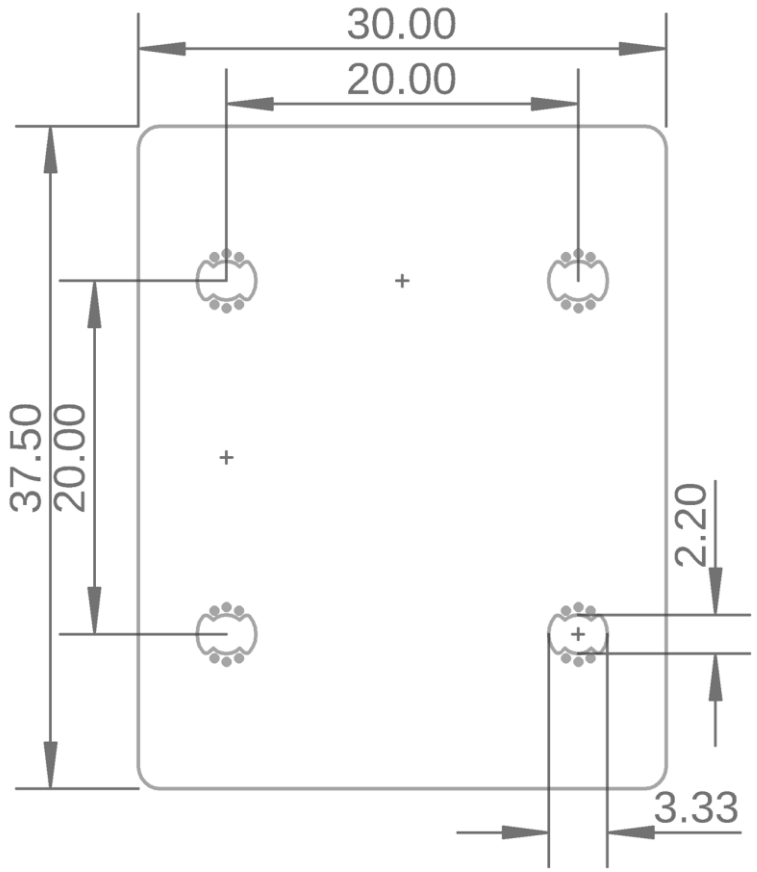
OpenLager/OpenLog

Easy way to get log files of your flights

Available here: https://fettec.net/shop/elektronik/sonstiges/openlager



Dimensions



Maximum outside dimensions: 30 x 37,5mm

Mounting hole arrangement: 20 x 20mm with M2 mounting hole (expandable to M3)

Overall height: 7,9mm

Highest part on each PCB side: 3,2mm

Weight: 8,9 g

Do not file the mounting holes as this may cause damage!