FPV 220 RTF

Racing Kit

Instruction Manual

For technical support, contact us at support@force1rc.com

Table of Contents:

Thank you for purchasing this product. Please read this instruction manual carefully before using to ensure proper flight and safely. Please save this manual for future reference.

Important Statement

(1) This product is not a toy but a piece of complicated equipment which is integrated with professional knowledge of mechanics, electronics, air mechanics, high-frequency emission etc., so it should be used and adjusted correctly to avoid accidents. The user must always operate in a safe manner. We undertake no liability for human injury or property damage caused by improper operation as we cannot control the procedure of installation, use and operation of this drone.
(2) This drone is suitable for experienced RC drone users aged 14 years or above.
(3) The flying field must be legally approved by your local government. Do not fly the drone near the airport. Keep far away from any airport more than 5 miles when flying an RC drone.
(4) We undertake no liability for those accidents caused by improper operation, use and control of the drone after sale of the product.
(5) We have entrusted the distributor to provide technology support and after-sale service. If you have any questions about use, operation, repair etc., please contact Force1RC at support@force1rc.com.
(6) Keep the user manual so that you can refer to important information when needed.

Safety Precautions

(1) **Use correctly**

For safety elements, please only use DYS spare parts to replace the damaged parts. Improper assembly, broken main frame, defective electronic equipment or unskilled operation all may cause unpredictable accidents such as drone damage or human injury. Please pay special attention to your surroundings and operate the drone using the proper safety precaution.

(2) **Keep away from obstacles and crowds**

The speed and status of a flying RC drone is uncertain and it may cause potential danger. The user must keep away from crowds, tall buildings, power lines etc. when operating a flying RC drone. For safety purposes, do not fly around other people and their property. Do not fly an RC drone in inclement weather: rain, storms, thunder and lightning

(3) **Keep away from humid environments**

The drone is made of precise electronic components. Humidity or water vapor may damage electronic components and cause an accident.

(4) **Safe operation**

Please operate the RC drone in accordance with your physical status and flying skill. Fatigue, listlessness and improper operation may increase the rate of accidents.

(5) **Keep away from rotating parts**

Rotating parts like propellers or motors may cause serious injury and damage. Keep face and body away from rotating parts.

(6) **Keep away from heat**

The RC drone is made of metal, fiber, plastic, electronic components etc. Keep away from heat and sunshine to avoid distortion and damage.

(7) **To avoid being burnt, do not touch the hot motor(s)**

(8) **Use the recommended charger only.**

(9) **Power off the drone before cleaning. Check the charging plug to ensure that it is working properly. If there is any damage, stop using it immediately until its is fixed.**

LiPo Battery Care Instructions

Temperature:

- If a battery heats up beyond 140°F/60°Cs it could damage the battery.
- After flying the battery may be warm to the touch. Please let the battery cool down before recharging.

Storage:

- Please store batteries at normal room temperature (between 5 and 27 degrees Celsius or 40 and 80 degrees Fahrenheit) and avoid direct exposure to sunlight or heat.
- Try to store the battery at around a 50% charge
- If you have a battery that has been sitting around for some time with a charge do not attempt to charge again before flying. Use whatever battery juice is available from the last charge.
- Depending on how they are used, most LiPo batteries don't last longer than 300 charge cycles. Leaving them around on a full or depleted charge all the time, running them completely dead, or exposing them to high temperatures will shorten this lifespan dramatically.

Usage:

- Once the battery has been used please allow some time (5 minutes or so) before charging it again.
- Changing out the battery before it completely dies can help prolong battery life.
- If the battery is pushed beyond normal limits it may get hot to the touch and performance can decline.
- Using the battery for long periods of time may cause overheating.

Charging:

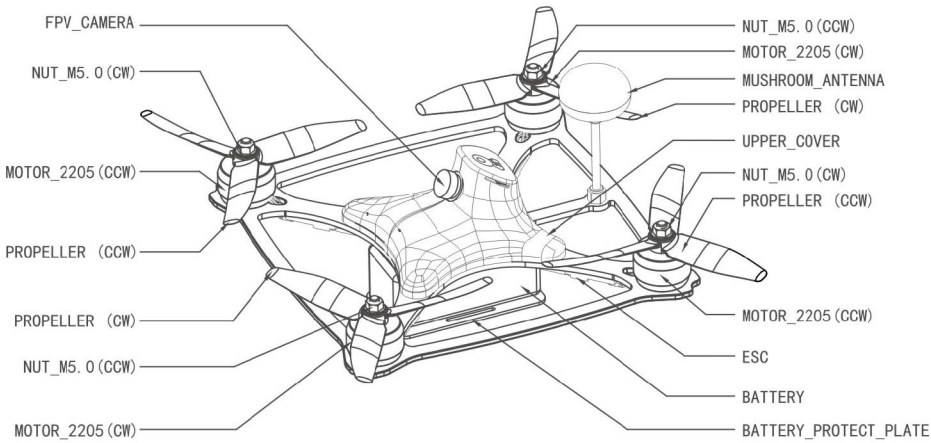
- Do NOT overcharge the battery. It may cause overheating and in turn this overheating could damage the unit.
- Never try charging a battery that has been crashed or is damaged, you run the risk of fire! Cells that are obviously swollen or have physical damage should never be used and careful disposal is required, especially if the cells are swollen.
- If your battery is not charging, try plugging it into another charger to see if the issue persists. If the charger is defective you should discard it immediately and process a warranty return if still under warranty or contact our support team at support@force1rc.com so we can arrange to ship you a replacement charger and/or batteries.
- If the battery is not charging, remove the battery from the device. Inspect the battery and the battery connections. Ensure there is no damage to the battery, battery pins or contacts on the device. If you have damage to the battery or charging pins, please discontinue use and contact us at support@force1rc.com for repair/ replacement.
- After crashing the quadcopter please check battery connectors and battery properly. If any part is damaged get spare parts from a DYS reseller. Use genuine factory spare parts replacements from DYS or Force1RC only.

Introductions & Functions

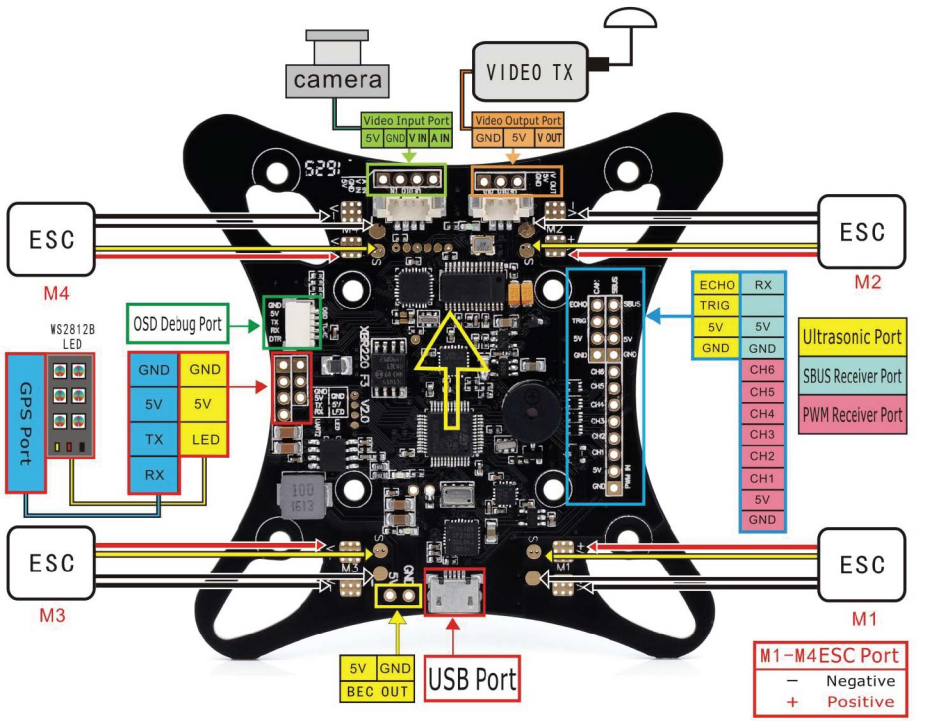
- FPV 220 RTF is a unique FPV racer with a high performance flying experience for any pilot, especially for FPV racing, aerobatic flight, aerial photography, aerial view, etc.
- Featuring a brand new design with verified SpracingF3 flight controller system, high sensor algorithm, I/0 port, and the new generation CPU design, with integrated OSD and power distribution board on one small PCB board.
- Equipped with a FPV HD CCD camera, wide dynamic and good backlight, built-in 5.8G 200mW 40CH transmitter and 5dbi omnidirectional gain mushroom antenna.
- The frame uses high-end carbon fiber material which is light weight, high strength, and non-deformable. The motors are perfectly matched with the ESC so the user can achieve a smooth flight after easy installation.
- Compatible with any 2.4 GHz/6 or more channel remote control.
- The brand new FPV 220 RTF design works seamlessly with almost any OSD, SMART-PORT, SBUS, GPS, LED lights, battery alarm, and sonar.
- Flight controller with built-in “black box” logging, large internal memory for flight records, record & remember flight details and automatic debugger.
- Data calculation, STM32F3 processor with fast ARM cortex M4 kernal.
- Integrated main board with OSD and power distribution board for maximum weight reduction.
- Fully support BLheli_S ESC and the PID tuning.
- SBUS, SumH, SUMD, spektrum1024/2048,XBus, PPM, PWM receiver supported. NO need for external inverter (Built-in).
- The programmable LED light can be programmed for flight heading, colorful signal lights for races, and night flight.
- Buzzer alerts and notifications.
- Configure the flight controller through a cross-platform GUI (compatible with Windows, OSX , Linux).

Drone Overview

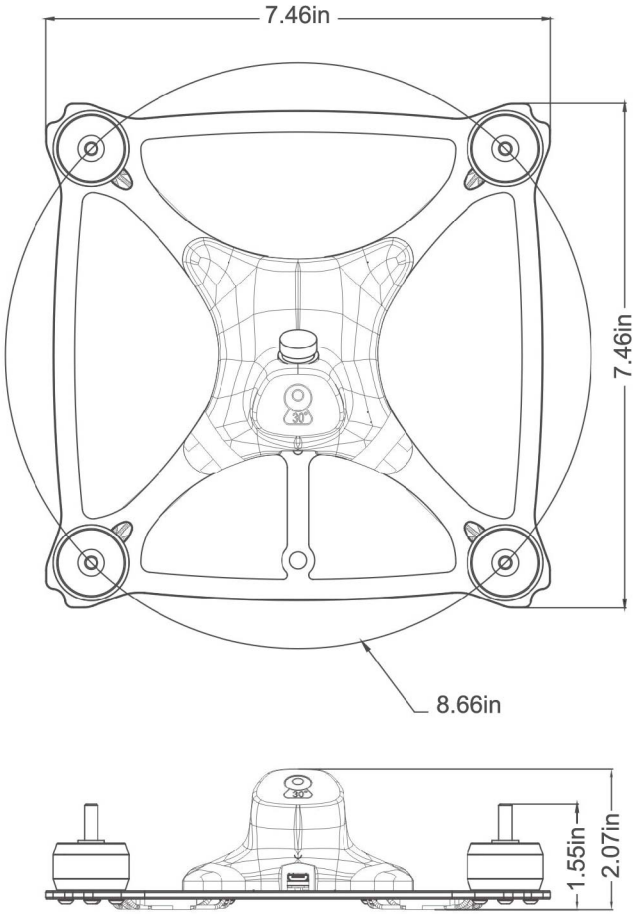
1. Drawing



2. Flight Controller Connections



3. FPV 220 RTF Dimensions



Basic Data
Wheelbase: 8.66 in
Whole frame weight: 10.93 oz.
Motors: SE2205-2300KV
ESCs: XS20A BLheli_S ESC
Props: XT50403 Tri-prop
Flight controller: XDR-F3
Video Transmitter: 5.8G/40CH/25mW to 200mW Camera angle of covers: 30°/ 40°
Camera: 5V camera (CCD)
Battery(excluded): 3S-4S/1300mha-1500mha/35C-70C

Operating Instructions

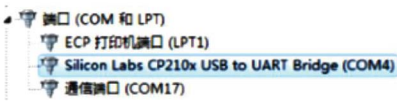
FPV 220 RTF uses Cleanflight open-source software. The software is a community software that has friendly developers and a growing number of users. Here is a debugging software link for your flight controller, http://Cleanflight.com; please make sure your reference manual is appropriate for your firmware version.

Software installation (skip this step if already downloaded)

- First, install the Google Chrome browser (This step must be finished before you go to the second step)
- Second, install debugging software Cleanflight by searching Cleanflight on the chrome app store
- Third, install the proper USB to serial port drive in order to identify the flight controller hardware (follow cleanflight instructions under the Firmware tab)
- Fourth, connect flight controller with micro USB cable, the power light of the flight controller will light up
- Open the debugging software:

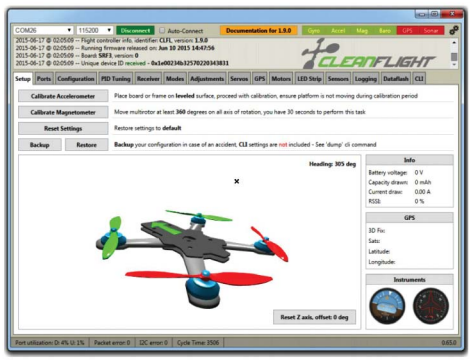
  1) Start Menu > All programs > Chrome Applications > Cleanflight - confirgurator
  2) Desktop > Chorme App launcher> Cleanflight
  3) Taskbar> Chrome App launcher > Cleanflight
  4) Chrome Browser> Bookmarks bar> Apps > Cleanflight

- Click “Connect” to connect flight controller, after connection there will will be an additional COM port in the device manager, as below (accessed by searching drivers in the start menu),



- Choose the COM port number as per device manager (it may already be selected), choose the default baud rate 115200(flight controller default baud rate).

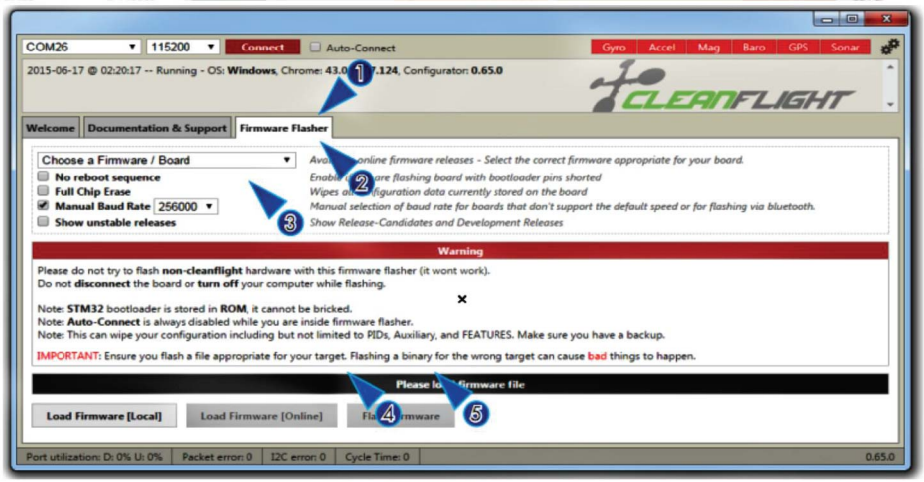
- Click Connect, once the flight controller is connected with cleanflight, it will appear as seen below,



- Disconnect and upgrade the firmware via debug tool

3. Firmware Upgrade

- Click firmware flasher tab
- Choose the latest SPRACINGF3 stable version
- Set Manual baud rate 256000
- Click the “Load firmware [online] , download the firmware, read and update the log
- Click “flash firmware”



4. After upgrading the firmware, please choose the correct settings according to the following steps,

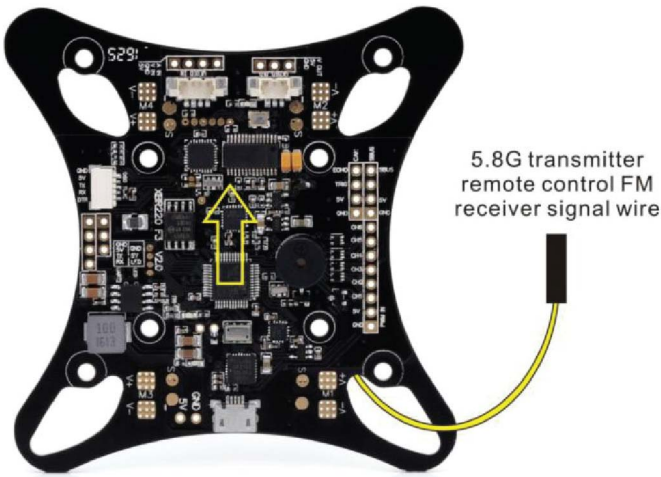
- Select the correct flight direction from the flight control
- Sensor calibration
- Serial port configuration
- Choose the airplane shape
- Turn on selected functions
- Configure the receiver, set channel mapping
- Configure the end of the channel and trim the remote control channel
- Configure voltage monitor
- Configure output ports(servo/esc)
- Ensure the esc match with the motor, if necessary, retune the ESC
- Learn about the flight modes, if necessary, configure some channel switch for flight modes
- Learn how to arm and disarm
- Failsafe test
- To debug and optimize the aircraft, learn how to download and read flight logs
- Clear FLASH before first flight
- Learn how to recognize flight characteristics, and know how the PID affect flight
- It is better to fly in auto-stabilizing or low rate mode for first flight. (If the other modes do not activate, use the default mode)
- PID Calibrating

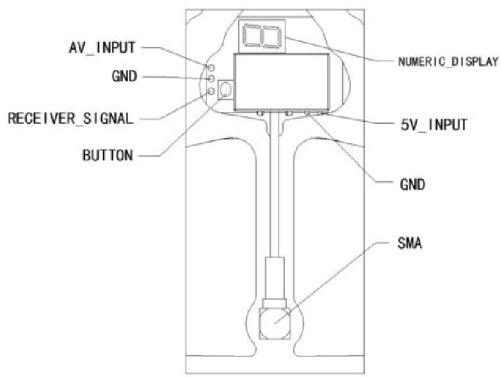
APPENDIX

5.8G Video Transmitter

With this brand new design, it is easy to select frequency band via the built in transmission module. The frequency band can be selected by remote control variable channel switch. The user can set the remote control variable output channel and, while the signal cable of transmission module is connected with the receiver in the variable output channel, you can change the variable output switch to change the frequency band from your controller.
The transmission module is mounted in the bottom of the frame and includes a digital display and frequency band selection switch on. The users can also directly use the selection button on the module to choose frequency band instead of using the variable output switch via remote control if so desired.

Picture





How to Change Transmitter Power

The same method is used with both the remote control variable output switch and the button switch on transmission module for the below procedures.

- The transmission module will be on automatically once there is power on the racer frame;
- The factory default is 200mW(green LED light) and the display shows " H "; Long press the button 5 seconds to switch 25mW (red LED light) and display shows " L "
- Long press 3 seconds to switch FR/CH
- Short press the button to select the band

Variable output channel switch settings

- The same channel output is synchronous for the three channels of the "Frsky X4R" receiver and four channels of SBUS mode and also applies to similar controllers
- Enter the mixer page of Frsky remote control, move back four channels by copying them over, change CH1 to CH2 output, the following channels and so on
- When copying the debugging channel and copying channels over, delete the spare channels, keeping CH1, and set the output switch to control the video transmitter
- Connect the F3 debugging software, enter the the debugging ground station, the ports will be disordered. Go back to the command window of ground station, modify to the correct channel sequence and click save to make it work properly
- Use "X4R" CH1 port, the sequence is 1AETR234
- Tune out one channel to use from SH channel output in PWM mode
- Similar settings apply for other remote controls

Basic Data

Transmission frequency: 5.8G
Transmit power: 25-200MW
Frequency point: 40CH
Transmission distance: 1000M
Input Voltage: 5V
Antenna connector: SMA-Hole
Antenna gain: 5dbi
Working current: 500mA/5V
Working temperature: -10-85ºC
Video format: NTSC/PAL
Video bandwidth: 8M

Frequency band selection

CH / FR		CH							
		CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
FR	A	5865M	5845M	5825M	5805M	5785M	5765M	5745M	5725M
	B	5733M	5752M	5771M	5790M	5809M	5828M	5847M	5866M
	C	5705M	5685M	5665M	5645M	5885M	5905M	5925M	5945M
	D	5740M	5760M	5780M	5800M	5820M	5840M	5860M	5880M
	E	5658M	5695M	5732M	5769M	5806M	5843M	5880M	5917M

FCC Information

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.These limits are designed to provide residential protection against harmful interference in a residential installation.
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. There is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by & turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on the circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC WARNING:

The equipment may generate or use radio frequency energy. Changes or modifications to this equipment may cause harmful interference unless the modifications are expressly approved in the instruction manual. Modifications not authorized by the manufacturer may void user's authority to operate this device.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference,and
(2) This device must accept any interference received, including interference that may cause undesired operation.

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