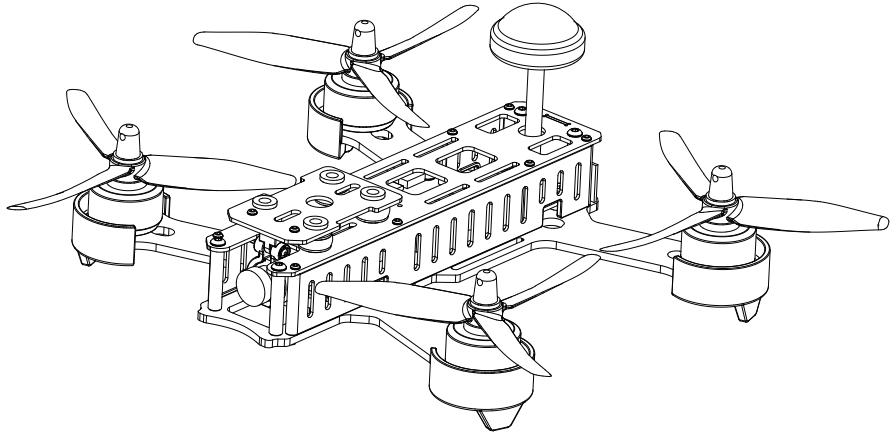


# X220 Manual

(V1.0)



## Disclaimer and Warning

Thank you for purchasing X220.

Please read this instruction manual carefully before using this product. By using this product, you hereby agree to this disclaimer and signify that you have read it in full.

Please mount and use this product as per this manual strictly. As manufacturer has no control over use, setup, final assembly, modification (including use other parts such as motor, ESC, propeller etc), no ability shall be assumed nor accepted for any resulting damage or injury. As it may cause wireless interference in the living environment, please take effective measures to avoid it.

Any parts of this manual is subjected to change without prior notice.

Any problems while mounting this frame, please contact with us or authorized agents.

## Product Overview

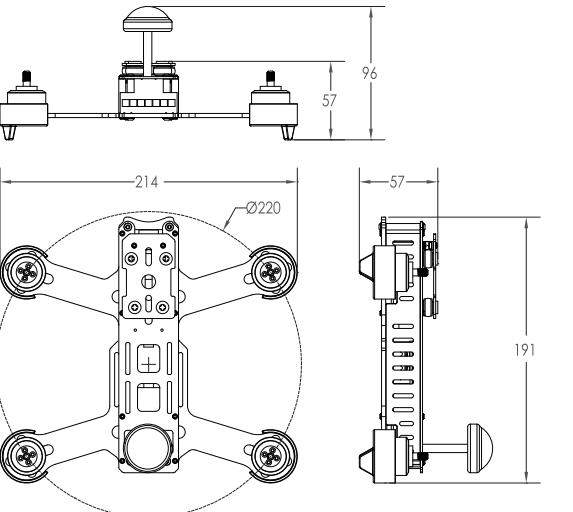
### Introduction

X220 is a racer for hobbyist. It is a high-integrated product with highly flexible control. Equipped with latest motor 2205-2300KV, 5 inch 3 blades prop as well as the popular 20A BLHeli firmware ESC (Oneshot support), flight range of remote control more than 1000 meters.

To gain the quality and real-time shoot for FPV, X220 combines with 22CH transmitter with 1/3"CMOS lens, which supports 127 and wider 160 shooting and brings you the exciting FPV experience every moment.

X220 with OSD for video, the real-time status will be returned back to the display. Come with flight control SPRACING F3 CleanFlight, just connect with battery, receiver and set remote control.

X220 Power set			
Flight control	SP F3 CleanFlight	Motor	2205/2300KV
propeller	5 inch	Transmitter	5.8G 200mW/32CH
ESC	20A (BLHeli XM)	Weight (excluded battery)	340g
Lens	1/3" CMOS lens FOV:160°		



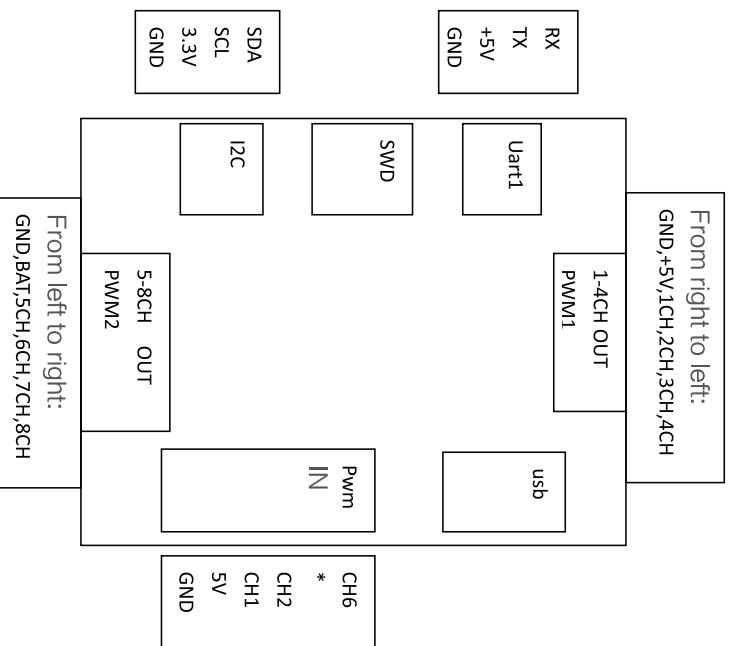
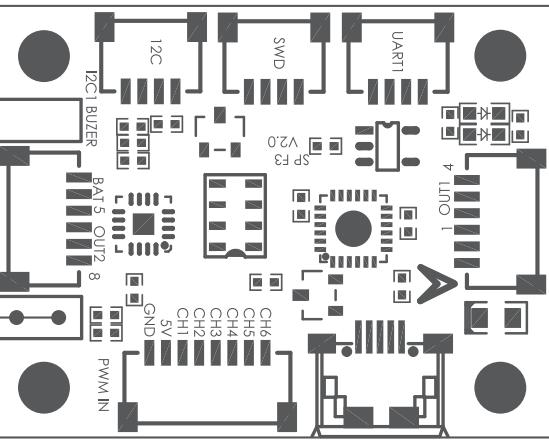
Box List
X220 frame 1pc
5 inch propeller 4 pairs
5.8G Antennas 1PC
Antennas fixed seat A/B 1pc for A/B
Gopro camera Base 1pc
T-nail 4pcs
T-nail cover 4pcs
PVC rubber tube 2pcs
Antennas tube 2pcs
M1.5x5 screw 6pcs
nylon lock nut (CW) 2pcs
nylon lock nut(CCW) 2pcs

## Switch frequency selection

Dial 12345 switch to choose required FR/CH for 22 channels

FR								
FR1 (A)		FR2 (B)		FR3 (C)		FR4 (D)		
CH	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
FR	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
FR1	5865M	5845M	5825M	5805M	5785M	5765M	5745M	
FR2	5733M	5752M	5771M	5790M	5809M	5828M	5847M	5866M
FR3								
FR4	5740M	5760M	5780M	5800M	5820M	5840M	5860M	

UART1: connect OSD  
 SWD: Manufacture use  
 I2C: for external device( such as bluetooth)  
 USB: Connect flight control with computer  
 PWM input: CH1 to CH6 for receiver signal input( CH1 for PPM input port as well)  
 PWM1: CH1 to CH4 for moto signal output  
 PWM2: CH5 to CH8 for motor signal output

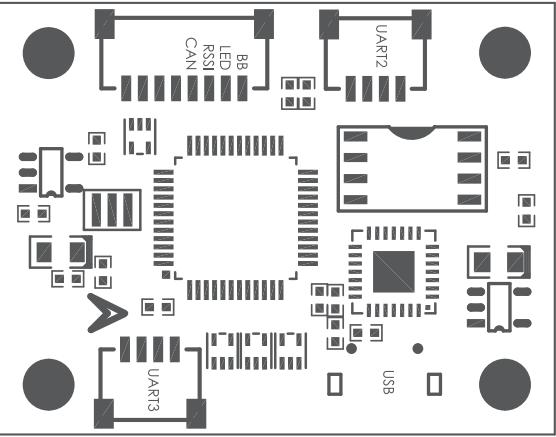


From right to left:  
GND,+5V,1CH,2CH,3CH,4CH

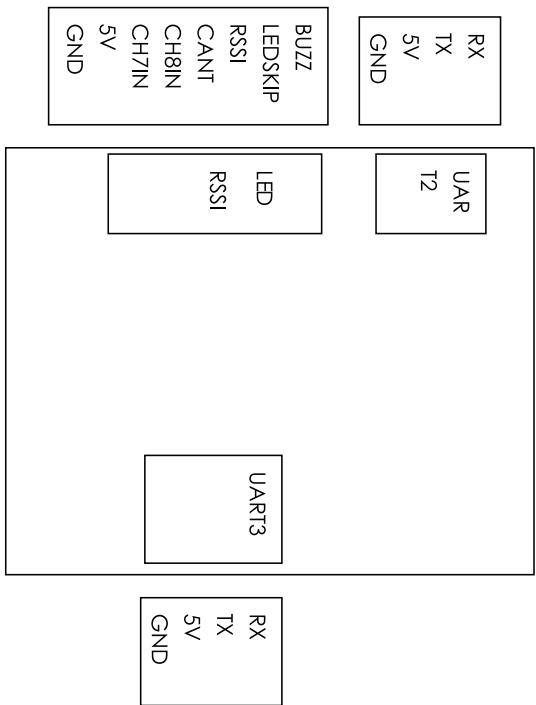
TOP

# Appendix

## Bottom



UART3: SBUS receiver input port  
UART2: GPS  
8pin input port: CH7 and CH8 are double input port,  
For CH7 and CH8 signal or ultrasonic signal input  
LED SKIP: Colorful LED signal output



## Basic Configuration

- Master mode STM32F303CB, inner parameter 32bit/72MHz/256k Flash/40k SRAM
- MPU6050 sensors
- Build-in 8MB flash
- Support PPM/SBUS/SumD/DSM2/DSMX and RSSI signal input
- On board OSD with MAX7456EUI and FTDI
- Connectors for SWD/GPS/MAG/soft-serial/cam-stab servo
- On board Buzzer 12WS2812B RGB colorful LED and 5V-3A BEC
- On board Voltage sensors
- 20A ESC 3-4S with BLHeli firmware
- Powerful motor 2205/2300KV and 5 inch propellers
- 1/3" CMOS lens

## Preparation before flight

### First

- Download with below link and install the latest Silon Labs CP2102 USB to UART bridge VCP driver <http://www.silabs.com/products/mcu/pages/usbtouartbridgevcpdriivers.aspx>
- Drive the Cleanflight Configurator tool.  
<https://chrome.google.com/webstore/detail/cleanflight-configuration/enacoimjcgeinfnnnpajinjgmkahmfgb>
- Connect flight control to computer via USB cable, select the correct COM port if it cannot detect automatically
- Click to connect and make sure well communicated.

## Basic operation

### Sensor calibration

- Configuration port: Default setting: UART2 for GPS, UART3 for serial RX(SBUS)
- Enable feature: Recommended ONESHOT125
- Receiver mode: Default setting: SBUS(RX\_serial)
- Voltage detection: Voltage detection scale must be 110
- Configure RSSI if you using a receiver with RSSI output
- Other features: You can open SERVO-TILT if connect Cam-stab servo with the frame.
- Default setting: LED light bar/ BLACKBOX
- Receiver configuration, channel mapping setting.
- Learn about flight modes and channel configuration/ Activate switches as required.
- Learn how to lock/ unlock
- Bench-test failsafe.
- Read safety notes.
- Learn how to download and view your flight logs to help tune your aircraft.
- Erase flash contents before first flight (so you have a log).
- Learn how to recognize un-tuned flight characteristics and the effects of a PID controller via watching some videos.

- First flight should be in Acro/Rate mode (the default mode when no other modes are active).
- Tune PIDs.
- Backup settings

## Firmware Flash (Upgraded)

- Disconnect power, USB cable and OSD
- Click load firmware[local] and found that firmware file/
- Be sure selected no reboot sequence/ full chips erase/ manual baud rate25600
- Connect shortly flight control (F3) to upgrade by reserved solder pad
- Connect USB cable
- Click flash firmware and wait for the prompts to complete it
- Released short cable when finishing firmware upgraded

## OSD Debug

- Don't connect any power to the quad before debug.
- Install FT232VCP driver and connect FTDI to UART1(SH) port
- Download MWOSD GUI zip file and open it.  
<http://www.dys.hk/ProductShow.aspx?ID=171>
- Select correct COM port, and wait for reading OSD configuration parameter
- Modify the parameter, font and write back to OSD MCU after finishing reading.

## Jack and Power Distribution

- The 328P of OSD connected to F303(F3) via UART1
- The GPS connected to F303(F3) via UART2
- Extended I2C equipment (such as bluetooth) connected to F303(F3) via I2C
- Receiver SBUS signal connected to F303(F3) via UART3
- OSD circuit will keep working and communicate with F303(F3) when using battery power supply.  
If you plug a USB cable, OSD circuit will be cut off powered to ensure that flight
- controller(F3) can communicate with computer.
- When debugging OSD, do not connect battery and plug FTDI tool, disconnect OSD to flight controller.
- At this time, OSD circuit can work independently.

## **FCC Statement**

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 reasonable 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. However, 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 a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To assure continued compliance, any changes or modifications not expressly approved by the party.

Responsible for compliance could void the user's authority to operate this equipment. (Example- use only shielded interface cables when connecting to computer or peripheral devices).

This equipment 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.

## **FCC Radiation Exposure Statement:**

The equipment complies with FCC Radiation exposure limits set forth for uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

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