

Instructions for X650 Pro RTF Kit

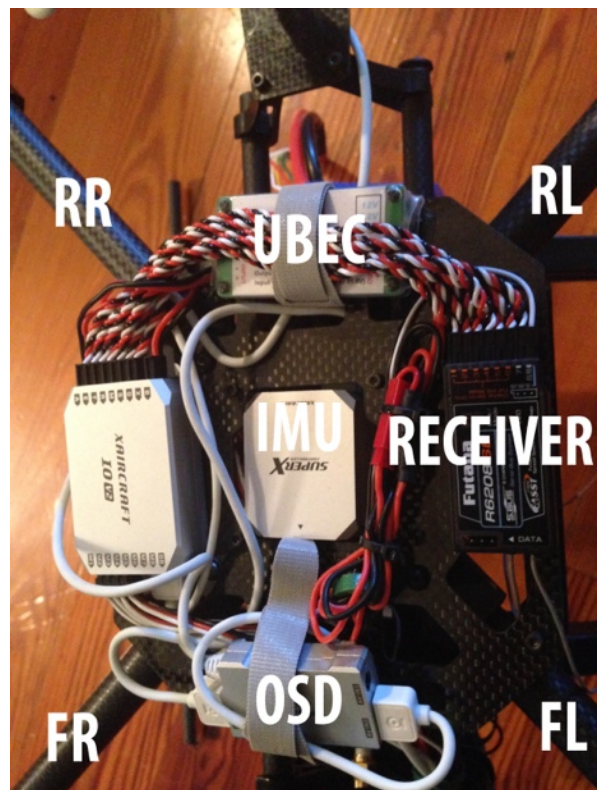
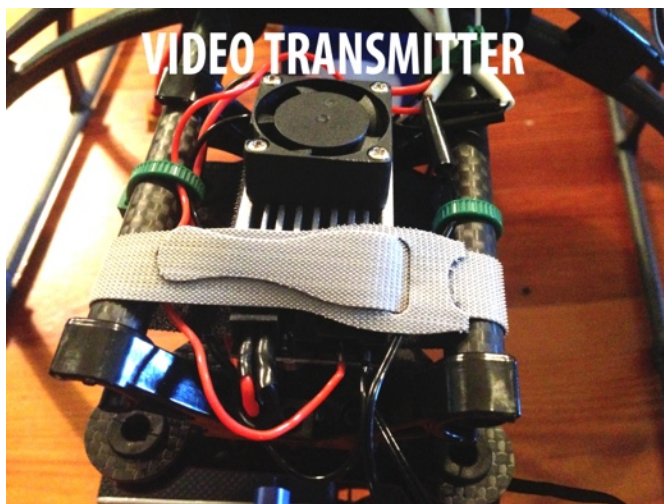
Whats in the box:

- Assembled Quad w/ Gimbal and Video Tx
- 3 5800 mah 4S 14.4v Batteries
- 1 2200 mah 3S 11.1v Battery
- 4 Labeled Props (see photo for where they should go)
- LiPo Charger & Cables
- 8FGS Radio Transmitter & Charger
- Tripod and Cable for Video Monitor
- Video Monitor
- Head Tracking Goggles
- Antennas for Video Monitor and Goggles
- Cables for SuperX and Gimbal

System Overview

The IMU contains the gyros, barometer, computer, and other equipment needed for stabilized flight.

The OSD takes info from the IMU and overlays it onto the video input into the module. That video is then output to the video transmitter.



The I/O module stands for "In/Out" and it's sole function is to take the inputs from the receiver and IMU and output power settings to the ESCs and motors.

The receiver is what receives the signal inputs from your radio transmitter and sends those inputs to the I/O.

The UBEC is connected directly to the battery and supplies constant 12V

power to the gimbal and video transmitter.



The video transmitter takes power from the UBEC and video from the OSD and outputs that signal over the 5.8GHZ band to your video receiver in either the goggles or the monitor. Both the monitor and goggles can be used simultaneously.

The gimbal holds your GoPro and you will need a T6 torx bit to tighten the screws in the back. Plug the black wire with the USB end into the GoPro for power and

video output. Be sure to turn your GoPro on before plugging the quad in and off before unplugging the quad. From our experience the GoPro crashes less when this procedure is followed.

Batteries & Charging

Lipo Batteries are not shipped charged for safety reasons. You will need to charge them prior to use. Watch our charging video at <http://www.youtube.com/watch?v=m0o0w3dpfo> for instructions on using the included LiPo charger. Be sure to charge in a safe place because LiPos can be dangerous if not charged and used correctly. The 3 5800mah batteries are used on the quad and the 2200mah battery is used for the video monitor. Fully charged 4S batteries should be around 16.8v. You should land when voltage drops to 14V in flight. Rule of thumb is to not let your cells ever drop to below 3V per cell and to be on the ground by 3.4V per cell. (12V and 13.6V for a 4S battery) There is a low battery indicator on the OSD, but always be mindful of what kind of power you have left. Always better to be safe than sorry!



The 8FGS Transmitter Radio

Your 8FGS comes pre-programmed. The SG 3-position short switch located on the top right of the transmitter toggles your flight modes. There are 3 flight modes. Fully forward is Normal mode, Middle position is ATT mode, and fully back toward you is GPS ATT mode. Each of these modes has a flash pattern from the

LED on the quad that will let you know which mode you are in.

NORMAL - Fast Green Flash

ATT - Slow Green Flash

GPS ATT - Double Green Flash

In GPS ATT mode if you see a Green/Red flash, it simply means that there are not enough satellites locked for a reliable GPS signal. You can see how many satellites are currently locked in the top left of your video monitor or goggles from the OSD. When you see the Red/Green flash pattern the quad reverts to ATT mode.

If you ever see a solid yellow light, it means that the quad is sensing interference with the compass and GPS and you should recalibrate the compass. See the SuperX manual and video link below for instructions on how to calibrate. When this yellow light is on, the quad reverts to ATT mode.

The safe mode switch on the transmitter is the SF switch. It has only 2 positions. Forward is normal and towards you will toggle safe mode. Safe mode is indicated by a slow red flash pattern.

The knob on the front right of the quad adjusts the stabilization gain. Turn it to the right to increase the gain and to the left to decrease gain. I recommend turning it until you see a slight wobble and then giving a slight turn back until it is stable for best results. Most of the time adjusting this knob is not even necessary.

The left stick on the Y axis controls throttle, X axis controls yaw left and right. Right stick Y axis controls tilt forward and backwards and the X axis controls tilt left and right.

The SB 3-way switch toggles your gimbal control from the head trackers to the radio. All the way down enables the head tracking goggles and all the way up disables head tracking and will default to using the right slider to control gimbal tilt.

Be sure to watch your radio voltage. When it gets down to around 7V you need to recharge. A full charge takes 8-10 hours. Be sure to keep the radio off when charging.

Setup & Calibration

To enter calibration mode for setting middle stick position, max stick position, and compass calibration, rapidly switch the flight mode switch between each mode back and

forth. When calibration mode is entered you will see a fast green/red alternating flash pattern. If your throttle stick is high it will enter max stick position programming, in the middle it will initialize middle stock position programming, and low it will enter compass calibration. Be sure that your throttle is all the way at the bottom when attempting to calibrate the compass. Your stick positions have already been programmed, but you can do it again if you want to learn how to do it. Instructions are in the SuperX manual.

Before your first flight you will need to calibrate your compass. We recommend calibrating the compass at each new location you fly at for best results. Follow the instructions in the SuperX manual on page 14 and 15. There is also a great video from XAircraft explaining what to do here <http://vimeo.com/71250157>:

Video Monitor



Setting up the video monitor is pretty simple, just screw the monitor to the tripod (the hood is optional and recommended in sunny conditions) and attach the round antenna to the left side and square patch antenna to the right side. The mushroom antenna is unidirectional and can pick up signals in all directions. Think of it as a light bulb emitting a small amount of light in all directions. The square antenna is called a patch

antenna and picks up signal only in front of it about 30 degrees to either side. The front is the side with the texture. Think of the patch antenna as a flashlight directing all of its light a long way in a single direction. The video monitor has a built in diversity receiver that will switch between the two antennas to achieve the best signal. Be sure to always have your patch antenna facing in the direction of the quad for best results. You can visually see which antenna is delivering the signal from the lights at the bottom left of the monitor. See the SuperX manual on page 23 for information on the OSD. For monitor power, plug the included wire into the monitor and then attach the 2200mah lipo.



Head Tracking Goggles

The head tracking goggles plug into the back of your radio and are powered from the radio. Attach the mushroom antenna labeled RX-RPSMA to the goggles. Be sure to keep an eye on your radio voltage when using the goggles because they can use a good bit of power. Press and hold the power button on the goggles to turn them on and then rotate the knob at the top until you see the menu. Rotate it one more click to clear the menu. If you will be using the tracking feature be sure to have the goggles level on power up. To enable head tracking just toggle the SB switch to the full down position.

Gimbal Control

The gimbal can be controlled using either the head tracking goggles by tilting your head up or down or the radio right side slider. The SB switch in the full up position will use the radio's sliders and in the full down position will enable head tracking. When using the slider the gimbal is controlled by sliding the slider up and down. Movement is stopped by returning the slider to the center position. For example, if you want to tilt the camera down you would slide the slider down until the camera was facing in the direction you want and then return the slider to the center to stop the downward motion. The further you move the slider, the faster the gimbal moves. It takes some getting used to, but enables very precise control of where you are looking.

The same function is true when using the goggles. The further you tilt your head up or down the faster the gimbal will move. Return your head to center to stop the camera from moving.

First Flight

Always do your first flight in GPS ATT mode and ensure that you have double green flashing lights. To arm the motors move your left stick to the full down and right position and your right stick to the full down and left position (thumbs together at the bottom) at the same time. This will arm the motors for 3 seconds. Apply gentle power and you will be in the air. Be sure to take it slow and if you notice any instability ensure that all of your props are pushing air down before fully throttling up. Failure to install props correctly will result in a flip. Be sure to do your first flight in an open area and preferably on grass to minimize damage risk from a mishap.

Preflight Check

Before each flight be sure to do a complete pre-flight check and run up to ensure that all of your systems are working and there is nothing out of the ordinary. As you fly more you will learn what “normal” is. Be sure to regularly review your Black Box logs (see Black Box section) for irregularities and never take off if you suspect something is wrong. Losing a motor will result in a crash. Keeping your motors clean and always checking everything over should be enough to ensure that you never have any issues.

Altitude Control In GPS ATT & ATT Mode

The throttle in GPS ATT and ATT mode is different than in manual mode. In GPS ATT and ATT when your throttle is at 50% (middle) it will keep the quad at constant altitude. Moving it above 50% will make the quad ascend and moving below will make it descend. When you have your throttle at 50% you should have the quad remain stable in the air without any inputs from the controller.

Radio Inputs For Flight

- To fly forward and or backwards move your right stick forward or backward along the Y axis.
- To tilt left or right move the right stick left or right along the X axis.
- To yaw left or right move your left stick along the X axis
- To throttle up or down move the left stick along the Y axis

Controlled flight requires mastering each of these techniques and using them together. We recommend either investing in the Phoenix flight simulator program (windows only, but works great with Parallels) or purchasing a Syma X1 mini quad from Amazon (just \$40 and amazingly stable!) if you do not have a decent amount of experience flying a 6

channel helicopter or quad. It takes time and lots of practice to master, but thankfully the X650 Pro is a very stable platform and easy enough for a complete beginner to learn on if you take it slowly.

Return to Home Function

Your quad has been pre-programmed to return to home tail first when the safe mode switch is activated (the SF long switch on the top left side of the transmitter) or your transmitter signal is lost as a fail safe. When safe mode is toggled the quad will climb to a pre-selected altitude (programmable in the software when plugged into a computer, default is 15 meters) and return to the location where the quad was powered up and the GPS signal was acquired. Be sure to ALWAYS power up in a place that is safe to land and ensure that you have a good GPS lock (double green flashing in GPS Mode) prior to taking off.

SuperX Software

The SuperX Software runs directly from the flight controller. Plug your quad into a windows based computer and you will see the SuperX come up as a drive. Click on the program within the drive and the software will launch. It is pretty self-explanatory, but see the SuperX manual page 18-19 for full documentation. From the software you can adjust gains and configure the way you want the quad to behave in safe mode. The gimbal tab will not adjust your Tarot gimbal; it only works with servo driven gimbals. The OSD is already set up so do not adjust anything on that tab.

Firmware Upgrades

Your flight controller has version 1.07 installed which is the latest version as of now. Periodically new firmware updates are released and we will update our blog and Facebook page when new updates are released. See page 24 of the SuperX manual for instructions on updating firmware.