

# LOTUSRC™

*[www.lotusRC.com](http://www.lotusRC.com)*

## T580 Basic Quadcopter Manual

### Version 1.0.1

(May 2011)

*Manual Edition: 2011-March-12*

### **Safety Precautions**

1. Please read this manual before building and flying the aircraft.
2. The product is a radio-controlled model with exposed rotating blades. Therefore it poses some safety risk.
3. Do take the necessary steps to prevent being hit by the rotating blades or motors and avoid personal injury.
4. If you have never built a quadcopter before, we advise you to seek help and guidance from someone who has.

### **Disclaimer**

1. Do not use this product for illegal reasons or purposes.
2. LotusRC and our dealers bare no responsibility on how this product is utilized.
3. This model contains a large number of sophisticated components and electronics, which may fail over time. LotusRC and our dealers assume no responsibility to any losses, be it direct and indirect as a consequence to this failure.

### **Agreement**

Upon purchasing this product, you automatically accept to the above agreement.

## Table of Contents

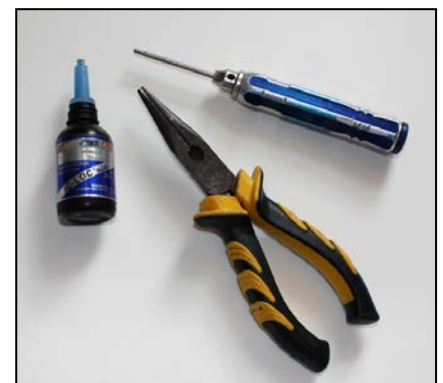
T580 BASIC COMPONENTS AND FUNCTION .....	3
TOOLS NEEDED TO COMPLETE THE T580 .....	3
PARTS LIST .....	4
AIRCRAFT DIMENSIONS (MM): .....	5
TECHNICAL PARAMETERS .....	6
T580 AIRCRAFT COMPONENTS .....	7
ELECTRONIC COMPONENTS .....	8
PROCESSOR SOFTWARE .....	8
AIRCRAFT ASSEMBLY .....	9
<i>Main body</i> .....	9
<i>Remote Control Receiver Installation</i> .....	12
<i>RADIO SETTINGS</i> .....	13
<i>Powering Up for the First Time</i> .....	13
<i>Initialization Beep Tones</i> .....	13
<i>FIRST FLIGHT</i> .....	14
<b>WARNING: PLEASE READ BEFORE YOUR FIRST TEST FLIGHT</b> .....	14
4. <i>Control Direction</i> .....	14
BUILT IN SAFETY FEATURES .....	17
1. <i>Loss of RC Signal</i> .....	17
2. <i>Start-Up throttle protection</i> .....	17
3. <i>In-flight Protection during RC Signal lost</i> .....	17
4. <i>Low battery protection</i> .....	17
5. <i>Beeping Tone Summary</i> .....	18
FEEDBACK .....	18
UPGRADE PARTS .....	19
<i>PAN TILT ZOOM (PTZ) CAMERA MOUNT</i> .....	19

**T580 Basic Components and Function**

- a) The T580 Quadcopter is a high precision four-rotor aircraft designed for stable recreational flight and aerial photography.
- b) The aircraft arrives fully built and flight tested. However, to ship it to you the landing gear and propellers had to be dismantled - a 15 minute reassembly job.
- c) To get this unit flying, you will need your RC Gear (at least 4 Channel Receiver) and 3s1p LiPo battery (2200mAh).
- d) Lift is achieved using four high efficiency 12-inch propellers with direct drive low KV brushless motor. Maximum lifting efficiency of 12g per Watt.
- e) The T580 utilizes a high-performance MEMS sensor for 6 DOF stabilization with low drift. Altitude hold is achieved via an integrated barometric sensor.
- f) The T580 can take off and land vertically, hover, altitude hold, fly left, right, forward and back with ease.
- g) Upgrading this basic quadcopter for aerial photography is easy via plug-n-play camera mount and stabilization system. Check our website to purchase these upgrade.

**Tools needed to complete the T580**

- 2mm Hex Screwdriver
- Loctite
- 5 mm socket Hex Screwdriver or a good Plier
- Minimum 4 channel receiver

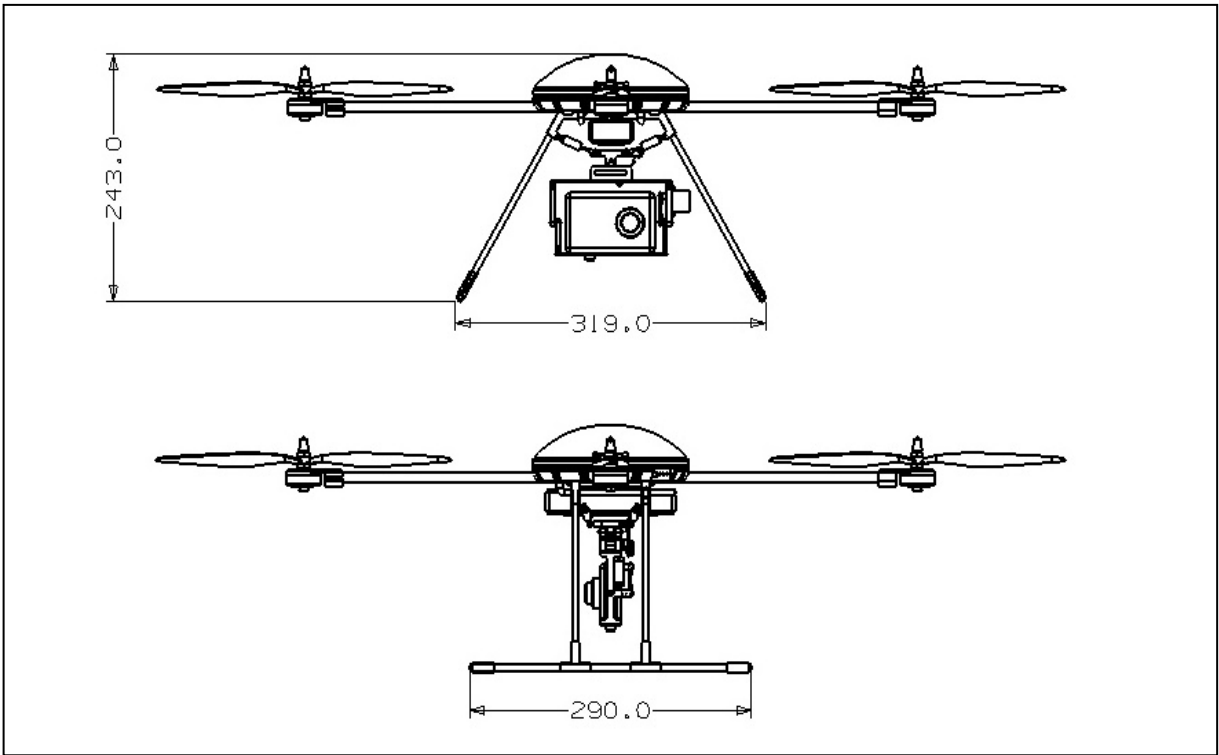


**Part List**

Note: The part lists may vary depending on T580 version purchased:

<b>No.</b>	<b>Part</b>	<b>Specifications</b>	<b>QTY</b>	<b>Units</b>
1	Main shell	ABS composite material	1	Set
2	Arm	Fiberglass / carbon fiber	4	Pcs
3	Landing Gear	Fiberglass, rubber, aluminum	1	Set
4	Motor	C2806 600KV High Efficiency brushless motor	4	Pcs
5	Propeller	1260, 1260 R Nylon composite slow flyer	4	Pcs
9	ESC	2-3S, 12A high-speed electronic transfer	1	Set
10	Flight control system	Inertial self-stabilizing system with Barometric Sensor	1	Set

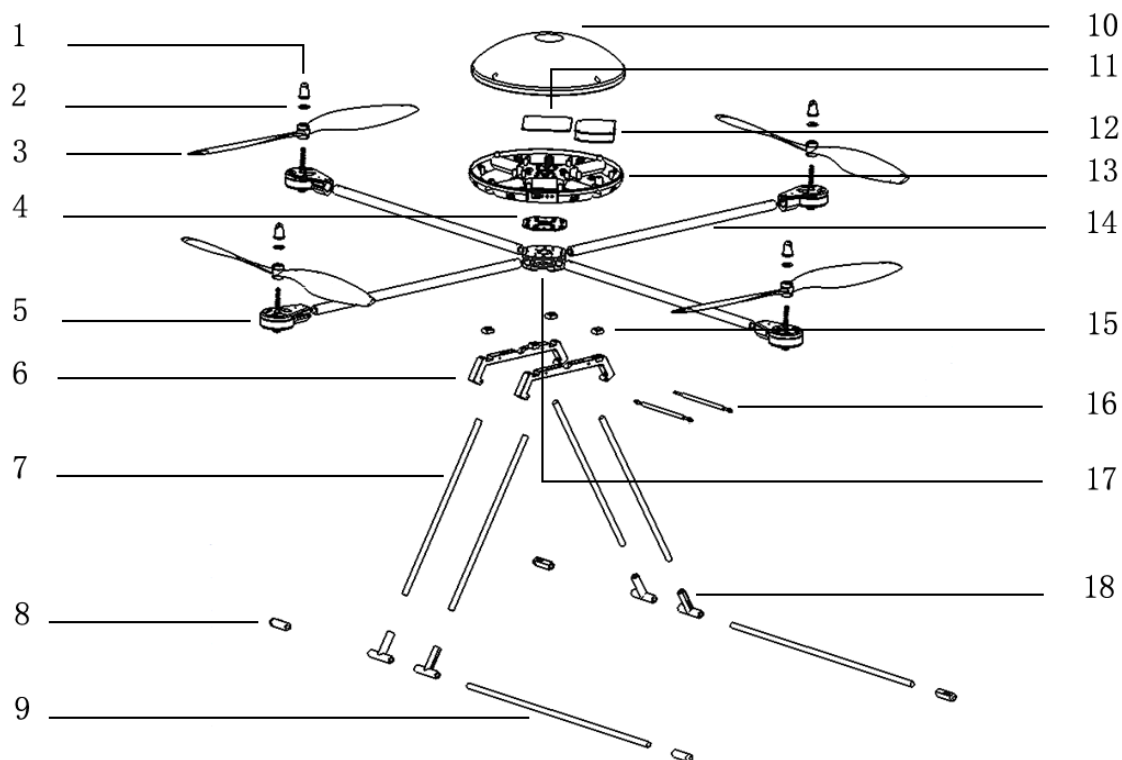
**Aircraft Dimensions (mm):**



Rotational diameter (mm):	Recommended battery placement (mm):
<p>Technical drawing of the top view of the quadcopter showing rotational diameters. The outermost diameter is <math>\phi 885.0</math>, the middle diameter is <math>\phi 580.0</math>, and the inner diameter is <math>\phi 160.0</math>. A dimension of 305.0 mm is also indicated.</p>	<p>Technical drawing of the top view of the quadcopter showing recommended battery placement dimensions. The dimensions are 133.0, 102.0, 34.0, and 45.0 mm.</p>

**Technical parameters**

<b>No.</b>	<b>Part</b>	<b>Parameter</b>
1	Aircraft size	608 mm × 608 mm × 243 mm
2	Maximum expandable size	885 mm × 885 mm × 243 mm
3	Motor to Motor	Diagonal distance between two motor centers: 580 mm
4	Propeller	1260, pusher and normal high efficiency props (12 Inches)
5	Battery	LiPo 3S1P 2200mAh 20C
6	Aircraft weight (kit only)	730 grams
7	Take-off weight	950 grams (3S 2200mAh 1P Battery, receiver, cover)
8	Recommended Payload (Camera and mount)	230 grams (recommended)
9	Maximum payload	580 grams
10	Maximum takeoff weight	1800 grams
11	Flight distance	Depends on user Radio system and battery capacity
12	Flight Time	12 minutes (3S1p 2200mAh 20C Battery)
13	Wind Resistance	Class S4

**T580 Aircraft Components**

No.	Component Name	Quantity
1	Blade Holder	4
2	Shim	4
3	Propeller	4
4	Rubber Damper Gasket	1
5	Brushless Motor	4
6	Cross Beam	2
7	Side Arm (Landing Gear)	4
8	Rubber Plug (Landing Gear)	4
9	Bar (Landing Gear)	2
10	Cover	1
11	Flight Control Panel	1
12	ESC	1
13	Bottom Body Shell	1
14	Quadcopter Arm	4
15	Locking Block	4
16	Lateral Axis	2
17	Center Coupling	1
18	Rubber Tee (Landing Gear)	4



**Electronic Components**

- 1) 4 units integrated brushless motors, 12 A maximum load.
- 2) Motor and ESC overload and burn-out protection – motors are gradually turned off if overloading is detected by the ESCs.
- 3) Flight controller with six high-performance MEMS transducer to achieve the stable, reliable and drift-free stabilization.
- 4) Flight controller is ready for PTZ stabilization (*see last page*).

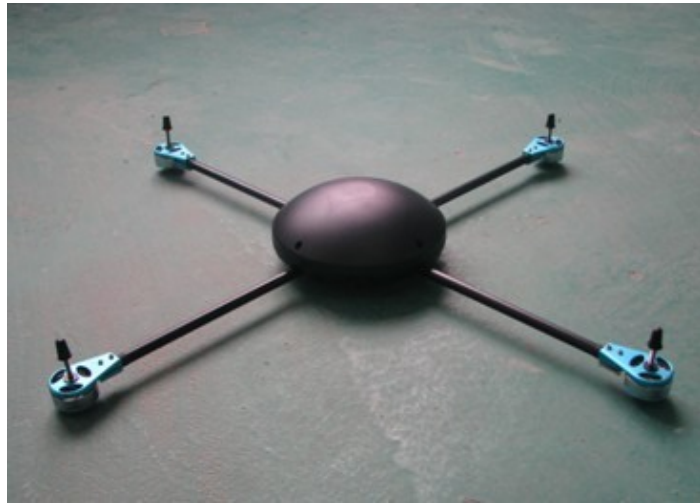
**Processor Software**

1. The fuzzy logic algorithm, the aircraft stabilization is proprietary and intellectually protected worldwide.
2. The T580 system has been fully field tested and intuitively easy to fly.

## **Aircraft Assembly**

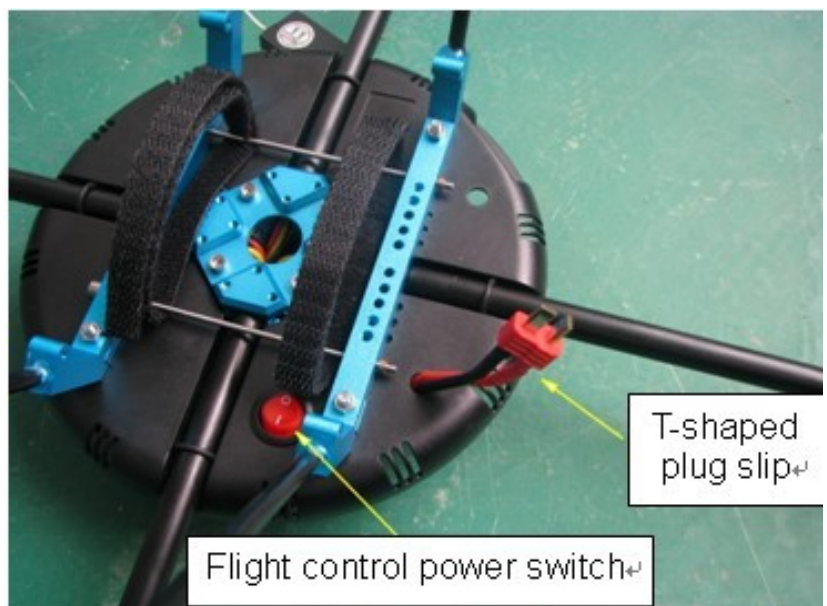
### **Main body**

1. To ensure the optimum configuration, the main body of the T580 has been fully assembled and flight tested before shipping.



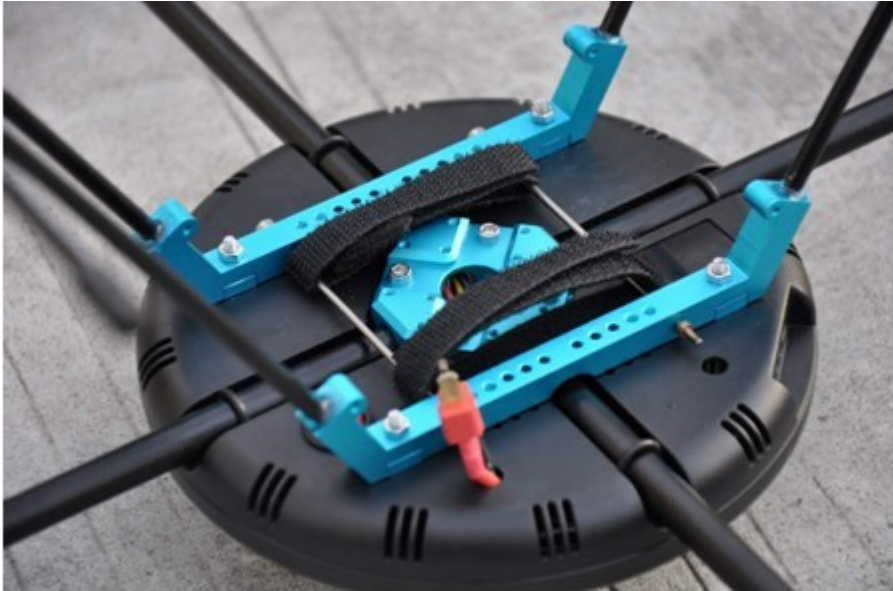
2. To complete the aircraft, you only need to install the propellers, landing gear (LG) and your RC Receiver.

3. Install the LG by utilizing the M3 bolts located at the bottom of the body shell. Tighten the nuts until the LG sits snugly in place (to prevent damaging the plastic chassis, please do not over tighten).



4. The flight control power switch (switch may be removed with current shipment) and battery T-plug is installed on the body shell bottom. Please note that you will need to use a female T-plug of the same design (a standard Deans Ultra connector).

5. To hold your 3s battery in place, install the provided Velcro onto the LG crossbeams.



## **Propeller Installation**

1. The T580 comes with 4 pieces 12-inch high efficiency slow flyer propeller; two pushers and two normal.
2. Install the threaded brass sleeve of the propeller onto the motor shaft, followed by the washer and Blade Holder.

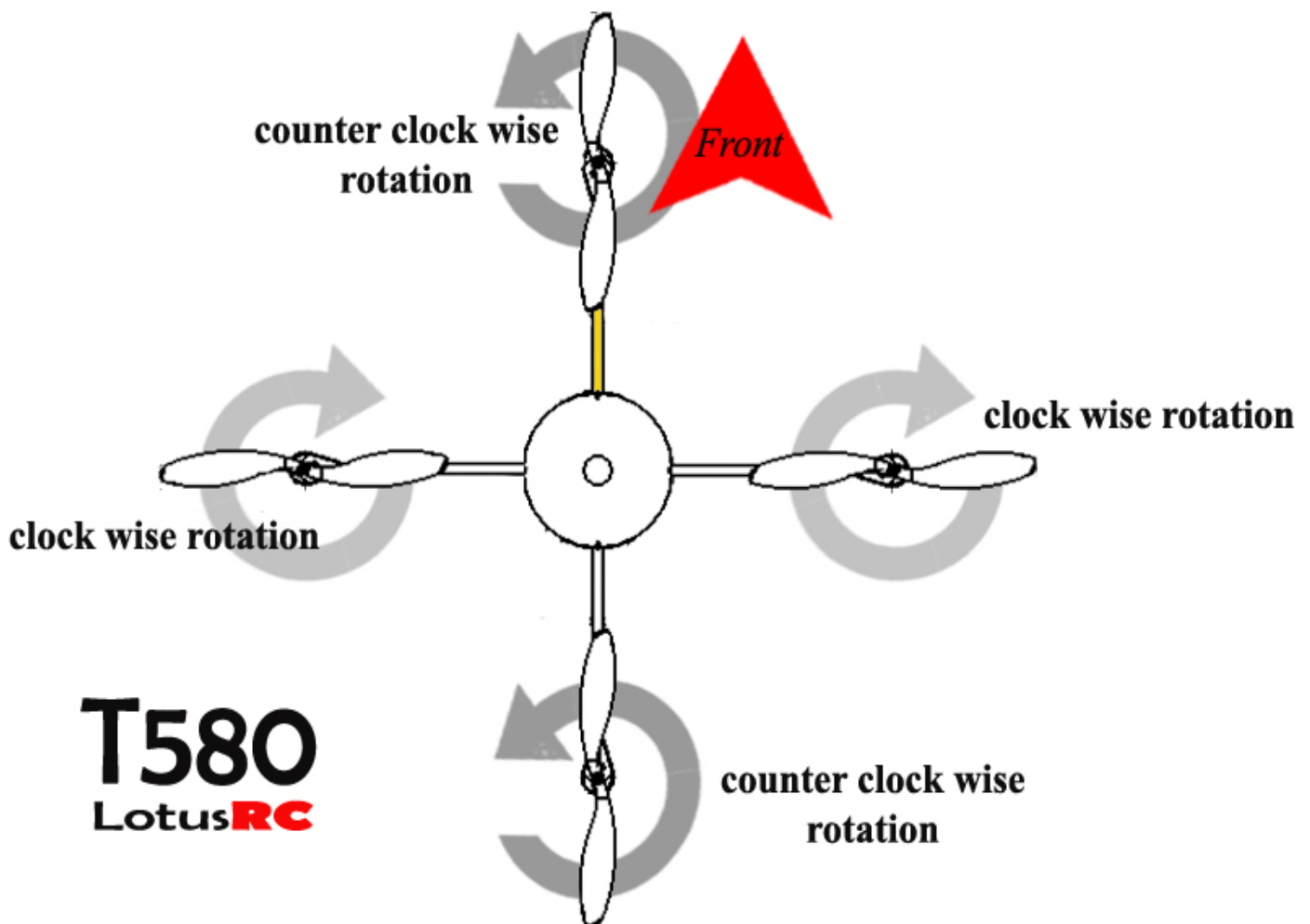
**Warning:** Do not over tighten the Blade Holder as this may cause the propeller to press down and bind with the motor housing. This increases power consumption and may lead to motor overheating.



3. **Important:** Use Loctite or other thread locker when installing the Aluminum Blade Holder. This is to prevent it coming off during flight.



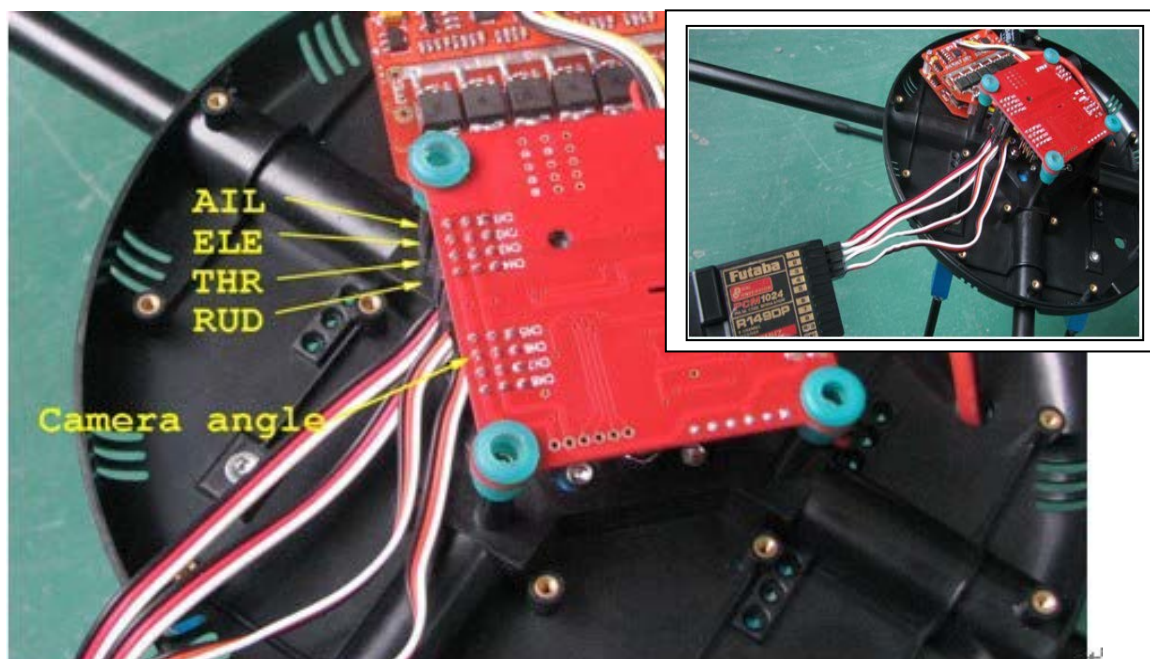
4. Propeller rotation (note aircraft Front):





## Remote Control Receiver Installation

1. A minimum 4 channel Receiver is required to fly this system.
2. The T580 has been tested to work with major brands of RC Radios, including Spektrum (DX7), JR (DSX7, 9XII), Sanwa (RD8000), Futaba (6EX, 10C, FF9), Hi-TEC (Eclipse 7), GWS, WFLY (FT06-C), ESKY, etc.
3. Plug in the channels as shown below to the corresponding channels to your RC Receiver:



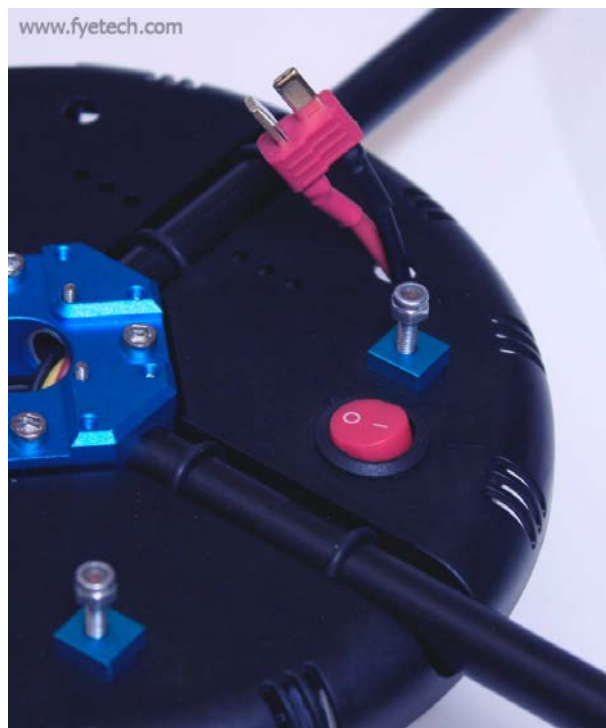
<b>T580 Input</b>	<b>Corresponding Receiver Channel</b>	<b>Example: Futaba Receiver</b>	<b>Example: JR Receiver</b>
<b>CH 1</b>	Aileron Input	Channel 1	Channel 2
<b>CH 2</b>	Elevator Input	Channel 2	Channel 3
<b>CH 3</b>	Throttle Input	Channel 3	Channel 1
<b>CH 4</b>	Rudder Input	Channel 4	Channel 4
<b>CH 6</b>	Camera Angle Control Input (Optional)	Channel 5	Channel 5

## RADIO SETTINGS

1. Set your transmitter on fixed wing mode.
2. Set the end points of Channel 1, 2, 3, and 4 to between 0~100%.  
(Recommended dual rate or expo setup to reduce control sensitivity)
3. Remove or disable any mixing between channels.
4. Set a straight line curve for Throttle channel. You may fine tune this curve later.

## Powering Up for the First Time

1. Turn on your Radio Transmitter. Move the Throttle stick to the lowest position (zero throttle).
2. Place the aircraft on level ground, install your LiPo battery and power up (make sure the power switch is in the **OFF** position). You will hear some beeps indicating power is on.
3. Turn the Power Switch **ON**. Do not move the aircraft until the initialization process is complete (indicated by the 3 beep-beep-beep tones).



## Initialization Beep Tones:

No.	Beep	Indication
<b>1</b>	First Beep Tones after 2 seconds	Indicate battery is connected.
<b>2</b>	Second Beep Tones after Power Switch is turned <b>ON</b> .	RC signal is detected and the lowest throttle position is identified.
<b>3</b>	Final Beep Sound after 6 seconds: "Beep Beep Beep"	Flight Control System is initialized and aircraft is ready to fly.
<b>4</b>	Beep before flight (after throttle stick is pushed up).	The aircraft confirms throttle stick has been moved and propeller will now start to rotate.

## FIRST FLIGHT

### WARNING: PLEASE READ BEFORE YOUR FIRST TEST FLIGHT

1. Default factory setting for the T580 '**Cross Mode**' configuration.
2. One of the Motor Arm is coloured yellow as a marker to indicated the 'front' of the aircraft:

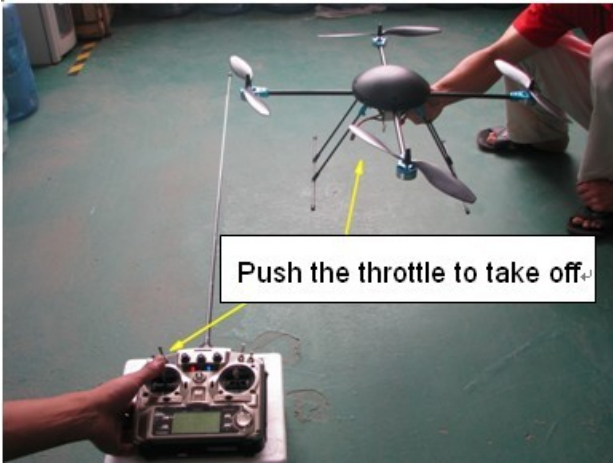


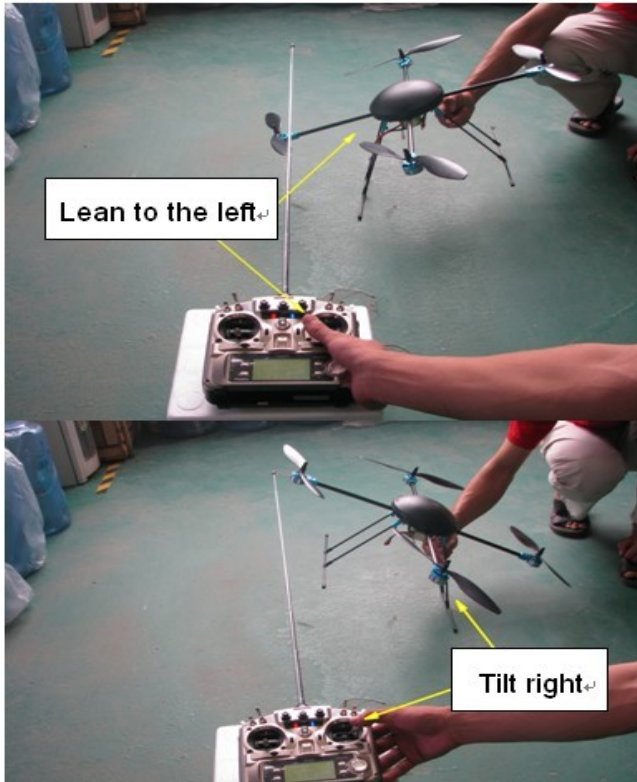
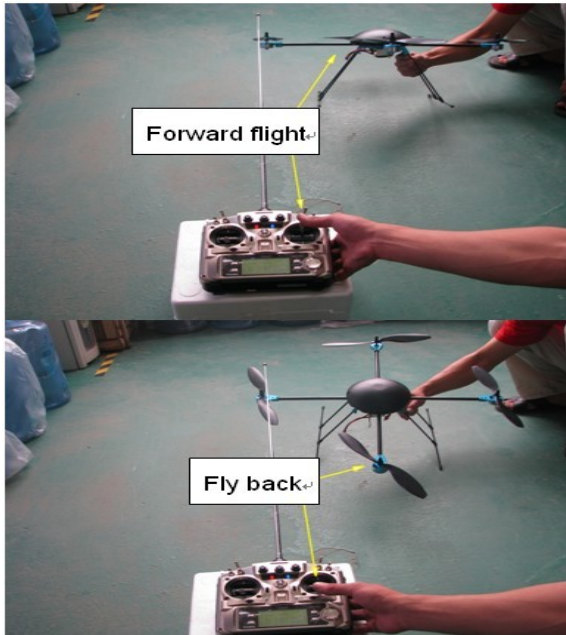
3. To ensure your safety, the following flight tests must be done carefully with small controlling increments.

#### 4. Control Direction

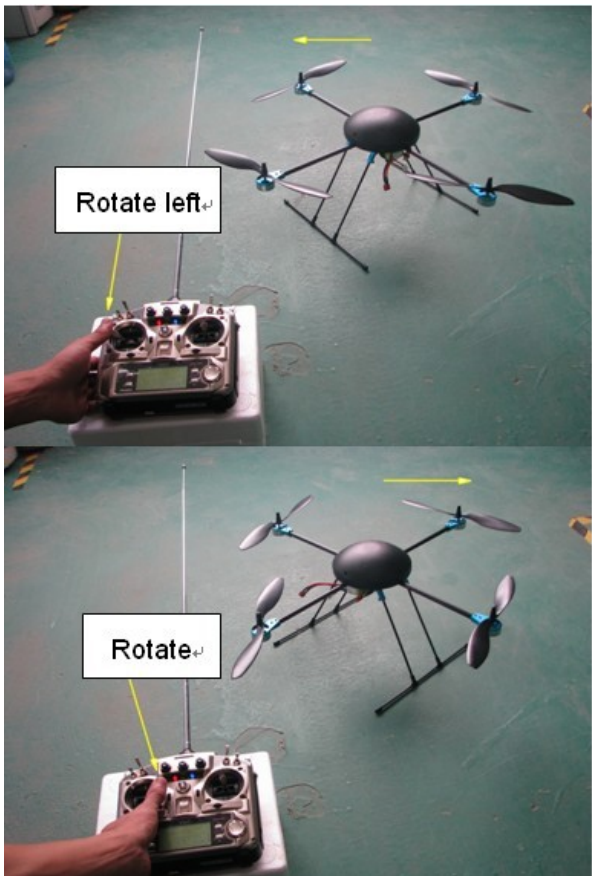
To check your RC Transmitter control settings, carefully test as instructed below. If the movement is incorrect, Reverse the channel accordingly.

**Safety Note:** This can be successfully done without the propeller installed.

No.	Control Input	Aircraft Reaction
1	Increase Throttle Gently (do not lift off!)	Motor revs up and down as per throttle input: 

2	Manually checking control direction.	<ol style="list-style-type: none"> <li>1. Carefully hold the aircraft by hand.</li> <li>2. Gently increase throttle until the motors just begin to rotate.</li> </ol>
3	Roll left / Right	 <ol style="list-style-type: none"> <li>1. Move the Aileron stick to the left, you should observe the right motor speed up while the left motor slows down.</li> <li>2. Observe the opposite when rolled to the right</li> </ol>
4	Forward / Back	 <ol style="list-style-type: none"> <li>1. Move the Elevator stick to the front.</li> <li>2. You should observe the back motor speed up while the</li> </ol>



		front motor slows down. 3. Observe the opposite when Elevator stick is moved to the back.
5	Rudder left / right (direction of rotation)	 <p>1. It is easier to check correct rotation if the aircraft is allowed to lift off slightly (do not hold the aircraft in your hand if you do this!).</p> <p>2. If you move the rudder stick to the left, the aircraft should rotate to the left, and vice versa.</p>

## 5. Lift off and hover

- After you have tested and confirm all 4 channels in your RC radio is correctly set up, its time for your first flight.
- As before, put the aircraft on the flat ground, turn on the power and go through the initialization process. Do not move any control sticks or the aircraft during this process.
- Gently move your throttle to start all motors. Push the throttle stick higher until the aircraft begins to lift off and fly.

- d) If the aircraft looks stable, allow it to hover, maintain altitude before gently bringing the throttle stick down for a soft landing.
- e) Continue to test hover the aircraft, flying low and slow until you get used to its flight characteristics before going into higher altitude and forward flight.

## **BUILT IN SAFETY FEATURES**

### **1. Loss of RC Signal**

- a) In case of RC signal is not detected during flight, the aircraft will automatically enter the *security protection mode (SPM)*.
- b) In *SPM*, the aircraft will emit a long “beeeeeep” tone intermittently.
- c) The aircraft will not fly until a RC signal is received by the controller.

### **2. Start-Up throttle protection:**

- a) During power up, if your radio throttle stick is not in the lowest position (zero throttle), the SPM will be activated.
- b) In this state, the aircraft will not respond to any command until the throttle stick is placed in the lowest position.

### **3. In-flight Protection during RC Signal lost**

- a) If RC signals is lost or interrupted while in flight, the aircraft will immediately self land.
- b) And intermittent beep tone would also be emitted.
- c) When RC signal is regained, this protection will be deactivated and the aircraft can continue flying.

### **4. Low battery protection**

- a) Upon detecting low battery, the aircraft will beep intermittently while still flying.
- b) Please land as soon as possible and change the battery.
- c) If this warning is ignored, the aircraft will slowly power down and self-land. You still have flight control during this time, but not throttle control.

## 5. Beeping Tone Summary:

No.	Alarm sound	Indicator for:	Action Required
1	Beeping sound during flight. Motor power down.	Low battery	Replace battery
2	Intermittent long beeps	No RC signal detected or throttle stick is not zero at start up.	Check your radio transmitter
3	Quick Beeps during flight	Low battery or the RC signal was lost	Check battery voltage and RC connection.
4	Quick Beeps and flight control is not allowed	Low battery or the RC signal is lost	Check the batteries and RC Connection

## 6. X-Mode setup

The model shipped with default at + mode. If you need to fly at X mode, you need to install the X-mode Ring to the landing gear.

Change the firmware for X-mode:

- Turn on Transmitter and the T580
- After one beep, immediately move Throttle to full, you will hear one long beep
- Move Aileron to Right for X-Mode, you will hear two rapid beep
- Move the Throttle back to minimum and you will hear one beep, follow by 3 slow beep
- You are now ready to fly at X-Mode

To change back to + mode, follow the above but at step C move Aileron stick to Left and you will hear one beep

## Feedback

We would like to hear from you to improve both the product and our services.


Please do not hesitate to contact us via email:

**Website:** [www.lotusRC.com](http://www.lotusRC.com)

**Technical services:** [flying.yan@163.com](mailto:flying.yan@163.com)

**UPGRADE PARTS****PAN TILT ZOOM (PTZ) CAMERA MOUNT**

1. There are 3 upgrades available to convert the Basic T580 to an Aerial Photography platform:

<b>Upgrade name</b>	<b>Part</b>	<b>Description</b>
<b>Monopodium A</b>	Single axis camera mount	<ul style="list-style-type: none"> <li>a) A single axis (pitch up &amp; down) camera mount, constructed of carbon fibre &amp; aluminum.</li> <li>b) Pitch axis stabilization achieved with an all-metal geared digital servo.</li> <li>c) Vibration damping ring and suspension system.</li> <li>d) Camera shutter servo mounting and control.</li> </ul>
<b>Monopodium B</b>	3 axis camera mount 	<ul style="list-style-type: none"> <li>a) Pitch up &amp; down controlled via an all metal geared digital servo.</li> <li>b) Triple axis (pitch, roll &amp; pan) camera movement suspension system with vibration damping ring.</li> <li>c) Pitch axis stabilization achieved with an all-metal digital servo.</li> <li>d) Camera shutter servo mounting and control.</li> </ul>
<b>Biaxial head</b>	To be updated	To be updated