Flier Car ESC User's Manual

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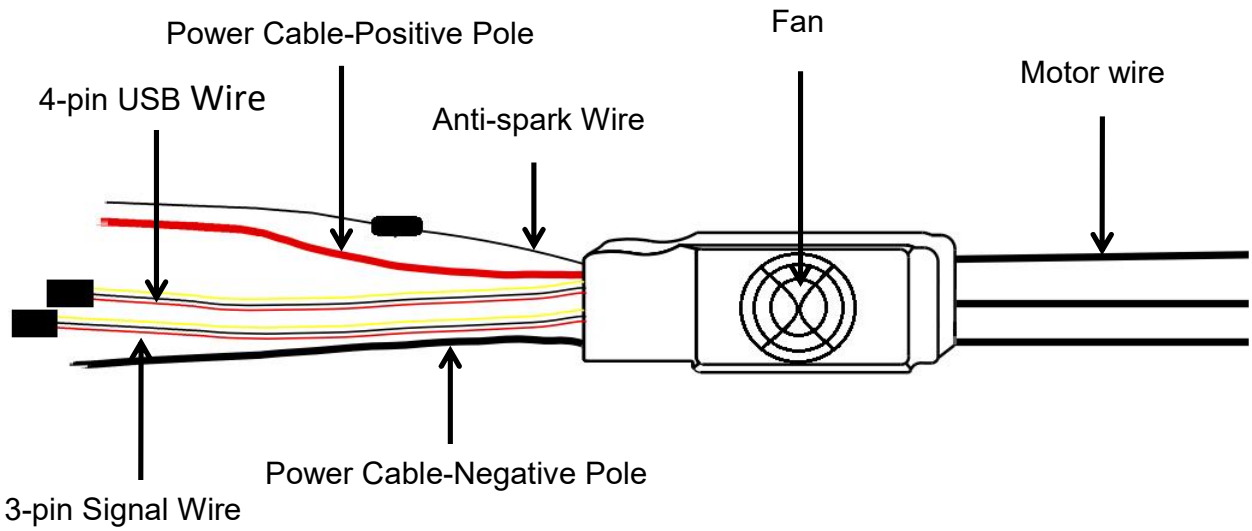
1. Introduction

Thank you for purchasing our products! For the high power of this system, failure to use it may result in injury and damage to the whole device. So we highly recommend you read carefully and abide by the operating procedures of this manual before using it. Our company is not responsible for your misuse of this product or any damage, including incidental or indirect losses you may cause. Moreover, we have no responsibility for your modifying the products without authorization. We have the right to change the design, features, functions, and operating requirements of our products without any advanced notice!



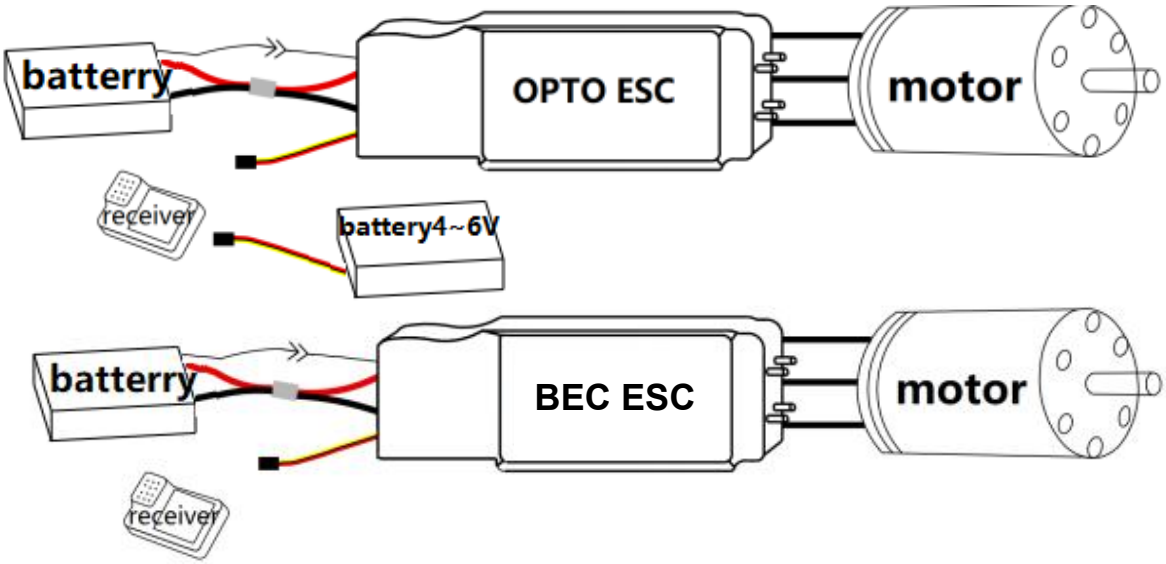
2. Features

① Design for car and more functions.
② Battery voltage from 2S to 22S for super high voltage version.
③ Two-way communication while connecting with a computer.
④ Firmware can be upgraded by the user.
⑤ Set function values by Prog-Box or by PC via USB link wire simply.
⑥ Motor test when powered on.
⑦ Li-MH/Li-Po, Ne-Cd/Ne-MH, and LiFe batteries can be used.
⑧ Enables setting the voltage per cell for the point at which the controller's cut-off circuitry engages. Li-MH/Li-Po from 2.0-3.6V, Ne-Cd/Ne-MH 0.4-1.0V, LiFe from2.2-2.8V.
⑨ Timing settings may be adjusted (0°-30°) per degree to suit the motor type.
⑩ Three types of throttle curve.
⑪ Automatically detects the throttle range or can be set a fixed value by manual operation.
⑫ ABS brake system.

3.How to use the ESC

1). Connect the motor and receiver according to below diagram. If it is an ESC without BEC (i.e. OPTO), an external 5V power supply needs to be connected to the receiver.
2.) Connect the ESC to the battery pack. (Correctly use the Anti-spark wire while connecting the ESC to battery pack).
3). Then you will hear ' ♫♪ ' or " ♫♪♪ " melody.
(If you hear other melodies, please check your motor connection. The ♫♪ melody means the ESC enters forward-only mode. The ♫♪♪ melody means the ESC is entering Forward&Reverse mode, if you hear a group of beeps per 10 seconds, please check your receiver connection or your remote control.)
4). Push the trigger and then the motor will start to work.

4.Diagram for wire connection



① The above drawing show how to connect the ESC with all the other parts.

② There are 2 thicker wires (red&black) on the one side of the ESC, they are for battery. The red wire is connected to the positive of the battery, and black wire is connected to the negative of the battery. The ESC will be damaged possibly if wrong connection.

③ There are 3 thicker wires (black) on the other side of the ESC. They are for motor. They can be connected to any 3 motor wires. but if the motor rotate a wrong direction, it will be changed into the correct rotation if you swap any two wires connection.

④ If it is a ESC with hall sensor, there are 5pin color wires for hall sensor in the motor. The red is +5V, the black is for ground, the green blue yellow 3 wires is for hall sensor ABC

⑤ There is longer 3pin cable(Brown red orange) is connected the receiver. The brown is the ground of the receiver ,it is not connect to the ESC ground because of optocoupler isolation. the red is 5V of the receiver, and the orange is the PPM signal to control the ESC.

⑥ There is shorter 4 pin cable(black red white yellow) is for the connected to the computer. The cable can configure the ESC or upgrade the ESC firmware. Don't connection while the ESC work.

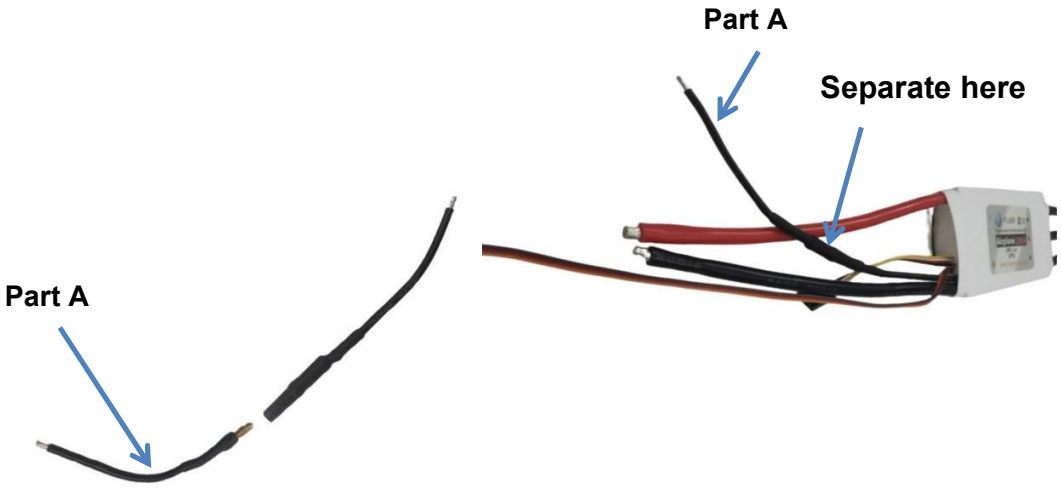
⑦ A thin wire at the side of black power wire is anti-spark wire. The anti-spark wire includes a bullet connector and an anti-spark resistor. You can separate it into two wires. You must solder another wire on the negative wire of the battery pack. If you want to connect the

ESC to the battery pack, you can connect the red wire of the ESC to the positive wire of the battery first. Then connect the anti-spark wires well. The last step is to connect the black wire of the ESC to the negative wires of the battery. If you do this, no spark will be generated, and it will protect the main bullet connector from damage.

5.Anti-spark Wire Connection

The anti-spark wire must be correctly installed to prevent damage to the ESC. The anti-spark wire can be identified as the thin black wire with a resistor installed along its length. Follow next steps to use the anti-spark wire correctly:

First, separate the two halves of the spark wire at the bullet joint at the resistor. Next, solder the free end of the anti-spark wire(Part A) to the bullet connector of the black (negative) wire from the battery. And then connect the red (positive) battery wire to the ESC first, then connect the small black resistor wire via the bullet connector at the resistor. Finally, connect the black (negative) battery wire to the ESC.



6.Function Values (Default values in red color)

- **Reverse:** On/Off ON means forward and reverse mode, OFF means forward only mode
- **Timing:** 0°、1°、2°、3°、……30°
- **Frequency:** 8 kHz, 16 kHz, 32 kHz
- **Acceleration:** Soft / Medium / Hard
- **Accumulator type:** NiCd/NiMh、Li-Ion/Li-Pol、LiFe
- **NiCd/NiMH CutOff:** No Cut Off、0.4V、0.5V、0.6V、0.7V、0.8V、0.9V、1.0V
- **Number of cells:** Auto, 2S, 3S ……22S
- **Lilo/Pol Cut Off:** 2.0V、2.1V、2.2V、2.3V、2.4V、2.5V、2.6V、2.7V、2.8V、2.9V、3.0V、3.1V、3.2V、3.3V、3.4V、3.5V、3.6V
- **LiFe Cut Off:** 2.2V、2.3V、2.4V、2.5V、2.6V、2.7V、2.8V
- **LVC Cut Off Type:** Slow Cut Off、Hard Cut Off
- **Power limited forward:** Off, 75%, 50%, 25%
- **Power limited reverse:** Off, 75%, 50%, 25%
- **FWD to REV Delay time:** 0.25S, 0.5S, 0.75S, 1S, 1.5S, 2S, 3S, 5S
- **Reverse point:** Auto、fixed 1.0mS、fixed 1.1mS、fixed 1.2mS、fixed 1.3mS
- **Forward point:** Auto、fixed 1.7mS、fixed 1.8mS、fixed 1.9mS、fixed 2.0mS
- **Timing monitor:** On/Off
- **Start Power :** Auto, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65%, 70%, 75%, 80%, 85%, 90%, 95%, 100%. Usually the default value ”auto” is OK, but if the motor startup is too violent or too powerless, you can adjust the value, you can from 5% begin, then increase the start power percent, till the motor startup performance is good.

7.Changing the function values

There are three ways to change the function values. The easiest method is by using the Program Box accessory. A limited number of function values can be changed by using the transmitter. You can also program the ESC by using a PC with the supplied USB cable.

7.1 Changing a function value with the Program-Box

With the Flier Program Box, you can set all function values very simply. The setting procedure is as follows:

① Connect the 4-pin connector of ESC with the 4-pin connector in Prog-Box. Make sure the direction is correct.

② Connect ESC and motor.

③ Power on the ESC, and you will hear a “♪♪♪” melody, it prompts that the connecting is ready and you can go ahead.

④ “Great! Read ESC Data OK” will be displayed on the LCD screen(on the front of the Box). After 1 second, it will enter the first function-MODE TYPE setting interface automatically. Then your ESC type can be displayed on the LCD screen. “←” and “→” buttons make no difference because the ESC type can’t be changed.

⑤ Press the “Forward” button to enter the second function item-CONTROLLER TYPE. The ESC type which you purchased will be displayed on the LCD screen. “←” and “→” buttons make no difference because the ESC type can’t be changed.

⑥ You can press the “Forward” button to enter desired function item, then press the “←” and ”→” buttons to enter a desired value. You can also press the “Back” button, then back to the last function item.

⑦ All setting is done. The LCD screen will display “Sending Data to ESC” if you press the “Back” and “Forward” buttons. It prompts the setting value has been sent to the ESC.

⑧ Turn off the power of the ESC, and connect the power. You can inspect whether the function values were written in the ESC or not.

⑨ After setting over, turn off the ESC, and disconnect the Prog-Box.The setting is done.

Note：If you need to restore factory defaults. You should disconnect the 4pins wires on the ESC after the Prog-box read the ESC function value. Then connect the box with the 4-pin wires from ESC. The Prog-box can automatically restore the Factory Defaults after disconnecting. At this time, you need to press the “Forward” and “Back” buttons. The Factory Default value will be sent to the ESC, and the ESC will be the Factory Defaults Value ESC.

7.2 Changing function values with the transmitter

Throttle calibration can be performed using the transmitter. Also, Some simple function values for this ESC can be changed or set by using the transmitter. First, we' ll explain how to carry out throttle calibration, and then we' ll discuss how to use the transmitter for Changing parameter settings.

Throttle Calibration:

Ideally, the throttle pulse width from the receiver ranges from 1.0ms (the minimum throttle achievable by the transmitter) to 2.0ms (the maximum throttle achievable by the transmitter), corresponding to motor speeds of 0% to 100%. However, due to individual device variations, both the minimum and maximum throttle values may deviate. The maximum throttle might not be exactly 2.0ms, and without throttle calibration, the motor may not reach 100% speed at the maximum throttle or already reach 100% motor speed at 80% throttle position. In such cases, throttle setting or calibration becomes necessary. Our ESC can be set to a fixed throttle travel directly through computer software, allowing it to be close to the remote's travel without calibration. However, for advanced users who require precise throttle control, it is still recommended to perform throttle calibration.

To ensure that your ESC can fully utilize the throttle travel, it is recommended to perform throttle calibration in the following situations:
- When using the ESC for the first time.
- After replacing the remote controller or receiver.
- After adjusting ESC settings or upgrading firmware.
- When the throttle travel is inappropriate even be set.

Before performing throttle calibration, please ensure that the ESC's power and motor wires are correctly connected, but do not power it on yet. Ensure that the receiver is connected properly and powered on. Additionally, confirm that the ESC parameters Forward Point/Reverse Point or Set Ini/End Point are set to Auto (factory default value).

- If your ESC software is for cars, boats, etc., and the motor can rotate in both directions, the calibration steps are as follows:

1. Minimum Throttle Calibration:
   - If your reverse function is turned off (the factory default is on), you can skip this step (minimum throttle calibration) and proceed directly to step 2 (maximum throttle calibration).
   1.1. Set the remote controller's throttle to the minimum position (the minimum should be less than 1.35 ms) and hold it steady, then power on the ESC. You will hear three beeps: “Do Mi Sol.”
   1.2. Hold the throttle in this position for about 4 seconds, after which you will hear four beeps: “Do Do Sol Sol.” At this point, the throttle position is calibrated as the minimum throttle.
   1.3. Immediately move the throttle to the neutral point (between 1.35 ms and 1.65 ms); the calibrated throttle will now be stored.
   1.4. You can then disconnect the ESC's power, and the minimum throttle calibration is successfully completed.

2. Maximum Throttle Calibration:
   2.1. Set the remote controller's throttle to the maximum position (the maximum should be greater than 1.65 ms) and hold it steady, then power on the ESC. You will hear three beeps: “Do Mi Sol.”
   2.2. Hold the throttle in this position for about 4 seconds, after which you will hear four beeps: “Do Do Sol Sol.” At this point, the throttle position is calibrated as the maximum throttle.
   2.3. Immediately move the throttle to the neutral point (between 1.35 ms and 1.65 ms); the calibrated throttle will now be stored.
   2.4. You can then disconnect the ESC's power, and the maximum throttle calibration is successfully completed.

3. After completing step 2, the ESC's forward/reverse mode will switch (i.e., if it was in forward mode, it will change to reverse mode, and vice versa). If the forward/reverse mode after calibration is not the expected mode, please perform the maximum throttle calibration operation again (i.e., repeat step 2).

Changing function values:

Currently, there are 3 parameters that can be adjusted using the transmitter:

1. Forward/Reverse Mode: Includes two modes, Forward Mode and Reverse Mode (Including forward and backward).

2. Motor Timing Degrees: Includes four adjustable values: 0-7°, 8-15°, 16-23°, and 24-30°.

3. Frequency (PWM): Includes three adjustable values: 8kHz, 16kHz, and 32kHz.

The adjustment process is the same as throttle calibration.please ensure that the ESC's power and motor wires are correctly connected, but do not power it on yet.

Set the throttle of the remote controller to the maximum position (greater than 1.65ms) and hold it steady. Then power on the ESC; you will hear three beeps: "Do Mi Sol."

Keep the throttle steady for about 4 seconds, after which you will hear four beeps: "Do Do Sol Sol." This indicates that the ESC has entered the setup mode. At this point, if you need to change the Forward/Reverse Mode, set the throttle to the neutral point (between 1.35 ms and 1.65 ms). If the current mode is Forward Mode, it will switch to Reverse Mode, and if the current mode is Forward Mode, it will switch to Reverse Mode.

Next, keep the throttle at full position. You will hear 8 different tones, each sounding 5 times, with the 8 tones playing in a loop. Each tone represents an adjustable parameter. When you hear a specific tone, set the throttle to the neutral point to adjust the corresponding parameter. If you keep the throttle at full position, the parameter will be skipped. The table below lists all adjustable parameters and their corresponding tones.

Sound count	Sound	Parameters	Note
1	♪ × 5	0° timing	recommended for 2 poles and common motors
2	♪♪ × 5	13°timing	recommended for 4 pole motors
3	♪♪♪ × 5	24° timing	recommended for 4 pole motors
4	♪♪♪♪ × 5	30° timing	recommended for 10 pole and outrunner motors

5	♪-- × 5	8 kHz	default setting for the lowest efficiency loss
6	♪--♪ × 5	16 kHz	recommended for low internal motor resistance
7	♪-♪ × 5	32 kHz	recommended for low motor inductance
8	♪--♪-♪× 5	No use	The parameter is reserved for future use.

* "-" represents a long tone, and "--" represents an even longer tone.

For example, if you need to set the ESC to 13° timing, keep the throttle at full position until you hear the "♪♪" tone 5 times, then set the throttle to the neutral point to save the parameter. Once the parameter is successfully adjusted, the tone will stop, and the setup mode will exit automatically. You can then power off the ESC. If you need to adjust other parameters, you will need to re-enter setup mode.

If you miss a parameter, you can wait for the next loop to make adjustments. Please note that the Forward/Reverse setting does not loop. If you miss this setting, you will need to power off and restart the ESC.

7.3 Changing a function value by using a PC

ESC function values can also be changed by using a PC with a USB connection and our proprietary USB Linker driver.
You have to install the USB Linker' driver if your computer is under Windows 7, otherwise no need to. But ESC programming software must be installed before you can change the ESC function values with your computer.

Installation of USB Linker' driver:

Example for Windows XP:

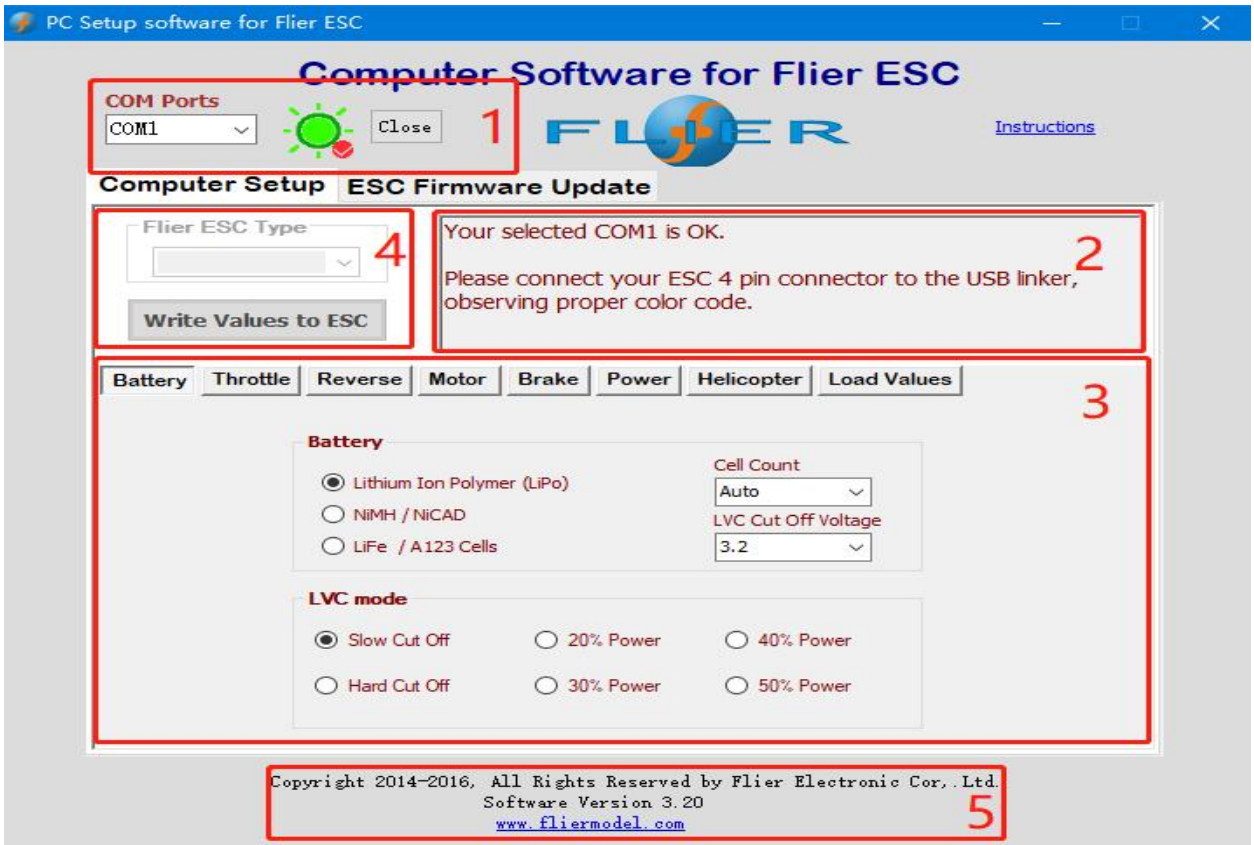
1. Plug the USB Linker into the computer USB port. The PC will display "Found new hardware". Click the "Next" button.

2. Click “Next” when prompted by “Install from a list or special position (Advanced).
3. Click “Search for the best driver in these locations” and click “Include this location in the search”. In the search dialog specify the location of the USB driver that is located in the CD or driver download folder “USB Driver”.
4. Open the Windows Device Manager.
5. Find “Ports (Com & LPT) in the list and click the + sign to the left.
6. Find the line “Prolific: USB-to-Serial Comm, Port (COMX)” .The “x” value is the COM port number that was assigned to the USB serial converter. This is the port that will be selected in the Flier ESC Computer Linking Software. Make note of it.

Installation of Flier ESC Programming Software:

The installation of the Flier ESC Programming Software is the same as the installation of any Windows software: simply open the setup file and install it according to the prompts. The software can be run after the USB Linker connects to the computer.

Overview of Flier ESC Software Interface:



1) The top-left of the interface is Select “COM Ports”.The light next to the port indicates whether the port is working or not. If the light is on(Green), it means the port is working. If the light is off(Gray),it means the port is not working.. The button next to it can temporarily open/ close the port.)

“Select COM Port”: Usually, the software will automatically select the port after running. But sometimes due to too many ports on the computer, there will be a selection error, then we need to select the port manually.

2) The top-middle of the interface is a text box. it can display some messages of the software progress.

3) The middle main area of the interface is the program area. You can program the setting value of the ESC here.

4) The “Flier ESC Type” on top-left of the interface would display ESC type once you connect ESC to the PC correctly. And below “Write Values to ESC” is a write data button. You can press it to save the setting value into the ESC.

5) The bottom of interface displays the copyright and company website information.

How to program the ESC by PC:

1) This is very important. Disconnect the battery, motor and receiver. In other words, disconnect all connections from the ESC.
2) Plug the Flier USB linker into your computer and run the Flier programming software.
3) You can see a interface which the above mention(Figure 3).
4) Check that the COM port is the one you saw earlier when you installed the driver. If it is incorrect, please manually select the correct COM port.
5) Connect the 4-pin wire to the 4-pin wire of the ESC, making sure that wires of the same color are connected together, otherwise the ESC may be damaged. If the connection is correct, the Flier ESC type will be displayed in the “ESC type” . If it is not displayed correctly, you can unplug the USB linker and plug it back in until it is displayed correctly.

6) All parameters in the ESC will be displayed on the computer software. Modify the parameters that need to be changed, or click "Load Factory Default" to load all factory default.

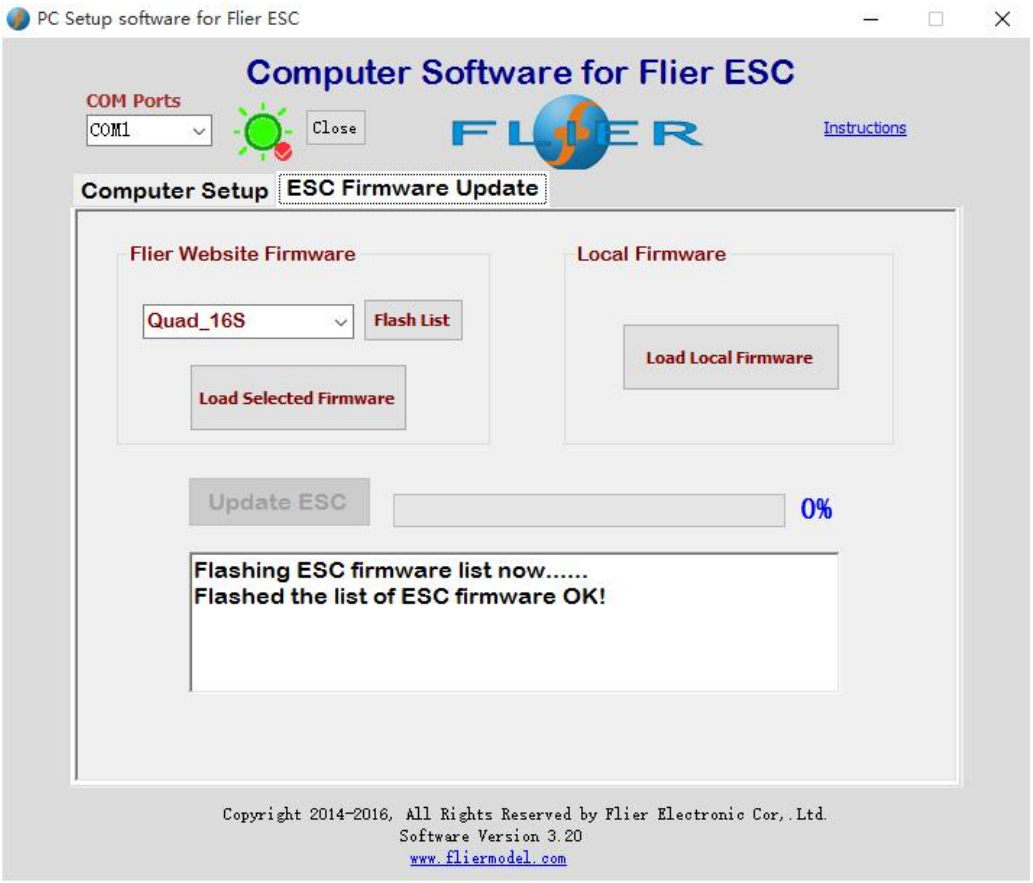
7) After completing the adjustment. Click on "Write values to ESC" in the upper left corner and all parameters will be written and stored in the ESC immediately.

8) Disconnect the 4pin wires, and reconnect it to check that the parameters you just changed have been recorded in the ESC.

9) Disconnect the 4-pin wire and exit the Flier ESC computer software,

10) Unplug the USB linker. Your ESC is now programmed.

8.Updating the Firmware:



(Figure 1)

1) Disconnect all the connections to the ESC. Insert the USB cable into the USB port of the computer, and run the software. Please kindly notice whether the right port is selected.

2) If it’s your first time running this software, or you can’t find the needed firmware in the list, please press the "Flash List" button next to it, then all the firmware will appear in the list. Close the software and rerun it. See Figure 1.

3) Choose the firmware which you need, the next step is to click the "Load Selected Firmware" button. "File read OK!" message will appear.

4) Disconnect the all wires of the ESC ,include power wires motor wires and BEC wires.

5) Plug the 4-pin wire of the ESC into the 4-pin of USB wire. pay attention to color correspondence."Connect OK, Pl....." message should be displayed.

6) If no message or any errors, please unplug the 4-pin wire and then repeat step 5 until the correct message is displayed.

7) Click the "Update ESC" button. The firmware will be updated now.

8) Wait until "update to 113 pages, errors pages 0....." appears, which means the firmware has been updated successfully

9) You can disconnect the 4-pin wire of the ESC from the USB Linker now.