Rev: 5th July 2011

FEIYU TECH

FY-91Q DREAMCATCHER

Multi-rotor flight stabilization & Autopilot System
Installation & Operation Guide

Guilin Feiyu Electronic Technology Co., Ltd

Rm. B305, Innovation Building, Information Industry Park, Chaoyang Road, Qixing District, GuiLin, CN

www.feiyu-tech.com

Email: feiyutech@yahoo.cn

Dear Pilot,

Thank you for purchasing the FY91Q multirotor flight control system from Feiyu Tech.

In order to achieve full potential and safe operation of this product, please carefully read this manual prior to installation.

ATTENTION:

- Set up and use of the FY91Q requires a certain degree of multi-rotor flight and RC experience.
- If you have never flown a multi rotor aircraft before, we recommend that you don't install this equipment on your own. Please seek assistance from an experienced RC multi rotor pilot.
- If you are already an experienced multi-rotor pilot, you will find the installation mildly challenging but logical. Just follow the instructions as stated in this manual and you won't go wrong.
- Remember, ***SAFETY ALWAYS FIRST***.

If you need any technical support you know where to find us.

FY91Q MULTI ROTOR SYSTEM

Basics on how the system works:

- **Inertial Stabilizer:** The FY91Q utilizes an attitude flight stabilization system (AFSS) which is inertial sensing based. The system also incorporates autonomous positioning and flight control.

- The FY91Q AFSS integrates a three-axis gyroscope combined with tri-axial accelerometers to sense and create a drift-free 3 dimensional stabilization system.

- The FY91Q also utilizes GPS and barometric pressure sensing to obtain accurate aircraft positioning and altitude.

- By combining sensor data from the gyros and accelerometers, together with altitude and GPS positioning, an accurate inertial navigation and autopilot system is formed. Fixed positioned and altitude hover and return to home is just a switch away.

- As this product is still under intense Research and Development, FeiYu Tech has enabled firmware upgrading via a USB-TTL Connector. As new algorithms are developed for the autopilot system you can download the upgraded firmware from our website.

Barometer and GPS & COMPASS module

- FY-91Q control module incorporates an accurate barometric pressure sensor. At start up, the take-off point air pressure is measured, providing the autopilot with an accurate relative height data.

- The GPS & COMPASS module provided with the FY91Q Navigation Edition consist of a three-axis magnetic sensor and high sensitivity GPS receiver. This module enables the autopilot to sense the flight course and exact location of the aircraft.

- Note that if the FY91Q is not connected GPS & COMPASS module, it will function as purely as a flight stabilizer for multi rotor aircraft. The Autopilot system cannot be engaged.

- For the autopilot to function, the GPS Receiver must detect at least 5 satellites.

Autopilot Function

The current FY91Q firmware supports two autopilot functions; fixed altitude Auto Hover and automated Return to Home. To enable autonomous flight, the GPS & Compass module must be connected to the FY91Q.

- **Auto Hover**
  - 3 dimensional GPS positioning is used to automatically maintain aircraft hover position and altitude.
  - Accuracy of hover position (range) depends on wind conditions and speed.
  - When throttle is increased the altitude of the aircraft will increase. If the aircraft is moved to another location (via AIL or ELE), upon releasing the control sticks the aircraft will automatically hold position and hover in the new location.

- **Automated Return to Home**
  - By utilizing GPS positioning, the autopilot will return the aircraft to the starting point upon activation of the RTH Mode.
  - Upon reaching the starting point (home) the autopilot will activate Hover Mode, maintaining position and altitude while waiting for your further instructions.
  - To establish the Home point, a minimum of 5 GPS satellites much be detected.

ON SCREEN DISPLAY and DATA RADIO

a. The FY91Q supports OSD data output via UART interface.
b. By connecting this interface to the AP117 OSD, telemetric data such as GPS, flight navigation, AHI and autopilot modes can be displayed on your downlink video.
c. The UART Interface can also be connected to the FY-606 digital data radio system, which establishes a bi-direction radio communication between the FY91Q and your portable computer.
d. By uploading our Ground Control Software (GCS) (free from our website), you can monitor your flight on the GCS map, display on-board telemetry data and control the aircraft flight path via the click of your mouse.

FY91Q Navigation Edition Package Content

FY-91Q Navigation Edition contains the following hardware:

- FY-91Q control module x 1;
- FY91Q RC receiver connection cable pack x 1;
- GPS & COMPASS Interface module x 1;
- FY GPS Receiver x 1
- Double-sided adhesive Damper mount x 1;
- Self-adhesive Velcro sponge x 2;
- All related wiring to complete the set up.

OPERATING SPECIFICATIONS

FY-91Q Module

Operating voltage	:	4.0~6.0 Volt
Current consumption	:	50mA (5V input)
Dimensions	:	55 x 33 x 20 mm
Weight (not including wires)	:	20g
Operating Temperature	:	-25°C~ +70°C
The maximum allowable rotation rate	:	3 rotations per minute

GPS & COMPASS INTERFACE MODULE

Operating voltage	:	4.0~6.0 Volt
Current consumption	:	60mA (5V input)
Dimensions	:	55 x 33 x 20 mm
Weight (not including wire)	:	20g
Temperature range	:	-25°C~ +70°C

APPLICABLE AIRCRAFT MODELS

The FY91Q can be installed and flown it the following multi-rotor aircraft:

- 4 motored quadcopters;
- Tri-axial rotory aircraft with 6 motors
- Six-axial multi-rotor aircraft (6 motors)

Any other configuration, please contact us for confirmation: feiyudz@hotmail.com

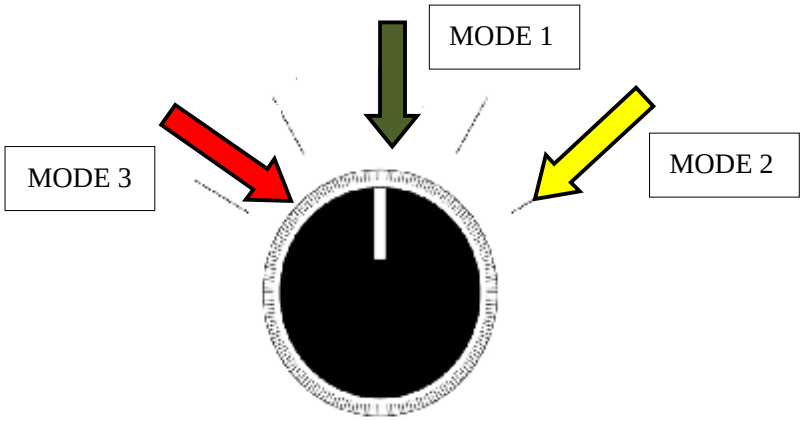
REMOTE CONTROL SYSTEM COMPATIBILITY

FY-91Q have been tested to work with the following RC systems:

- Robbe-Futaba PPM / PCM 1024 / PCM G3 mode, 2.4 GHz systems ;
- Graupner/JR PPM 8, PPM 12, SPCM mode ;
- MPX PPM8, PPM 12 with UNI mode
- Any remote control system using the standard of 1.5 ms *neutral position*.

FY-91Q FLIGHT MODES

1. FY-91Q has three operating Flight Modes, which is selected by using any free channel on your RC receiver.
2. You can set the 3 modes via a 3 way switch or use a dial knob. Example:



3. However, since switch flight modes is required during the setting for autonomous flight, we highly recommend that you use a 3-way switch.

Receiver PPM signal level	**1800-2100us**	**1200-1800us**	**900-1200us**
FLIGHT MODES	**Mode 3:** Return to Home	**Mode 1:** Stabilizer Mode	**Mode 2:** Automated Hover mode

Mode 1: *Stabilized Mode*

In this mode, the FY-91Q will stabilize the multi-rotor aircraft for normal flight. Full flight direction control is given to the pilot.

Mode 2: Automated *Hover Mode.*

Upon activating this mode, the aircraft will maintain hover altitude and position hold. You can move the aircraft to any position, and upon releasing the control sticks, the aircraft will automatically hold hover in that new location. The GPS and Compass Module must be connected to the FY91Q with at least 5 GPS satellites detected.

Mode 3: *Automated Return to Home Mode.*

Activating this mode will automatically initiate the aircraft to fly back to the starting point. Requires the GPS and Compass Module to be connected to the FY91Q with at least 5 GPS satellites detected.

Flight Modes and LED Indicator

1. To indicate the flight modes of the FY91Q, the Blue LED light will flash:

Flight Modes	Mode 1 *(Stabilized Mode)*	Mode 2 *(Hover Mode)*	Mode 3 *(RTH Mode)*
Blue LED Flashing	LED ON	Continuous flashing	Three intermittent flashing

GPS Status & Vibration LED Indicator

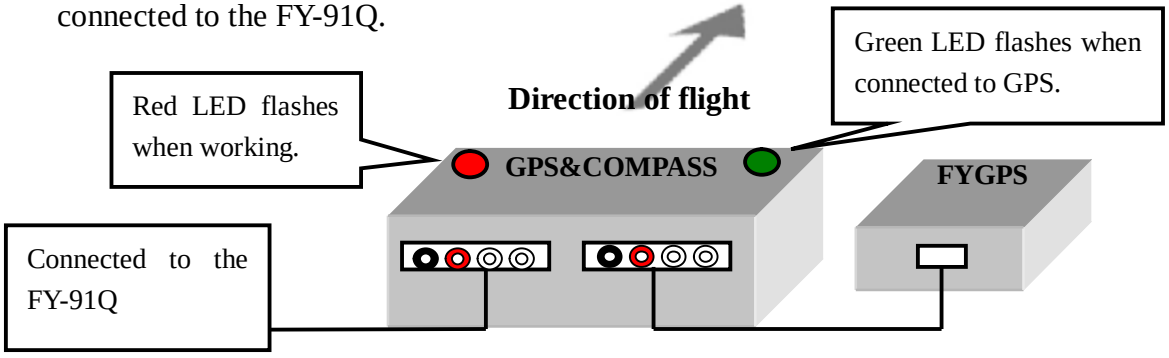
The GPS connection status & vibration level is indicated by the Red LED Flashing:

GPS & Vibration Status	Severe vibration*	GPS & COMPASS module not connected or position not Locked	5 GPS Satellite detected (Home position Locked)
Red LED flashing	Continuous flashing	None (LED light OFF)	Double Intermittent Flashing

***** In case severe vibration is detected, take action to reduce your aircraft vibration levels or improve vibration damping for the FY91Q mounting.

GPS & COMPASS Module Interface & Function

1. To enable the autopilot options you must have the GPS & COMPASS module connected to the FY-91Q.



2. **VERY IMPORTANT**: The GPS & COMPASS Module must be installed symmetrically centered on the aircraft with the arrow pointing towards the direction of flight.

3. **WARNING:** Wrong installation of the GPS & COMPASS Module will result in inconsistent performance and even autopilot malfunction.

4. GPS & COMPASS module is utilizes a ceramic passive GPS Receiver. This FY-GPS Receiver must be installed face up as indicated on the sticker.

5. Do not allow any metal or carbon fiber material to block or shield the FY-GPS from detecting GPS satellite signal.

6. **WARNING**: The GPS & COMPASS Module is very sensitive to metal, magnets, electromagnetic fields and radiation. Keep these materials as far away from the

Module as possible. Examples are main power cables, servo and servo wires, video transmitters, ESCs, motors, etc. all produce electromagnetic fields which can affect the GPS & Compass Module.

LOST OF GPS SIGNAL DURING AUTOPILOT MODES

WARNING

a. If the detected GPS satellite signal falls below the minimum 5 satellite, autopilot function will automatically deactivate.

b. The aircraft will revert to Mode 1: Stabilized flight mode.

c. Note that in Mode 1, the aircraft can only fly stabilized and the aircraft will drift. Fixed position and altitude hover (Mode 2) cannot be activated due to the lack of GPS positioning.

d. To avoid this situation, activated the autopilot function only when there is ample GPS signal and the weather is good (not excessively cloudy).

GYRO INITIALIZATION

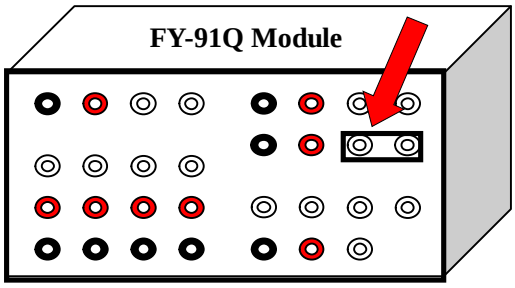
1. Out of the box, the FY-91Q has already been initialized and is ready to use.
2. Note that routine initialization is not recommended.
3. Generally the FY91Q do not need initialization, but under certain conditions initializing the gyros becomes necessary:
   a) The unit has not be used for a long time,
   b) Extreme change in environmental temperature in excess of 30°F.
   c) FY91Q fails to start the motors
   d) The blue light of the FY91Q is blinking continuously

   If you feel any of the above has occurred, please proceed with the initialization process.

4. Initialization Process

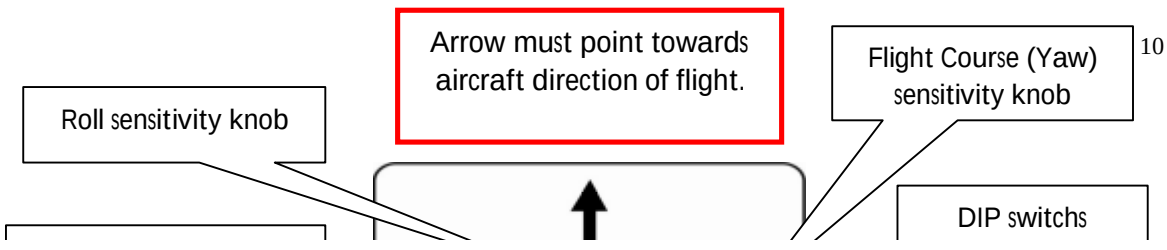
a. The FY91Q does not have to be leveled, however please ensure it is not moved, shaken or experience any kind of vibration during the initialization process. If movement / vibration did occur, please repeat the procedure.

b. Install the gyro initialization jumper as shown below:



c. Supply power to the module and ensure it remains stationary for at least 20 seconds.
d. The red LED light will flashes in two different rates.
e. After approximately 20 seconds, the initialization process is complete.
f. Disconnect the power supply and unplug the jumper (please keep in a safe place for future use).

FY91Q Connection Interface Diagram



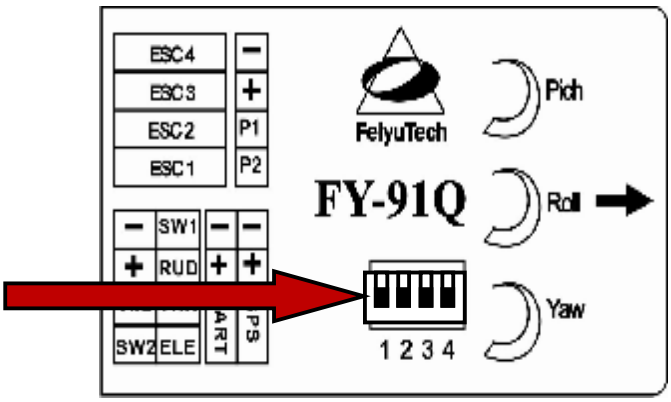
Interface Pin Panel Connection:

8	7	6	5	4	3	2	1	
GND	Null*	P1	P2	GND	Power	TX0	RX0	**I**
ESC4	ESC3	ESC2	ESC1	GND	Power	TX1	RX1	**II**
Null*	Null*	Null*	Power Input	Rx free channel (Switch 1)	Rx Rud (Ch 4)	Rx Throttle (Ch 3)	Rx Ele (Ch 2)	**III**
GND	GND	GND	GND	GND	Power	Rx AIL (Ch 1)	*No Pin*	**IV**

Null* *: Do not connect anything on these pins (leave open).*

DIP SWITCH SETTING

The FY91Q utilizes a Dip Switch system for model selection, via Dip switch No. 2 to 4:



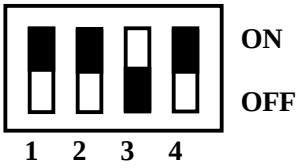
Switch Position	1	2	3	4
ON	(Factory use only)	Flight mode debugging	X-format	Y6 flight mode
OFF	Always OFF	Normal flight mode	Cross format	X4 flight mode

Switch Diagram Reference: the switches below are in the **OFF POSITION:**

Example:

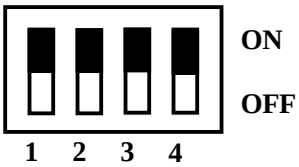
a. Dip Switch position for X-TYPE QUADCOPTER:

1 = OFF
2 = OFF
3 = ON
4 = OFF



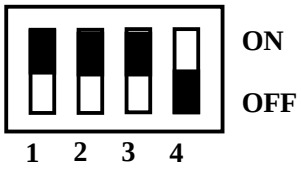
b. Dip Switch position for CROSS-TYPE QUADCOPTER:

1 = OFF
2 = OFF
3 = OFF
4 = OFF



c. Dip Switch position for CROSS-TYPE Y6:

1 = OFF
2 = OFF
3 = OFF
4 = ON



FY-91Q Power Supply Recommendations

1. The FY91Q input power supply can range from 4 to 6 volts.

2. More importantly, the current input and voltage must be stable.
   You may use an external BEC with 3A output or use ESC with good quality 3A BEC.

3. We recommend that power is supplied via the ESC 1 power input pin

4. Your radio receiver power supply is via the FY91Q Aileron cable (channel 1).

FY91Q Connection to the Receiver

1. The FY91Q is connected to the receiver via this cable bundle:

2. The wire colors will help you trace the connection to your Receiver:

Wire Colour	**Receive Channel**	
White (bundled with red and black)	Aileron	Channel 1
Orange	Elevator	Channel 2
Green	Throttle	Channel 3
Yellow	Rudder	Channel 4
Brown	Any free channel controlled by 3-way switch or dial (refer page 6)	Channel 5 (example)

3. Note that the open channel for Switch 1 (SW 1) must be controlled by either a 3-way switch or a dial on your radio transmitter. SW1 controls the Flight Modes of the FY91Q.

VIBRATION DAMPING

a) The FY91Q flight controller algorithms can filter and operate under normal vibration levels, however if the vibration and shock experienced by the onboard sensors is too extreme, stabilization can fail and the system can shut down altogether.

b) Because of this, to achieve the best stabilization and flight performance out of the FY91Q, you must minimize the amount of vibration on the aircraft as best you can.

c) Examples of vibration reduction steps that can be taken:

i) Ensure your motors are mounted properly and squarely.

ii) Balance your propellers regardless of the manufacturer's claim of perfect balance out of the factory.

iii) Balance your motor bell housing (if possible).

iv) Ensure rigidity of your frame (will not flex with motor rotation).

v) Use appropriate propeller length and pitch for the weight of your aircraft.

d) The FY-91Q is supplied with the shock absorbing mount and double-sided foam padding dampers. Please use them as shown below:

CHECKING FOR VIBRATION

a) Install the FY91Q as per the recommendations of this manual, including directions of propeller rotation.

b) Remove the connection to the GPS & Compass Module.

c) Throttle up in Mode 1 (*Stabilized Mode*) but **<u>do not take off</u>**!

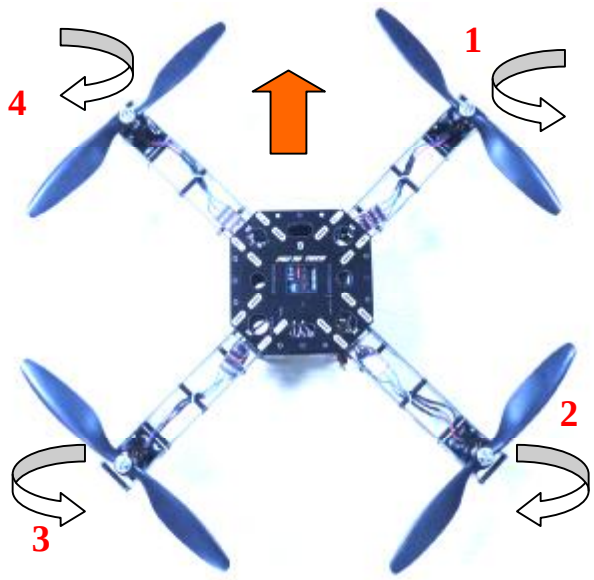
d) Observe the red LED on the FY91Q module.

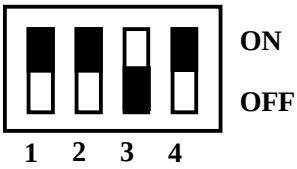
e) If the red LED light remains OFF, this indicates your aircraft vibration level is acceptable.

f) If instead the red LED light goes ON and remains lighted, your aircraft does not meet the vibration level requirement. Please take action to reduce the onboard vibration level.

QUADCOPTER SET UP

X-Type Layout



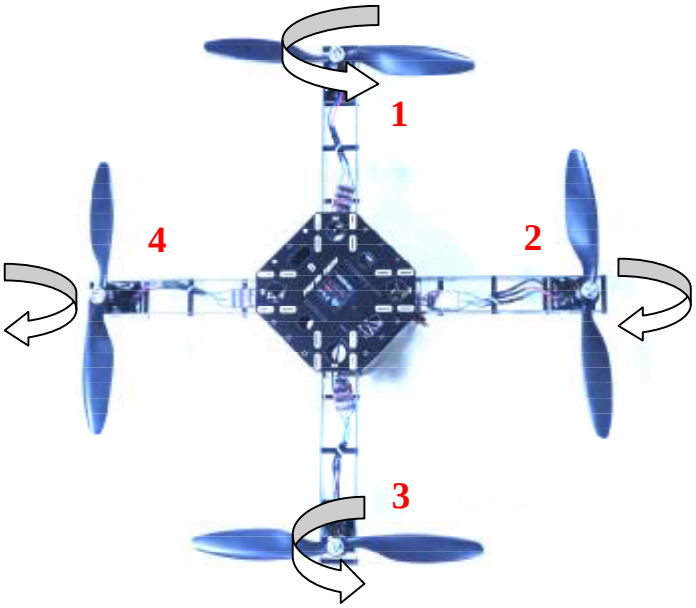


X-Type QuadCopter Layout:

1 = ESC 1 CCW
2 = ESC 2 CW
3 = ESC 3 CCW
4 = ESC 4 CW

cw = clock wise
ccw = counter clockwise

Cross Type Layout

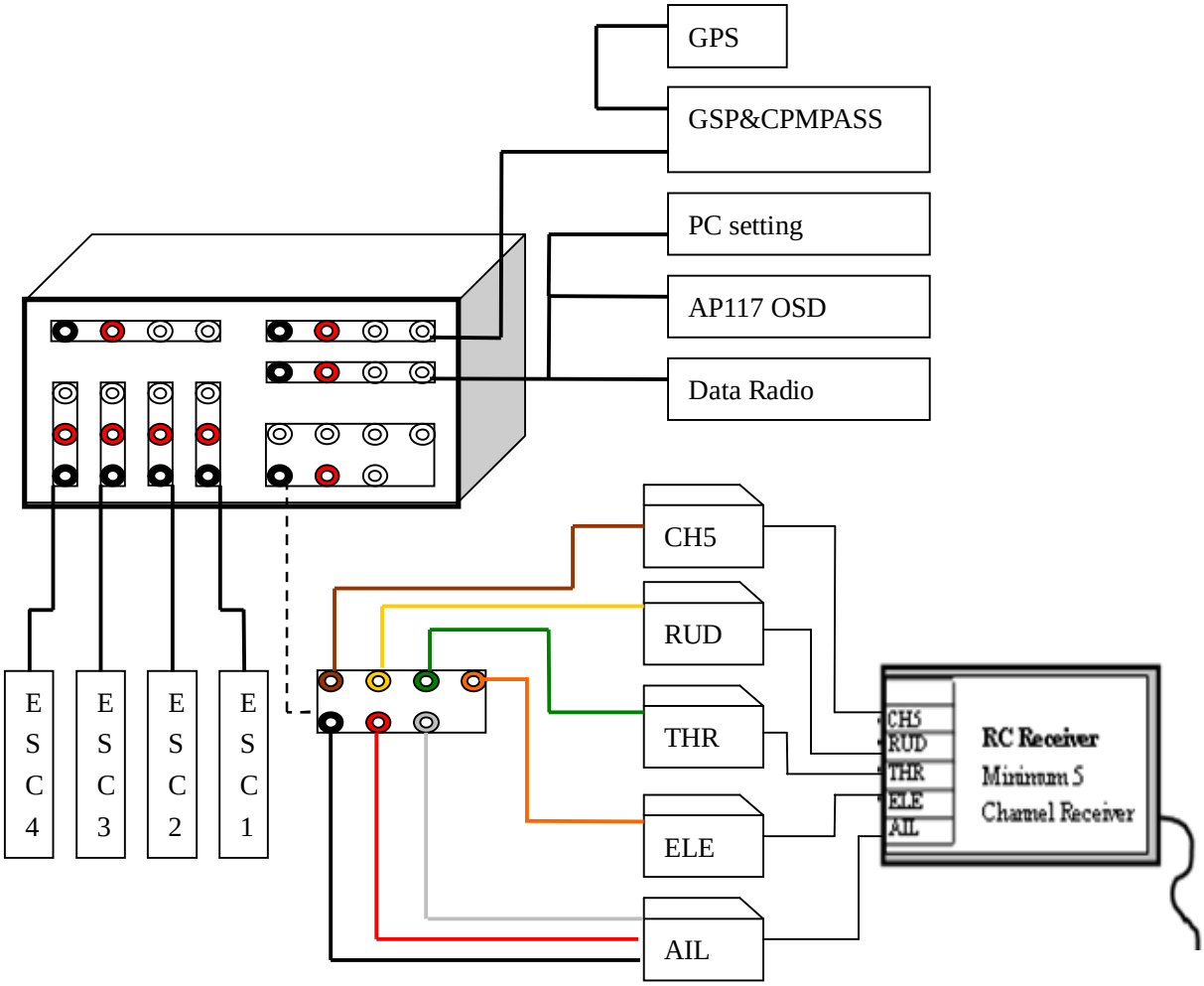


+ - Type Quad Layout:

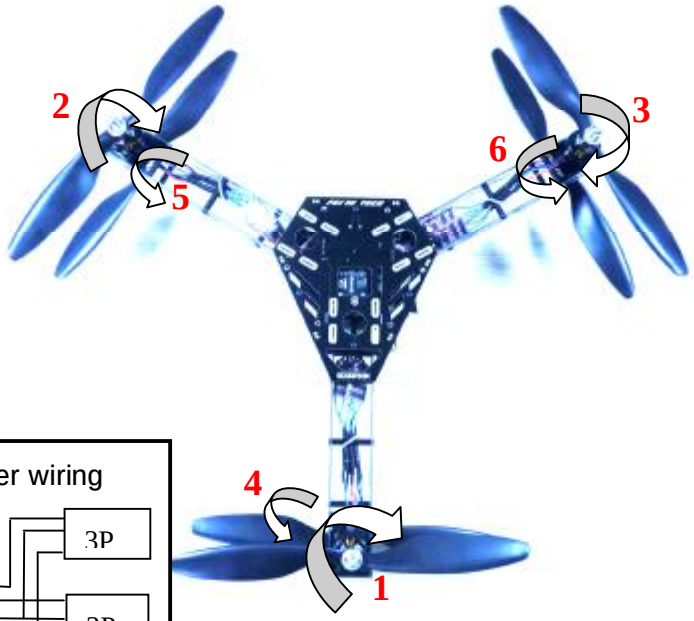
1 = ESC 1 CCW
2 = ESC 2 CW
3 = ESC 3 CCW
4 = ESC 4 CW

cw = clock wise
ccw = counter clockwise

QUADCOPTER FY91Q CONNECTION SCHEMATICS



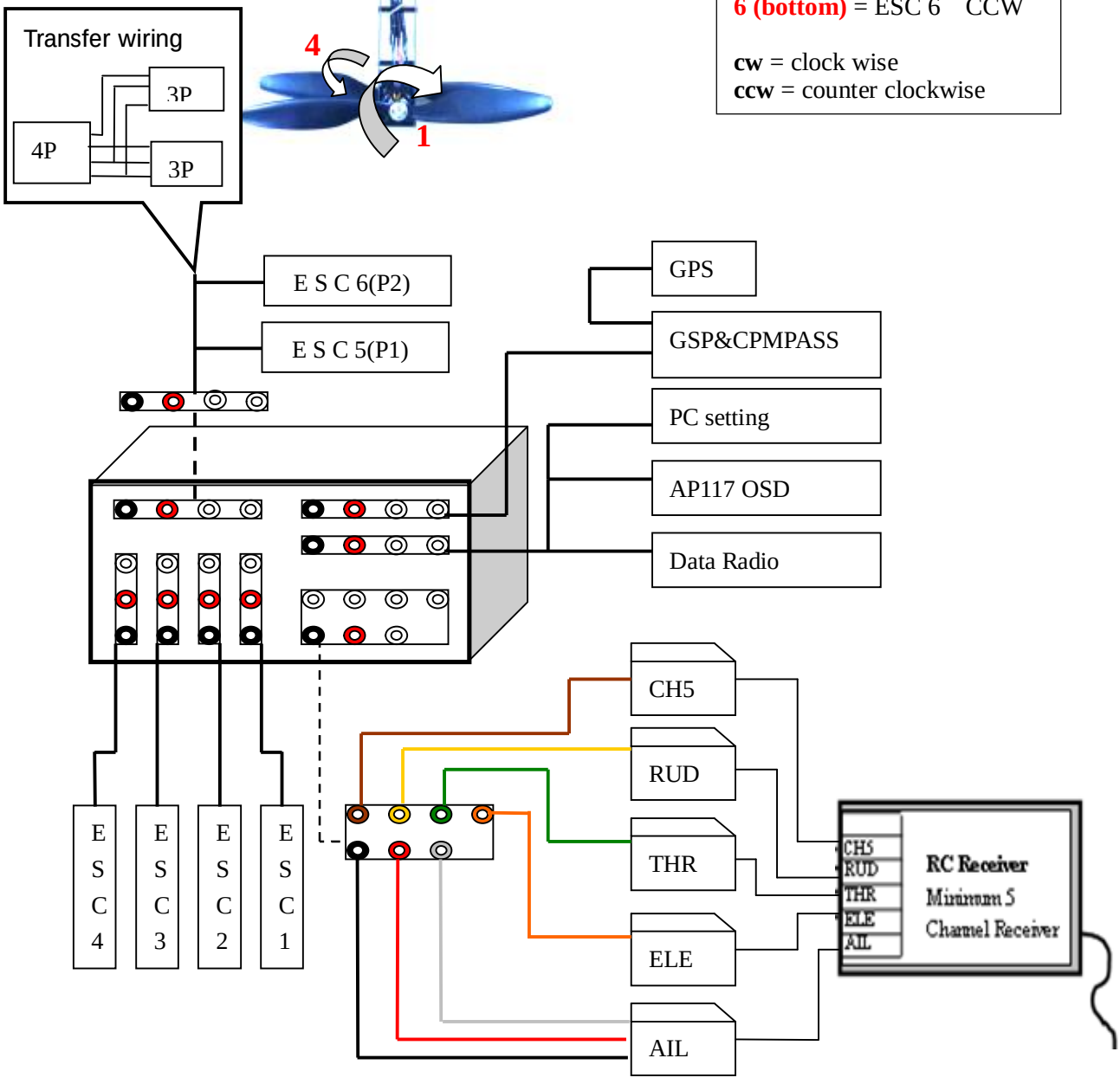
Y6 FY91Q CONNECTION SCHEMATICS



Y6 SCORPION FLYER

1 (top) = ESC 1 CW
2 (top) = ESC 2 CW
3 (top) = ESC 3 CW
4 (bottom) = ESC 4 CCW
5 (bottom) = ESC 5 CCW
6 (bottom) = ESC 6 CCW

cw = clock wise
ccw = counter clockwise



FY91Q Module Installation

1. FY91Q has an arrow indicator on top. Please ensure this arrow is pointed towards the direction of flight.
2. Installed the module horizontally, and as close as possible to the aircraft center. A more centered installation will result in more stable drift free hover.
3. The FY91Q sets its own benchmark of what is 'horizontal'. Install the module based on the hover characteristics of the aircraft in Mode 1 (Stabilized Mode). Shimming the module may be required to get the aircraft to hover perfectly.
4. You may also fine tune the stability of your aircraft using your radio Aileron, Elevator and Rudder trims to counter any drift.

FY91Q Preflight Inspection and Initial Testing

Pre-flight testing for aircraft control:

1. Remove all propellers.
2. Activate throttle to start up the motors. Check the rotation direction of each motor and make sure it is turning in the right direction.
3. Re-Install propellers.
4. Check again that the rotation is correct.
5. Check the FY91Q sensitivity control knobs. Please ensure the dials are beyond 12 o'clock. Anything less than that may result in no flight stability for this first flight.

6. **Tie down test**: Before proceeding, we highly advise that you tie down the aircraft to the ground to prevent any possibility it going out of control during this initial flight tests.
7. **First test lift off**: Advance your throttle stick, but do not take off (usually around 30% throttle). Let the aircraft float just enough so that you can see the aircraft reaction as you move your Aileron, Elevator and Rudder sticks.
8. If the control movement is reversed, just reverse the channel on your RC transmitter.
9. After step 8, you can take off higher. If the aircraft hovers well, you can proceed to remove the aircraft from the tie down test.
10. Observe the flight for stability and oscillations as the aircraft hovers higher.
11. If you feel there is not enough stability (e.g. excessive drifting), you can increase the sensitivity of the three dials.
12. If there are rapid oscillations, reduce the corresponding sensitivity knob.
13. More fine tuning adjustment can be done via the FeiYu software (you will need the TTL-USB cable for this).

Pre-flight Debugging

1. If your aircraft fails to lift off and hover for the initial pre-fight tests, please check the following:
   a) Check the ESC connections are all correctly plugged in. Take time to check and re-check that each ESC has been plugged in and that the plugs are correctly placed.
   b) Please ensure there is no short circuit of the power (positive) and GND wires. Short circuits can damage the internal processor chip beyond repair (voiding all warranty).
   c) Check that all motors are rotating in the direction noted in this manual.
   d) Ensure you have selected mid or high timing for your ESC (if you are not using FY ESCs).

SETTING UP HOVER MODE AND AUTOMATIC RETURN TO HOME

a) Note: commissioning the Hover Mode and RTH Mode require a certain degree of flying skill. You may need a friend's assistance to carry out the entire procedure.

b) Setting up involves:

   i) DIP Switch 2 Debug Mode (setting Neutral Value)

   ii) GPS & Compass Set Up (Field Calibration)

   iii) GPS Satellite Detection

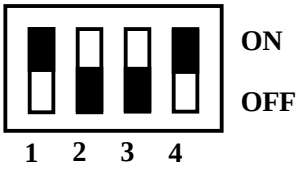
i) DIP SWITCH 2 (SETTING AIRCRAFT NEUTRAL VALUE)

This procedure is very important. Failure to properly set the Aircraft Neutral Value will result in autonomous flight malfunction.

1. Move the Dip Switch No. 2 to ON position (Debug Mode).

   Example: Dip Switch setting for X-TYPE QUADCOPTER in Debug Mode:

   1 = OFF
   2 = ON
   3 = ON
   4 = OFF



2. For ease of setting, carry out this procedure in minimal wind conditions.
3. Hover the aircraft above ground effect and adjust your throttle level and radio trims (Aileron, Elevator, Rudder) until the aircraft can hover almost hands free and with minimal drift.

   This minimal drift position is your aircrafts' "Neutral Value" and is the **Benchmark for successfully hovering and autonomously flying your aircraft**.
4. After achieving good hover, Switch from Mode 1 (Stabilized Mode) to Mode 2 (Hover mode). Leave for two seconds and back to Mode 1 again. The FY91Q has now recorded your Aircraft Neutral Value.
5. Land the aircraft and power OFF. Move the Dip Switch No. 2 back to OFF position.

ii) GPS & COMPASS MODULE SET UP (MANGETOMETER CALIBRATION)

1. The GPS & COMPASS Module contains an internal three-axis magnetometer. This module senses the earth's magnetic field, and uses this reading to accurately measure the aircraft direction of flight.
2. The magnetometer sensor is very sensitive to metallic objects and electric fields. Keep such objects as far away from the module as possible.
3. Before each flight, it is best to do a field calibration, especially before your first attempt at autonomous flight.
4. Field calibration enables the GPS & Compass Module to calibrate for the environment in which it is installed.
5. Field calibration should also be done if new equipment is installed on the aircraft which may affect the magnetic field around the aircraft.
6. Field calibration process:
   a) Place the aircraft on flat ground.
   b) Continuously change (toggle) the flight modes between Mode 1 (Stabilized Mode) to Mode 2 (Hover Mode) six times:
      (1) **balance mode** -> hover mode – (2) **balance mode** -> hover mode –
      (3) **balance mode** -> hover mode – (4) **balance mode** -> hover mode –
      (5) **balance mode** -> hover mode – (6) **balance mode**
   c) Observe the blue LED go OFF after you toggle 6 times. This indicates the FY91Q has entered the Field Calibration Mode.
   d) After the Blue LED goes OFF, move the aircraft slow and steady in a clockwise rotation one and a half times.
   e) After this rotation, the blue LED will light up again, indicating Field Calibration is complete.
   f) Power OFF the aircraft and proceed to into GPS Detection.

GPS DETECTION (HOME LOCK)

a) GPS is required to enable autopilot flight positioning.

b) Ensure you are outdoors to maximize GPS satellite detection (minimum 5 required).

c) Upon power up, the FY91Q will automatically search for GPS satellites.

d) Upon detecting 5 satellites, the red LED will begin flashing twice continuously, indicating GPS Home Position has been locked.

e) The red LED flashing also indicates the aircraft is ready for autonomous RTH flight.

HOVER MODE AND AUTOMATIC RETURN TO HOME TESTING

1. After carrying out the above Setting Up procedures and confirmation of 5 satellite detection (red LED double flashing continuously) you can proceed with Hover Mode and RTH testing.
2. We recommend carrying out the first autonomous flight tests in light winds (wind speed less than 3 mph).
3. Please ensure the Dip Switch 2 is in the OFF position and the aircraft is in Mode 1 (Stabilized Mode).
4. Fly the aircraft and bring it into a good hover manually.
5. Switch to Mode 2 (Hover Mode). The aircraft should automatically keep to the same position and altitude.
6. You can move the aircraft around manually even in Hover Mode, but the moment you release the control sticks, the aircraft will automatically return to Hover Mode (maintain position and altitude).
7. Note that if setting the Aircraft Neutral Value for hover was not done properly, the aircraft will fail to carry out autonomous fixed altitude / position hover.

8. After successfully testing Hover Mode, you may proceed to test the RTH function.
9. Move the aircraft to any location (not too far in the first few tests) - either in Stabilized Mode or Hover Mode (doesn't matter) – when you switch to RTH Mode, the aircraft will automatically fly back to Home position while maintaining current altitude.
10. Upon reaching the Home position, the aircraft will automatically activate Hover Mode (maintaining position and altitude)
11. Again, note that FY91Q must have successfully recorded your hover benchmark (setting Aircraft Neutral Value) to execute RTH. Failure which, the RTH function will not work.

Attention:

1)You should let go the stick when you change it to the auto hover mode.The FY91Q will record the current gain value as the neutral one.And the neutral gain value will be modified everytime when changing to the hover mode.

2)You should put the throttle stick to the middle position when changing to hover mode,thus you can get the altitude hold.

	Throttle Signal upon Neutral Gain and autonomous flight activation	**FY91Q Altitude Control**
1	Less than 1400 μs	Aircraft will descend
2	1400 to 1600 μs	Automatic Altitude Hold
3	1600 μs and above	Aircraft will ascend

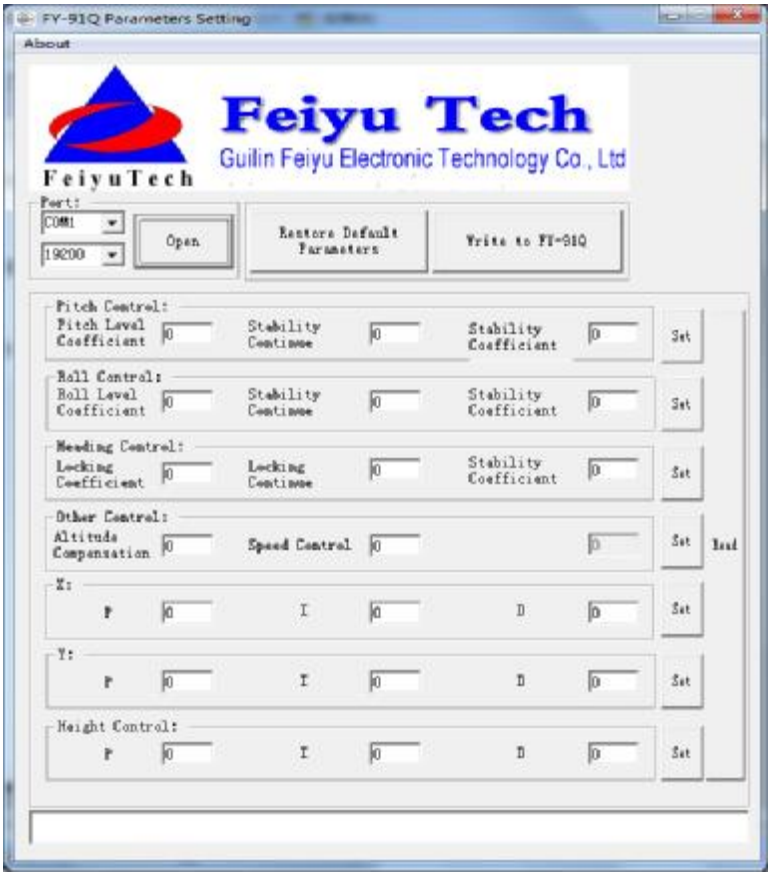
3)If You change the working mode from hover mode to other modes,and then change to the hover mode again,please note this in order to avoid a crash:

You need to modify your contolling state and ensure the quad is stable enough to let go the throttle stick,and then can you change to the hover mode.Do not change to the hover mode before the quad is stable enough!

4)The RTL fuction will use the neutral gains recorded in the hover mode.So you should go to the hover mode to get the right neutral gain value before change it to the RTL mode.

Flight Parameter Adjustment Software

The FY Tech FY91Q Parameter settings interface is as show below:



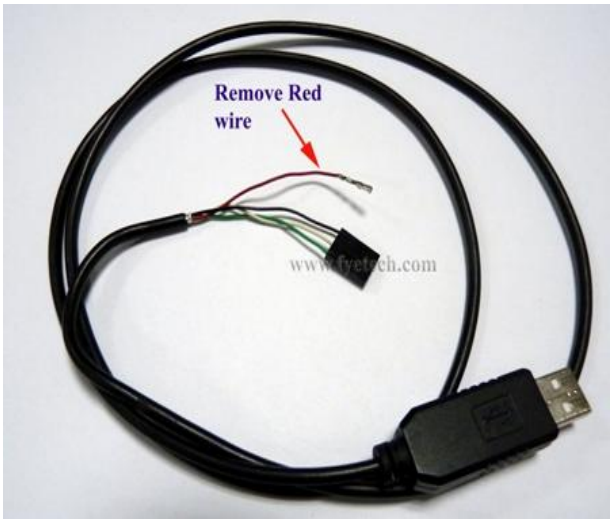
Flight Parameter Adjustment Software – SAFETY FIRST!

1. The default FY91Q settings have been adjusted for optimal stability and flight performance. The flight parameter adjustments provided via the ***FY Tech Flight Parameters Setting*** software should only be done by very experienced multirotor pilots who need to further **fine tune** the aircraft characteristics.

2. We do not recommend adjusting the flight parameters without a specific fine tuning target.

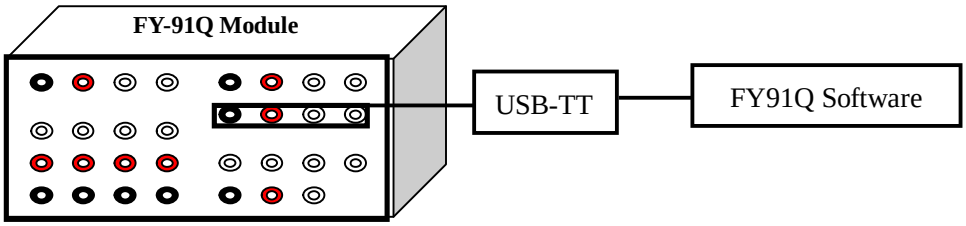
3. **Safety Warning 1:** A Wrongly Adjusted Flight Parameter Setting may result in extreme aircraft instability and crash. Do a tie down test when adjusting Flight Parameters for the first time.

4. **Safety Warning 2:** If you are powering the FY91Q via your onboard BEC, make sure you take off the red wire as shown below. Failure to do so may result in damage to both your computer and FY91Q. Additionally, if you are powering the FY91Q via your ESC BEC, make sure you tie down your aircraft or take off the propellers to prevent possible accidental injuries.



Remove Red wire if using the on board ESC BEC to power up the FY91Q. Failure to do this can result in damage of your PC and FY91Q.

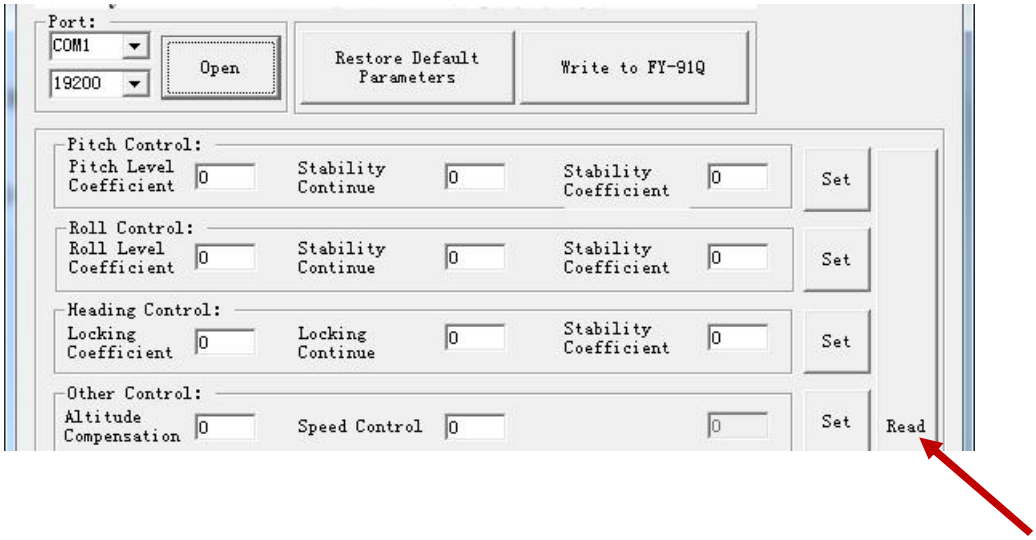
5. Hardware requirements:
   a) Portable PC / Laptop with USB port.
   b) USB – TTL Cable
   c) Download and install the USB-TTL Drive. Download site:
      http://shop.fyetech.com/dl/ttldriver.rar
   d) Download and install the FY91Q Parameters Setting Software. Download site:
      (**Link to be released later**)
6. Setting adjustment procedure:
   a) Connect USB-TTL cable to the computer.
   b) Connect the USB TTL cable to the FY91Q UART data port as shown below:



   c) Open the FY91Q Parameters adjustment software. Select the appropriate USB port number (check via your computer Device Manager) and set the baud rate to 19200.

d) Click "Open" to connect to your FY-91Q.

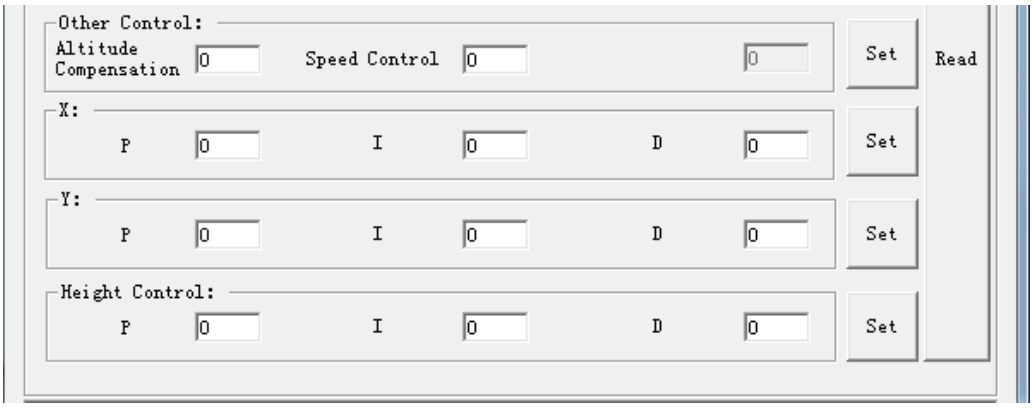
e) Click “Read” to see the existing parameters:



f) Flight parameter settings:

	Pitch level coefficient	**Stability Continue**	**Stability coefficient**
Pitch control	This setting controls the amount of pitch automatic recovery.	Stability level adjustments. Reduce until oscillations stops.	A higher value makes the respond stronger to prevent pitch angle changes. Generally larger / heavier aircraft require higher value.
Roll control	This setting controls the amount of roll automatic recovery.	Stability level adjustments. Reduce until oscillations stops.	A higher value makes the respond stronger to prevent roll angle changes. Generally larger / heavier aircraft require higher value.
Heading control	This setting controls the amount of heading (yaw) lock stability.	Controls the amount of integral yaw control. Too high will lead to oscillations.	A higher value makes the respond stronger to prevent heading (yaw) changes.

g) Additional setting adjustments:



Altitude compensation: This parameter controls the sensitivity of the FC to automatically increase or decrease throttle level to compensate for altitude loss during aircraft tilt recovery. Example: If you observe the aircraft lose altitude during tilt recovery, increase the value of this parameter.

Speed control: Increase or decrease this value to adjust the sensitivity to forward flight (speed) of the FC.

Hover PID Settings:

	P	I	D
X	Control the amount of lateral deviation.	Integral control the amount of lateral deviation.	Control the amount of lateral deviation change
Y	Control the amount of vertical deviation	Integral control the amount of vertical deviation	Control the amount of vertical deviation change
Height control	Control the amount of height variation	Integral control the amount of height variation	Height deviation change degree of control.

h) After setting adjustment, confirm the new parameters by clicking the "Set" button. Clicking the "Set" button will send the new setting to the FY91Q.

i) Click to "Read" button to confirm the changes have been saved.

j) Finally, click the "Write to FY-91Q" button to ***permanently save*** the new settings in the FY-91Q. If this button is not pressed, the new parameters will be lost when you power-down the FY91Q.

Return to Default Setting

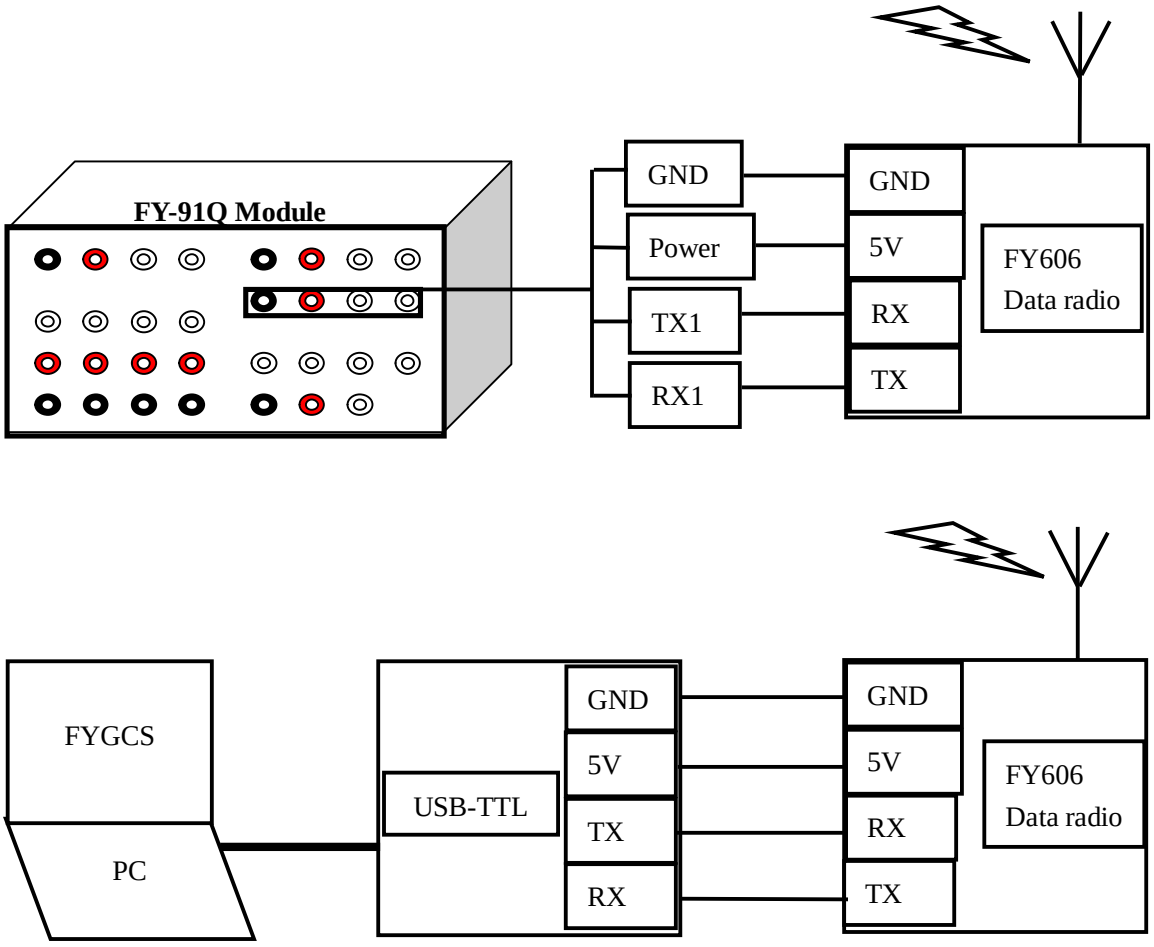
k) If you feel at any time you wish to return to the factory settings, simply click on "Restore Default Parameters". The factory default settings will be displayed. Click on all the "Set" buttons, before pressing "Write to FY-91Q".

FY 91Q ground stations using the radio connection

FY91Q the UART interface can connect to digital radio such as (FY606 Data Radio), by connecting data radio, you can remotely adjust the flight or flight parameters. FY-91Q serial

output will be in the flight data, ground station software can be FYGCS to check the position and flight parameters.

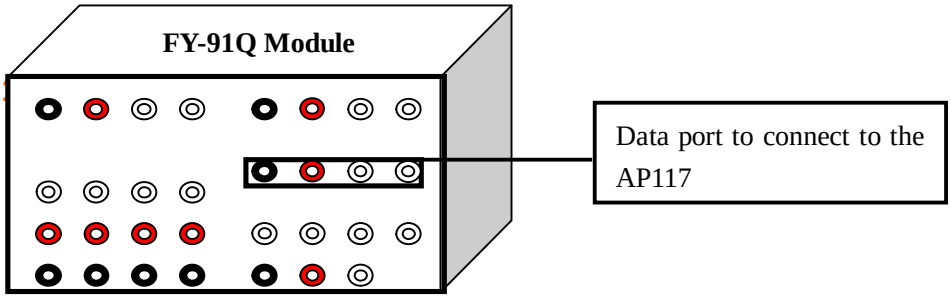
FY91Q interface panel have 4 Pin for UART	**GND, Power, TX1, RX1**
Baud rate	**19200**
Interface characteristic	**TTL**



1. Refer to FY606 Manual on more details on the FY606 (to be updated).
2. Refer to FYGCS Manual on more details of the FYGCS (to be updated).

A. **FY-91Q connection to AP117**

1. You can connect the FY91Q to the AP117 OSD module to display the telemetry data onto your On Screen Display.
2. Connection is as shown below:



Refer to AP117 Manual on more details of the display.

- END OF DRAFT MANUAL Dated 7th JULY2011 -