Thank you for purchasing our products. ISTONE-AII V2 is a 6-axis Gyro & Stabilizer for airplane. It is suitable for normal wing, fly-wing, and V-tail airplanes.

Change History			
No.	**Version**	**Date**	**Records**
1	V1.0	2016-11-29	This manual was first released.
2	V2.0	2017-12-05	- Modify the channel. - Added the accelerometer calibration.

Packing List

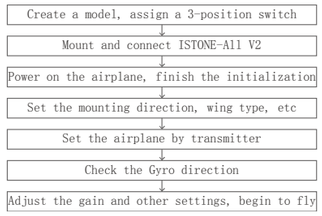
ISTONE-AII V2 Gyro & Stabilizer ×1
Anti-shock double sided tape ×2
Program Card and USB cable (optional) ×1
3-signal wire ×1
Single-signal wire ×2

Quick Start

Before installing, make sure:

- All the surfaces are well connected to the servos by the linkage rods.
- Install the receiver and bind it to your transmitter in advance.
- All channel directions and trims are set to the correct position.

Follow these steps to complete your first-time installation.



1. Power on the transmitter and create a new airplane model. Assign a 3-position switch for the flight mode control and make sure the switch does not have other function.
2. Mount the ISTONE-AII V2 on the airframe and connect its required input and output wires.
3. Place the airplane on the ground and power it on, the LED on ISTONE-AII V2 will start fast green flashing, which means it is calibrating the gyro and the sticks, don't move the airplane and the sticks during this period. After a successful initialization, the LED displays the current flight mode.
4. After a successful initialization, use the program card to set the programmable items (mounting direction, wing type, etc.).
5. Set all channels direction on transmitter as normal, switch to **Gyro Off Mode**. Adjust the neutral position for all servos. Check the movement direction of the servos by moving the stick one by one. If the servo moves in an opposite direction, reverse the gain direction on your ISTONE-AII V2 (for details, refer to this instruction manual of [adjust the gain] section).

CAUTION: If you have set the trims in this step, please redo Step 3.

6. Switch to **Normal Mode**, check the gyro direction one by one, and reverse it if the gyro reacts in a wrong direction.
7. Use the program card again to set the programmable items (assigning the desired flight mode to the 3-position switch, adjusting the gain, etc.). After completing all the settings, begin your first flight.

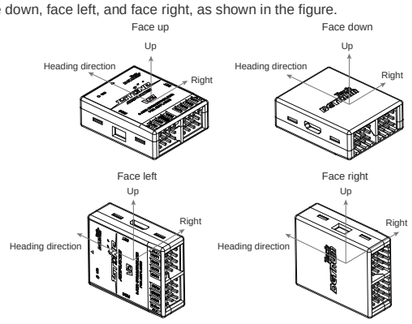
CAUTION: If the airplane can't fly level when the aileron and elevator sticks are centered, please land immediately and place it on the ground, toggle the mode switch for more than 5 times to calibrate the accelerometer, then you could restart ISTONE-AII V2 to ensure the calibration takes effect.

Installation

ISTONE-AII V2 should be mounted on the platform inside the airframe by using one of the provided double-sided tapes. The installation position should follow the principles below.

- Close to the receiver and the center of gravity (CG).
- ISTONE-AII V2's heading direction must be the same as the airplane's heading direction.
- The edges of ISTONE-AII V2 are all parallel with the corresponding axes of the airplane.

ISTONE-AII V2 can be attached flat or upright. There are four different mounting directions: face up, face down, face left, and face right, as shown in the figure.



Installation precaution:

- You need only one piece of the double-sided tapes each time. A soft or thick mounting may hinder the performance of the gyro.
- Please use the double sided tape comes with ISTONE-AII V2, do not use hot-melt glue or belt.
- Please make enough space around ISTONE-AII V2, stay away from motor, ESC, and battery, cannot be touched by servo horn, linkage, or other movable parts.
- Please calibrate the accelerometer when the ISTONE-AII V2 is re-positioned. Calibration method: place the aircraft horizontally and toggle the mode switch for more than 5 times.

Connection

Port Descriptions

There are 4 PWM input channels, a S.BUS input channel, up to 6 output channels, a DSM interface for connecting the DSM receiver, and a data interface (SET) for connecting the program card. The port descriptions of ISTONE-AII V2 are list in the table below. For the input and output channels (except **A-E-R**), the signal wire is close to the decal of ISTONE-AII V2, middle is VDD and bottom is GND. When wiring, please check the line sequence and all the connectors, make sure that all of them are connected firmly and correctly.

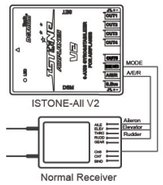
Port ID	Description
Input/Output channels	
OUT1	Connect to aileron servo
OUT2	Connect to elevator servo
OUT3	When using DSM/S.BUS receiver, OUT3 needs connect to the ESC
OUT4	Connect to rudder servo
OUT5	Output the CH6 signal of DSM/S.BUS receiver
MODE/OUT6	When using DSM/S.BUS receiver, output the CH7 signal of DSM/S.BUS receiver. When using PWM receiver, connect to the mode channel of receiver.
A-E-R	Connect to aileron, elevator, and rudder channels of the receiver by a 3-signal wire.
S.Bus	Connect to Futaba's S.BUS input
Others	
DSM	Connect to DSM receiver
SET	Data interface, connect to the program card

Connecting with Receiver

ISTONE-AII V2 supports a normal PWM receiver, a DSM receiver, or a Futaba's S.BUS receiver. The priority of the signal is: PWM > S.BUS> DSM.

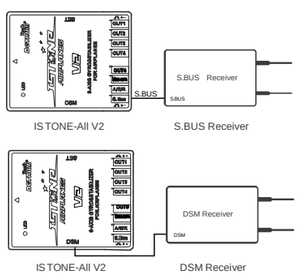
You do not need to connect all of the input channels/interfaces, just connect those to be used.

- When using a normal receiver, **MODE** channel of ISTONE-AII V2 is connected to the mode channel of the receiver, and **A-E-R** channel is connected to aileron, elevator, and rudder channels of receiver by a 3-signal wire.



NOTE: The mode channel of the receiver should be mapped to a 3-position switch of the transmitter. The diagram is an example. Please connect the **MODE** channel according to the receiver and transmitter you used.

- When using a S.BUS receiver, you only need to connect the receiver's S.BUS output to **S.Bus** port on ISTONE-AII V2, don't need to connect other inputs of ISTONE-AII V2 anymore.
- When using a DSM receiver, you only need to connect the receiver's DSM output to DSM port on ISTONE-AII V2, do not need to connect other inputs of ISTONE-AII V2 anymore.



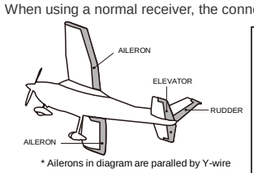
CAUTION: When using a DSM/S.BUS receiver, **OUT1**, **OUT2** and **OUT4** channels are respectively connected to aileron, elevator and rudder, and **OUT3** is connected to the ESC. **OUT5**, **OUT6** are used to respectively output the CH6 and CH7 signal of receiver (CH5 of the receiver is generally the Mode channel).

Connecting with Control Surfaces

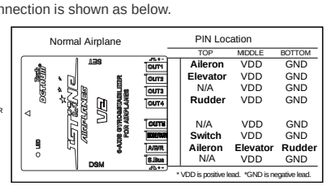
Set the new transmitter model such as the normal airplane and take the following table as an example to define the receiver channel.

CH1	CH2	CH3	CH4	CH5	CH6	CH7
Aileron	Elevator	Throttle	Rudder	Mode	Flap	Landing gear

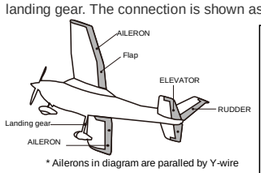
When using a normal receiver, the connection is shown as below.



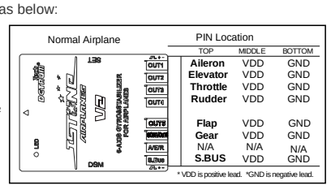
* Ailerons in diagram are paralled by Y-wire



When using a DSM/S.BUS receiver, **OUT1**, **OUT2** and **OUT4** channels are respectively connected to aileron, elevator and rudder, and **OUT3** is connected to the ESC. **OUT5**, **OUT6** are used to respectively output the CH6 and CH7 signal of receiver and connect with flap and landing gear. The connection is shown as below:



* Ailerons in diagram are paralled by Y-wire



CAUTION: In Delta wing type, it takes mixing control output between OUT1 and OUT2 and in V-tail type, takes mixing control output between OUT2 and OUT4.

Setting Mode Switch

Use five channels or higher transmitters, assign a 3-position switch to the mode channel and make sure that channel does not have other function. Connect the receiver's mode channel to the **MODE** port of ISTONE-AII V2. Then you can change the flight mode with the mode switch on transmitter.

Switch channel pulse width range should be low (850~1250) μs, middle (1350~1650) μs, high (1750~2150) μs. If the mode channel is not connected, or the positive pulse width of mode channel is out of the range that mentioned above, the ISTONE-AII V2 will work in Normal Mode.

The mode switch is used to switch the flight mode. The LED on ISTONE-AII V2 indicates the current flight mode. Please see the table below.

LED	Flight Mode
Blue	Normal Mode
Purple	Aerobatic Mode
Green	Gyro Off Mode
Blue-green	Auto-Recovery Mode (Auto Balance Mode)

The mode switch is also used to calibrate the accelerometer. If the airplane can't fly level when the aileron and elevator sticks are centered, please land immediately and place it on the ground, then toggle the mode switch for more than 5 times and the LED stats fast green flashing. When calibration finished, user can restart the ISTONE-AII V2 to ensure it takes effect.

Flight Mode

ISTONE-AII V2 provides four different flight modes. The descriptions of the flight modes are as follows.

- Gyro Off Mode (OFF): Choose this mode to disable the gyros for all channels. The airplane will be completely under the control of the transmitter, act the same as without an ISTONE-AII V2. Generally, it is only used to test.
- Normal Mode (Normal): On this mode, the gyro will sense angular velocity on each axis and make a momentary reaction. The normal mode is suitable for all types of airplane. It can effectively improve the stability of your airplane, especially on a windy day.
- Auto-Recovery Mode (Safe): Choose this mode to lock the tilt angle on pitch and roll axis. When operating in this mode, the airplane will maintain level flight automatically. When switch it to this mode from any other modes in an emergency, the airplane will recover to the level flight automatically, which it is known as one-click rescue. This mode is suitable for the new beginners or the FPV (First Person View) applications.
- Aerobatic Mode (Aerobatic): By adding the attitude hold function to the gyros, it will lock the airplane to its previous attitude if there is no command sent from the transmitter in a flight. This mode can effectively help you to accomplish an aerobatic flight. Operate the sticks in this mode, ISTONE-AII V2 won't affect the operation and can improve the stability of the airplane. Once release the sticks, ISTONE-AII V2 will save the previous flight attitude and lock the airplane to this attitude.

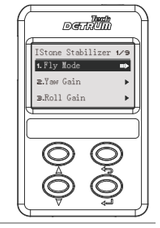
CAUTION: Flying in Aerobatic Mode, do not drastically adjust the trims, excessive trims will affect the judgment of neutral position for the transmitter. Please set the trims during test, and then turn off and power it on.

Setting the Parameters with Program Card

Before setting the parameters, make sure:

- All the surfaces are well connected to the servos by the linkage rods.
- Install the receiver and bind it to your transmitter in advance.
- ISTONE-AII V2 is well installed and connected.

After powering on ISTONE-AII V2, connect the program card to ISTONE-AII V2 with a USB cable. After successfully read ISTONE-AII V2's parameters, the program card will directly enter the **IStone Stabilizer** interface, as shown in the figure. If the connection fails, please check the wiring and then turn off and start the power again.



The buttons on program card:

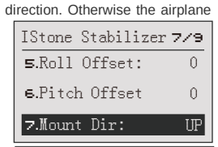
△: Up arrow
▽: Down arrow
: Back
: Enter

CAUTION: First set the mounting direction, wing type and next set the level offset, gain, etc. Then restart the ISTONE-AII V2 to ensure it's effective.

Set Mounting Direction

1. In the main interface, press △/▽ to select **Mount Dir**, press to confirm, then press △/▽ to set the value.

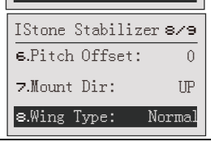
   The value must be consistent with the actual mounting direction. Otherwise the airplane cannot work properly. Values:
   - **UP**: The mounting direction is face up.
   - **DOWN**: The mounting direction is face down.
   - **RIGHT**: The mounting direction is face right.
   - **LEFT**: The mounting direction is face left.
2. After setting this parameter, press to exit.



Set the Wing Type

1. In the main interface, press △/▽ to select **Wing Type**, press to confirm, then press △/▽ to set the value.

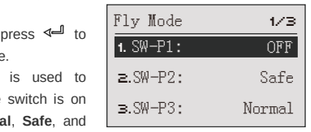
   The value must be consistent with the actual wing type. Otherwise the airplane cannot work properly. Values:
   - **Normal**: Normal airplane.
   - **Delta**: Delta wing airplane.
   - **V-Tail**: V-tail airplane.
2. After setting this parameter, press to exit.



Assign the Flight Mode to the Mode Switch

1. In the main interface, press △/▽ to select **Fly Mode**, press to enter the **Fly Mode** interface.
2. Press △/▽ to select the parameter, press to confirm, then press △/▽ to set the value.

   The parameter **SW-P1/SW-P2/SW-P3** is used to specify the flight mode when the mode switch is on P1/P2/P3 position. Values: **OFF**, **Normal**, **Safe**, and **Aerobatic**. For details about the flight mode, please see *Flight Mode.*
3. After setting one of the parameter, press to exit.
4. If you need to set the remaining parameters, please repeat step 2 to step 3.
5. After setting all the parameters, press to exit the flight mode setting.



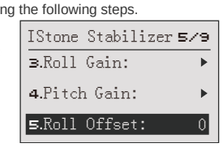
Adjust the Level Offset

This function is used to offset the absolute angle error caused by installation, and try to establish the appropriate level flight attitude of the plane when flying in auto-balance mode. If your plane drops down or up when switch to auto-balance mode, you will need to perform a level offset. Usually you just need to do it once after installation.

Roll Offset and **Pitch Offset** are respectively used to offset the absolute angle on roll and pitch axis. Adjusting the roll offset is taken as an example. Switch to auto-balance mode, place the airplane on the ground and power it on. If the aileron is horizontal, you do not need to perform the roll offset. If not, perform roll offset according the following steps.

1. In the main interface, press △/▽ to select **Roll Offset**, press to confirm, then press △/▽ to set the value.

   Values: -20~20.
2. After setting this parameter, press to exit.

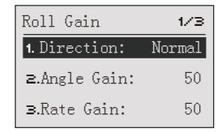


Adjust the Gain

There are different requirements for the gain in different application. You need to adjust the gain to get the best result. If the gain is set too high, there is a result of over amplification of the gyros, this rapid back and forth movement can make the airplane hard to control. But if the gain is too low, will cause the airplane become blunt. We suggest you start your first flight with a lower gain setting and then increase them gradually.

You can adjust the roll, pitch, and yaw gain respectively. Adjusting the roll gain is taken as an example.

1. In the main interface, press △/▽ to select **Roll Gain**, press to enter the **Roll Gain** interface.
2. Press △/▽ to select the parameter, press to confirm, then press △/▽ to set the value.
   - **Direction**: This parameter is used to specify the adjusting direction of the gain. Values:
     - **Normal**: Adjust the gain in positive direction. When the servo moves in normal direction, Set the value to **Normal**.
     - **Reverse**: Adjust the gain in negative direction. When the servo moves in reverse direction, Set the value to **Reverse**.
   - **Angle Gain**: This parameter is used to set the value (percentage) of the angle gain. When the value is 0, the gain is the lowest. The larger the value is, the larger the gain is. Values: 0~100.
   - **Rate Gain**: This parameter is used to set the value (percentage) of the angular velocity gain. When the value is 0, the gain is the lowest. The larger the value is, the larger the gain is. Values: 0~100.
3. After setting all the parameters, press to exit.



Appendix

LED Descriptions

LED	Descriptions
Flight mode	
Blue	Normal Mode
Purple	Aerobatic Mode
Green	Gyro Off Mode
Blue-green	Auto-Recovery (Auto Balance) Mode
Initialization	
Red, fast flashing	The remote control signal is lost (or the radio is off)
Green, fast flashing	It is calibrating the gyro and the stick (or calibrate the accelerometer)
Red, slow flashing	Fail to calibrate

Specifications

Items	Specification
Main Controller	32-bit MCU
Sensor	6-axis gyro
Gyro Scale Range	-2000dps ~ +2000dps
Accelerometer Scale Range	-4g ~ +4g
Input Signal	PWM, Futaba S.Bus, DSM
Output Signal	PWM (71.4Hz)
Input Voltage	4.8V ~ 7.4V
Operating Temp	-20℃ ~ 70℃
Size	36.5mm*29.4mm*12.6mm
Weight	10g