

DUALSKY[®]
ADVANCED POWER SYSTEMS

《FC151》

FC151 Flight Control System
Instruction Manual

FC151固定翼飞行控制器使用说明书

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ADVANCED POWER SYSTEMS



Thank you for using Dualsky FC151 Flight Control System. This gyro is equipped with latest MEMS gyroscope & accelerometer chip, 32-bit MCU and Dualsky original algorithm. It features at mini dimensions, high sensitivity and friendly user interface, more features are listed below:





- Mini dimension, MEMS gyroscope and accelerometer in one chip, only 8 grams
- 32-bit high performance ARM MCU
- Original advanced attitude stabilization algorithm
- Support single/double aileron, fly wing and V-tail aircraft
- Support flaperon mixing
- Support aerobatic/3D airplanes
- Independent sensitivity adjustment of all 3 axes
- Support Futaba S. BUS protocol
- Support mode switch via extra channel, can be switched between different modes
- Program via button and LEDs
- Support HV inputs

Caution: FC151 will take over all control channels except throttle, if the setting of FC151 is inappropriate, it might cause property damage or personal injury. Please read the caution items and the rest of this manual carefully before using FC151.

- It's recommended using this gyro on electric powered airplane models or unpowered glider models

- FC151 need 2~3 sec start-up time after powered on, please keep the airplane still during the process
- Servos will only work after the FC151 start-up process ends, this is normal.
- In auto-level mode, control surfaces of model which is still on the ground may move to their maximum travel. This is Normal.

Packing List

<p>(a) FC151 Gyro x 1 (b) Anti-shock double side tape x 1</p>	<p>(c) 3-signal wire (long) x 1 (d) Single-signal wire (long) x 2</p>
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>(a)</p> </div> <div style="text-align: center;">  <p>(b)</p> </div> </div>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>(c)</p> </div> <div style="text-align: center;">  <p>(d)</p> </div> </div>

Radio equipment

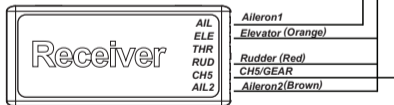
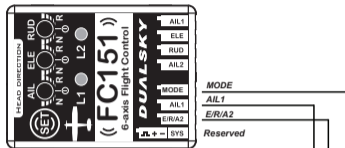
You need an at least 4-channel transmitter. If transmitter only has 4 channels, FC151 will work in auto-level mode by default and can't change modes during flight. We recommend you for 5 channel transmitter so that the 5th channel (usually the GEAR channel) can be used for mode selection.

2. Connect the FC151 to receiver as shown below

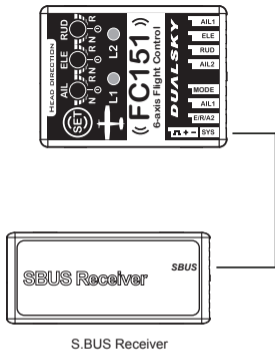
Installation instruction

1. FC151 installation principle:

- FC151's heading direction must be the same as airplane heading direction
- FC151 must be mounted parallel to flight path, otherwise airplane will yaw.
- FC151 should be installed inside of the airplane, close to the receiver and CG.
- Install platform must be parallel to horizontal tail, solid (recommend to use plywood), but do not use servo mount platform.
- Use accessory double side tape to fix FC151, do not use strap, patch or 3M Dual-Lock
- Do not wrap FC151 in foam
- FC151 cannot be touched by servo horn, linkage or other moveable parts
- FC151 must stay away from motor, engine, ESC and batteries
- FC151 cannot be installed outside the airplane, such as wings or tail



Normal Receiver



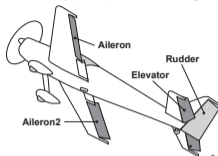
S.BUS Receiver

- Input/output signal wires are close to the top of FC151, middle is VDD and bottom is GND.
- Input signal supports Futaba S.BUS and S.BUS2, only need single-signal wire to connect SYS and receivers' SBUS port. SYS port has higher priority than other input ports. When using SYS port, other input ports won't work, transmitter channel sequence must be the same as following chart:

Sequence Channel	CH1	CH2	CH3	CH4	CH5	CH6
	Aileron 1	Elevator	Throttle	Rudder	Mode Switch	Aileron 2

3. FC151 corresponding control surface

- Normal type airplane with single or double ailerons

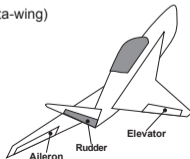


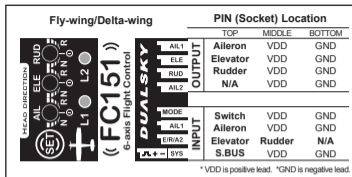
* Diagram show double aileron airplane

Normal Airplane		PIN (Socket) Location		
		TOP	MIDDLE	BOTTOM
	OUTPUT	Aileron	VDD	GND
		Elevator	VDD	GND
		Rudder	VDD	GND
		Aileron2	VDD	GND
	INPUT	Switch	VDD	GND
		Aileron	VDD	GND
		Elevator	Rudder	Aileron2
		S.BUS	VDD	GND

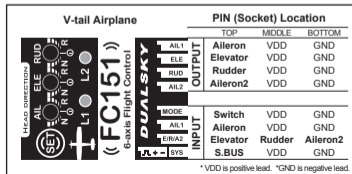
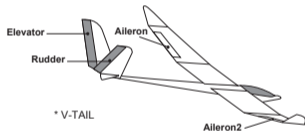
* VDD is positive lead. *GND is negative lead.

- Fly-wing(delta-wing)





- V-tail airplane

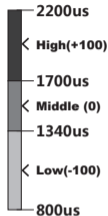


4. FC151 Power Supply

FC151 supports 4.8V-8.4V input voltage, share the same power with receiver, input voltage should meet the requirements of receiver, too. Power supply could be battery or ESC.

Set mode switch

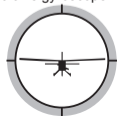
Mode select switch is used for select different flight modes. Please assign a 3-position switch to mode channel and make sure that channel doesn't have other functions. Switch channel pulse width range should be low 800~1340us, middle 1340~1700us, high 1700~2200us. If the mode channel is not connected, the FC151 will work in auto-level mode.



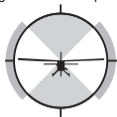
Gyro Off Mode: Position low, FC151 outputs receiver's signal directly



Aerobatic Mode: Position medium, only 3 axis gyroscope working



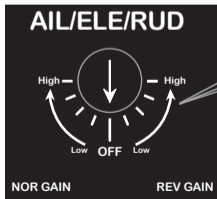
Auto Level Mode: Position high, limit angles of roll and pitch.



NOTE: You may need to reverse mode channel for correct switch operation.

How to setup gains and correction directions?

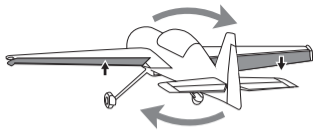
There are 3 pots to adjust the correction directions and gains for aileron (roll), elevator (pitch) and rudder (yaw) channel. please see the sketch below.



- It needs a few testing fly to determine appropriate gains, we recommend starting from conservative gains (low) first.
- Fly in aerobatic mode at safety altitude, accelerate the airplane to its maximum speed to see if there is oscillation in pitch, roll or yaw axis. Oscillation indicates the gain is too high, please slow down the airplane, decreasing the Gain after landing.
- Please don't change too much gain at one time, We recommend adjusting 5-10 degrees once.

Ground Test

- Please do a ground test before first flight.
- Test if the mode switch is working properly. Do not turn on the motor/engine, toggle the mode switch on the transmitter to middle position, LED2 will turn GREEN for 0.5sec, now FC151 is in Aerobatic mode.
- Test transmitter moving direction. Move the sticks (except the throttle) to see if each control surface is working rightly.
- Test gyro correction direction. Rotate the model on each axis, corresponding control surface should act to against that rotation (see below). If the action is wrong, please reverse the pot of that axis.



Roll & Aileron Movement



Pitch & Elevator Movement

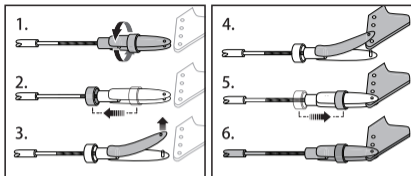


Yaw & Rudder Movement

Trim system

- First please trim model directly on your transmitter in gyro off mode (do not switch to other modes in trimming). But if transmitter trim is too large, please zero the trim and adjust the

model by changing the length of the linkage between the servo arm and the control horn.



- There is no need to trim in Aerobic mode if the model had been trimmed well in gyro off mode.
- Do not trim in auto level mode, if model attitude in auto level mode deviate from horizon after series of aerobatic maneuvers, please switch to aerobatic mode or gyro off mode.
- If model attitude isn't horizontal in auto level mode all the time, please check and adjust the mounting angle of FC151.

FC151 Setting

1.How to enter Setting Mode: Turn on the transmitter, move the throttle to its minimum; power on the model, wait until the L1 green LED ends flashing; Long Press "SET" button (2sec) to enter Setting Mode. After that, L1 displays the corresponding SETTING ITEM and L2 shows the corresponding SETTING VALUE.

2. "SET" Button usage:

- Long Press (more than 2 sec) : enter Setting Mode
- Single click in Setting Mode: switch between SETTING ITEM
- Double click (finish within 0.5sec) in Setting Mode: change SETTING VALUE
- Long Press in Setting Mode: Save and quit to flight mode

3. Please check the below chart for all settings

Item		L2(LED)			
L1(LED)		Blue (default)	Green	Red	Yellow
Blue	Install direction	Face up	Face down	Face right	Face left
Green	Airplane type	Normal	Delta wing	V-tail	

LED Status

LED1 STATUS	FC151 STATUS
Green flashing	Initializing
Green solid	Initialization completed, signal OK
Red solid	Initialization completed, no signal

LED2 STATUS	FC151 STATUS
Blue on for 0.5 second	In gyro off mode
Green on for 0.5 second	In aerobatic mode
Red on for 0.5 second	In auto level mode