Instruction Manual for FrSky S6R/S8R

Overview

Smart Port

F/S Button

SBUS Port

(CH1-CH16)

RSSI Output

Conventional Channel Outputs (CH1-CH8)

Working State

Green LED: ON / Flashing: OFF

Red LED: Status:
ON: Binding
Flashing: Normal
OFF: Signal lost

Yellow LED: Status:
ON: Accelerometer outside of Calibration limits [0.9 G, 1.1 G]
Flashing: Accelerometer within Calibration limits [0.9 G, 1.1 G]
OFF: Completed self-check

Blue LED: Status:
ON: Self-check in progress
OFF: Completed self-check

Specifications

- Model name: S6R (6CH receiver with built-in 3-axis gyro and 3-axis acceleration)
  S6R 47.42x23.84x14.7mm (L x W x H)
  46.47x26.78x14.12mm (L x W x H)

- Weight: S6R 12.1g; S8R 14g

- Number of Channels: S6R 6CH (1-6CH from conventional channel outputs)
  S8R 16CH (1-8CH from conventional channel outputs, 1-16CH from SBUS port)

- Operating Voltage Range: 4.0~10V

- Operating Temperature: -20°C to 60°C

- Gyroscope Measurement Range: ±200°/s

- Accelerometer Measurement Range: ±g

- Firmware Upgradable

- Compatibility: ACCST D16

Features

- Built-in three-axis gyroscope and three-axis accelerometer sensor module

- Built-in RSSI PWM output (0-3.3V) (S8R only)

- Built-in battery voltage detection

- Smart Port enabled

Channels

<table>
<thead>
<tr>
<th>Number of channel</th>
<th>Corresponding parts on the model</th>
<th>Full name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH1</td>
<td>AL1</td>
<td>Alleron</td>
</tr>
<tr>
<td>CH2</td>
<td>THR1</td>
<td>Throttle</td>
</tr>
<tr>
<td>CH3</td>
<td>RUD1</td>
<td>Rudder</td>
</tr>
<tr>
<td>CH4</td>
<td>AL2</td>
<td>Alleron</td>
</tr>
<tr>
<td>CH5</td>
<td>ELEV1</td>
<td>Elevator</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of channel</th>
<th>Corresponding parts on the model</th>
<th>Full name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH7</td>
<td></td>
<td>User-defined</td>
</tr>
<tr>
<td>CH8</td>
<td></td>
<td>User-defined</td>
</tr>
<tr>
<td>CH10</td>
<td></td>
<td>User-defined</td>
</tr>
<tr>
<td>CH11</td>
<td></td>
<td>User-defined</td>
</tr>
</tbody>
</table>

Note: CH9-CH12 are not marked on the diagram.

Setting CH9 at Weight 50 and offsetting 50, the assigned port/selector will work normally.

Attention:
CH1=CH8 should be connected to the corresponding servos.
S.Port could be used to update, edit parameter settings via FrSky STK PC tool and connect with telemetry sensors.

Binding Procedure

1. Put the transmitter/receiver module into binding mode

2. Turn on both the transmitter and the receiver.

3. Connect the battery to the receiver and holding the F/S button on the receiver. The LED on the receiver will flash, indicating the binding process is completed.

4. Turn on both the transmitter and the receiver. The GREEN LED on the receiver indicates the receiver is receiving commands from the transmitter. The receiver/transmitter module binding will not have to be repeated, unless one of the two is replaced.

Note: After binding procedure is completed, recycle the power and check if the receiver is really under control by linked transmitter.

Set up your model and receiver step by step

1. Connect your servos following the channel list according to your model.

2. Set your radio follow the channel list.

3. Choose the Wing Type via the configuration tool (S6R/S8R/LuaFirmLink APP/FirmLink.exe).

4. Choose the AUTO LEVEL mode, check the model servo feedback via transmitter.

5. Select the manual mode, check servo feedback via transmitter.

Quick Mode

If supports stabilization mode and manual (ail-axial/off) mode and configured through CH10. What's more, an urgent mode is added to configure automatic level mode default through CH12. The precise configuration is written below.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Position</th>
<th>Flight Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH10</td>
<td>SW Down</td>
<td>None</td>
</tr>
<tr>
<td>SW Mid</td>
<td>Stabilization Mode</td>
<td></td>
</tr>
<tr>
<td>SW Up</td>
<td>Automatic Level Mode</td>
<td></td>
</tr>
<tr>
<td>CH12</td>
<td>SW Down</td>
<td>Urgent Mode (Automatic Level Mode)</td>
</tr>
</tbody>
</table>

Note: The default mode of S6R/S8R is Quick Mode. When re-flashing firmware of S6R/S8R or replacing with a new one, the preset mode will be cleared out.

- If Quick mode is applied, there is no Knife Edge or (3D) Hover mode.

CH11 is only used when using Quick Mode.

Modes

Conventional Model

- Stabilization
- Automatic level
- Hover
- Flying Wing
- Knife-edge
- Vtail

- Stabilization
- Automatic level
- Hover
- Flying Wing
- Knife-edge
- Vtail

The model types could be enabled via FirmLink.exe or S6R/S8R Lua. If required, S6R/S8R could be used as a standard 6/8 channel receiver.

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01140055
The available flight modes can be assigned to CH10 and CH11 with three-position switches.

<table>
<thead>
<tr>
<th>Flight mode</th>
<th>Stabilization</th>
<th>Automatic Level</th>
<th>Hover</th>
<th>Knife-Edge</th>
<th>Off</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH10 (3 pos SW)</td>
<td>CH10+M+H (CH10 SW Down)</td>
<td>CH10+M+H (CH10 SW Down)</td>
<td>CH10+M+H (CH10 SW Down)</td>
<td>CH10+M+H (CH10 SW Up)</td>
<td>CH10 SW-mid</td>
</tr>
<tr>
<td>CH11 (3 pos SW)</td>
<td>M+CH11+M+H (CH11 SW Mid)</td>
<td>CH11+M+H (CH11 SW Down)</td>
<td>CH11+M+H (CH11 SW Up)</td>
<td>M+CH11+M+H (CH11 SW Mid)</td>
<td>CH11 SW-mid</td>
</tr>
</tbody>
</table>

Delta wing & Flying wing & V-tail

Layout of Delta wing and Layout of V-tail

The available flight modes can be assigned to CH10 with a three-position switch.

<table>
<thead>
<tr>
<th>Flight mode</th>
<th>Stabilization</th>
<th>Auto Level</th>
<th>Off</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH10</td>
<td>CH10+M+H (CH10 SW Down)</td>
<td>CH10+M+H (CH10 SW Up)</td>
<td>CH10 SW-mid</td>
</tr>
</tbody>
</table>

When Delta wing/Flying wing/V-tail is selected, the signal produced by the transmitter should be a non-active mix on the channels related to AIL and ELE. S8R/S8R will mix the AIL(CH1) and ELE(CH12) input signal with a fixed mix percentage automatically. Signals on CH4-CH8 will behave as required by the user.

M: represents a neutral signal period (1500us)
N: represents the rate of required signal change to activate the mode (50us). When the factory settings are selected, the switch position shown above represents the required modes.

Flight mode:
Off: When the mode is activated, S8R/S8R will transmit the received commands produced by the transmitter to the receiver without compensating.

Stabilization: When the model is activated, S8R/S8R will compensate for external forces (wind) as soon as receiving commands from the transmitter. This function is used to enhance the stability of the model on three axes (Pitch, Roll, Yaw). CH12 could be used to adjust gyro gain by assigning a knob or a slider, changing the sensitivity of the counterracting signal produced by the internal three-axis gyroscope.

Automatic level: When the model is activated, S8R/S8R will make the model return to level orientation with internal three-axis accelerometer and three-axis gyroscope on AIL and ELE channels after the sticks being released to neutral. RUD channel works in stabilization mode only.

Hover: When the model is activated, S8R/S8R will make the nose of the model straight up with internal three-axis accelerometer and three-axis gyroscope on RUD and ELE channels (ELE and RUD inputs are not required). Under this mode, AIL is used to control the rotation of the model and THR adjust the altitude. All channel works in stabilization mode only.

Knife-edge mode: When the mode is activated, S8R/S8R will roll the plane on a certain side (wing points up) with internal three-axis accelerometer and three-axis gyroscope on RUD and AIL channels. Thus, AIL inputs are not required. While the mode steering is done with ELE, altitude will be maintained with THR/RUD. ELE channel operates in stabilization mode only.
The menu screen on the home page is displayed below:

1. Open: Gives the PC software access to S6R/S8R configuration data.
2. Read: Retrieves the stored S6R/S8R data to be edited in the PC software.
3. Write: Stores the edited data on S6R/S8R.
4. Load: restore the settings into the file you saved before.
5. Save: save all settings to one file.
6. Default: Returns all PC software settings to the factory defaults.
7. S6R Enable/Disable the stabilization function

Configuration parameters
- The configuration parameters are listed on the top of the interface: Wing type, Mounting Type, Gain Setting, Offset Angle Setting, Accelerometer Calibration

Wing Type

Options of wing types: Wing_Rud_Ele_Ai—conventional model
Wing_Delta Ai/Wing_Flying—Delta/Flying wing
Wing_V-Tail Ai—V-Tail
AUX1: if selected, Ai2 function will be disabled on CH5
AUX2: if selected, ELE2 function will be disabled on CH6

Level, Button, Right and Left up options are available.

Gain Setting

The first part
Compensation direction: selecting the travel direction of AiL, AiL2, ELE, ELE2 and RUD. "+" means positive and "-" means negative.

The second part
Gyro gain: Stabilization Mode
The gain setting under stabilization mode should be set on the channels related to aileron, elevator and rudder.
Angle Gain: Auto Level Mode
The gain setting under automatic level mode could be set on the channels related to aileron and elevator.
Angle Gain: Hover Mode
The gain setting under hover mode could be set on the channels related to elevator and rudder.
Angle Gain: Knife-Edge Mode
The gain setting under knife-edge mode could be set on the channels related to aileron and rudder.

Note: Optional range is from 0 to 200%, 0, 1, 2 refers to 0%, 100% and 200% respectively.

Offset Angle Setting
Due to the possible errors in minor installation and calibration, the function is designed to adjust the attitude of the model. Thus, the user could achieve the best orientation when Auto Level, Hover mode and Knife-edge mode is activated.
Instruction Manual for FrSky S6R/S8R

Offset Angle of Auto Level
The angle of roll and pitch could be adjusted on the channels related to aileron and elevator. Straight and Level flight could be realized.

Offset Angle of Hover
The nose-up angle could be adjusted on the channels related to aileron and elevator. Stationary hover could be realized in calm weather.

Offset Angle of Knife Edge
The angle of aileron and rudder could be adjusted on the related channels. Straight and level knife-edge flight could be realized.

Note: Optional range is from -20° to 20°.

Accelerometer Calibration

The positive and negative values related to three-axis gyroscope and accelerometer make a total of six values that need to be acquired. Please follow the on-screen instructions.

- Click the "Calibration" button and wait until the YELLOW LED flashing, indicating the calibration on this orientation has been completed.
- Repeat the above step five times (remaining 5 dimensions). Place S6R/S8R in the required orientation, ensure all values (X, Y, Z, Mol) are displaying 1.000 with the deviation of ±0.1.
- Press "Write" to save the data on S6R/S8R when done.

Inspection of flight attitude

To ensure flight safety, checking the compensation direction of the model is strongly recommended. Activating auto level mode will produce a strong deflection on All and ELE, which is used to check the response of aileron and elevator. Also, activating Knife-edge and Hover mode will have the same reaction on the rudder.

When the plane is rotated left or right, the ailerons should have the correcting actions as illustrated above.

When the plane is rotated up or down, the elevators should have the correcting actions as illustrated above.

When the plane is rotated left or right, the rudders should have the correcting actions as illustrated above.

After changing the compensation direction, make sure to check it again on the actual model.

Note: If the compensation direction is incorrect, please reverse the corresponding channel as illustrated below.

Self-check

- Before self-check, please place the model on the ground (level surface).
- When the model is flying, aerodynamic balance is more important than level attitude, which results in that the model flies at a constant attitude with the nose slightly pointing up at low speed. To avoid the nose-diving of the model at high air speed, the user must ensure that the model is placed at a level or slightly nose-up attitude during self-check.
- Always install S6R/S8R straight and level in the model. If the sensor, FC software could be used to adjust the angle of attack with the purpose of realizing the required setting. If the values set by the user is bigger than average ones, we advise to recheck the installation orientation of S6R/S8R.

Steps

- Turn on the transmitter and ensure that All (CH1), ELE (CH2), RUD (CH4), All (2/CH5) and ELE (CH6) are in the neutral position.
- Power on the model and start S6R/S8R self-check. Ensure the auto-level angle of the gyro and the neutral position of rudder. Please don’t touch the model until self-check finishes, or it may corrupt the calibration settings created during the procedure.
- Move the three-position switches bound to CH12 three times in 3 seconds (up, mid, down). Then the BLUE LED will turn on, indicating self-check procedure is initiated. After that, the corresponding parts on the model will move. After the last move, the BLUE LED will turn off, indicating self-check has completed.
- Move the sticks bound to CH1~CH6 (except the stick related to TH) and check the channel output limits, ensuring that the signal outputs of S6R/S8R will not damage the corresponding parts on the model. In the end, S6R/S8R will save the zero points of the gyro, auto level angle, neutral position and servos channel limits.

S Never operate the stick bound to CH12 during flight session. If so, it will trigger self-check and may cause the crash of the model.

Setup

- Calibrate S6R/S8R with the FC software and install it into the model. Ensure the settings of wing type and mounting type are identical to the intended model installation.
- Turn on the transmitter and reduce the value of servo endpoint setting. Ensure self-check mode will not damage the corresponding parts on the model.
- Assign a knob/violator to CH9, then real time gain adjustment capabilities of S6R/S8R will be activated.
- Assign three-position switches to CH10 and CH11 with the purpose of switching available flight modes.
- Power on the model and check the deflection direction of each related parts on the model. Make sure the switch assigned to flight modes is correct and the compensation direction of the gyro is set as intended on All, RUD and ELE.
- Make a self-check for S6R/S8R if necessary. Disconnecting the power on S6R/S8R will not lose the set parameters.

S Under identical operating conditions, the value of each channel produced by the assigned switch in FrOS is opposite to that in OpenTX. For example, SW Up in FrOS is equal to SW Down in OpenTX.

FrSky is continuously adding features and improvements to our products. To get the most from your product, please check the download section of the FrSky website www.frsky-r.com for the latest firmware updates and manuals.