

FRSKY

Instruction Manual for FrSky ARCHER PLUS SR10+ Receiver

Version
1.0

Introduction

The Archer line of receivers has been enhanced further with the addition of the new Archer Plus Series. The Archer Plus Series receivers include some new features. Firstly an enhanced anti-RF-Interference capability can offer a more solid RF performance, and this is in addition to existing anti-interfere performance in the spark ignition process. These Plus series receivers are also with both ACCESS and ACCST D16 modes, where the RF protocol is smart matched during the binding process on the radio. With the Black-Box function, some basic flight data (like Power & Signal related) can be well preserved.

The Archer Plus SR10+ are gyro-stabilized receivers with a built-in 3-axis gyroscope and 3-axis accelerometer and feature multiple flight modes (Auto-level, Stabilization, Knife-Edge, etc.) and configuration methods. The SR10+ receivers have 10 configurable channel ports, each channel port can be assigned as PWM, SBUS, FBUS, or S.Port.

The SR10+ supports full-range signal strength with dual detachable antennas and guarantees optimal antenna reception and range. The SR10+ can be used as a Primary receiver in a redundant solution by setting a port as SBUS In and connecting to any other FrSky receiver equipped with an SBUS Out port. With the FBUS protocol, the Archer Plus series receivers can open up the possibility of seamlessly pairing with multiple telemetry devices (XACT servos, ADV Sensors, etc.) as well as simplifying the builds setup.

Overview

Working State

Green LED	Red LED	Status	Yellow LED	State (Calibration of Accelerometer)	Blue LED	State (Self-check)
On	On	Register	ON	exceeding limits (0.9G, 1.1G)	ON	Center detection of channel in progress
Flash	Flash	Register successfully	OFF	In normal status	OFF	Self-check is completed
On	Off	Bind	Flashing	Calibration is completed	Flashing	Max & Min of channels in detecting
Flash	Off	Work Normally				
Off	On	Failsafe				

Specifications

- Dimension: 46.5*26.3*14.7mm (L*W*H)
- Weight: 13g
- 10 Configurable Channel Ports
CP1: PWM / SBUS Out / FBUS / S.Port / SBUS In
CP2-10: PWM / SBUS Out / FBUS / S.Port

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SBUS Out (Supports 16CH / 24CH mode)

- Operating Voltage Range: 3.5 -10V
- Operating Current: <100mA@5V
- Control Range: Full range* with telemetry
(*Full Range: >2km, range may vary based on local conditions.)
- Voltage Measurement Range via AIN2 (External device): 0-35V
(Battery Voltage Divider Ratio: 1:10)
- Compatibility: FrSky 2.4GHz ACCESS / ACCST D16 capable transmitters

Features

- Enhanced Anti RF-Interference capability with more solid RF performance
- Smart-matched ACCESS & ACCST D16 modes
- Supports basic Black-Box function
- Built-in 3-axis gyroscope and 3-axis accelerometer sensor
- Multiple flight modes and configuration tools (ETHOS, LUA scripts, etc.)
- 10 configurable channel ports (PWM, SBUS, FBUS, or S.Port)
- Supports signal redundancy (SBUS In)
- Full control range with telemetry (S.Port or FBUS)
- Anti-interference capability in the spark-ignition process
- Over-The-Air (OTA) FW update
- External battery/device voltage detection

Basic Step Guides

- Model creation & Receiver binding;
- Ensure stabilization is enabled & Calibrate the gyroscope sensor of the device;
- Servo connection & Build the stabilization device to the model;
- Set up the receiver channel and radio switches;
- Determine the [Wing Type] & [Mounting Type];
- Check the stabilized channel outputs of the receiver in the Auto-Level mode;
- Check the stick control of the transmitter in the manual mode;
- Self-Check of the receiver;
- Failsafe setting.

Registration & Automatic Binding

Follow the step below to finish the registration & binding procedure:

- For TANDEM X20 as an example, enter into the Model, select RF System, turn on the internal module, select status [ON] and ACCESS, Then determine the antennas (internal or external) and choose the RF power according to the actual usage, the ACCESS receiver can be registered to the radio at the moment. (Notice: the "Registration" process is not required while binding the receiver in ACCST D16 mode.)
- Connect the battery to the receiver while holding the button on the receiver. The RED LED and GREEN LED on the receiver will be on, indicating into the [Reg] status.
- When it shows the Register ID, RX name and UID, click [Register]. The RED LED and GREEN LED on the receiver will flash, and the transmitter displays [Registration OK].
- Power off the receiver.
- Move the cursor to select any one of the 3 receivers and press [Bind].
- Connect the battery to the receiver.
- Select the RX, the GREEN will keep lit, then the transmitter displays [Bind successful].

Note: Once the receiver is registered, the button is not needed anymore in the binding process (ACCESS mode).

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Gyroscope Sensor Calibration

Ensure the SxR stabilization function is enabled.

< Device Config

ETHOS

Air Speed

Current

SBEC

Gas Suite

GPS

Lipo Voltage

RB 30/40

RPM

SxR

SxR Calibration

Variometer

V5600

XAct

Pressure

Temperature

[Device Configuration] → [SxR]

< SxR

ETHOS

Wing Type

Wing Rud Ele Ail

Mounting Type

Level

SxR Enable

OFF

ON

Ail Inverted

OFF

ON

Ele Inverted

OFF

ON

Rud Inverted

OFF

ON

Ail2 Inverted

OFF

ON

[SxR Enable] → [On]

Move to [SxR Calibration] tool and calibrate the gyroscope sensor of the receiver.

- The gyroscope of receiver (6 surfaces) must be calibrated before mounting into the model. Please place the receiver on a flat ground or a table, and follow the instruction steps below to calibrate the gyroscope sensor;
- Make sure the receiver with the LOGO sticker side facing upwards laying on the desktop, move to the radio and enter the [SxR calibration] tool, and select "click to confirm". At this moment, the yellow LED light will flash until it lits off, then follow the prompts to calibrate the sensor;
- Complete the calibration of all the receiver surfaces. Ensure the values of each axis (X, Y, Z, Mod) is about 1.000 while placing the receiver in the corresponding direction, and the deviation could be ±0.1;
- The calibration is completed if all the steps above are done.

< Device Config

ETHOS

Air Speed

Current

SBEC

Gas Suite

GPS

Lipo Voltage

RB 30/40

RPM

SxR

SxR Calibration

Variometer

V5600

XAct

Pressure

Temperature

< SxR Calibration

ETHOS

Calibration of SxR Gyros and Accelerometers

Place your receiver horizontal, top side up.

Click when done

< SxR Calibration

ETHOS

Calibration of SxR Gyros and Accelerometers

Place your receiver horizontal, top side down.

Click when done

< SxR Calibration

ETHOS

Calibration of SxR Gyros and Accelerometers

Place your receiver vertical, pins left.

Click when done

< SxR Calibration

ETHOS

Calibration of SxR Gyros and Accelerometers

Place your receiver vertical, pins down.

Click when done

< SxR Calibration

ETHOS

Calibration of SxR Gyros and Accelerometers

Calibration finished!

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Servo connection & Build the stabilization device to the model

Connect the servos to the ports of the stabilization device according to the Channel List. Please make sure the receiver antenna forwards the nose direction, and with receiver pins backward

Number of Channel	Corresponding parts on the model	Full name
CH1	AIL 1	Aileron
CH2	ELE 1	Elevator
CH3	THR	Throttle
CH4	RUD	Rudder
CH5	AIL 2	Aileron
CH6	ELE 2	Elevator
CH7	User-defined	
CH8	User-defined	
CH9	No mark	Gyro gain adjustment
CH10&CH11	No mark	Flight modes
CH12	No mark	Emergency mode

Gyro gain adjustment of CH9: When the the value of CH9 is in the center, the gain is zero. The gain increases as the value get bigger. Until the value is ±100%, the gain reaches maximum.

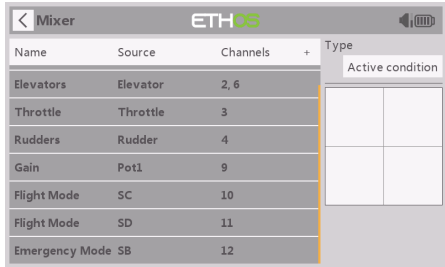
Note: CH9~CH12 are not marked on the diagram.
CH9 Edit - Setting CH9 at Weight 50 and offsetting 50, the assigned pot/slider will work normally.

Attentions

CH1~CH8 should be connected to the corresponding servos.

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Set up the receiver channel and radio switches



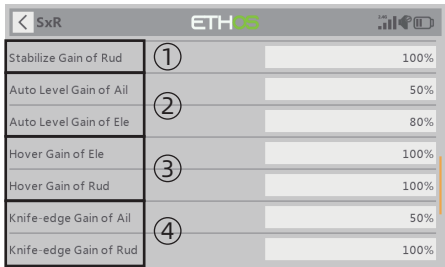
Refer to the Channel List to set the channel and switches. The switch setting of CH9-12 on the picture is for reference.

Move to the [SxR] tool, determine the [Wing Type] & [Mounting Type];

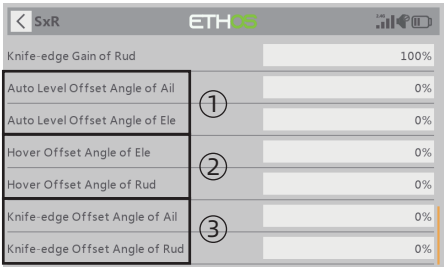


- ① Wing Type
- ② Mounting Type

[Gain] and [Offset] configurations of flight modes



- ① Stabilize Gain
- ② Auto Level Gain
- ③ Hover Gain
- ④ Knife-Edge Gain



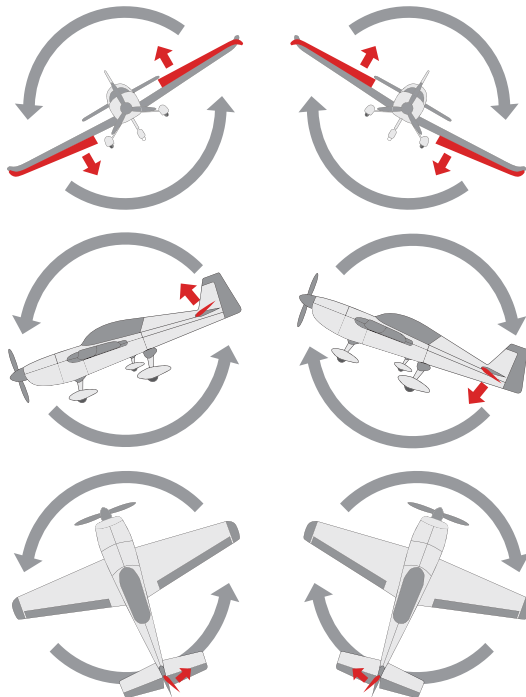
- ① Auto Level Offset Angle
- ② Hover Offset Angle
- ③ Knife-Edge Offset Angle

Check whether the reaction of the wing/servo is in line with the flight attitude caption below in the [Auto-Level] mode. If not, please try to invert the corresponding channel output in the [SxR] tool.



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 AIL 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 (Roll), ailerons should have the correcting actions as illustrated above.

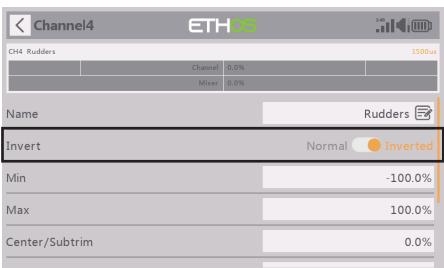
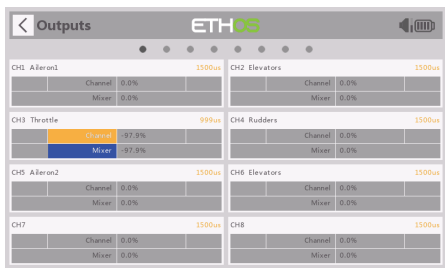
When the plane is rotated up or down (Pitch), elevators should have the correcting actions as illustrated above.

When the plane is rotated to left or right (Yaw), 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.

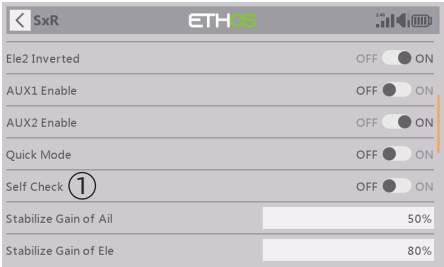
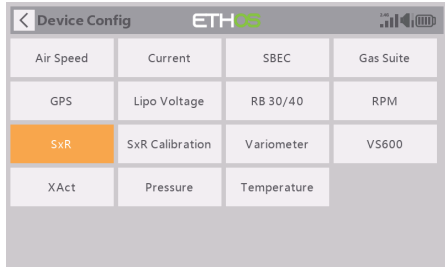
Check whether the reaction of the wing/servo is in line with the radio stick operation in the [Manual] mode. If not, please try to invert the corresponding channel output by pressing the channel bar in the [Output] tool.



Self Check

- Put the throttle to 0, and keep the other channels in the center position.
- Move to [Device Config] and enter the [SxR] tool to turn on [Self Check], then the blue LED light turns on. Once the blue LED starts flashing, we can calibrate the maximum travel of stick channels (excluding the throttle channel).
- If the calibration is completed, the LED turns off and the servos react left and right to indicate that the calibration process is completed.

Do the Self-Check in the [SxR] tool.



[Device Configuration] → [SxR]

① Self Check

Note 1: To do the Self-Check of the stabilization device, please ensure the [SxR] function is enabled. Enter the [SxR] tool and turn On the [SxR Enable], then quit the [SxR] tool and back into this tool again, now the [Self-Check] function is capable to enable.

How to set the flight modes

Quick Mode

It supports stabilization mode, auto-level mode, and manual (six-axis off) mode and configured through CH10.

What's more, an Emergency mode is added to configure automatic level mode default through CH12. The precise configuration is written below.



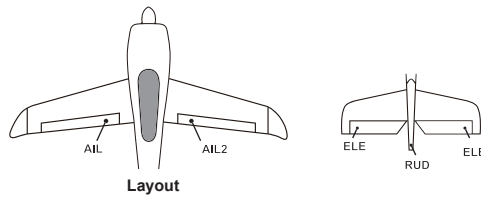
Note: The default mode of SR10+ is Quick Mode.
- If Quick mode is applied, there is no Knife Edge or (3D) Hover mode.
- CH11 is not used when using Quick Mode.

Flight Mode

Channel	Position	Flight Mode
CH10	SW Down	None
	SW Mid	Stabilization Mode
	SW Up	Automatical Level Mode
CH12	SW Down	Emergency Mode (Automatic Level Mode)

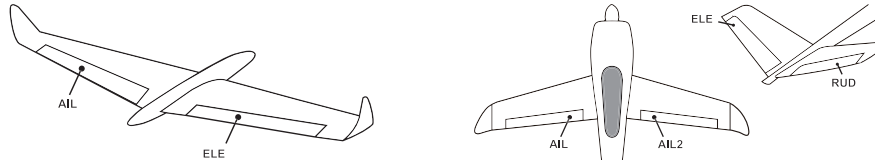
The Stabilization series receivers fit multiple types of models, the model type can be changed via different tools (like STAB RX.lua, ETHOS SxR, etc.), and this series receivers can also be used as a standard receiver by disabling the gyro function (SXR Enable by default).

Conventional mode



Flight mode	Stabilization	Automatic level	Hover	Knife-Edge	Off
CH10 (3 pos SW)	CH10>M+H (CH10 SW Down)	CH10>M+H (CH10 SW Down)	CH10>M+H (CH10 SW Down)	CH10<M-H (CH10 SW Up)	CH10 SW-mid
CH11(3 pos SW)	M-H<CH11<M+H (CH11 SW Mid)	CH11>M+H (CH11 SW Down)	CH11<M-H (CH11 SW Up)	M-H<CH11<M+H (CH11 SW Mid)	

Delta wing & Flying wing & V-tail



Flight mode	Stabilization	Auto Level	Off
CH10	CH10>M+H (CH10 SW Down)	CH10<M-H (CH10 SW Up)	CH10 SW-mid

1. When Delta wing/Flying wing is selected, the signal produced by the transmitter should be without active mixes on the channels related to AIL and ELE. SR10+ will mix the AIL(CH1) and ELE(CH2) input signal with a fixed mix percentage automatically.
2. When V-tail type is selected, the signal produced by the transmitter should be without active mixes on the channels related to ELE and RUD. SR10+ will mix the ELE(CH2) and RUD(CH4) input signal with a fixed mix percentage automatically.

M: represents a neutral signal period (1500μs)

H: represents the time of required signal change to activate the mode (50μs). When the factory settings are selected, the switch position shown above represents the required modes.

Off: When the mode is activated, SR10+ will transmit the received commands produced by the transmitter to the model without compensating.

Stabilization: When the model is activated, SR10+ will compensate with 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, Roll). CH9 could be used to adjust gyro gain by assigning a knob or a slider, changing the sensitivity of the counteracting signal produced by the internal three-axis gyroscope.

Automatic level: When the mode is activated, SR10+ 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.

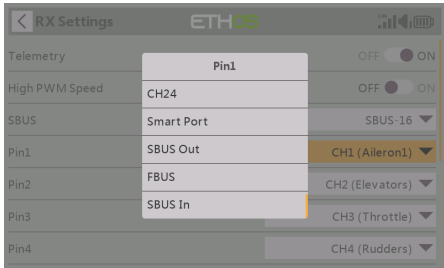
Hover: When the mode is activated, SR10+ will make the nose of the model straight up with internal three-axis accelerometer and three-axis gyroscope on RUD and ELE channels (ELE and RUD inputs are not required). Under this mode, AIL is used to control the rotation of the model and THR adjust the altitude. AIL channel works in stabilization mode only.

Knife-edge mode: When the mode is activated, SR10+ 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.

How to switch the S.Port/SBUS OUT/SBUS IN/FBUS



Enter into the [Set] of receiver.



Select the FBUS/S.Port/SBUS Out/SBUS In for the channel ports.

How to switch SBUS channel mode

Enter into RX Settings, click [SBUS], then select SBUS-16 mode or SBUS-24 mode.

About OTA function (ACCESS mode)

Go to the [File manager], and select the FW, press the enter button, select [Flash RX by int.OTA]. Power on the receiver, select the RX, go to the [ENTER], complete the flash process, the transmitter will display [Success]. Wait for 3 seconds, the receiver works properly at the moment.

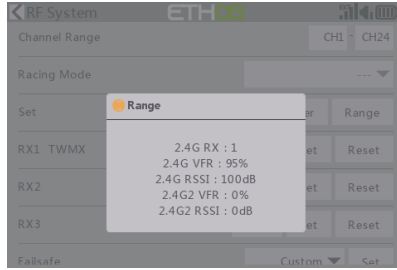
Note: Please do not do the binding operation in the near range while the firmware upgrading in progress.

Note: Update the firmware after the receiver getting registered (OTA).

Range Check

A pre-flight range check should be done before every flight, in case the signal loss is caused by the reflection of the signal by the nearby metal fence or concrete, and the shading of the signal by buildings or trees during the actual flight. Under normal circumstances, in Range Check mode, the RSSI at 150m is about 45-50.

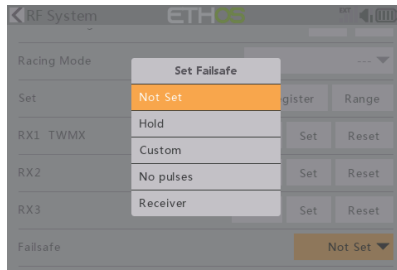
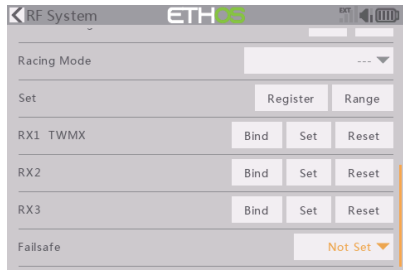
1. Place the model at least 60 cm (2 feet) above the non-metal contaminated ground (such as on a wooden bench). The receiving antenna should be in a vertical position.
2. Enter the ETHOS system, move to the "RF System", scroll the Encoder to select "RANGE" mode and press Encoder. In range check mode, the effective distance will be decreased to 1/30.



How to set Failsafe

There are 3 failsafe modes when the setting is enabled: No Pulse, Hold, and Custom mode.

- No Pulses Mode: On loss of signal, the receiver produces no pulses on any channel. To use this mode, select it in the menu and wait 9 seconds for the failsafe to take effect.
- Hold Mode: The receiver continues to output the last positions before the signal was lost. To use this mode, select it in the menu and wait 9 seconds for the failsafe to take effect.
- Custom Mode: Pre-set to required positions on the lost signal. Move the cursor to the failsafe mode of the channel and press Encoder, then choose the Custom mode. Move the cursor to the channel you want to set failsafe On and press Encoder. Then rotate the Encoder to set your failsafe for each channel and short-press the Encoder to finish the setting. Wait 9 seconds for the failsafe to take effect.



Note:

- If the failsafe is not set, the model will always work with the last working status before the signal is lost. That could cause potential damage.
- When the failsafe is disabled on the RF module side, the failsafe set on the receiver side will be applied.
- SBUS port does not support the failsafe setting in No Pulses mode and always outputs signal. Please set "Hold" or "Custom" mode for the SBUS port.