

Transmitters (TX)

The purpose of the transmitter is to take input from the RC pilot (by movement of the control sticks), convert it to digital signals then send those signals to the receiver (RX) in the aircraft. The receiver interprets the signals, and causes the control surfaces to move.

There are a wide variety of transmitters available for RC pilots. These range from a simple 3-channel for beginner planes, up through 7, 8, and more channels for advanced aircraft. The TXs with additional channels offer added control of accessories such as flaps, landing gear, bomb drop, etc.

This discussion covers the basic differences between and 3- and 4- channel transmitters for a high-wing, trainer aircraft. Most Ready-To-Fly (RTF) trainers can be purchased with transmitter included. The included TXs are basic, in that they will control the plane, but allow for little to no growth as one increases their fleet of aircraft. More expensive transmitters offer the ability to store the settings (such as trim adjustments, servo reversing, etc.) for up to 50 different aircraft –both helicopters and fixed wing.

A 3-channel TX provides the pilot with throttle, elevator and rudder control. The 4-channel TX gives throttle, elevator, aileron and rudder control. On a high-wing trainer-type plane, there is little difference in how the airplane flies, or reacts to pilot inputs between a 3- or 4-channel transmitter.

Both the 3-channel and 4-channel transmitter operate in the same basic manner. The left stick (throttle) and right stick (elevator) operate the same whether a 3-channel or 4-channel aircraft. Moving the left stick (throttle) forward or up, increases the voltage to the motor, increasing aircraft speed and lift on the wing. Moving the left stick (throttle) backward or down decreases voltage to the motor, the aircraft slows and wing-lift decreases. Moving the right stick forward causes the elevator to deflect downward and the nose of the aircraft to pitch down. Moving the right stick backward causes the elevator to deflect upward and the nose of the aircraft pitches up.

On a 3-channel aircraft (throttle, elevator, rudder), the rudder is **normally**** associated with the right stick. Moving the right stick to the left causes the rudder to deflect left and the nose of the aircraft yaws left. Moving the right stick to the right deflects the rudder right and the aircraft yaws right. In the case of a left turn, the right wing flies faster than the left, which causes increased lift and the wing tip to rise.

On a 4-channel transmitter (throttle, elevator, rudder and ailerons), the rudder control **normally**** moves to the left stick, and the aileron control is now on the right stick. Pushing the right stick (aileron control) to the left causes the left aileron to go up, the right aileron to go down and the aircraft banks & turns left. Pushing the right stick to the right cause the right aileron to go up, left aileron to go down and causes the aircraft to bank right & turn right. The net effect is the same as on a 3-channel aircraft. The rudder on the left stick functions the same as when it was on the right stick – i.e. was set up for 3-channel control.

****The majority of 3-channel aircraft sold in the U.S. are set up with rudder control on the right stick. There may be a few transmitter/ aircraft 3-channel kits set up with the rudder on the left stick, but these are the exception and can be difficult to become accustomed to flying.**

Beginner pilots – and even some intermediate pilots- will notice little or no difference in how a 3- or 4-channel high-wing trainer steers. The net effect of using ailerons or rudder to steer is : the airplane yaws/ rolls in the direction of stick movement. The advantage of a 4-channel over a 3-channel transmitter/ aircraft set up is the ability to perform more advanced maneuvers like rolls and hammerheads. However, a 3-channel aircraft is ideal for beginners because it simplifies the coordination of stick controls required to learn RC flying. On a 3-channel aircraft, the pilot can virtually “set and forget” the throttle on the left stick. Therefore, it does not require coordinating the use of the left stick to control the rudder, while not changing the throttle setting.

A summary of the differences between a 3-channel transmitter and 4-channel transmitter can be seen on the last page.

If you have a 2.4GHz radio system, and encounter problems binding the transmitter to the receiver, here are a few quick check you can perform. In addition, occasionally the binding plug can become unusable – it is rare, but we have seen it occur. If you cannot bind your TX to RX, try another binding plug.

2.4GHz TROUBLESHOOTING GUIDE

Problem	Possible Cause
Aircraft will not Bind (during binding) to transmitter	Transmitter too near aircraft during binding process
	Aircraft or transmitter is too close to large metal object
	The bind plug is not installed correctly in the bind port
	Flight battery/Transmitter battery charge is too low
Aircraft will not link (after binding) to transmitter	Transmitter too near aircraft during linking process
	Aircraft or transmitter is too close to large metal object
	Bind plug left installed in bind port
	Aircraft bound to different model memory (ModelMatch™ radios only)
	Flight battery/Transmitter battery charge is too low
	Transmitter may have been bound using different DSM protocol

Differences between 3-Channel and 4-Channel Aircraft

(High-Wing trainer)

3-Channel

Channel	Stick Location on Transmitter	Effect	Effect
Throttle	Left Stick	Throttle Forward (Up): Aircraft speeds up; Lift Increases	Throttle Back (Down): Aircraft Slows; Lift Decreases
Elevator	Right Stick	Stick Forward(Up): Tail Rises, Aircraft Descends	Stick Back(Down): Tail Lowers; Aircraft Climbs
Rudder	Right Stick	Stick Right: Rudder Moves Right Tail yaws left; Aircraft Turns Right	Stick Left: Rudder Moves Left Tail yaws right; Aircraft turns Left

4-Channel

Throttle	Left Stick	Throttle Forward (Up): Aircraft speeds up; Lift Increases	Throttle Back (Down): Aircraft Slows; Lift Decreases
Rudder	Left Stick	Stick Right: Rudder Moves Right Tail yaws left; Aircraft Turns Right	Stick Left: Rudder Moves Left Tail yaws right; Aircraft turns Left
Elevator	Right Stick	Stick Forward(Up): Tail Rises, Aircraft Descends	Stick Back(Down): Tail Lowers; Aircraft Climbs
Ailerons	Right Stick	Stick Right: Right Aileron Up/ Left Aileron Down Aircraft Rolls Right; Aircraft Turns Right	Stick Left: Left Aileron Up/ Right Aileron Down Aircraft Rolls Left; Aircraft Turns Left