Control with an analog receiver

ElMod FusionECO/PRO

Requirements

ElMod Fusion ECO/PRO are delivered with a cable for connection to an analog receiver. With this, all commercially available 2.4GHz as well as all older 40MHz systems can be connected.

You need at least two channels to control the vehicle: throttle and steering. It is usually the right stick on the radio. With these two channels the engine can be "started", "stopped" and the vehicle can be driven (throttle, brake, steering).

We recommend to connect only these two channels during the first tests to check the basic function of the radio system and the central unit.

A rotary control on the radio system can be used to control the volume. If the radio system does not have a rotary control, the volume is set by default using a rotary control provided with the central unit.

Two additional channels (usually assigned to the left stick) are used by ElMod Fusion ECO/PRO to control the turret (turret rotation and the elevation of the main gun). Additionally, it can be used to fire the main gun and a machine gun. With an optional additional channel (a knob or with functional restrictions also a switch) you change the function assignment of the left stick. This is then no longer assigned with turret functions but with other functions such as lights, turn signals, user sounds etc.

All other channels can be freely assigned with different functions. In total, up to eight channels can be used. The highest flexibility is achieved when all channels are equipped with rotary controls. 3-way switches or on/off switches can also be used, but the possible number of assignable functions is reduced.

Connection of the receiver

The supplied cable for the receiver has a total of nine plugs:

One plug with two wires (red/black) is the power supply for the receiver with 5V (BEC). This plug must always be attached. Some receivers do not have a separate connector for it. In these cases, any other socket of the receiver (channel 1 to 8) can be used.

The remaining eight plugs are connected with channels 1 to 8 of the receiver. For correct operation, only connect channels that are actually used.

The actual order varies from radio to radio. Depending on the equipment and model, it may differ from the ElMod assignment. A typical case for this is the volume control, which does not always have to be on channel 8 on the receiver. For example: if the rotary control of your radio is assigned to channel 6 of your receiver, the white line from ElMod channel 8 must be connected to channel 6 on the receiver.

The assignment of channels in ElMod Fusion ECO/PRO is as follows:

Function	Color	ElMod Channel	Control
Acceleration/braking	brown	1	Stick
Steering	orange	2	
Main gun elevation / shot*	yellow	3	Stick
Turret rotation*	green	4	
Function selection for channel 3+4	blue	5	Knob or switch
Channel for quick access functions	violet	6	Knob or switch
Channel for quick access functions	gray	7	Knob or switch
Volume control	white	8	Knob

*Depending on the position of channel 5 (blue), the control pad (channels 3 (yellow) and 4 (green)) is assigned other functions. This is explained further in the text.

The ElMod channels 1 to 4 (brown, orange, yellow, green) correspond in most cases to channels 1 to 4 on the receiver. In the domain of model aircraft it corresponds to Mode 1: "Throttle right".

Configuration of the RC radio

Before the radio system can be used, it must be configured correctly. Many radio systems offer a very large variety of functions. Most of them are not needed for driving a vehicle and are intended for model aircraft. The following points must be considered:

- Only channels that are actually needed to control the vehicle are to be assigned at the receiver. For example, if the receiver has sockets for 8 channels, but the transmitter only has two sticks assigned to channels 1 to 4, then the status of channels 5 to 8 is not defined. This often leads to disturbances in operation such as random triggering of different functions. In this case, only the four channels actually used may be wired.
- All controls must be in the neutral position (sticks centered, knobs and 3-way switches in the center position, on-off switches in the off position). The only exception is the rotary control for the volume which can be in any position.
  It is possible that the center position of a control on the transmitter does not correspond to the actual neutral position. Often the neutral position can be shifted in the transmitter, e.g. by trimming.
- All mixers must be deactivated. A control element (switch, knob..) may only affect the signal of one channel. This is normally the standard case.
- The actuation travel of the individual channels must be approx. -100% to +100%. The lowest position of a control corresponds to -100%, the highest corresponds to +100%. For the sticks in the horizontal direction, it is -100% on the left, +100% on the right.

To check the settings of the radio system, the ElMod app can be used. All the information required for this is in the "Analog receiver" tab:

- the parameter "Connected channels" shows which ElMod channels detect a signal from the receiver. If an '-' is displayed instead of a number, either the associated cable is not connected to the receiver or there is no signal.

- The parameters "Position channels 1 to 4" and "Position channels 5 to 8" show the position of the corresponding control element. This is what you can see:

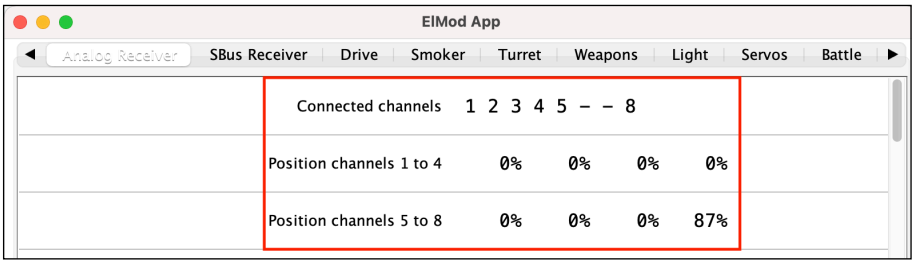
  - Which control element is assigned to which channel. To do this, change the position of a control element (e.g. switch or knob) and observe which number changes. Remember that a stick is always assigned to two channels. If the stick is moved diagonally, the values for two channels will change simultaneously. So move the stick first only

vertically and then only horizontally to see if the wiring of channel 1 (brown, throttle) and channel 2 (orange, steering) matches

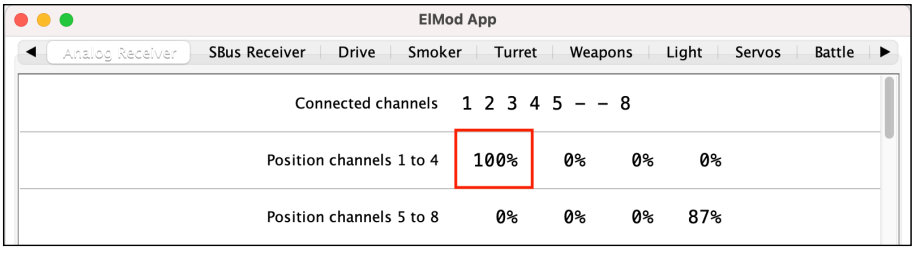
- Whether a control element reacts in the correct direction. If a switch, a stick or a knob is moved upwards (when horizontal, to the right), the value for the position must change to positive. If it is moved downwards (when horizontal, to the left), the value goes into the minus range. If it is the other way around, the direction of movement must be "reversed" (also known as "servo reverse" or "channel reverse"). Most radio systems offer such a setting. It is also provided in the ElMod App for all channels individually.
- Whether a control is deflected far enough. The displayed value should be between -100% and +100% (+110% to -110% is also OK). If this is not reached, the entire usable range of the channel cannot be utilized. The vehicle can then not reach full speed, for example. In this case, the servo travel must be extended at the radio control. If -100% or +100% is reached well before the limit stop, the servo travel for this control element should be reduced at the radio control.
- Whether mixers are activated. This is the case if the values of more than one channel are changed when a control is moved. In this case, deactivate the mixer on your radio control.

In a correctly set radio system, in the idle position all channels are at 0% (except the volume knob), operating a control changes the value of only one channel. This value goes from -100% to +100%. Here -100% is at the lowest or left position and +100% is at the highest or right position.

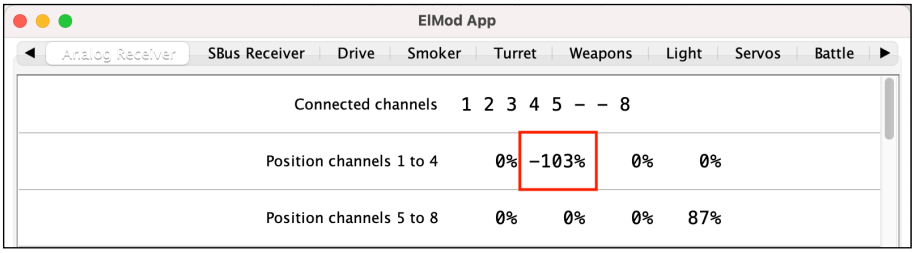
In the picture below you can see that all channels except 6 (violet) and 7 (gray) are connected (parameter: "Connected channels"). All channels except the volume (channel 8, white) are in the neutral position. The knob on channel 8 (white), is set to 87%.



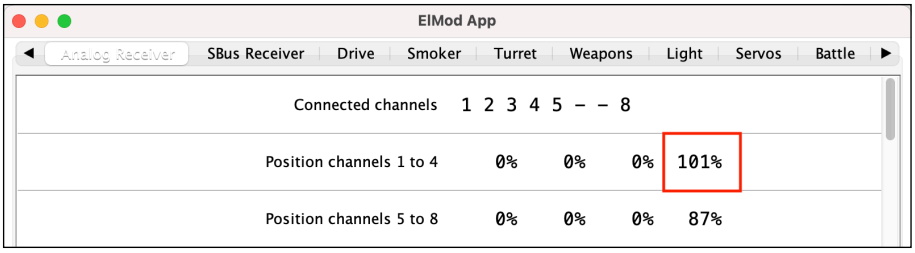
In the following image, full throttle was applied to the right stick. Now channel 1 (brown) is at approx. +100%.



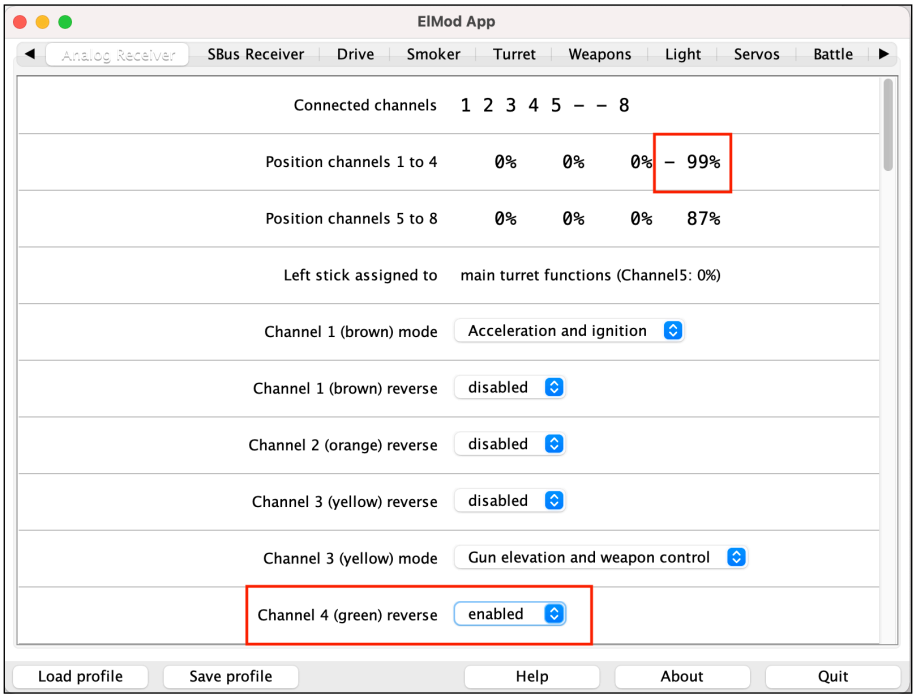
In the next image, the throttle is removed again (0% for channel 1, brown), but the steering is maxed on the left: approx. -100% for channel 2 (orange).



Now the turret rotation (channel 4, green) was actuated to the left. The ElMod App shows a positive deflection: here, the channel 4 (green) must be reversed.



After changing the parameter "Channel 4 (green) Reverse" the indicator is now correct: when deflecting to the left the value is negative.



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