Ethos

INDEX

Model Setup

The Model setup menu is used to configure each model's specific setup. It is accessed by selecting the Airplane tab along the bottom of the Home screen. Conversely, settings that are common to all models are performed in the System menu, which is accessed by selecting the Gear tab instead (see page <System>).

Overview

Edit Model

The 'Edit model' option is used to edit the basic parameters for the model as set up by the wizard, and is mainly used to edit the model name or picture.

Flight Modes

Flight modes allow models to be set up for switch selectable specific tasks or flight behavior. For example, gliders may be set up to have flight modes such as Launch, Cruise, Speed and Thermal. Power planes may have flight modes for Normal flying, Take Off and Landing. Helicopters have modes such as Normal for spool up and take off/landing, Idle Up 1 for aerobatic flying, and Idle Up 2 for perhaps 3D.

Mixer

The Mixer section is where the model's control functions are configured. It allows any of the many sources of input to be combined as desired and mapped to any of the output channels.

This section also allows the source to be conditioned by defining weights/rates and offsets, adding curves (eg Expo). The mix can be made subject to a switch and/or flight modes, and a slow function to be added.

Outputs

The Outputs section is the interface between the setup "logic" and the real world with servos, linkages and control surfaces as well as actuators and transducers. In the Mixer we have set up what we want our different controls to do. This section allows these pure logical outputs to be adapted to the mechanical characteristics of the model. This is where we configure minimum and maximum throws, servo or channel reverse, and adjust the servo or channel center point or add an offset using subtrim. We can also define a curve to correct any real world response issues. For example, a curve can be used to ensure that left and right flaps track accurately.

Timers

The Timers section is used to configure the three available timers.

Trims

The Trims section allows you to configure the Trim Mode, disable trims, or enable Extended Trims or Independent Trims for each of the 4 control sticks.
The Trim Mode configures the granularity of the trim switch steps, from Fine to Coarse to Exponential, or to disable trims. The normal trims range is +/- 25%, but Extended Trims enables the full range. If you are using Flight Modes, then Independent Trims enables the relevant trim to be independent for each flight mode, instead of being common across flight modes.

RF System

This section is used to configure the Owner Registration ID, and the internal and/or external RF modules.

The Owner Registration ID is an 8 character ID that contains a unique random code, which can be changed if desired. This ID becomes the Owner Registration ID when registering a receiver (refer page nn). Enter the same code in the Owner ID field of your other transmitters you want to use the Smart Share feature with them. This must be done before creating the model you want to use it on.

Telemetry

Telemetry is used for passing information from the model back to the RC pilot. This information can be quite extensive, and includes RSSI (receiver signal strength) and Link Quality, various voltages and currents, and any other sensor outputs such as GPS position, altitude, etc.

Note that the telemetry screens are set up as main views in the Configure Screens section.

Checklist

The Checklist section is used to define startup alerts for things like initial throttle position, whether failsafe is configured, pot and slider positions, and initial switch positions.

Logic Switches

Logic switches are user programmed virtual switches. They aren’t physical switches that you flip from one position to another, however they can be used as program triggers in the same way as any physical switch. They are turned on and off by evaluating the conditions of the programming. They may use a variety of inputs such as physical switches, other logical switches, and other sources such as telemetry values, channel values, timer values, or Global Variables. They can even use values returned by a LUA model script.

Special Functions

This is where switches can be used to trigger special functions such as trainer mode, soundtrack playback, speech output of variables, data logging etc. Special Functions are used to configure model specific functions.

Curves

Custom curves can be used in input formatting, in the mixers or in the outputs. There are 100 curves available, and can be of several types (between 2 and 21 point, with either fixed or user-definable x-coordinates).

In the Mixer a typical application is using an Expo curve to soften the response around mid-stick. A curve may also be used to smooth a flap to elevator compensation mix so that the aircraft does not 'balloon up' when flaps are applied.

In the Outputs a balancing curve may be used to ensure accurate tracking of the left and right flaps.

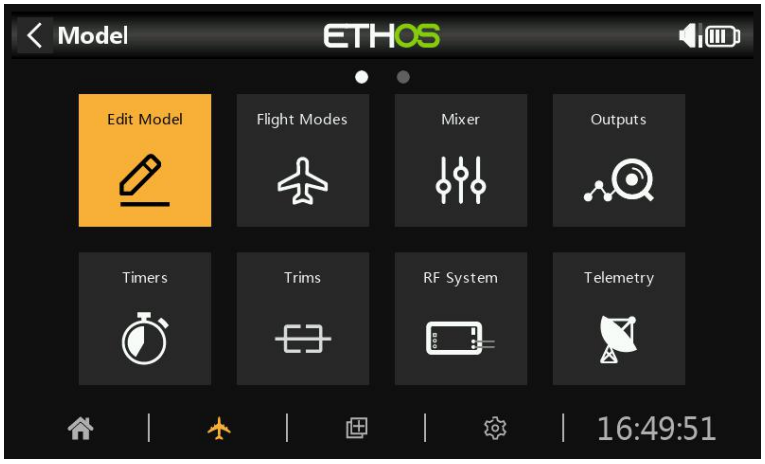
Trainer

The Trainer section is used to set the radio as a Master or Slave in a trainer setup. The trainer link can be via Bluetooth or a cable.

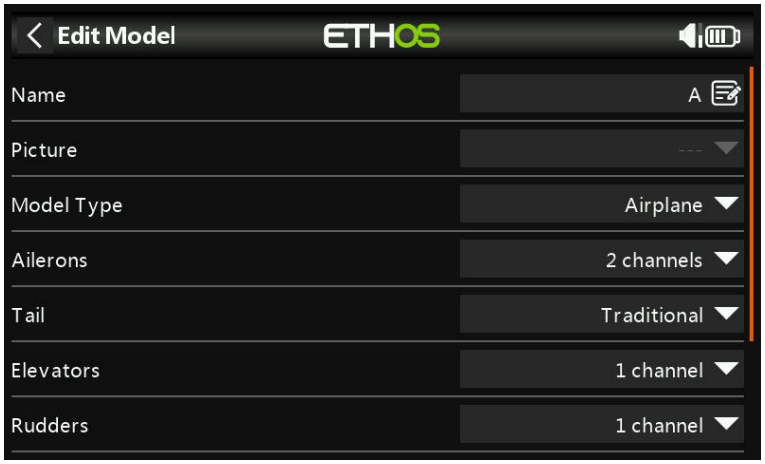
Device Config

Device Config contains tools for configuring devices like sensors, receivers, the gas suite, servos and video transmitters.

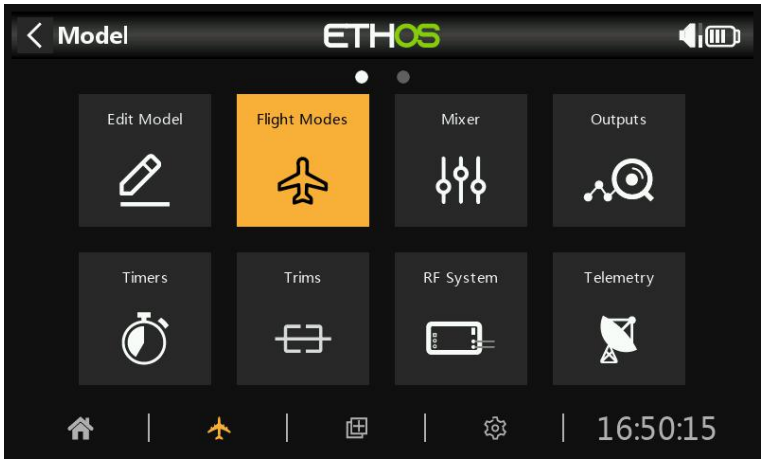
Edit model



The ‘Edit model’ option is used to edit the basic parameters for the model as set up by the wizard. The model can be renamed, or the picture assigned or changed. Changing any of the channel configurations, will cause all mixers to be reset.

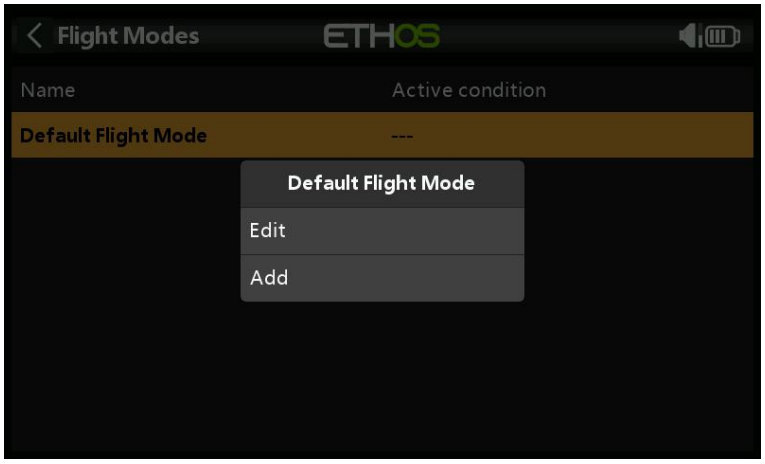


Flight Modes

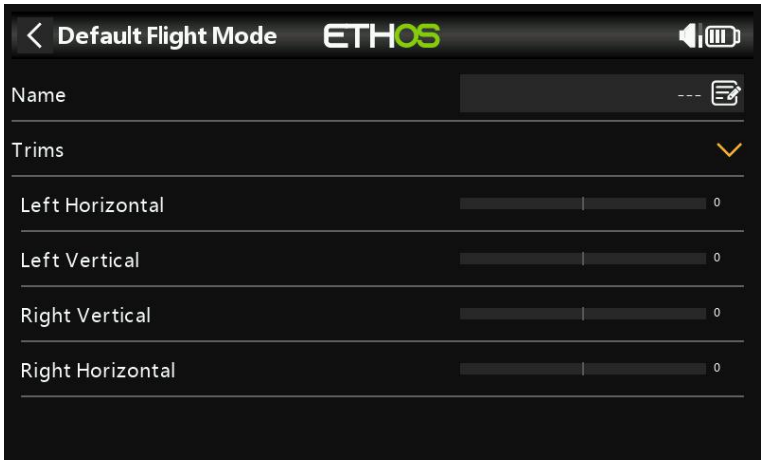


Flight modes bring incredible flexibility to a model setup, because it allows models to be set up for switch selectable specific tasks or flight behavior. For example, gliders may be set up to have switch selectable modes such as Launch, Cruise, Speed and Thermal. Power planes may have flight modes for Normal precision flying, Take Off, and Landing with either half or full flaps deployed. Helicopters have modes such as Normal for spool up and take off/landing, Idle Up 1 for aerobatic flying, and Idle Up 2 for perhaps 3D.

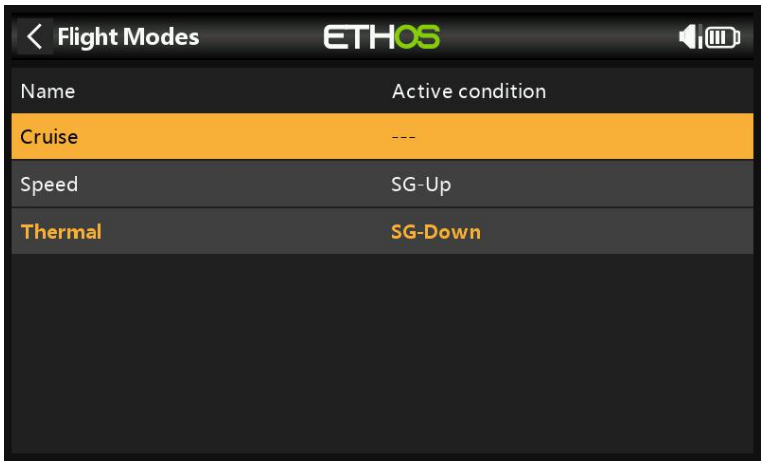
Flight modes remove much of the switching and trimming burden from the pilot.
The great power of flight modes is that they support independent trims and mixer Variables, and can also be used to enable Mixer lines. Together, these features allow for great flexibility. Please refer to the 4ch Glider tutorial to see examples of these features applied (see page nn).



There are no default flight modes defined. Tap on the default flight mode, and select Edit if you wish to rename it, otherwise select Add to define a new flight mode.



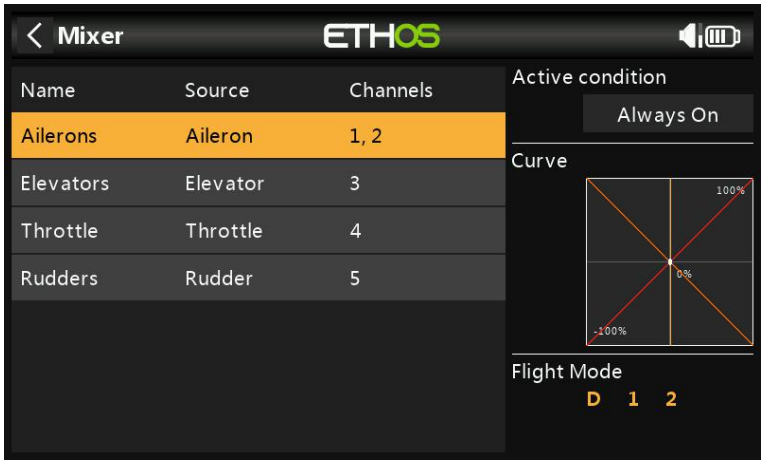
You can name each flight mode, and define its active condition, which can be a switch or button position, a function or logic switch, or a trim position. Note that the default flight mode does not have an active condition parameter, because this is the flight mode that is always active when no other flight mode is active.



Once programed the flight mode selections are displayed in the mixers. Up to 100 flight modes can be programmed. Like most functions in ETHOS the user can program descriptive text Flight Mode names such as Cruise, Speed, Thermal or Normal, Take Off, Landing.

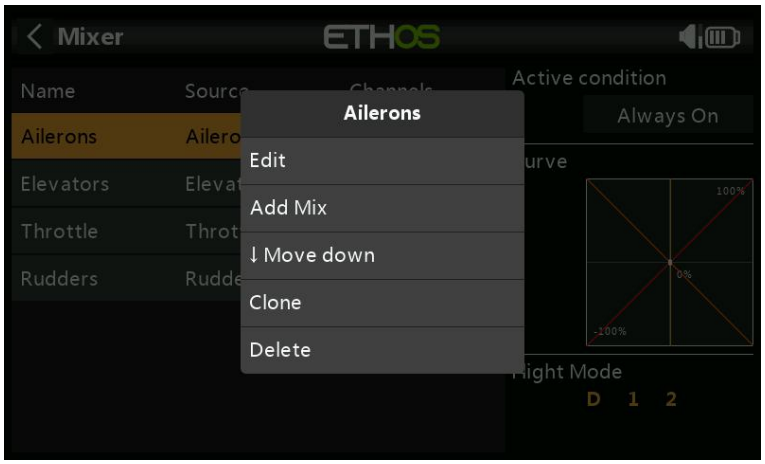
Mixer

This is where the model's control functions are configured. The Mixer section allows any of the many sources of input to be combined as desired and mapped to any of the output channels. This section also allows the source to be conditioned by defining weights/rates and offsets, adding curves (eg Expo). The mix can be made subject to a switch and/or flight modes, and a slow function to be added. (Note that Delays are implemented in the Logic Switches because they are related to switches.) The mixer includes contextual help text that dynamically changes as mixer options are touched. Up to 100 mixer lines may be defined.



If your model was created using one of the model creation wizards in the 'Model select' function in the System menu, the base mixer lines will be shown when you tap on the 'Mixer'.

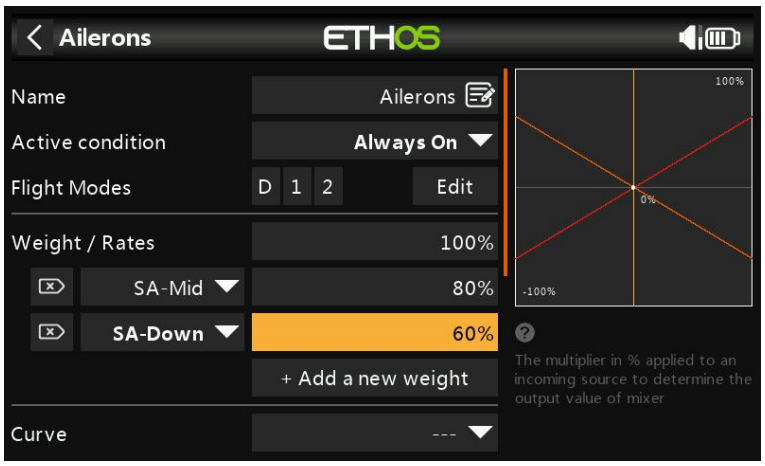
In addition, the most common predefined mixes can be added as well as free mixes that are user configurable.



There is one mix line for each control/mix and a graphic display for that mix. To edit a mixer line, touch the mixer and touch again for the popup menu, then select Edit.

Aileron, Elevator, Rudder Mixer

We will use the Ailerons as an example, but the Elevator and Rudder mixes are very similar.



Name

Ailerons has been filled in as the default name, but it can be changed.

Active Condition

The default active condition is 'Always On', which is appropriate for Ailerons. It may be made conditional by choosing from switch or button positions, function switches, logic switches or trim positions. Finally this can be selected to be active when the condition is Positive or Negative (i.e True or False).

<<**note for rev2**: in the 0.0.16 test version , there is a bug showing Flight Mode as an option for Active Condition. This is not needed any more, because the next line is for selecting the Flight Modes. >>

Flight Modes

If any flight modes have been defined, the mix can be made conditional to one or more flight modes. Click on 'Edit' and check the boxes for the flight modes in which this mixer line must be active.

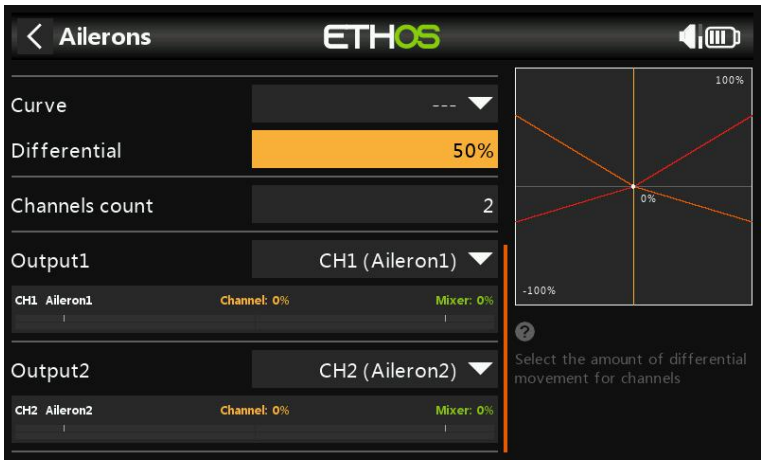
Weight / Rates

Multiple rates can be defined, subject to a switch position, function switch, logic switch, trim position or flight mode. A line is added for each rate. The default rate (i.e. first rates line) is active when none of the other rates are active. There is a small cross inside an arrow on the left of defined rates that can be used to delete a rates line.

Curve

A standard curve option is Expo, which by default has a value of 0, which means the response is linear (i.e. no curve). A positive value will soften the response around 0, while a negative value will sharpen the response.

Any previously defined curve may also be selected. The mixer output will then modified by this curve. Alternatively, a new curve may be added.



Differential
On Ailerons differential (typically more up aileron travel than down) is utilized to reduce adverse yaw and to improve turning/ handling characteristics. A positive value will result in the ailerons having less downward travel, as can be seen in the graph above. (Default = 0. Range -100 to +100).

Channels Count

Channel count defines how many Output channels are allocated. In this example two ailerons were configured in the model creation wizard.

Output1, Output2

The model creation wizard assigned channels 1 and 2 to the ailerons, because the default channel order in the System – Sticks menu was set to AETR, i.e. ailerons, elevator, throttle, rudder.

The default can be altered if required, but care must be exercised to assess any other impacts to making a change here.

Throttle Mixer

The Throttle mixer has parameters for managing Throttle Cut and Throttle Hold. Throttle Cut, together with Low Position Trim, is used for managing the throttle and idle settings on glow or gas powered models. Throttle Hold is commonly used on electric models.

Throttle Cut

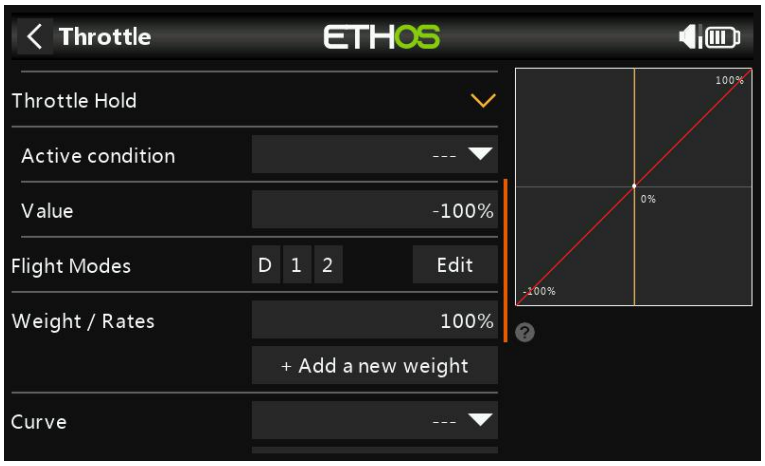
Note that the Throttle Cut function interacts with the Low Position Trim setting (see below).

Active Condition

The active condition may be chosen from switch or button positions, function switches, logic switches or trim positions. Finally this can be selected to be active when the condition is Positive or Negative (i.e True or False).

Trigger Value

The Trigger Value is chosen so that once the throttle stick goes below the Trigger value then the Idle Output Value will be output on the throttle channel. For example, using the defaults, once the throttle stick value drops below -85%, the throttle channel output will be switched to the Idle Output Value of -100%.



Throttle Hold

Active Condition

The active condition may be chosen from switch or button positions, function switches, logic switches or trim positions. Finally this can be selected to be active when the condition is Positive or Negative (i.e True or False).

Value

Once the throttle hold function goes active, the Value setting will be output on the throttle channel. On electric powered models, the throttle hold value is normally -100%.

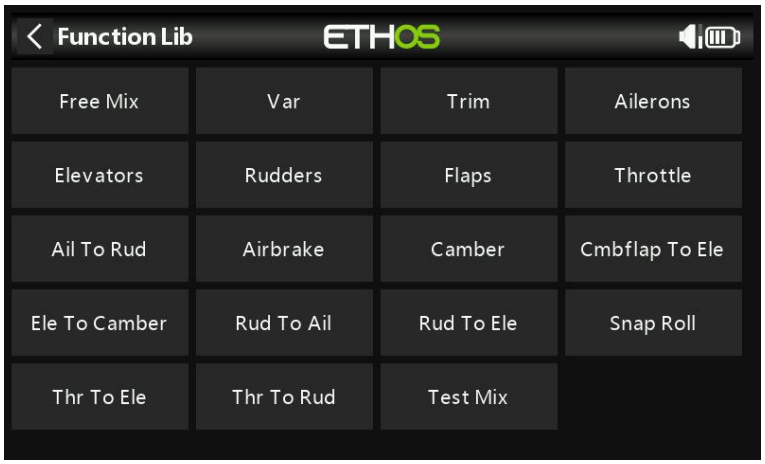
Low Position Trim

For glow and gas we use 'Low position trim' to adjust the idle speed. The idle speed can vary depending on the weather, etc., so having a way to adjust the idle speed without impacting the full throttle position is important.

If 'Low position trim' is enabled, the throttle channel goes to an idle position of -75% when the throttle stick is at the low position. The throttle trim lever can then be used to adjust the idle

speed between -100% and -50%. Throttle Cut can then be configured to cut the engine with a switch.

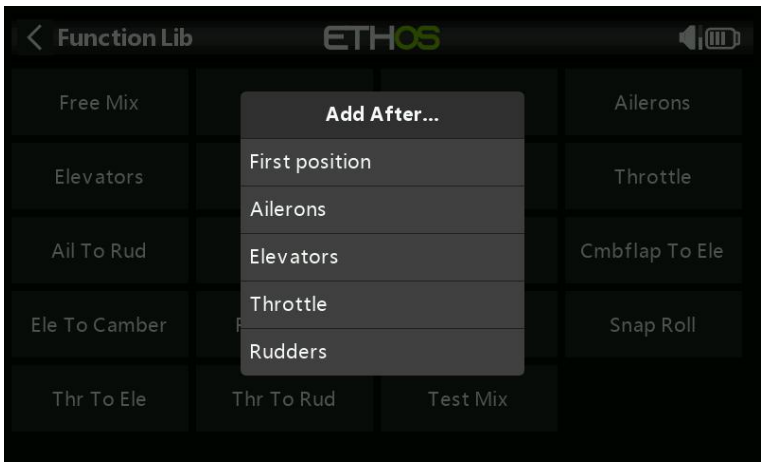
Predefined Mixes



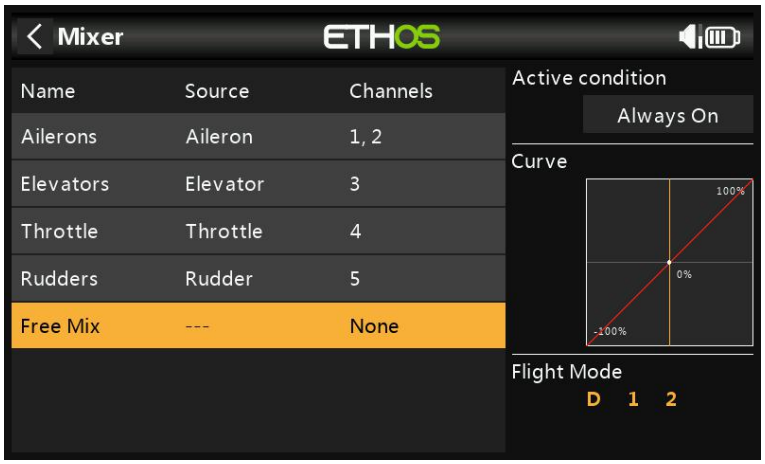
Free Mix

The Mixer function can best be described by making use of a Free Mix, which we will add to the above mixes for illustration purposes. Tap on any Mixer line, and select 'Add Mix' from the popup menu to add a new mixer line.

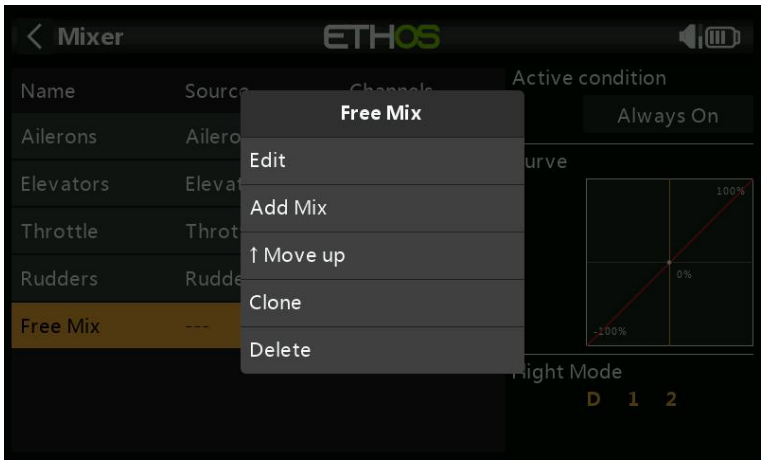
Select Free Mix from the list of available predefined mixes.



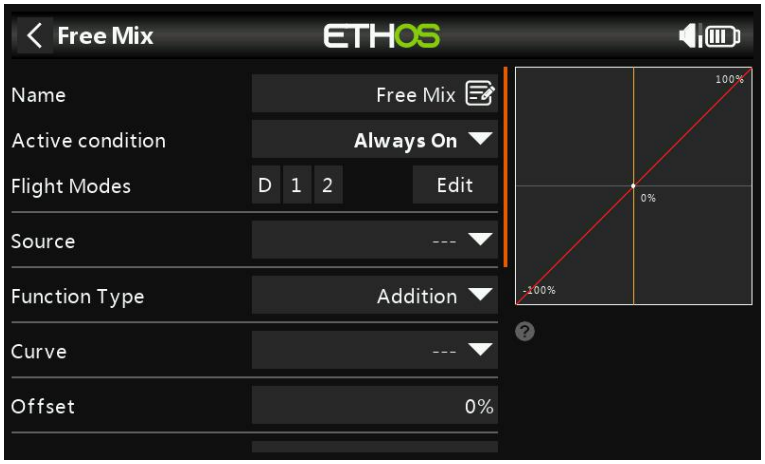
Next the position for the new mixer line must be chosen, in this example after 'Rudders'.



Tap on 'Free Mix' to bring up the edit sub-menu.



Select Edit to open a new screen showing the detailed parameters for the 'Free Mix'. The graph display on the right will display the mixer output, and the effect of any setting changes that are made.



Name

A descriptive name can be entered for the Free Mix.

Active Condition

The default active condition is 'Always On'. It may be made conditional by choosing from switch or button positions, function switches, logic switches or trim positions. Finally this can be selected to be active when the condition is Positive or Negative (i.e True or False).

Flight Modes

If any flight modes have been defined, the mix can be made conditional to one or more flight modes. Click on 'Edit' and check the boxes for the flight modes in which this mixer line must be active.

Source

The source or input to this mix can be chosen from:
a) analog inputs such as the sticks, pots and sliders
b) the toggle switches or buttons
c) any defined logic switches
d) the trim switches
e) any defined channels
f) a gyro axis
g) a trainer channel
h) a timer
i) a telemetry sensor
j) a 'special' value, i.e. minimum, maximum or 0

The mixer line will take the value of the source at any instant as its input.

Function Type

The Function Type defines how the current mixer line interacts with the others on the same channel. There are three function types:

Addition

The output of this mixer line will be added to any other mixer lines on the same output channel.

Multiply

The output of this mixer line will be multiplied with the result of any other mixer lines on the same output channel.

Replace

The output of this mixer line will replace the result of any other mixer lines on the same output channel.

The combination of these operations allows the creation of complex mathematical operations,

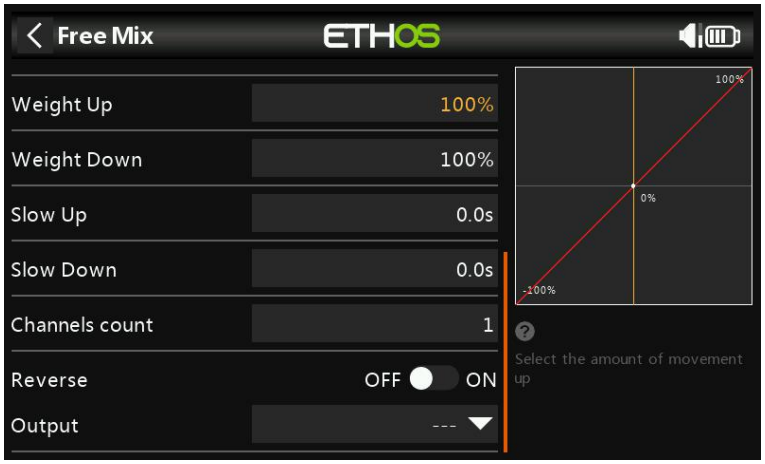
Curve

A standard curve option is Expo, which by default has a value of 0, which means the response is linear (i.e. no curve). A positive value will soften the response around 0, while a negative value will sharpen the response.

Any previously defined curve may also be selected. The mixer output will then modified by this curve. Alternatively, a new curve may be added.

Offset

Offset will shift the mixer output up or down by the offset value entered here.



Weight Up

The mixer output in the positive direction will be scaled by the weight value entered here.

Weight Down

Similarly, the mixer output in the negative direction will be scaled by the weight value entered here.

Slow Up/Down

Response of the output can be slowed down with regard to the input change. Slow could for example be used to slow retracts that are actuated by a normal proportional servo. The value is time in seconds that the output will take to cover the -100 to +100% range.

Channels Count

Channel count defines how many Output channels are allocated.

Reverse

The output of this mixer line can be reversed or inverted by enabling this option. Please note that servo reversal should be done under Outputs. This option is for getting the logic of the mixing right.

Output

Any channel can be selected to receive the output from this mixer line. If the Channels Count above is greater than one, then a channel must be configured for each Output.

Other Pre-defined Mixes

<< this section to be added >>

Outputs

The Outputs section is the interface between the setup "logic" and the real world with servos, linkages and control surfaces as well as actuators and transducers. In the Mixer we have set up what we want our different controls to do. This section allows these pure logical outputs to be adapted to the mechanical characteristics of the model. This is where we configure minimum and maximum throws, servo or channel reverse, and adjust the servo or channel center point or add an offset using subtrim. We can also define a curve to correct any real world response issues. For example, a curve can be used to ensure that left and right flaps track accurately. The various channels are outputs, for example CH1 corresponds to servo plug #1 on your receiver (with the default protocol settings).

The Outputs screen shows two bar graphs for each channel. The lower green bar shows the value of the mixer for the channel, while the upper orange shows the actual value of the Output after the Outputs processing, which is what is sent to the receiver. In the example above you can see that both the mixer and output values for CH4 Throttle are at -100%.

Note: For quick access to this monitor screen, a long press of the enter key from the Mixer screen and Flight Modes screens will jump to the Outputs.

Outputs Setup

Tap on the Output channel to be edited or reviewed.

Name

The name can be edited.

Invert

Will Invert the channel output, typically to reverse servo direction.

Min/Max

The Channel min and max settings are 'hard' limits, i.e. they will never be overridden. They should be set to avoid mechanical binding. Note that they serve as gain or 'end point' settings, so reducing these limits will reduce throw rather than induce clipping. Note that the limits default to +/- 100%, but may be increased here to +/- 125%.

Center and Subtrim

Used to introduce an offset on the output, typically used to center a servo arm.

Curve

Allows you to select an Expo or custom curve to condition the output. The popup allows to to either select an existing curve, or to add a new curve. After configuring the curve, an Edit button is added so that you can edit the curve easily.

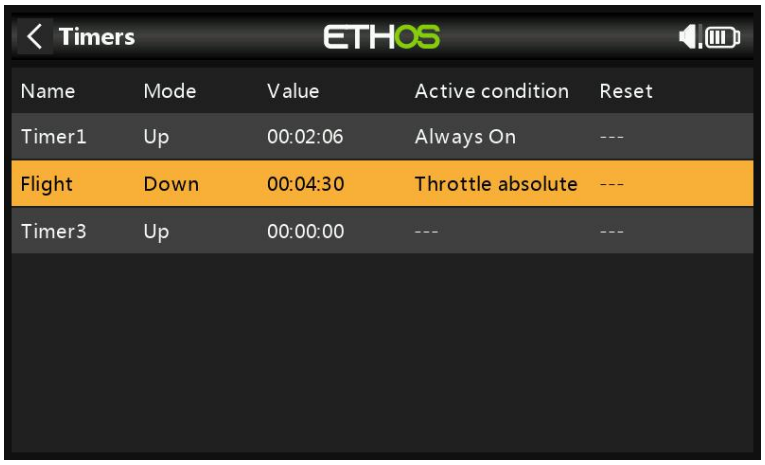
Curves are a quicker and more flexible way of configuring the center and min/max limits of the outputs, and you get a nice graphic. Use a 3-point curve for most outputs, but use a 5-point curve for things such as the second aileron and flap, so you can synchronize the travel at 5 points. When using a curve it is good practice to leave Min, Max and Subtrim at their 'pass thru' values of -100, 100 and 0 respectively (or -125, 125 and 0 if using extended limits).

Slow Up/Down

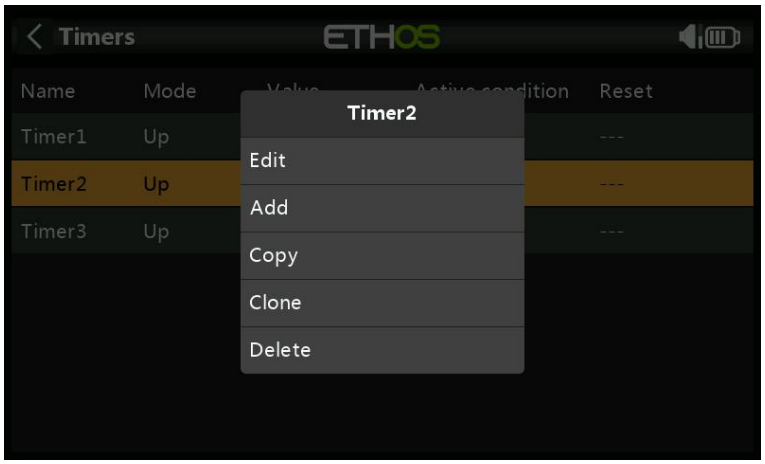
Response of the output can be slowed down with regard to the input change. Slow could for example be used to slow retracts that are actuated by a normal proportional servo. The value is time in seconds that the output will take to cover the -100 to +100% range.

Please note that a delay function is available under Logic Switches.

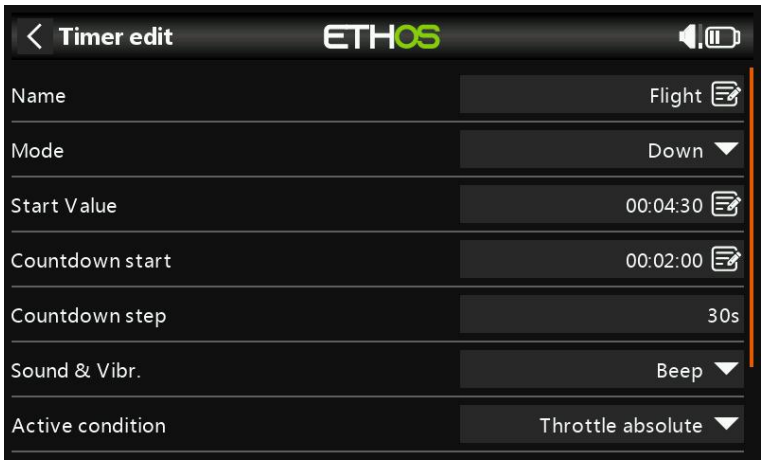
Timers



There are 3 fully programmable timers that can count either up or down.



Touching any timer line brings up a popup with options to edit that timer, add a new timer, copy/paste or clone or delete a timer.



Name

Allows the timer to be named.

Mode

The timer can count Up or Down.

Alarm/Start Value

If the timer has been set to count Up, the next parameter sets the Alarm Value at which the timer triggers the configured alerts.

If the timer has been set to count Down, the next parameter sets the Start Value from which the timer counts down. When it reaches zero, it triggers the configured alerts.

Countdown Start

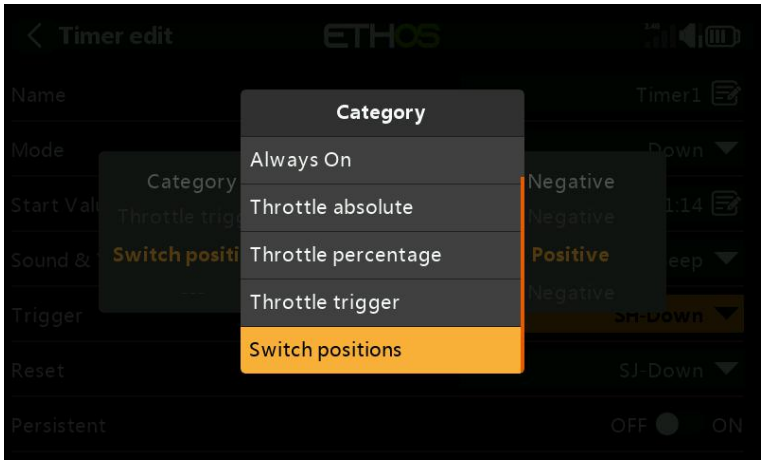
The timer value from which the countdown alerts start.

Countdown Step

The interval at which countdown alerts are made.

Sound & Vibr

This setting determines whether the countdown alert is a beep or spoken value.



Active Condition

The active condition parameter which determines when the timer is running has the following options:

Always On
Always On counts all the time.

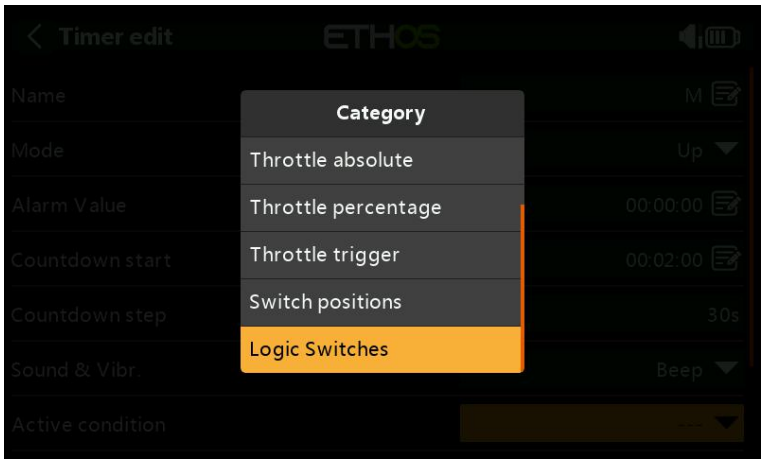
Throttle Absolute
The timer runs whenever the throttle stick isn't at idle.

Throttle Percentage
The timer counts up/down as a percentage of the full stick range.

Throttle Trigger
Throttle Trigger starts the timer the first time throttle is advanced,

Switch Positions
The timer may also be enabled by a switch position.

Logic Switch Positions
The timer may also be enabled by a logic switch.

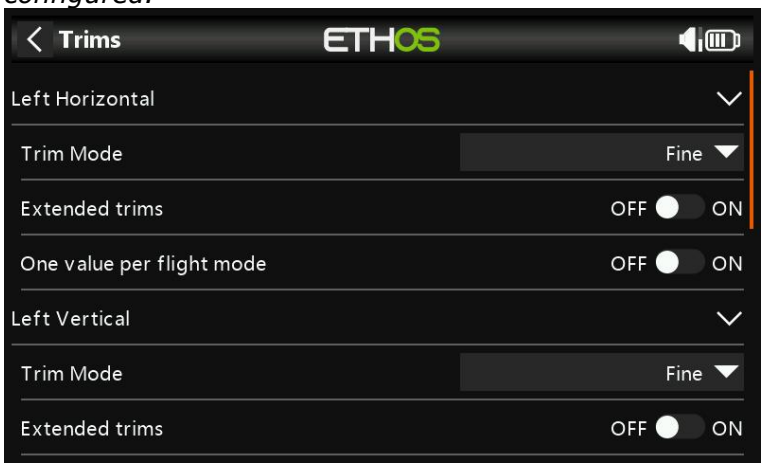


Reset
The timer can be reset by switch positions, function switches, logic switches or trim switch positions. Not that the timer will be held in reset while the Reset condition is valid.

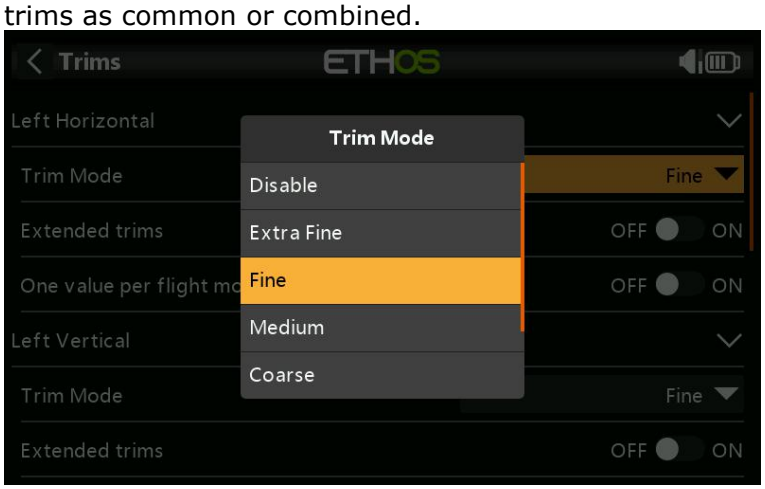
Persistent
Turning Persistent to On allows storing the timer value in memory when the radio is powered off or the model is changed, and will be reloaded next time the model is used.

Trims

The Trims section allows you to configure the Trim Mode (i.e. trim step size), enable Extended Trims or Independent Trims for each of the 4 control sticks. It also allows Cross Trims to be configured.



There are four sets of Trims settings, they are individual for each stick trim. For example, you can have independent elevator trims per flight mode, while leaving the aileron and rudder trims as common or combined.



Trim Mode

The Trim Mode allows trims to be disabled, or to configure the granularity of the trim switch steps, from Extra Fine through Medium to Coarse, or Exponential. The Exponential setting gives fine steps near the center, and coarse steps further out. Custom allows the trim step to be specified.

Extended Trims

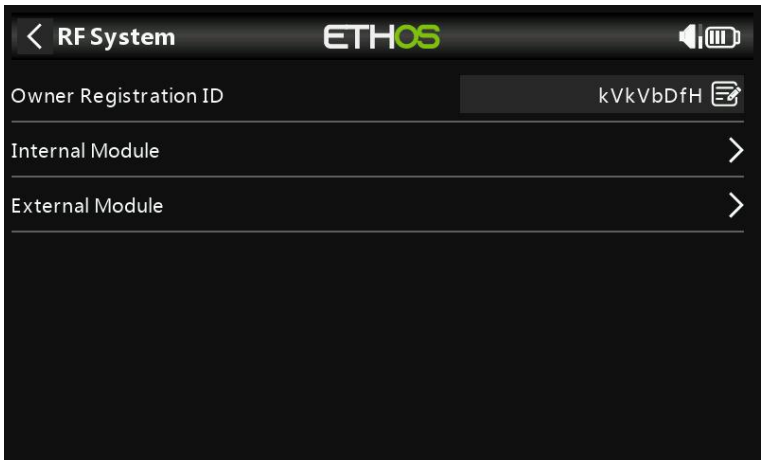
Extended trims allows trims to cover the full stick range instead of +/- 25%. Care must be taken with this option, as holding the trim tabs for too long might add so much trim as to make your model unflyable.

One Value per Flight Mode

If you are using Flight Modes, then this setting enables the relevant trim to be independent for each flight mode, instead of being common to all flight modes.

RF System

This section is used to configure the Owner Registration ID, and the internal and/or external RF modules.



Owner Registration ID

The Owner Registration ID is an 8 character ID that contains a unique random code, which can be changed if desired. This ID becomes the Owner Registration ID when registering a receiver (refer page nn). Enter the same code in the Owner ID field of your other transmitters you want to use the Smart Share feature with them. This must be done before creating the model you want to use it on.

Internal Module

Overview

The X20 TD-ISRM internal RF module is a new design that provides tandem 2.4GHz and 900MHz RF paths. It can operate in 3 modes, i.e. ACCESS, ACCST D16 (see page nn) or TD MODE (see page nn).

ACCESS Mode

In ACCESS mode the 2.4G and 900M RF paths work in tandem with one set of ACCESS controls. There can be three 2.4G receivers registered and bound or three 900M receivers registered and bound or a combination of 2.4G and 900M for a total of three receivers.

In ACCESS mode with a combination of 2.4G and 900M receivers the telemetry for the 2.4G and 900M RF links are active at the same time. The sensors are identified in telemetry as 2.4G or 900M.

There is a new ETHOS telemetry receiver source feature named RX. RX provides the receiver number of the active receiver sending telemetry. RX is available in telemetry like any other sensor for real time display, Logic Switches, Special Functions and data logging.

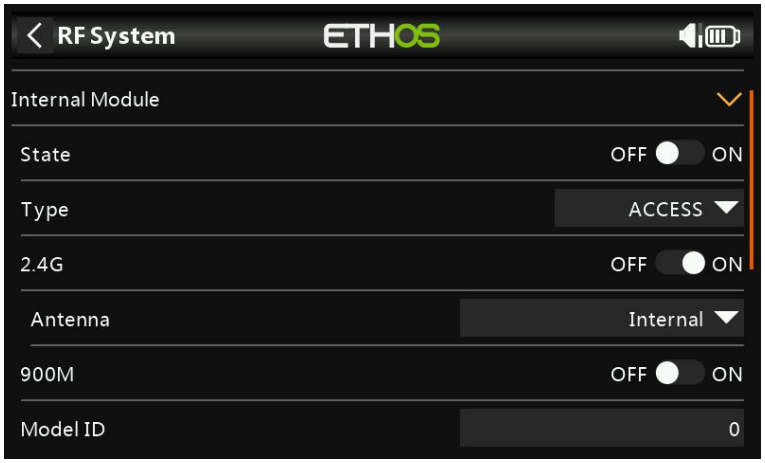
ACCST D16 Mode

In ACCST D16 the TD-ISRM becomes a single 2.4G RF path.

TD Mode

In TD Mode the TD-ISRM is in a low latency long range mode using the 2.4G and 900M RF links in Tandem to work with the new Tandem receivers. At the time of writing Tandem receivers are not available yet.

Please see the following sections for configuration details.



State

The Internal Module can be On or Off.

Type

Transmission mode of the internal RF module. The X20/X20S models operate on the 2.4GHz and/or the 900MHz band. The ACCESS and TD (Tandem) modes can operate on both the 2.4GHz and/or the 900MHz band simultaneously (or individually), while the ACCST D16 operates only on the 2.4GHz band. The Mode must match the type supported by the receiver or the model will not bind! After a Mode change, carefully check model operation (especially Failsafe!) and fully verify that all receiver channels are functioning as intended.

Type: ACCESS

ACCESS changes the way receivers are bound and connected with the transmitter. The process is broken into two phases. The first phase is registering the receiver to the radio or radios it is to be used with. Registration only needs to be performed once between each receiver / transmitter pair. Once registered, a receiver can be bound and re-bound wirelessly with any of the radios it is registered with, without using the bind button on the receiver.

Having selected the ACCESS mode, the following parameters must be set up:

2.4G

Enable or disable the 2.4G RF module.

Select Internal or External (on ANT1 connector) Antenna. Ensure that an external antenna or dummy load has been fitted before selecting the External antenna to avoid damage to the RF section.

900M

Enable or disable the 900M RF module.

Antenna: Select Internal or External (on ANT2 connector) Antenna. Ensure that an external antenna or dummy load has been fitted before selecting the External antenna to avoid damage to the RF section.

Power: Select the RF Power desired between 10, 25, 100, 200, 500mW.

In ACCESS mode the 2.4g and 900m RF paths work in tandem with one set of ACCESS controls. There can be three 2.4G receivers registered and bound or three 900M receivers registered and bound or a combination of 2.4G and 900M for a total of three receivers.

Model ID

When you create a new model, the default Model ID is 0. However, you should change this to a unique number.

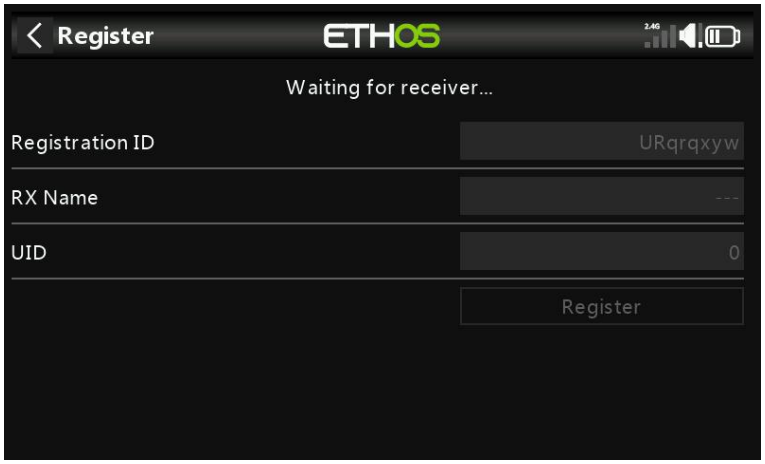
Channel Range

Since ACCESS supports 24 channels, you normally choose Ch1-8, Ch9-16 or Ch17-24 for the receiver being set up.

Phase One: Registration

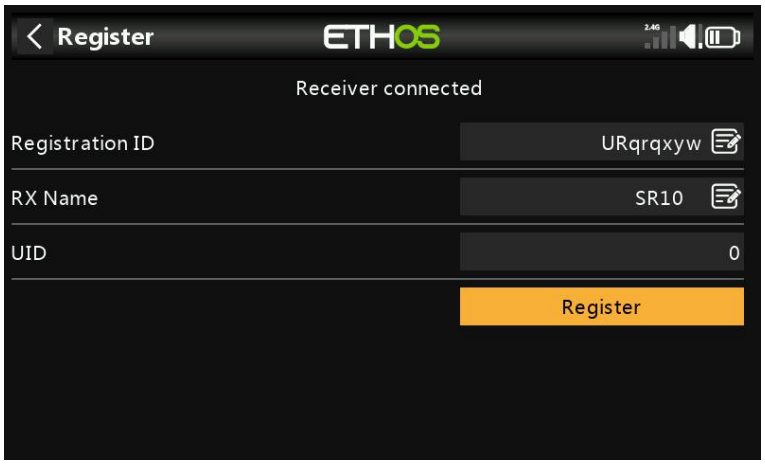
Set:

1. Initiate the registration process by selecting [Register].



A message box with 'Waiting....' will pop up with a repeating ‘Register’ voice alert.

2. While holding down the bind button, power up the receiver, and wait for the red & green LEDs to become active.

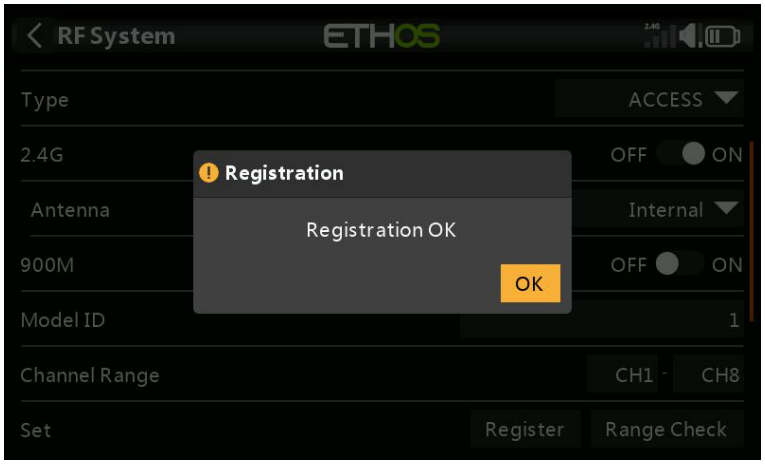


The 'Waiting...' message changes to ‘Receiver Connected’, and Rx Name field will be filled in automatically.

3. At this stage the Reg. ID and UID can be set:
- Reg. ID: The Registration ID is at owner or transmitter level. This should be a unique code for your X20/X20S and transmitters to be used with Smart Share. It defaults to the value in the Owner Registration ID setting described above at the start of this section, but can be edited here. If two radios have the same ID you can move receivers (with the same Receiver No for a given model) between them by simply using the power on bind process.
- RX Name: Filled in automatically, but the name can be changed if desired. This can be useful if you are using more than one receiver and need to remember for example that RX4R1 is for Ch1-8 or RX4R2 is for Ch9-16 or RX4R3 is for Ch17-24 when rebinding later. A name for the receiver can be entered here.
- The UID defaults to 0 for Ch1-8. When more than one receiver is to be used in the same model, the UID should be changed to 1 for Ch9-16, or 2 for Ch17-24. Please note that this UID cannot be read back from the receiver, so it is a good idea to label the receiver.

4. Press [Register] to complete. A dialog box pops up with 'Registration ok'. Press [OK] to continue.

5. Turn the receiver off and back on. The green LED should now be on.

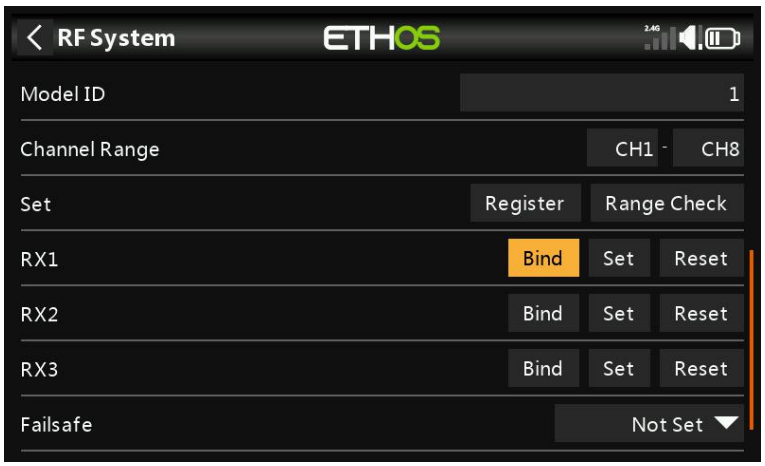


Range:

A range check should be done at the field when the model is ready to fly.

Range check is activated by selecting 'Range'. A voice alert will announce ‘Range Check’ every few seconds to confirm that you are in range check mode. A popup will display the VFR% and RSSI value to evaluate how reception quality is behaving. When the Range Check is active, it reduces transmitter power by a factor of 900, which reduces the range by a factor of 30. Under ideal conditions, with both the radio and receiver at 1m above the ground, you should only get a critical alarm at about 30m apart.

Please refer to the Telemetry section (from pg nn) for a discussion on VFR and RSSI values.



At this point the receiver is registered, but it still needs to be bound to the transmitter to be used.

Phase 2 – Binding, and Module Options

Receiver binding enables a registered receiver to be bound to one of the transmitters it has been registered with in phase 1, and will then respond to that transmitter until re-bound to another transmitter. Be certain to perform a range check before flying the model.

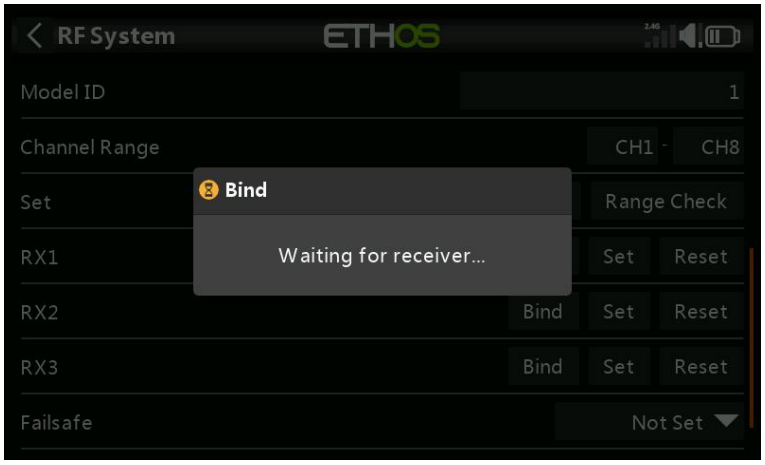
Receiver No: Confirm the receiver number the model is to operate under. Receiver matching is still as important as it was before ACCESS. The receiver number defines the behavior of the receiver lock function (aka: Receiver Match). This number is sent to the receiver, which will only respond to the number it was bound to. By default this is the number of the model's slot when it is created. It can however be changed manually, and will not change if a model is moved or copied. If manual setting or a copy/move operation results in 2 or more models on the radio having the same number, a warning pop-up will show up. It is then up to the user to determine if this is the desired behavior or not and change if required.

Bind

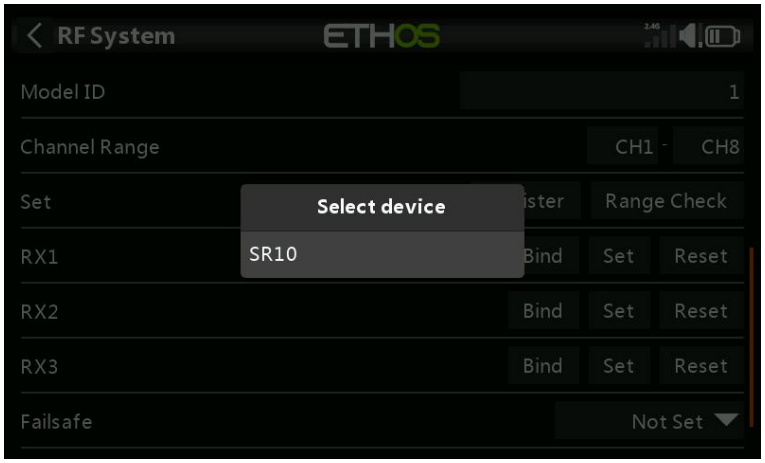
1. Turn the receiver power off.

2. Confirm that you are in ACCESS mode.

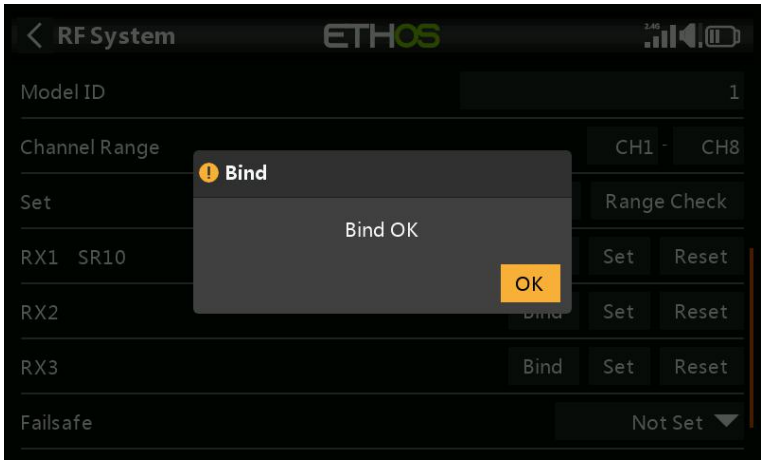
3. Receiver 1 [Bind]: Initiate the binding process by selecting [Bind]. A voice alert will announce 'Bind' every few seconds to confirm that you are in bind mode. A popup will display 'Waiting for receiver….'.



4. Power up the receiver without touching the F/S bind button. A message box will pop up 'Select device' and the name of the receiver you have just powered on.



5. Scroll to the receiver name and select it. A message box will pop up indicating that binding was successful.

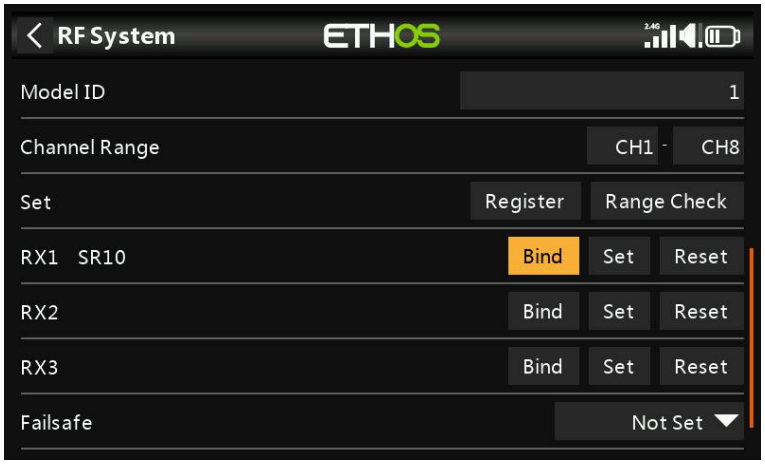


6. Turn off both the transmitter and the receiver.

7. Turn the transmitter on and then the receiver. If the Green LED on the receiver is on, and the Red LED is off, the receiver is linked to the transmitter. The receiver/transmitter module binding will not have to be repeated, unless one of the two is replaced.

The receiver will only be controlled (without being affected by other transmitters) by the transmitter it is bound to.

The receiver selected will now show for RX1 the name next to it:



The receiver is now ready for use.

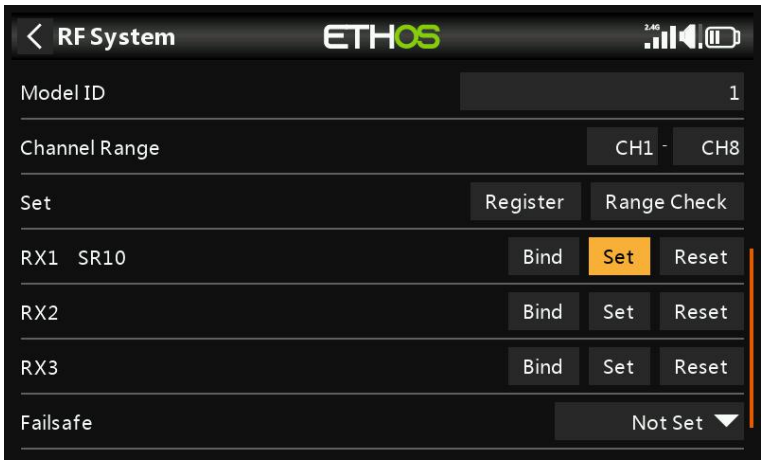
Repeat for Receiver 2 and 3 if applicable.

Warnings – Very Important

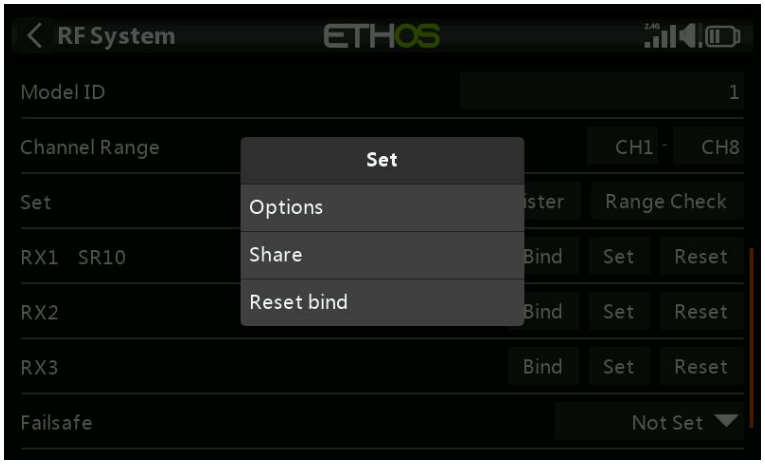
Do not perform the binding operation with an electric motor connected or an internal combustion engine running.

Refer also to the Telemetry pages (see page nn) for a discussion on RSSI.

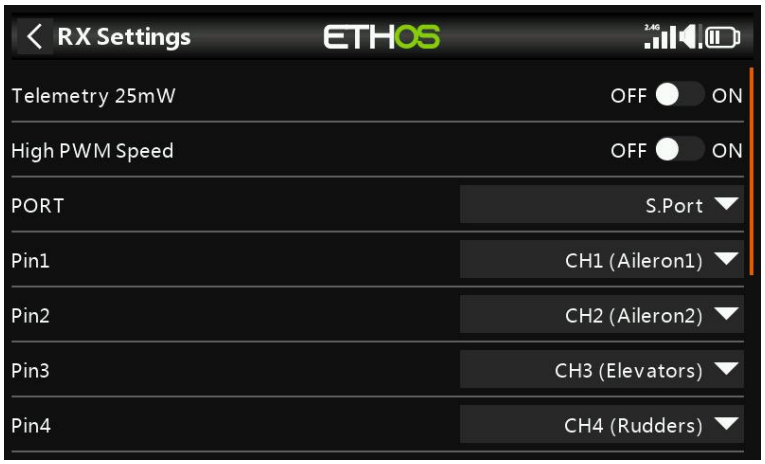
Set – Receiver Options



Tap the Set button next to Receiver 1, 2 or 3, and to bring up Receiver Options:



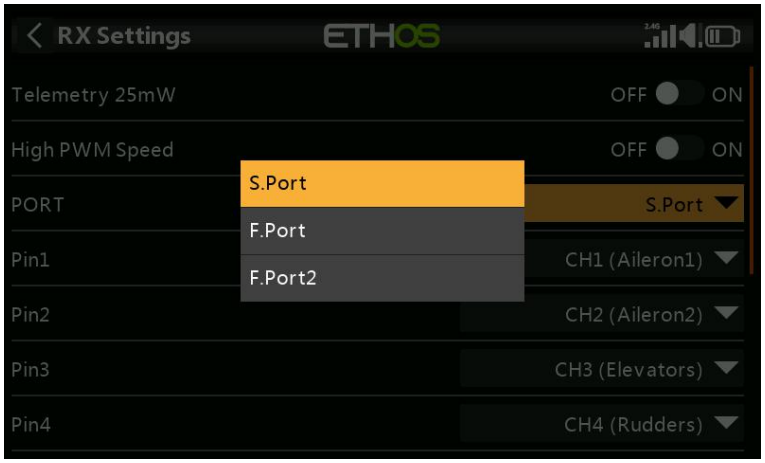
Tap on Options:



Options

Telemetry 25mW: Checkbox to limit telemetry power to 25mW (normally 100mW), possibly required if for example servos experience interference from RF being sent close to them.

High PWM Speed: Checkbox to enable a 7ms PWM update rate (vs 20ms standard). Ensure that your servos can handle this update rate.



Port: Allows selection of the SmartPort on the receiver to use either S.Port, F.Port or the F.Port2 protocol. The F.Port protocol was developed with the Betaflight team to integrate the separate SBUS and S.Port signals. F.Port 2.0 also enables one Host device to communicate with several Slave devices on the same line.

The receiver Options dialog also gives the ability to Remap channels to the receiver pins.

Share

The Share feature provides the ability to move the receiver to another ACCESS radio having a different Owner Registration ID. When the Share option is tapped, the receiver green LED turns off.

On target radio B, navigate to the RF System section and Receiver(n) and select Bind. Note that the Share process skips the Registration step on Radio B, because the Owner Registration ID is transferred from radio A. The receiver name from the source radio pops up. Select the name, the receiver will bind and its LED will go green.

A 'Bind successful' message will pop up.

Tap on OK. Radio B now controls the receiver. The receiver will remain bound to this radio until you choose to change it.

Press the EXIT button on Radio A to stop the Share process.

The receiver can be moved back to radio A by rebinding it to radio A.

Note: You do not need to use 'Share' if all your radios are using the same Owner ID / registration number. You can simply put the radio you want to use in bind mode, turn on the receiver, select the receiver in the radio and it will bind with that radio. You can switch to another radio the same way. It is best to keep the model receiver numbers the same when copying the models.

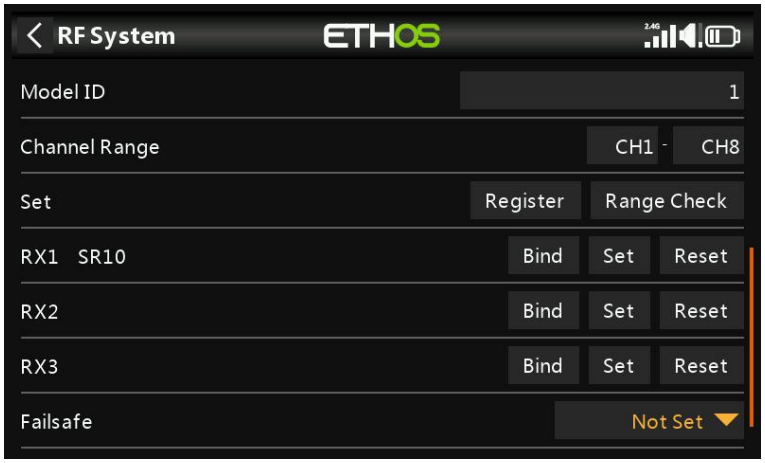
Reset bind

If you change your mind about sharing a model, select 'Reset bind' to clean up and restore your bind. Power cycle the receiver, and it will be bound to your transmitter.

Reset – Receiver

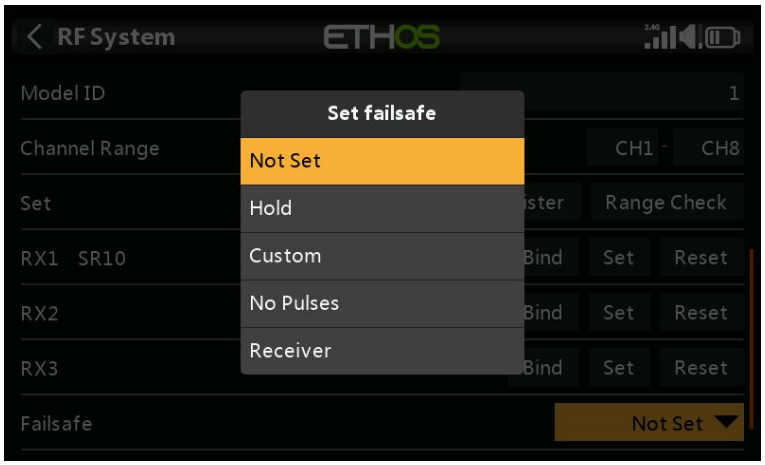
Tap on the Reset button to Reset the receiver back to factory settings and clear the UID. The receiver is unregistered with X20.

Set Failsafe



The Failsafe mode determines what happens at the receiver when the transmitter signal is lost.

Tap on the drop-down box to see the failsafe options:



Hold

Hold will maintain the last received positions.

Custom

Custom allows moving the servos to custom predefined positions. The position for each channel can be defined separately. Each channel has the options of Not Set, Hold, Custom or No Pulses. If Custom is selected, a fixed value for that channel can be entered.

No Pulses

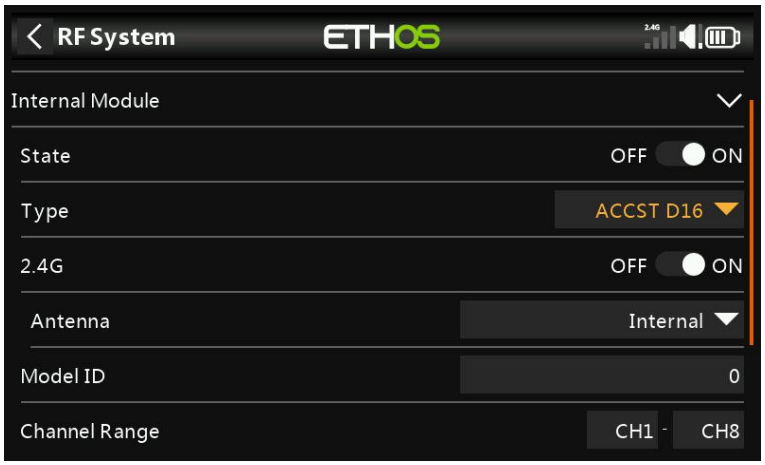
No Pulses turns off pulses (for use with flight controllers having return-to-home GPS on loss of signal).

Receiver

Choosing "Receiver" on X series or later receivers allows failsafe to be set in the receiver.

Warning: Be sure to test the chosen Failsafe settings carefully.

Type: ACCST D16



Mode ACCST D16 is for the ACCST 16ch two-way full duplex transmission, also known as the "X"-mode. For use with the legacy “X” series receivers.

2.4G

ACCST D16 operates on 2.4G, so the 2.4G RF section is on by default.

Antenna

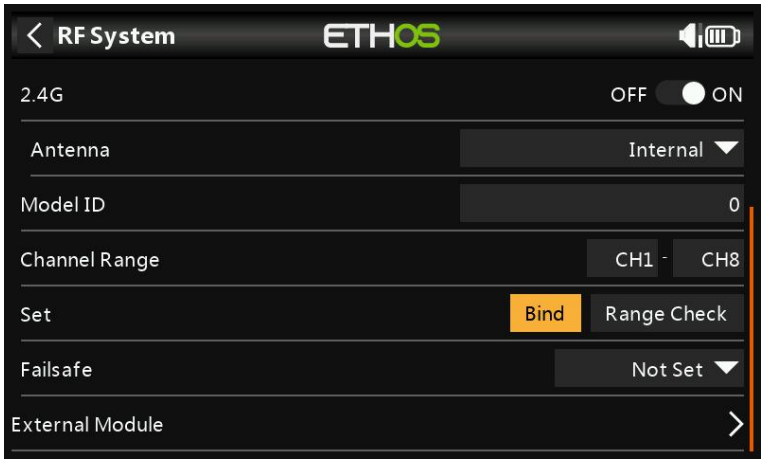
Select Internal or External (on ANT1 connector) Antenna. Ensure that an external antenna or dummy load has been fitted before selecting the External antenna to avoid damage to the RF section.

Model ID

When you create a new model, the Model ID is automatically allocated. However, you should change this.to a unique number. The Model ID defines the behavior of the receiver lock function (aka: Receiver Match). This number is sent to the receiver, which will only respond to the number it was bound to. By default this is the number of the model's slot when it is created. It can however be changed manually, and will not change if a model is moved or copied.

Channel Range

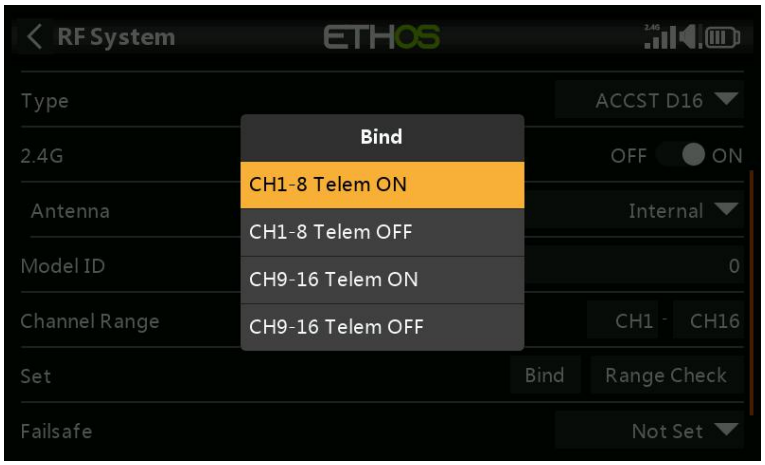
Choice of which of the radio's internal channels are actually transmitted over the air. In D16 mode you can choose between 8 channels with data sent every 9ms, and 16 channels with data sent every 18ms.



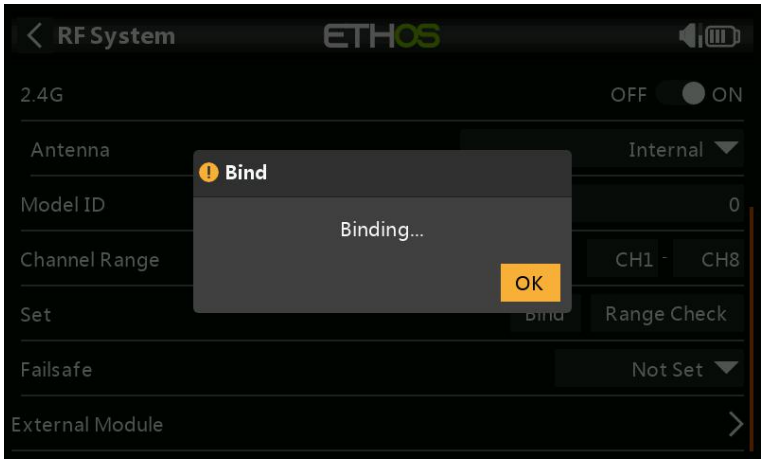
Bind

1. Initiate the binding process by selecting [Bind]. A voice alert will announce ‘Bind’ every few seconds to confirm that you are in bind mode. In D16 mode a pop-up menu will open during

bind to allow selection of the operation mode of the receiver. The options refer to the PWM outputs, and apply to receivers that support choosing between these 4 options using jumpers. Ensure that the receiver and RF module firmware support this option. If not, a regular bind takes place.



There are 4 modes with the combinations of Telemetry on/off and channel 1-8 or 9-16. This is useful when using two receivers for redundancy or to connect more than 8 servos using two receivers.



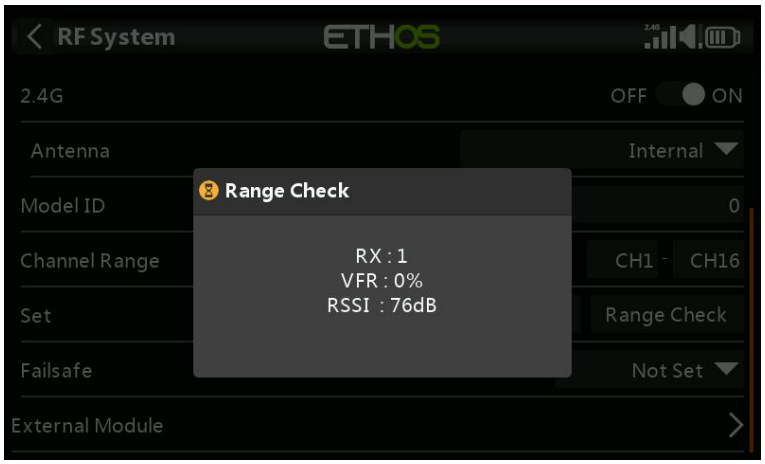
2. Power up the receiver, putting it into bind mode as per the receiver instructions. (Generally done by holding down the Failsafe button on the receiver during power up.)

3. The Red and Green LEDs will come on. The Green LED will go off, and the Red LED will flash when the binding process is completed.

4. Tap OK on the transmitter to end the Bind process, and power cycle the receiver.

5. If the Green LED on the receiver is on, and the Red LED is off, the receiver is linked to the transmitter. The receiver/transmitter module binding will not have to be repeated, unless one of the two is replaced. The receiver will only be controlled (without being affected by other transmitters) by the transmitter it is bound to.

Warnings – Very Important
Do not perform the binding operation with an electric motor connected or an internal combustion engine running.



Range

A range check should be done at the field when the model is ready to fly.

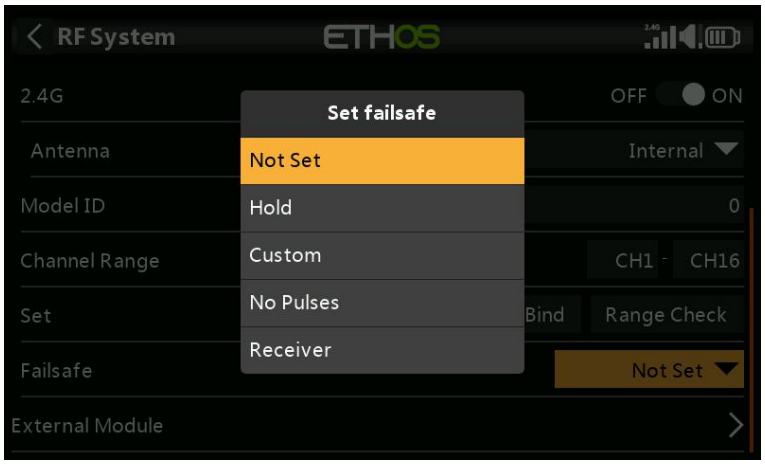
Range check is activated by selecting 'Range'. A voice alert will announce ‘Range Check’ every few seconds to confirm that you are in range check mode. A popup will display the VFR% and RSSI value to evaluate how reception quality is behaving. When the Range Check is active, it reduces transmitter power by a factor of 900, which reduces the range by a factor of 30. Under ideal conditions, with both the radio and receiver at 1m above the ground, you should only get a critical alarm at about 30m apart.

Please refer to the Telemetry section (from pg nn) for a discussion on VFR and RSSI values.

Set Failsafe

The Failsafe mode determines what happens at the receiver when the transmitter signal is lost.

Tap on the drop-down box to see the failsafe options:



Hold

Hold will maintain the last received positions.

Custom

Custom allows moving the servos to custom predefined positions. The position for each channel can be defined separately. Each channel has the options of Not Set, Hold, Custom or No Pulses. If Custom is selected, a fixed value for that channel can be entered.

No Pulses

No Pulses turns off pulses (for use with flight controllers having return-to-home GPS on loss of signal).

Receiver

Choosing "Receiver" on X series or later receivers allows failsafe to be set in the receiver.

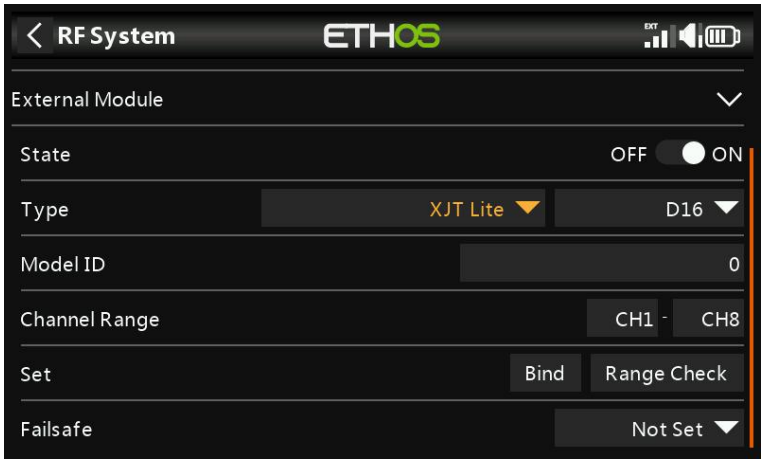
Warning: Be sure to test the chosen Failsafe settings carefully.

Type: TD Mode

<< to be completed when Tandem receivers are ready >>

External Module

Currently the following external modules are supported: XJT Lite, R9M Lite, R9M Lite Access, R9M Lite Pro Access and PPM.
The External module can operate in 3 modes, i.e. ACCESS, ACCST D16 or TD MODE. Please see the following sections for configuration details.



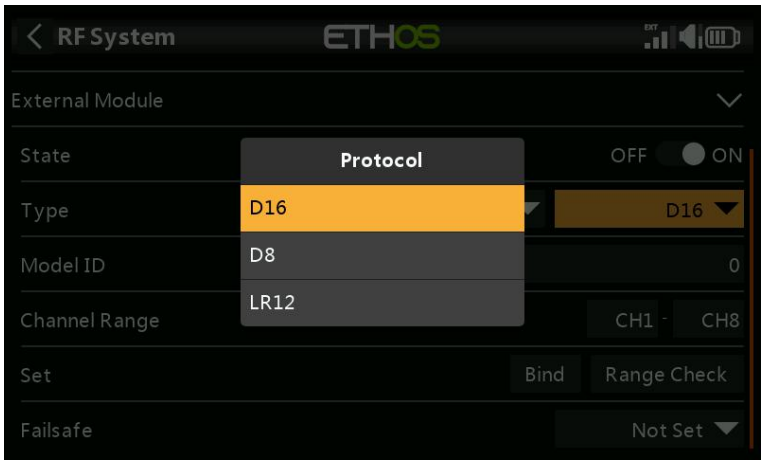
State

The Internal Module can be On or Off.

Type

XJT Lite

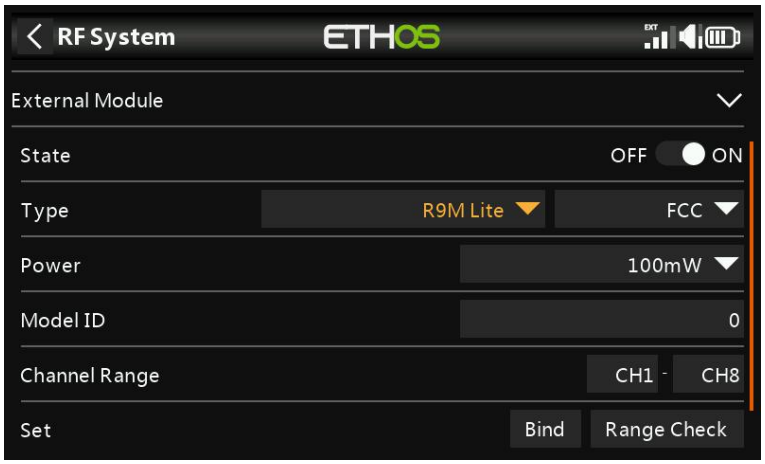
Protocol

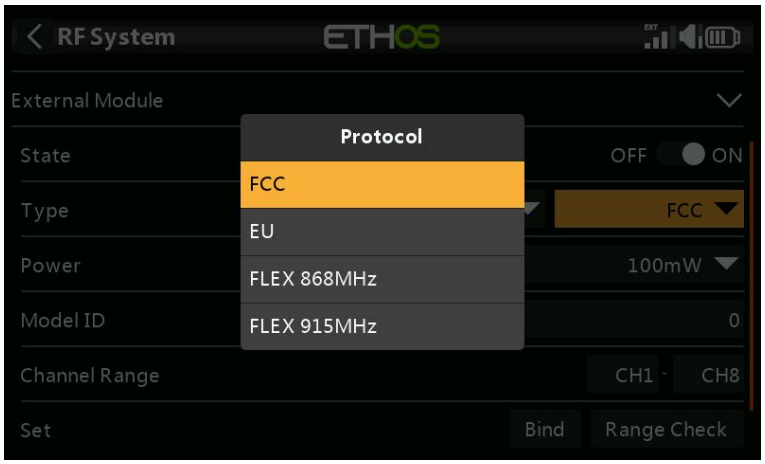


The XJT Lite can operate in D16 (up to 16 channels), D8 (up to 8 channels) or LR12 (up to 12 channels) modes.

Type

R9M Lite





Protocol

The R9M Lite can operate in the following modes:

Mode	RF Operating Frequency	RF Power
FCC	915MHz	100mW (with telemetry)
EU	868MHz	25mW (with telemetry) / 100mW (without telemetry)
FLEX 868MHz	Adjustable	100mW (with telemetry)
FLEX 915MHz	Adjustable	100mW (with telemetry)

Type

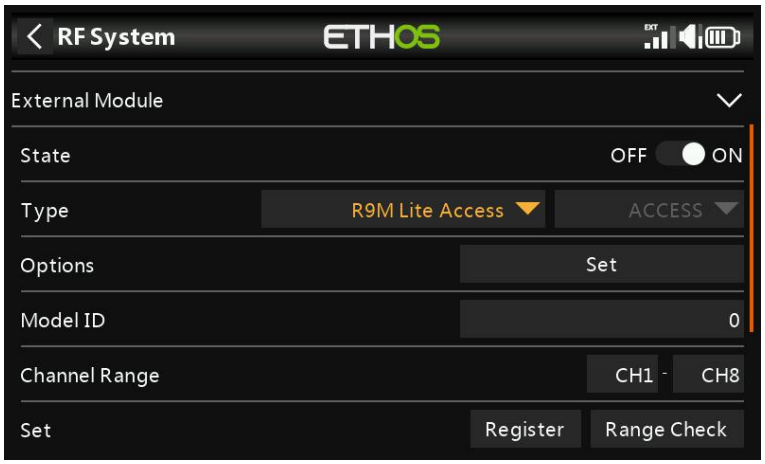
R9M Lite ACCESS

Protocol

The R9M Lite ACCESS operates in ACCESS mode.

Type

R9M Lite Pro ACCESS



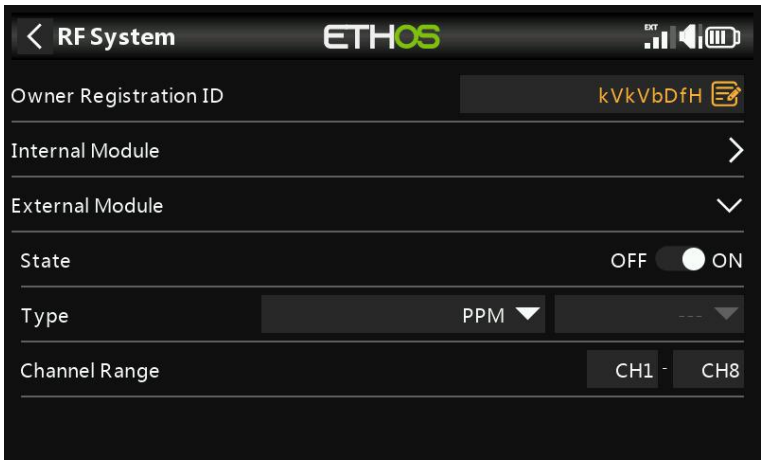
Protocol

The R9M Lite Pro ACCESS operates in ACCESS mode.

Mode	RF Operating Frequency	RF Power
Non-LBT	915MHz	10mW / 100mW / 500mW / 100mW~1W (Self-adaptive)
LBT	868MHz	Telemetry mode (25mW) / Non-Telemetry mode (200mW / 500mW)

Type

PPM



The External RF Module can operates in PPM mode.

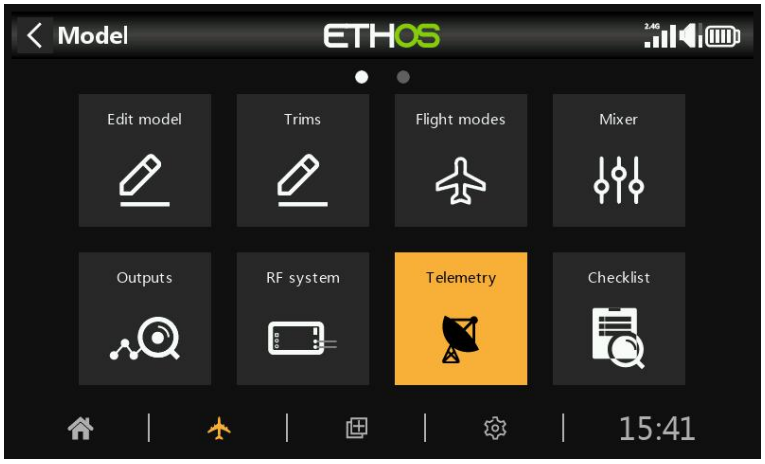
Channels Range

Bind/Range

Set Failsafe

These settings are similar to those for the Internal RF Module, so please refer to the relevant sections above for configuration details.

Telemetry



FrSky offers a very comprehensive telemetry system. The power of telemetry has lifted the RC hobby to a whole new level, and allows much more sophistication and a much richer modeling experience.

Smart Port telemetry

FrSky's series of sensors are a hub-less design. Smart Port (S.Port) telemetry devices are daisy chained together in any sequence and plugged into the Smart Port connection on compatible X and S and later series receivers. The receiver can achieve full duplex (2-way) high speed communication with many compatible devices through this connection with little or no manual set up. This results in less clutter and gives you the freedom to design the system you need, not what a hub will allow.

Key features:

Each value received via telemetry is treated as a separate sensor, that has its own properties such as

- the S.Port Data ID and Physical ID number
- the unit of measurement
- the decimal precision
- the calculation ratio
- an offset value

and the following options:

- Auto offset zero
- Clamp any negative value to zero
- Filter that will calculate a moving average of 4 past values
- Whether persistent
- Option to log to the SD card

The sensor also keeps track of its min/max value.

More than one of the same sensor type can be connected, but the Physical ID must be changed (using the FrSky SBUS servo changer SCC) to ensure that each sensor in the smart port chain has a unique ID. Examples are a sensor for each cell in a 2 x 6S Lipo, or monitoring individual motor currents in a multi-motor model.

The same sensor can be duplicated, for example with different units, or for use in calculations such as absolute altitude, altitude above starting point, etc.

Each sensor can be individually reset with a special function, so for example you can reset your altitude offset to your starting point without losing all the other min/max values.
With FrSky sensors, once set up, they are auto-discovered whenever the complete system is powered up. However, when initially installed, they must be manually 'discovered' in order for the system to recognize them.

Telemetry Sensors can be

- played in voice announcements
- used in logical switches
- used in Inputs for proportional actions
- displayed in custom telemetry screens
- seen directly on the telemetry setup page without having to configure a custom telemetry screen

Displays are updated as data is received, and loss of sensor communication is detected.

Access Telemetry

Single receiver telemetry with ACCESS works in the same way as before.

Multi receiver telemetry

ACCESS offers Trio Control, which allows one transmitter to control the channels and/or telemetry for up to 3 receivers per model. You no longer need to use the STK tools for setup, and Smart Port also allows the use of third-party input/output devices with pass-through mode.

ACCESS will automatically switch to the next receiver if the RF link to a receiver is lost. The switching order is Receiver 1, then 2, then 3.

The most common application would be using S.Port, by daisy chaining the S.Port sensor chain to all 3 receivers, which should be sharing a common power supply.

- Register and bind the receivers (refer to pg nn of Model Setup).
- Connect the sensor and receiver Smart Ports in a daisy chain fashion.
- Discover new sensors (refer to pg nn of Telemetry Setup), and test carefully that Smart Port switching is working correctly.

Note that on the transmitter there will only be one telemetry entry for RSSI and RxBat, but these values will dynamically come from the receiver that is currently handling the telemetry. Simultaneous telemetry from three receivers will come later. Further developments are expected in this area.

Sensor Types:

1. Internal Sensors

FrSky radios and receivers have built-in telemetry functions to monitor the strength of the signal being received by the model.

RSSI

Receiver Signal Strength Indicator (RSSI): A value transmitted by the receiver in your model to your transmitter that indicates how strong the signal is that is being received by the model. Warnings can be set up to warn you when it drops below a minimum value, indicating that you’re in danger of flying out of range. Factors affecting the signal quality include external interference, excessive distance, badly oriented or damaged antennas etc.

It is not an absolute measurement, but a number that indicates the ratio of the signal to some initial "good" value. The number is relative, but can give an indication that the model may be approaching the range limit for control of the airplane.

The operating range of, for example, the X8R is about 1.45 – 2km under normal operating conditions.

ACCESS

The default alarms for ACCESS are 35 for 'RSSI Low' and 32 for 'RSSI Critical'. Loss of control will happen when the RSSI drops to around 28.

These numbers are on a dB logarithmic scale, which means that the value drops by 6 every time the distance to the receiver is doubled. Close to the transmitter the RSSI reading is close to 100. At a distance of 125m, the reading should be about 50, and drop by 6 to 44 at 250m, to 38 at 500m, and to 32 at 1km. At this point there will be about another 500m to spare because 32 is still 4 above the loss of signal value of 28, which equates to a range factor of about 1.5 (if it had been 6db, it would have been double, so 4db is about 1.5 times).

ACCST

The default alarms for ACCESS are 35 for 'RSSI Low' and 32 for 'RSSI Critical', while for ACCST they are 45 and 42 respectively. Loss of control will happen when the RSSI drops to around 28 for ACCESS and 38 for ACCST.

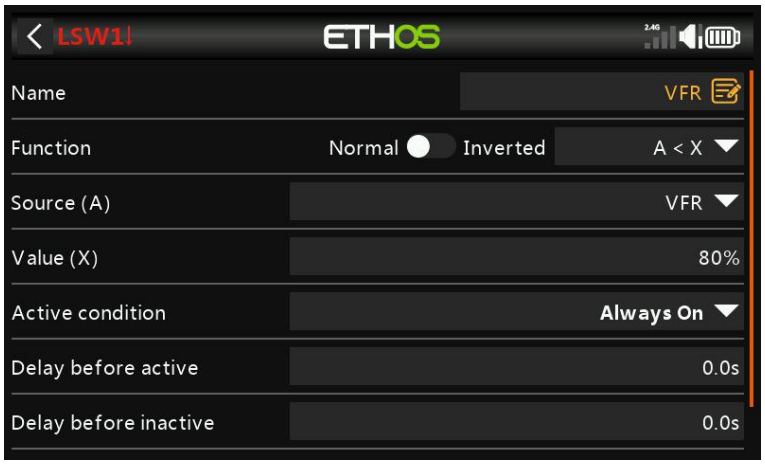
These numbers are on a dB logarithmic scale, which means that the value drops by 6 every time the distance to the receiver is doubled. Close to the transmitter the RSSI reading is close to 100. At a distance of 125m, the reading should be about 60, and drop by 6 to 54 at 250m, to 48 at 500m, and to 42 at 1km. At this point there will be about another 500m to spare because 42 is still 4 above the loss of signal value of 38, which equates to a range factor of about 1.5 (if it had been 6db, it would have been double, so 4db is about 1.5 times).

The warning for when telemetry is lost completely is announced as 'Telemetry Lost'. Be aware that further alarms will NOT sound, because the telemetry link has failed, and the radio can no longer warn you of an RSSI or any other alarm condition. In this situation it is wise to turn back to investigate the problem.

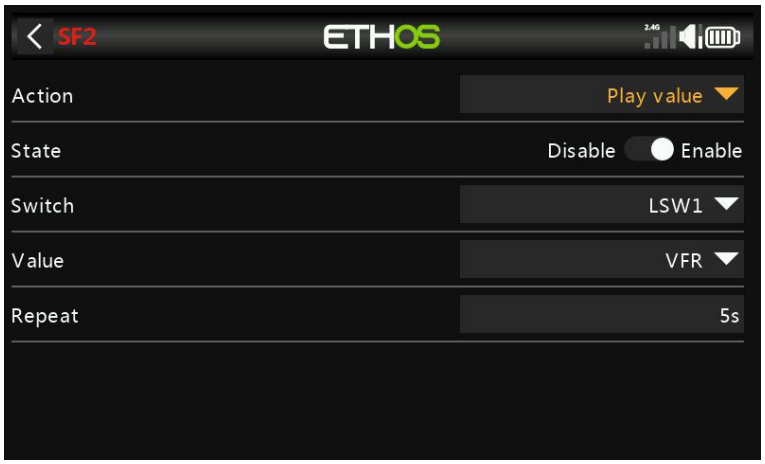
Note that when the radio and receiver are too close (less than 1m) the receiver may be swamped causing spurious alarms, resulting in an annoying "Telemetry Lost" - "Telemetry Recovered" alarm loop.

VFR%

Valid Frame Rate % (VFR%): Provides a measure of Link Quality, where 100% is perfect. At this stage there is no built in alert for VFR%, but you can easily set one up as follows:
a) Set a Logical Switch to become True when VFR drops below say 80% (please refer to the Logic Switches section):



b) Then create a Special Function to play the VFR value when the Logical Switch is True (please refer to the Special Functions section):



RxBatt

Another standard internal sensor is the receiver battery voltage.

ADC2

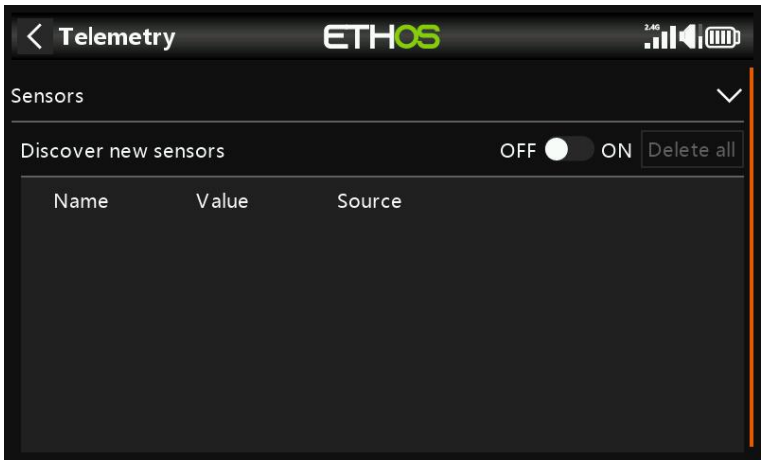
Some receivers support a second analog voltage input, which is available in telemetry as sensor ADC2.

2. 'External' Sensors

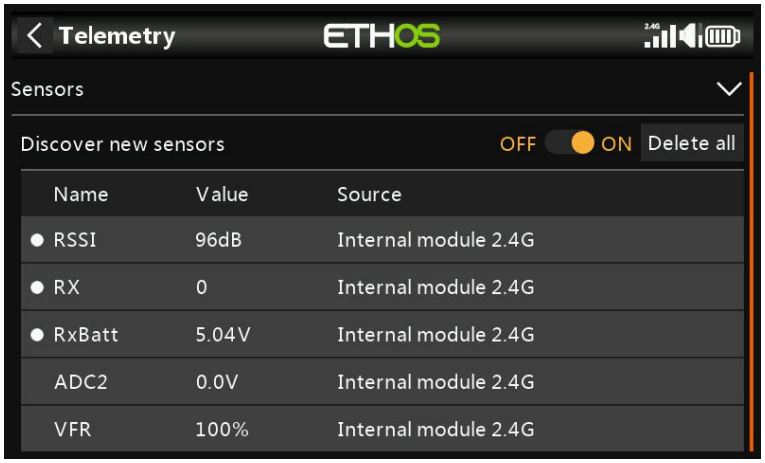
The current FrSky telemetry system makes use of FrSky Smart Port sensors. The X and S and later series of telemetry enabled receivers have the Smart Port interface. Multiple Smart Port sensors can be daisy chained together, making the system easy to implement. Most receivers also have either one or both A1/A2 analog input ports, which are useful for monitoring battery voltages, etc.

Telemetry Settings

Discover and edit sensor options including data logging. When the sensors are discovered they have an individual description for 2.4G or 900M so the sensor values can be used throughout the system. Up to 100 sensors are supported.



Sensors



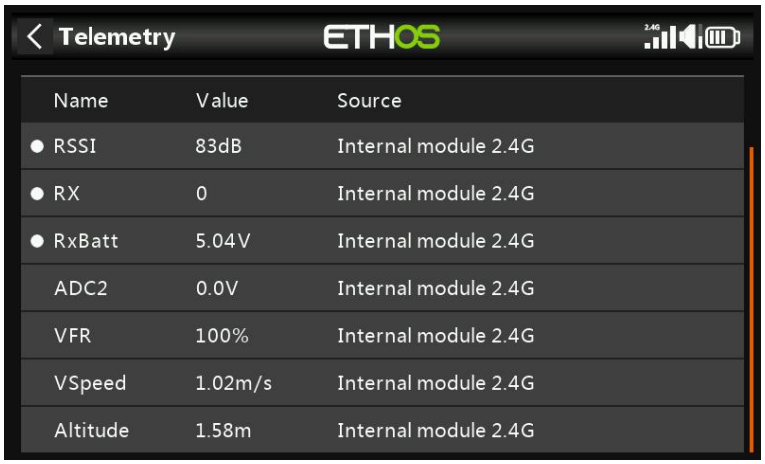
Discover new sensors:

Once the sensors have been connected, and the radio and receiver have been bound and are powered up, enable 'Discover new sensors' to discover new sensors available. A flashing dot in the left column indicates sensor data being received, or the value shows in red if no data is being received. Up to 100 sensors are supported.

During discovery the screen will be automatically populated with all the sensors found.

The above example screen shows an SR10 Pro receiver's 'internal' sensors, which are:

1. RSSI (Receiver Signal Strength Indicator) on line 1,
2. RX: There is a new ETHOS telemetry receiver source feature named RX. RX provides the receiver number of the active receiver sending telemetry. RX is available in telemetry like any other sensor for real time display, Logic Switches, Special Functions and data logging.
3. RxBatt, the receiver battery voltage measurement on line 3,
4. ADC2, the receiver analog voltage input on line 4, and
5. VFR, the Valid Frame Rate percentage on line 4.



6. VSpeed, the Vertical Speed from a FrSky High Precision Vario (FVAS-02H) on line 6,
7. Altitude, and Altitude from the same sensor.

Note that the minimum and maximum values are also defined for each parameter, even though they are not displayed on the sensor list. For example, when Altitude is defined, Altitude- and Altitude+ for the minimum and maximum altitude also become available.

Sensor discovery must be done for every model.

Stop Discovery:

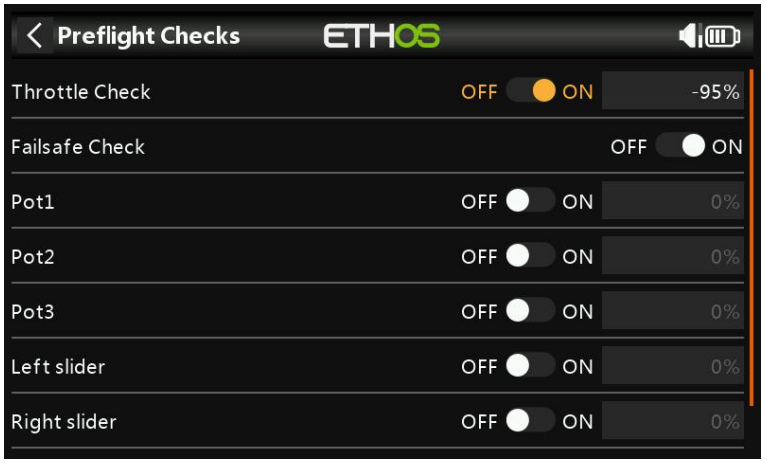
Move the 'Discover new sensors' switch to Off to stop discovery once the sensors have been discovered.

Delete all sensors:

This option will delete all sensors so you can start again.

Checklist

The Checklist function provides for a set of Preflight Checks. This is a group of safety features that take effect when powering up the radio and/or loading a model from the model list.



Throttle State

When enabled, it will warn you if the throttle stick is above the value set in it's parameter.

Failsafe Check

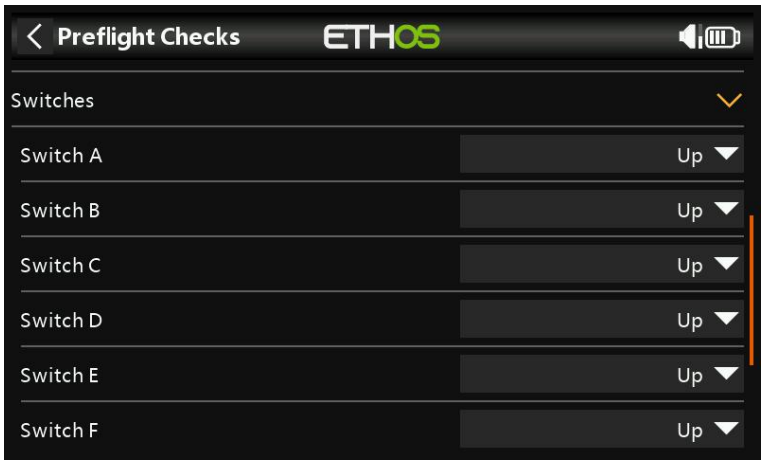
When enabled, it will warn you if Failsafe has not been set for the current model. It is highly advisable to leave this enabled!

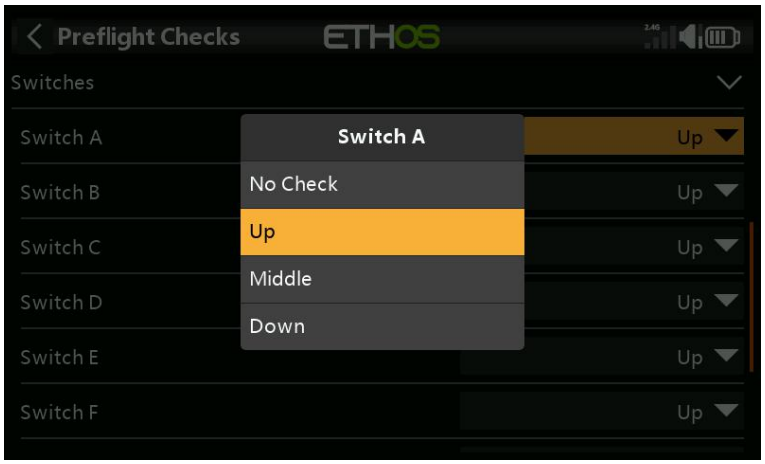
Pot1/2/3

Defines whether the radio requests the pots to be in predefined positions at startup. The desired pot values can be entered for each pot.

Left/Right Slider

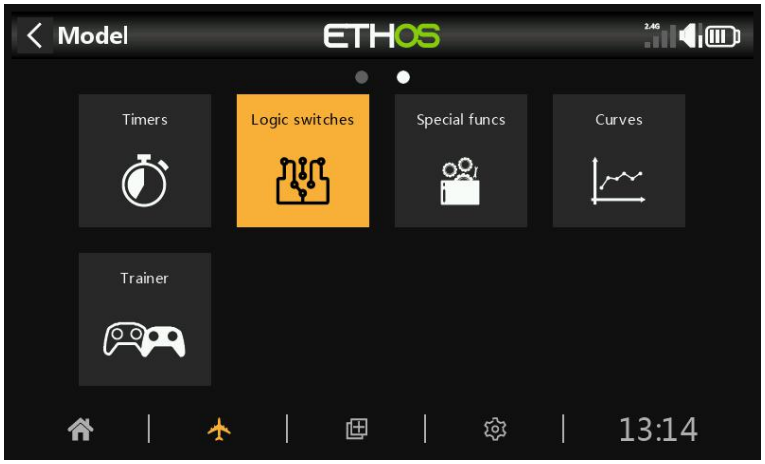
The same applies for the slider controls.





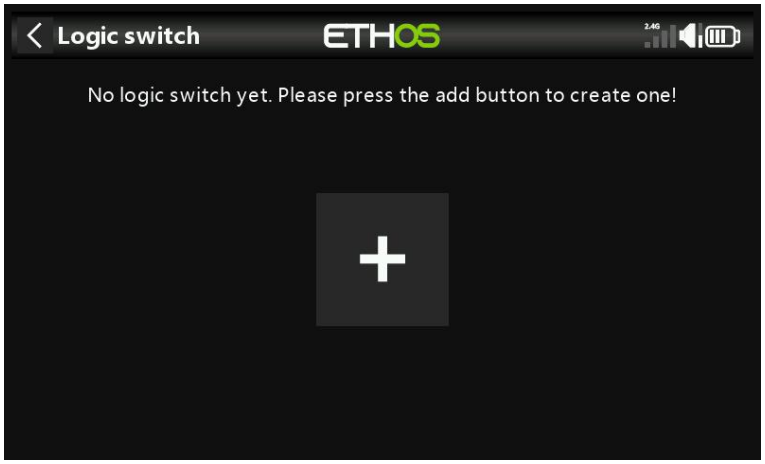
Switches
For each switch, you can define whether the radio requests that switches to be in the desired predefined positions. The options are shown above.

Logic Switches

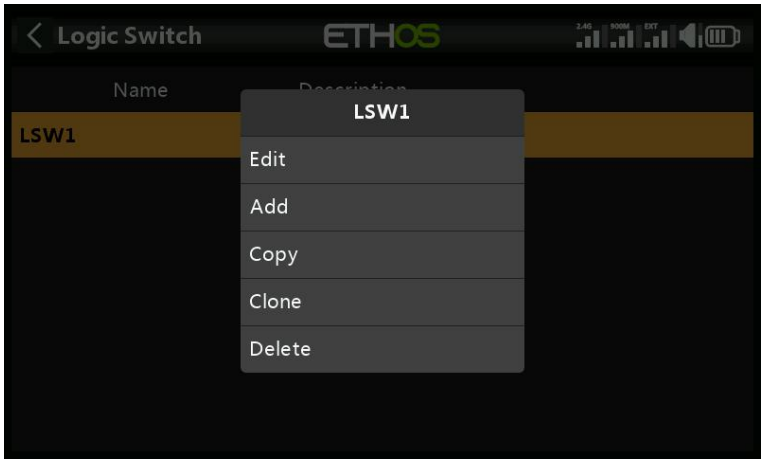


Logical switches are user programmed virtual switches. They aren't physical switches that you flip from one position to another, however they can be used as program triggers in the same way as any physical switch. They are turned on and off (in logical terms they become True or False) by evaluating the input conditions against the programming for the logical switch. They may use a variety of inputs such as physical controls and switches, other logical switches, and other sources such as telemetry values, mixer values, timer values, gyro and trainer channels. They can even use values returned by a LUA model script.

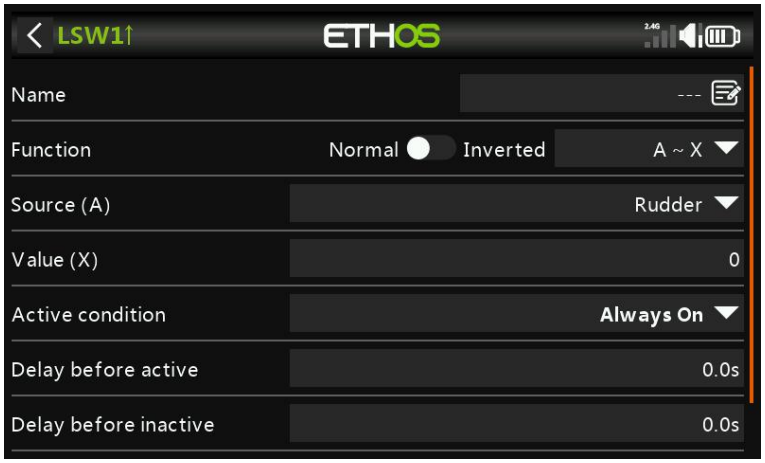
Up to 100 Logic Switches are supported.



There are no default Logic Switches. Tap on the '+' button to add a Logic Switch.



Once Logic Switches have been defined, tapping on one will bring up the above popup menu, allowing you to edit, add, copy/paste, clone or delete that switch.



Name

Allows the Logic Switch to be named.

Functions

The functions available are listed below. Please note that all functions may have normal or inverted outputs. Please also refer to the shared parameters section following the function descriptions below.

A~X
The condition is True if the value of the selected source 'A' is approximately equal (within about 10%) to 'X', a user defined value.

In most cases, it is better to use the approximately equals function rather than the 'exactly' equals function.

A=X
The condition is True if the value of the selected source 'A' is 'exactly' equal to 'X', a user defined value.

Care must be taken when using the 'exactly' equals function. For example, when testing if a voltage is equal to a setting of 8.4V, the actual telemetry reading may jump from 8.5V to 8.35V, so the condition is never met and the Logical Switch will never turn on.

A > X
The condition is True if the value of the selected source 'A' is greater than 'X', a user defined value.

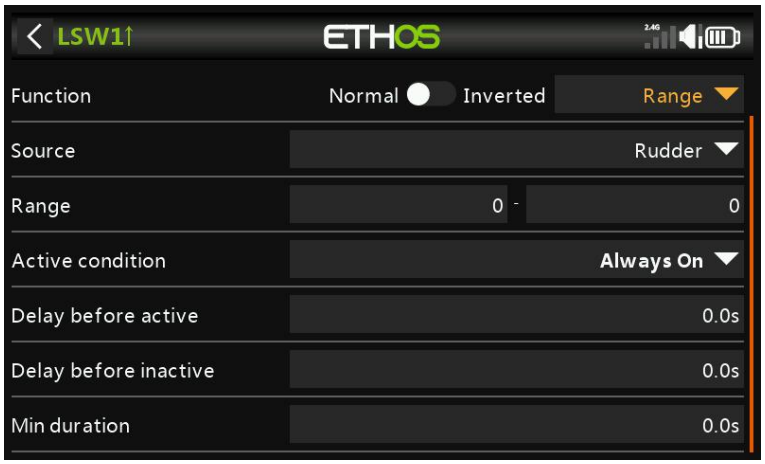
A < X
The condition is True if the value of the selected source 'A' is less than 'X', a user defined value.

|A| > X
The condition is True if the absolute value of the selected source 'A' is greater than 'X', a user defined value. (Absolute means disregarding whether 'A' is positive or negative, and just using the value.)

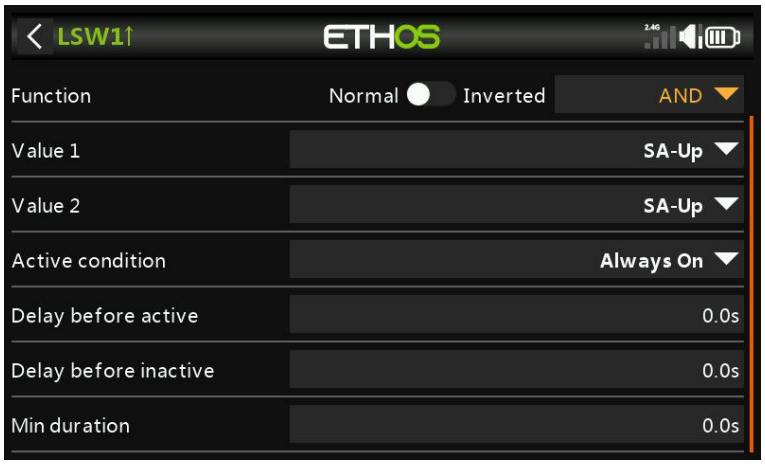
|A| < X
The condition is True if the absolute value of the selected source 'A' is less than 'X', a user defined value. (Absolute means disregarding whether 'A' is positive or negative, and just using the value.)

Δ>X
The condition is True if the change in value 'd' (i.e. delta) of the selected source 'A' is greater than or equal to 'X', a user defined value.

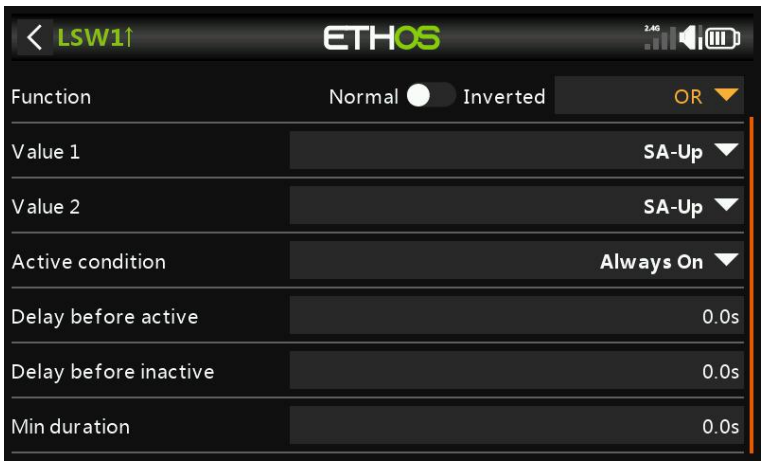
|Δ|>X
The condition is True if the absolute value of the change '|d|' in the selected source 'A' is greater than or equal to 'X', a user defined value. (Absolute means disregarding whether 'A' is positive or negative.)



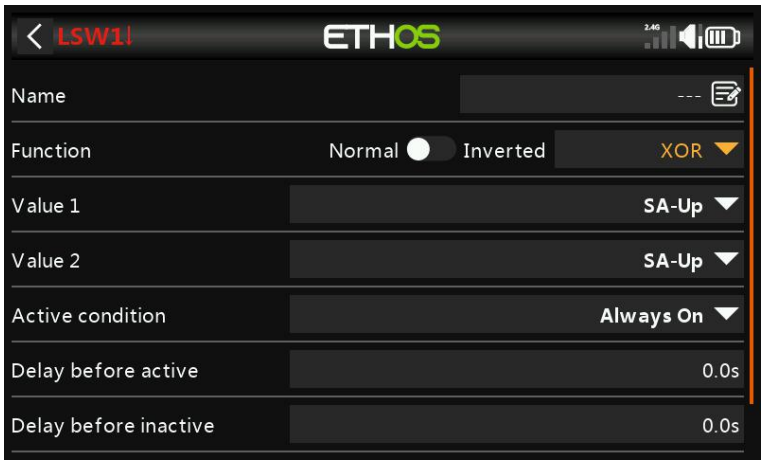
Range
The condition is True if the value of the selected source 'A' is within the range specified.



AND
The condition is True if both the sources selected in Value 1 and Value 2 are true (i.e. ON).



OR
The condition is True if either of the sources selected in Value 1 and Value 2 is true (i.e. ON).



XOR (Exclusive OR)

The condition is True if either the Value 1 source or the Value 2 source is true (i.e. ON) but not both.

Timer

The Logical Switch toggles on and off continuously. It switches on for time 'Duration Active', and off for time 'Duration Inactive'.

Sticky

The Sticky function is latched on (i.e becomes True) when the'Active Condition' switches from False to True, and holds its value until it is forced to False when the 'Inactive Condition' switches from False to True. This can be gated by the optional 'Active Condition' parameter. This means that if the 'Active Condition' is True, then the Logical Switch output follows the Sticky function's condition. However, if the 'Active Condition' is False, then the Logical Switch output is also held False.

Note that the Sticky function continues to operate, even if its output is gated by the 'Active Condition' switch. As soon as the 'Active Condition' switch condition becomes True again, the Sticky function's condition is switched through to the Logic Switch output.

<<note to team: the Sticky LSW has two 'Active Condition' parameters, which is confusing. Please see Github issue #214 for a resolution.>>

Edge

Active Condition

Edge is a momentary switch that becomes True for a moment when triggered by its first 'Active Condition' source.

During

During: is in two parts [t1:t2]; t1 is the Minimum and t2 the Maximum duration for the 'Active Condition'. The logical switch becomes True only after the trigger 'Active Condition' has been True for at least t1 AND is released before t2.

Logic Switches – Shared Parameters

The Logic Switches all have a number of shared parameters:

Active Condition

The Logic Switches can be gated by the optional 'Active Condition' parameter. This means that if the 'Active Condition' is True, then the Logical Switch output follows the Function's condition. However, if the 'Active Condition' is False, then the Logical Switch output is also held False. Note that the Sticky function continues to operate, even if its output is gated by the 'Active Condition' switch. As soon as the 'Active Condition' switch condition becomes True again, the Function's condition is switched through to the Logic Switch output.

Delay before active

This value determines the time for which the Logic Switch conditions have to be True before the Logic Switch output becomes True.

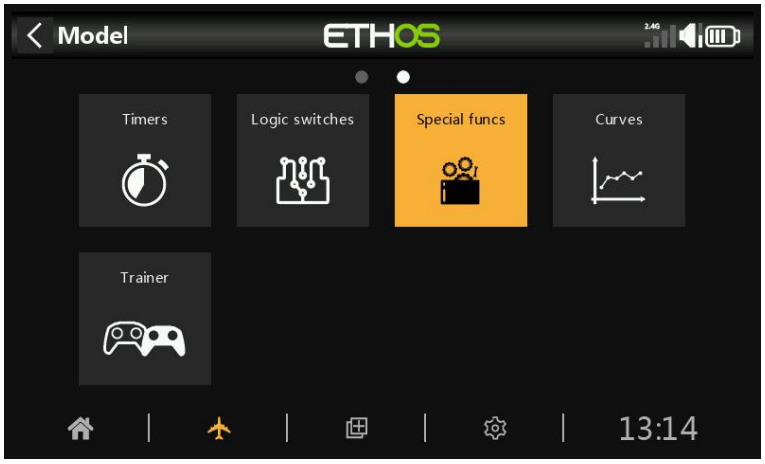
Delay before inactive

Similarly, this value determines the time for which the Logic Switch conditions have to be False before the Logic Switch output becomes False.

Min Duration

Once the Logic Switch becomes True, it will remain True for the duration specified.

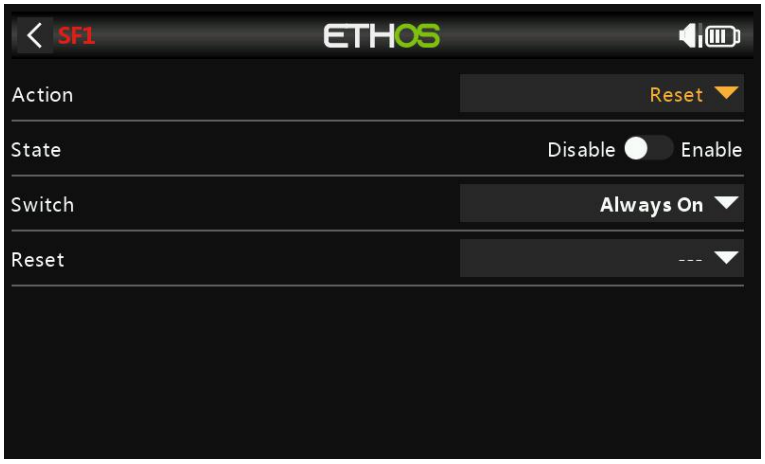
Special Functions



Special Functions can be configured to play values, play sounds, etc. Up to 100 Special Functions supported.

Currently the following Special Functions are supported:

- Reset
- Screenshot
- Set failsafe
- Play track
- Play value
- Haptic
- Write logs



Action: Reset

State

Enable or disable this Special Function.

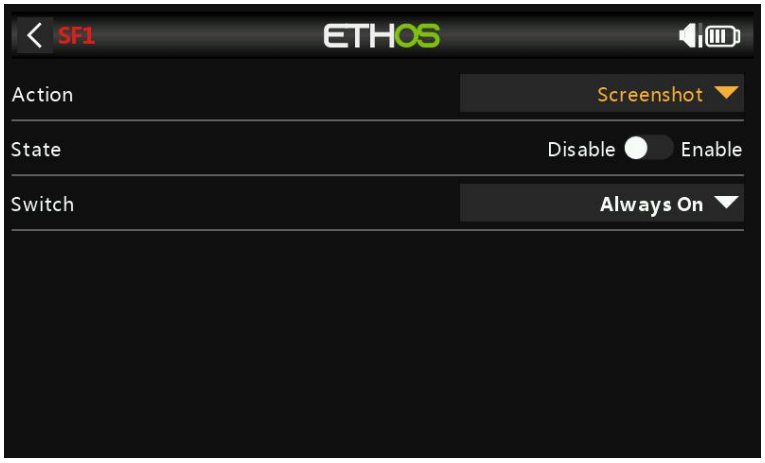
Switch

The Special Function may be Always On, or activated by switch positions, function switches, logic switches, trim positions or flight modes.

Reset

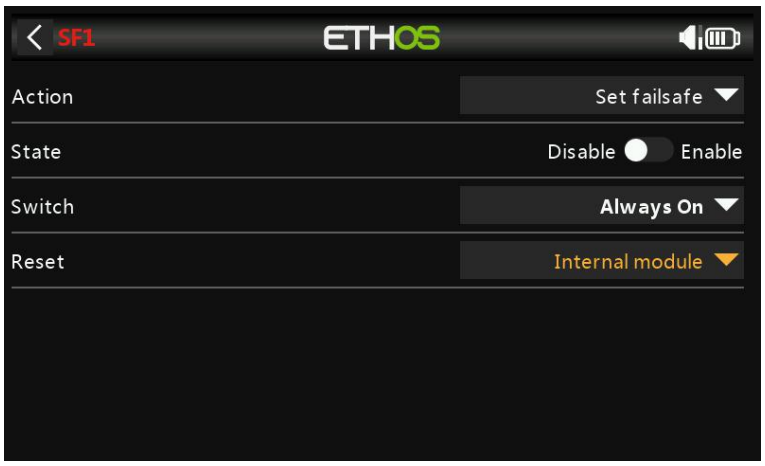
The following categories may be reset:

- Flight data: resets both telemetry and timers
- All timers: resets all 3 timers
- Whole telemetry: resets all telemetry values.



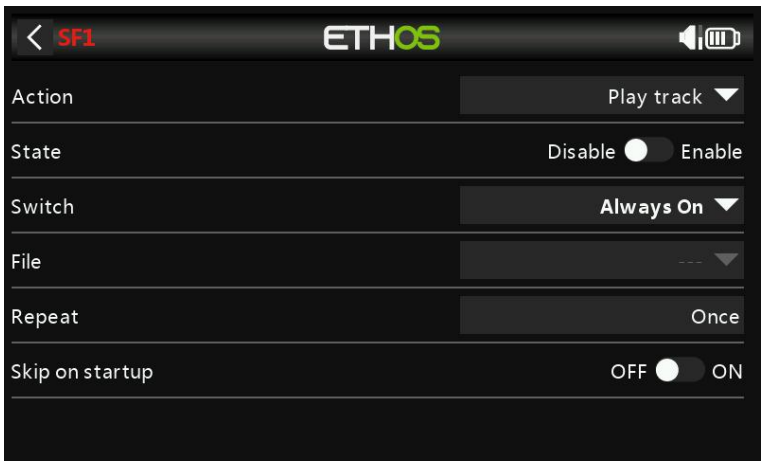
Action: Screenshot

Will save a screenshot into the location:
SD Card (drive letter)/screenshots/



Action: Set failsafe

<< detail to be added >>



Action: Play track

State

Enable or disable this Special Function.

Switch

The Special Function may be Always On, or activated by switch positions, function switches, logic switches, trim positions or flight modes.

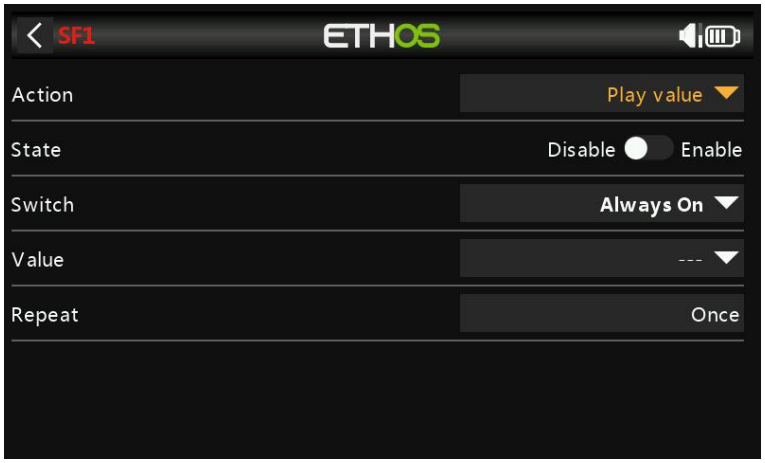
File

Select the wav file to be played. The file should be located in
SD Card (drive letter)/audio/

Repeat

Skip on startup

If enabled, the file will not be played on startup.



Action: Play value

State

Enable or disable this Special Function.

Switch

The Special Function may be Always On, or activated by switch positions, function switches, logic switches, trim positions or flight modes.

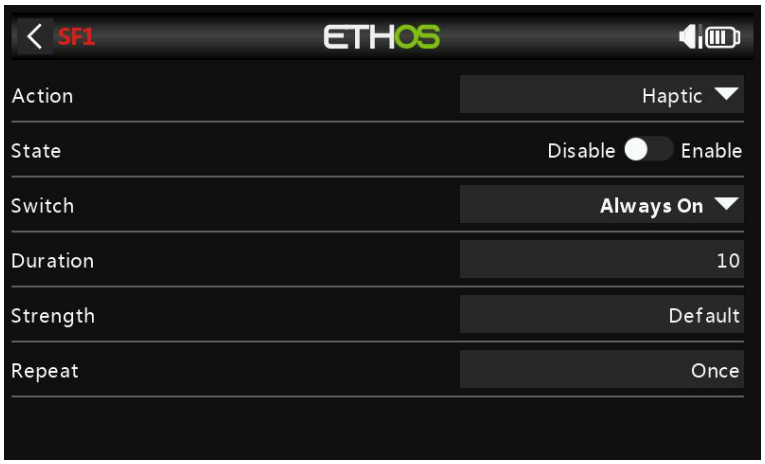
Value

Select the source whose value is to be played. The source may be from any of the following:

- Analogs, i.e. sticks, pots or sliders
- Switches
- Logic Switches
- Trims
- Channels
- Gyro
- Trainer
- Timers
- Telemetry

Repeat

The value may be played once, or repeated at the frequency entered here.



Action: Haptic

This Special Function assigns haptic vibration

State

Enable or disable this Special Function.

Switch

The Special Function may be Always On, or activated by switch positions, function switches, logic switches, trim positions or flight modes.

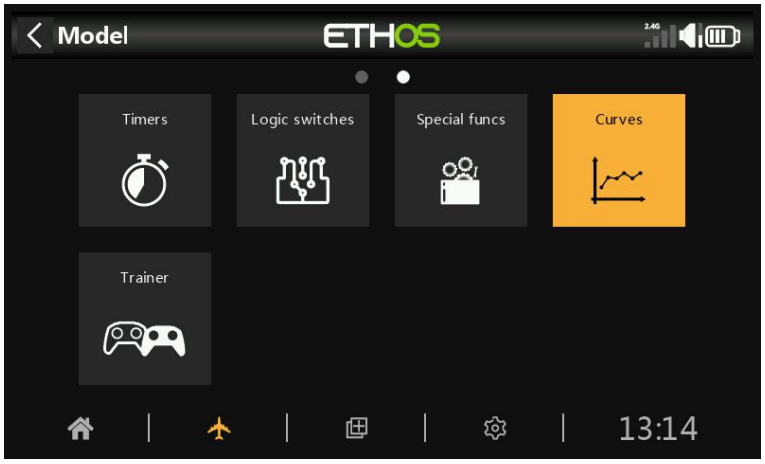
Duration

Sets the duration in seconds.

Strength

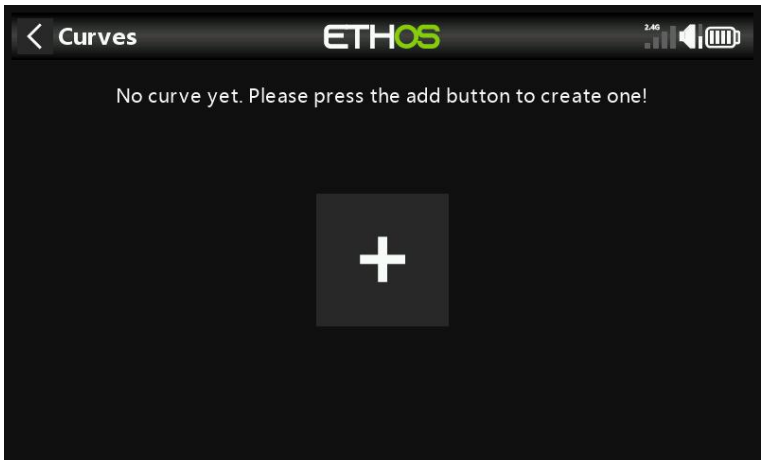
Select the strength of the haptic vibration, between 1 and 10. The default is 5.

Curves

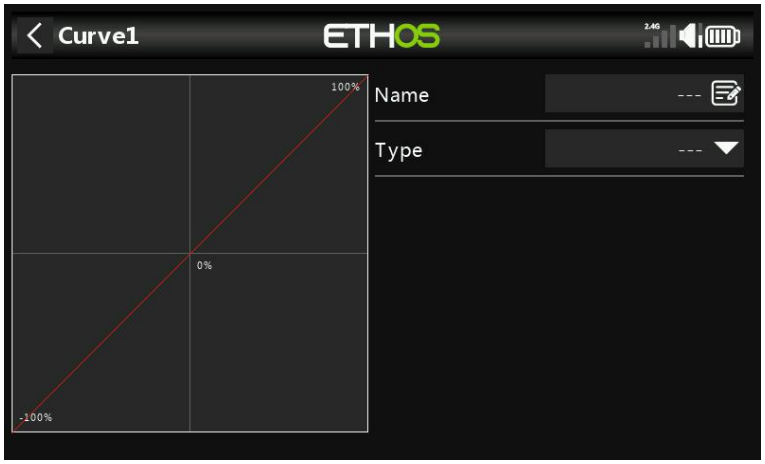


Curves may be used to modify the control response in the Mixers or Outputs. While the standard Expo curve is available directly in those sections, this section is used to define any custom curves that may be required. The 'Add curve' function may also be reached from the Mixer and Outputs edit screens directly.

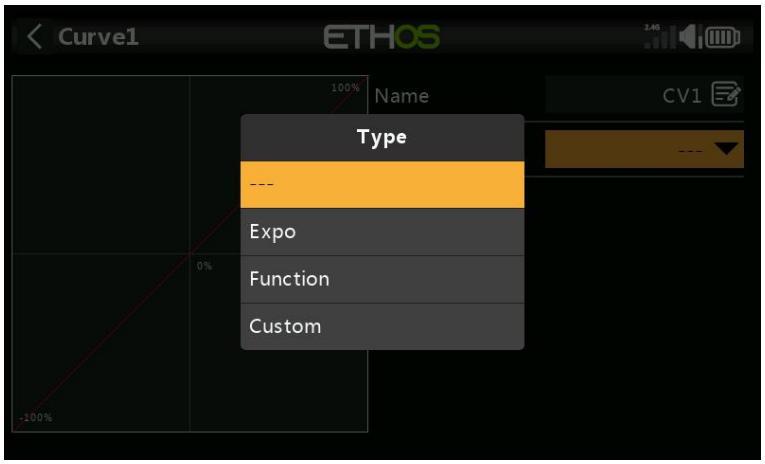
There are 100 curves available.



There are no default curves (except Expo which is built in). Tap on the '+' button to add a new curve.



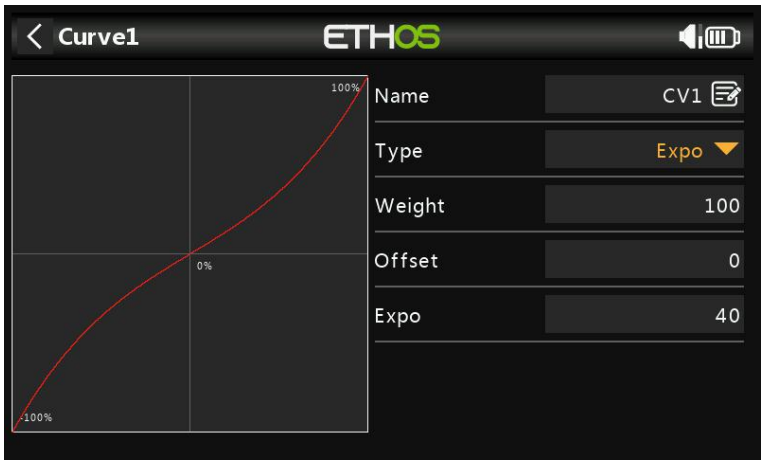
The initial screen allows you to name your curve, and to select the curve type.



The available curve types are:

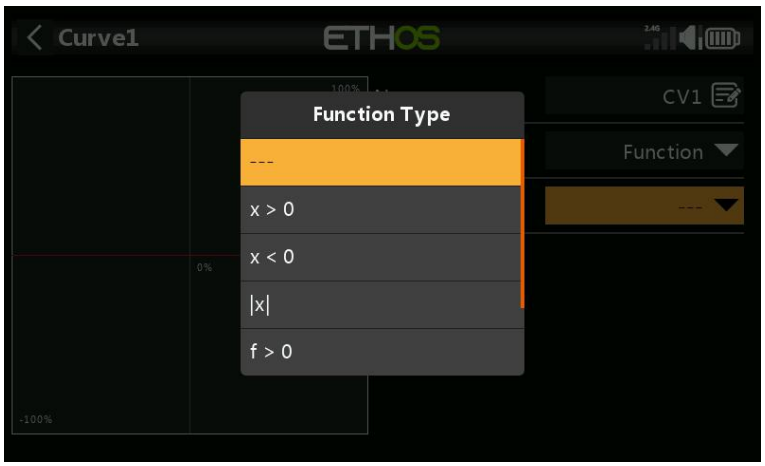
Expo

The default exponential curve has value of 40.

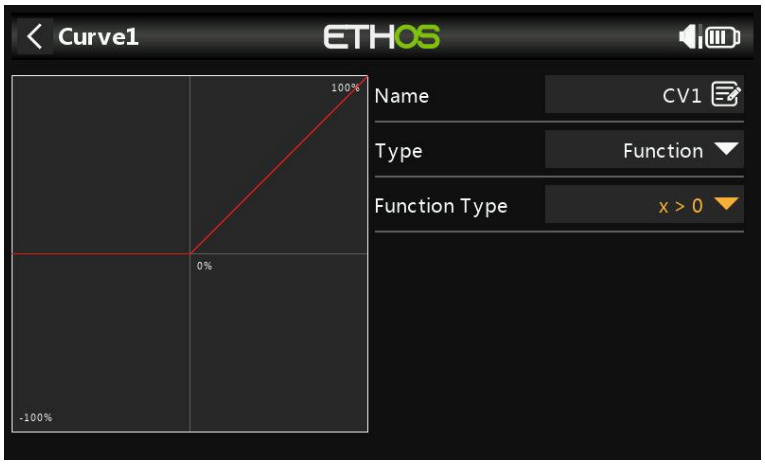


A positive value will soften the response around 0, while a negative value will sharpen the response around 0. Softening the response around mid stick helps to avoid over controlling the model, especially for beginners.

Function

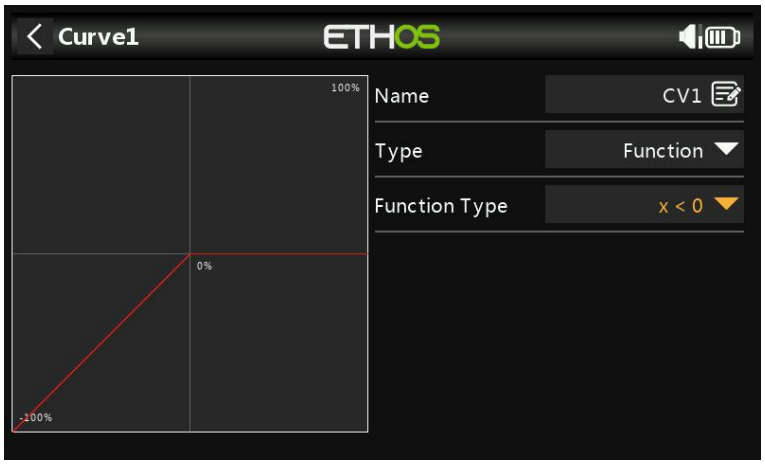


The following mathematical function curves are available:



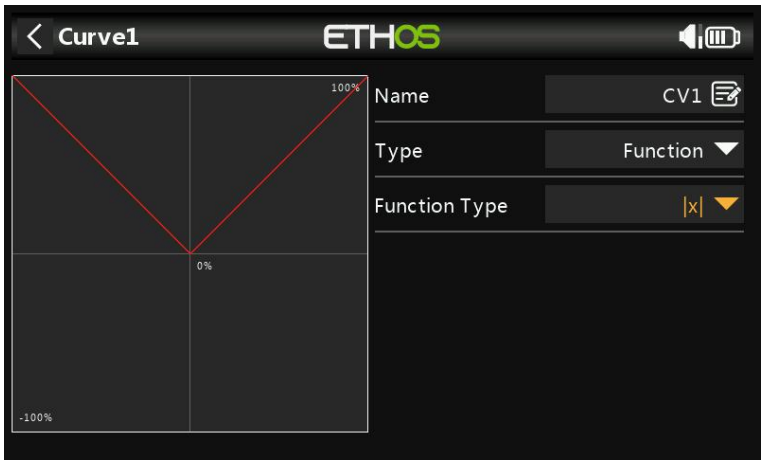
x > 0

If the source value is positive, then the curve output follows the source.
If the source value is negative, then the curve output is 0.



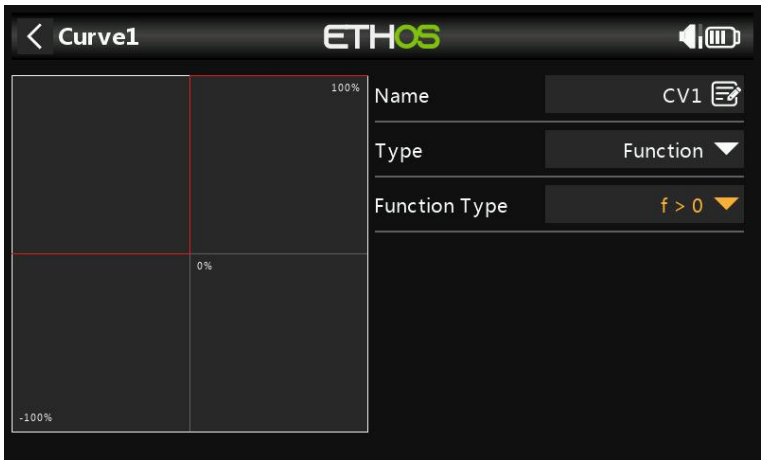
x < 0

If the source value is negative, then the curve output follows the source.
If the source value is positive, then the curve output is 0.



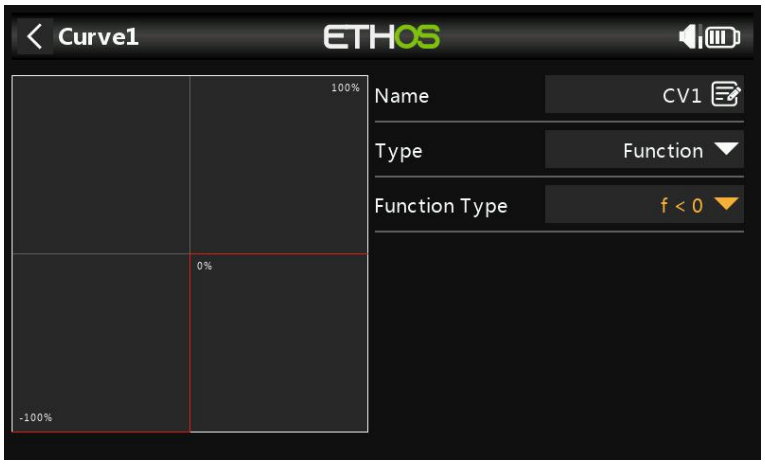
|x|

The curve output follows the source, but is always positive (also called 'absolute value').



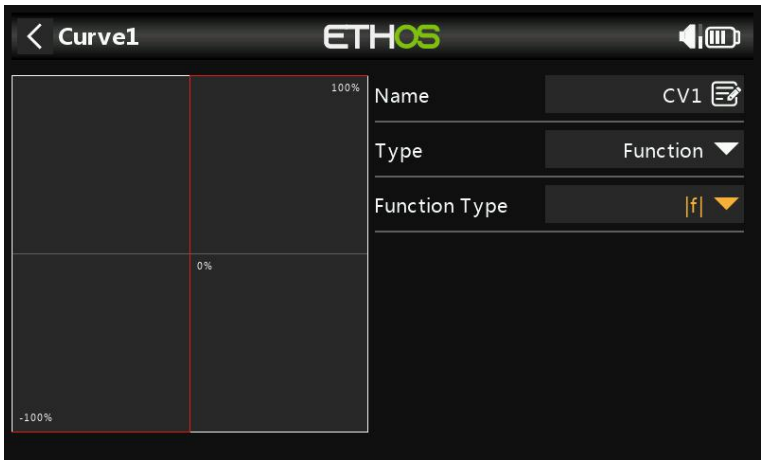
f > 0

If the source value is negative, then the curve output is 0.
If the source value is positive, then the curve output is 100%.



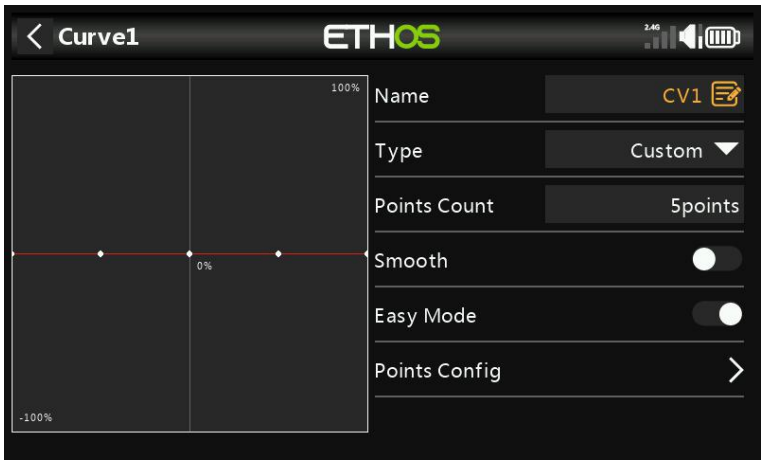
f < 0

If the source value is negative, then the curve output is -100%.
If the source value is positive, then the curve output is 0.



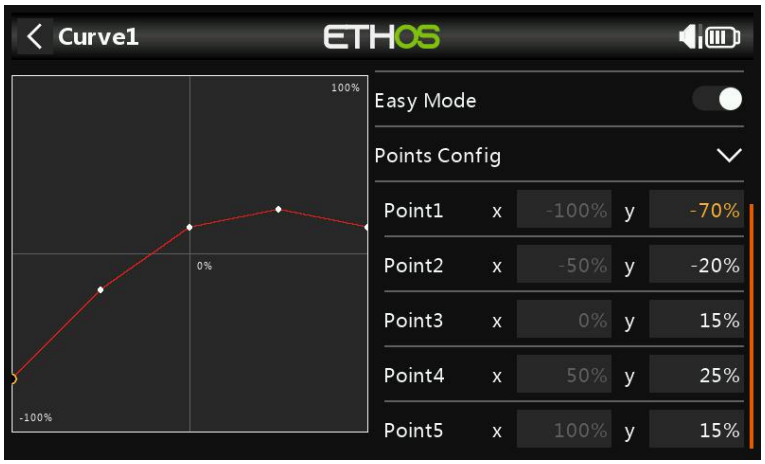
If the source value is negative, then the curve output is -100%.
If the source value is positive, then the curve output is +100%.

Custom



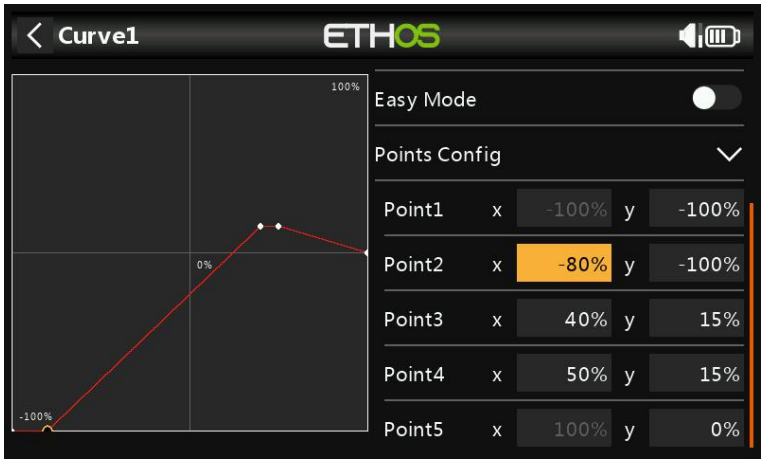
Points Count
The default custom curve has 5 points. You may have up to 21 points on your curve.

Smooth
If enabled a smooth curve is created through all points.



Easy Mode = On
Easy mode has equidistant fixed values on the X axis, and only allows the Y coordinates for the curve to be programmed.

Points Config
With Easy Mode On, the Y coordinates may be configured (see example above).

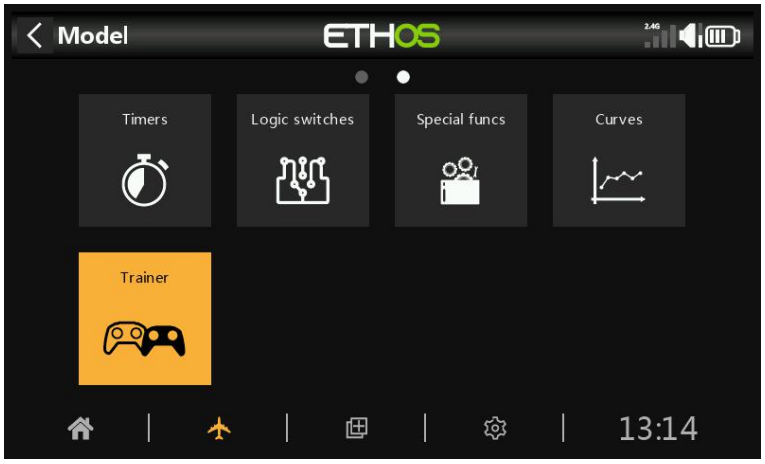


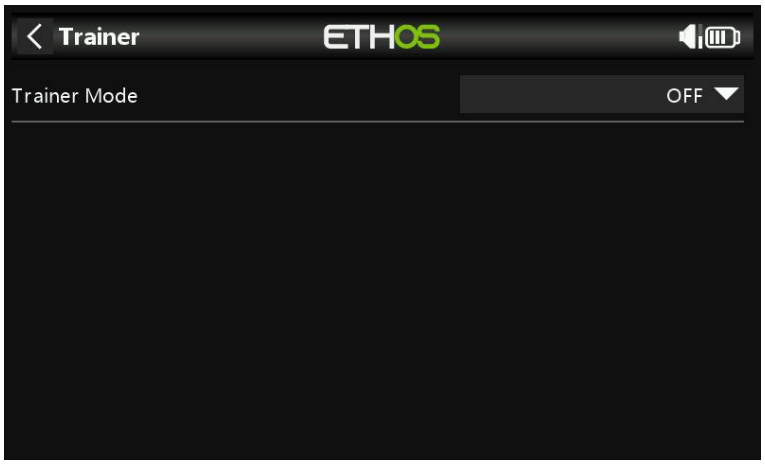
Easy Mode = Off

Easy mode has equidistant fixed values on the X axis, and only allows the Y coordinates for the curve to be programmed.

Points Config
With Easy Mode Off, both the X and Y coordinates may be configured, (see example above). Note that the -100% and +100% X coordinates for the curve end-points cannot be edited, because the curve must cover the full signal range.

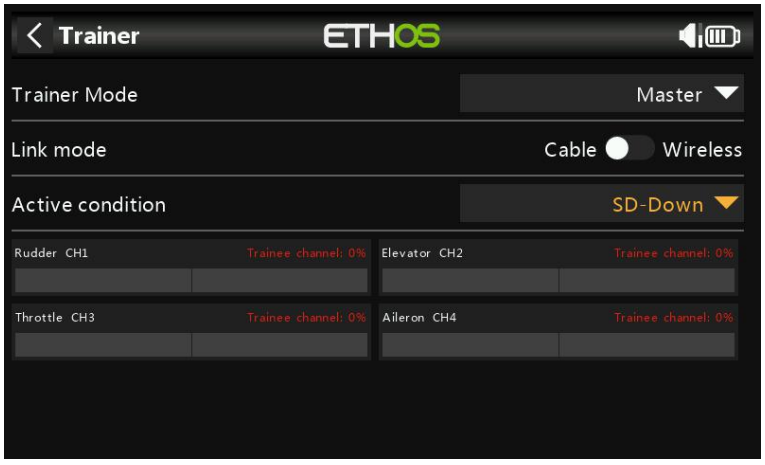
Trainer





The Trainer function is off by default.

Trainer Mode = Master



Link Mode

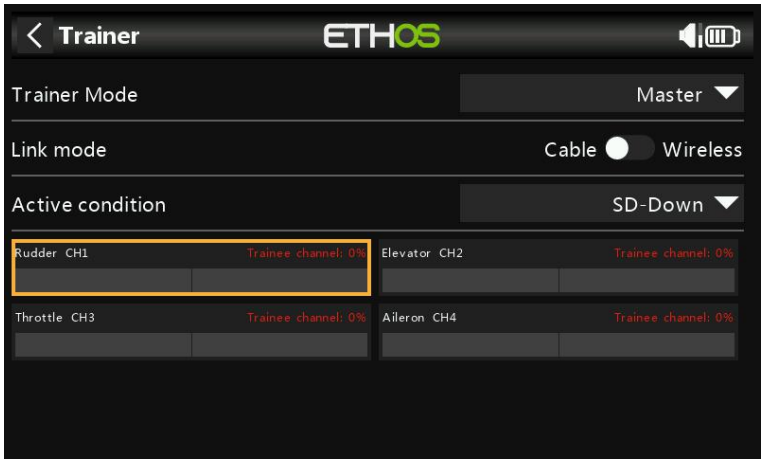
The trainer link can be either via cable or wireless (BT). At the time of writing, the wireless option has not been implemented. The cable should be a 3.5mm mono audio lead.

Active Condition

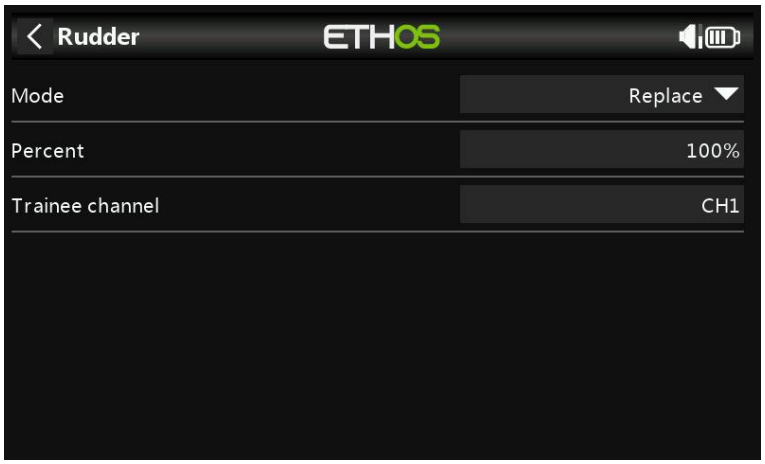
Control of the model can be transferred to the student radio by a switch or button, a function switch, logic switch, trim position, or flight mode.

Trainer Channels

The 4 main controls are transferred from the student radio to the master radio when the 'Active Condition' set above is active.



Tap on each channel to configure it individually:



Mode

- OFF: disables the channel for trainer use.
- Add: selects additive mode, where both master and slave signals are added so both teacher and student can act upon the function.
- Replace: replaces the master radio's control with the student's, so the student has full control while the 'Active Condition' is active. This is the normal mode of use.

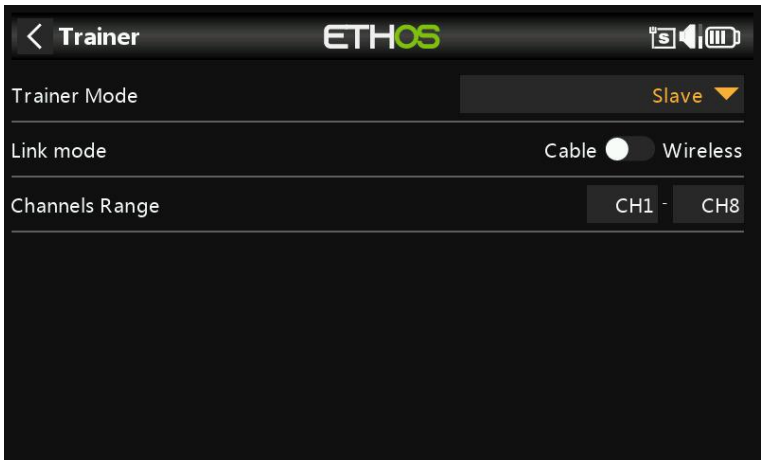
Percent

Normally set to 100%, but can be used to scale the Slave input.

Trainee Channel

Maps the slave radio's channel to the corresponding function.

Trainer Mode = Slave



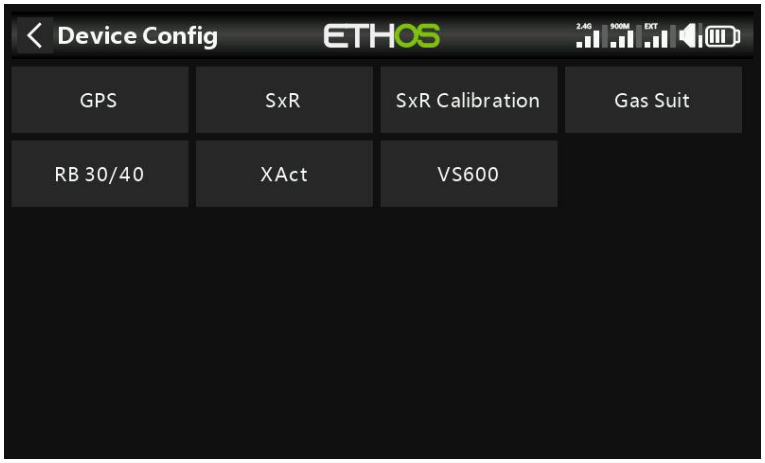
Link Mode

The trainer link can be either via cable or wireless (BT). At the time of writing, the wireless option has not been implemented. The cable should be a 3.5mm mono audio lead.

Channels Range
Selects which channels are transferred to the master radio.

Device Config

Device Config contains tools for configuring devices like sensors, receivers, the gas suite, servos and video transmitters.



The following devices are currently supported:

- GPS
- SxR
- SxR Calibration
- Gas Suite
- RB 30/40
- XAct servos
- VS600 video transmitter

Please refer to the device's manual for further details.