RADIOMASTER

ZORRO

Instruction manual

Version：1.0

WWW.RADIOMASTERRC.COM

Content

1. Overview

1.1. Introduction

Thank you for purchasing the RadioMaster ZORRO radio system. Advanced and highly-versatile, ZORRO is adaptable for pilots of any skill level. To ensure safe and reliable operations, please read this manual carefully prior to use.

As the software and hardware are constantly improved, the information contained in this manual is subject to change without prior notice. Please visit our website for up-to-date information and radio firmware.

ZORRO is an open-sourced, ergonomic radio with powerful multi-protocol capability. Able to bind to most contemporary protocols on the market, this is one radio to rule them all! ZORRO runs EdgeTX, an open-sourced operating system; for more information, please visit the EdgeTX link below.

-The RadioMaster team

1.2. Safety information

Radio-controlled models commonly contain sharp components like propellers, rotating at high RPMs; when operating or maintaining the model, always use common sense and proceed with caution.

Always disconnect power to the model AND remove propellers (if applicable) during the assembly or maintenance process.

Never operate the ZORRO radio system in the following conditions:

• In severe weather or strong windy conditions, such as rain, hail, snow, storms or electromagnetic environments.

• In limited visability

• In the proximity of other people, property, high-voltage power lines, public roads, vehicles or animals

• When feeling unwell, or under the influence of drugs or alcohol.

• If the ZORRO radio system/model is damaged or showing signs of interference.

• In areas with high 2.4GHz interference or where 2.4GHz radios are prohibited.

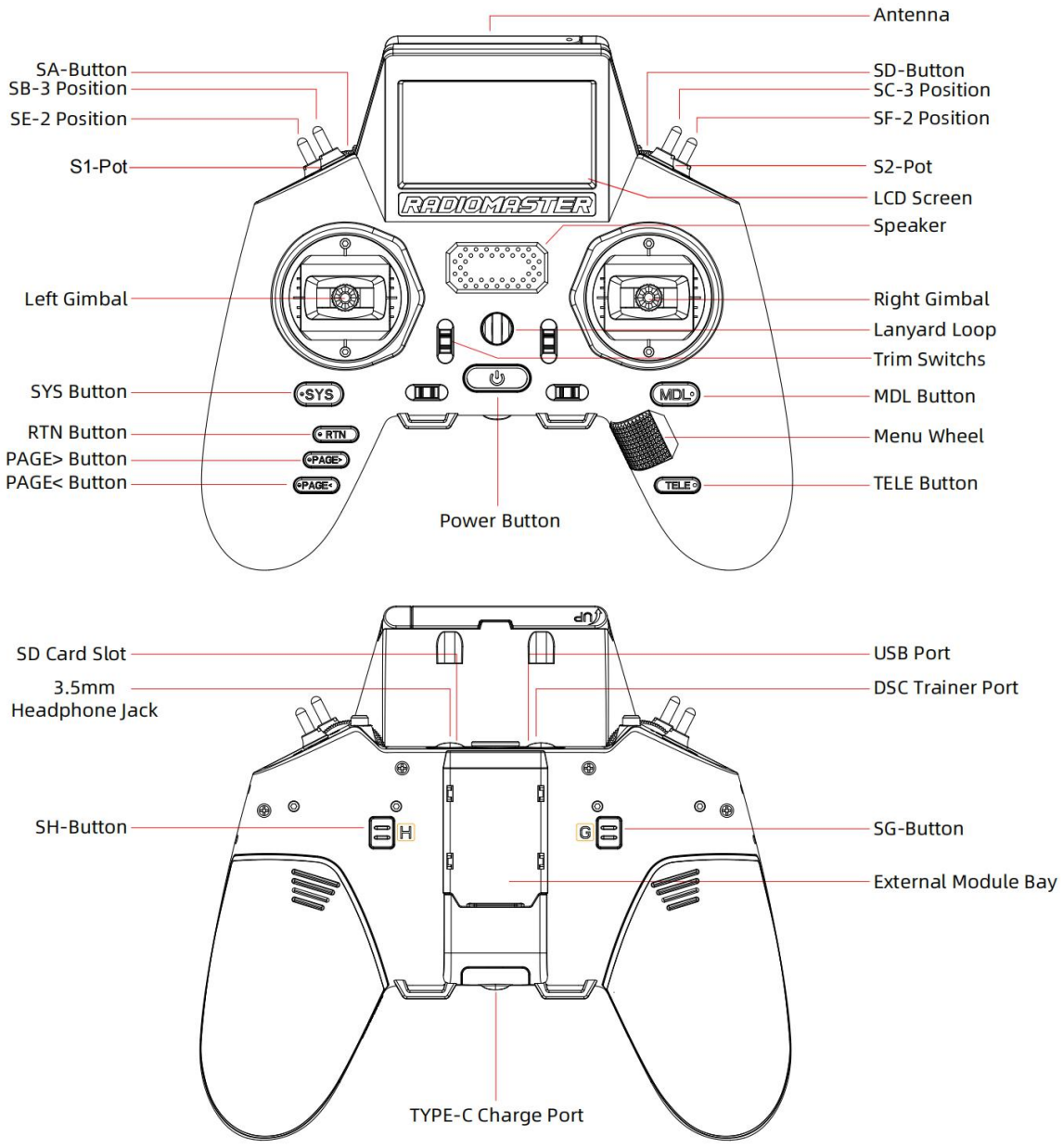
• When the TX/RX battery is low.

• In areas where local regulations prohibit the use of R/C aircraft.

⚠ WARNING!

Zorro is pre-installed with the most stable firmware at the factory at time of release. please only attempt to update the firmware if you are confident in the process. Incorrect firmware updates may cause the remote control to become inoperable. Damage as a result of improper firmware update may not be covered under warranty.

1.3. Radio overview



1.4. Battery and charging information

ZORRO is powered by 2x 3.7V 18350 Lithium Ion cells and is charged using the built-in USB-C port. The charging circuitry is designed for charging 2x 3.7V Lithium Ion/Poly or 1x 7.4V Lipo battery pack only; the nominal voltage is 3.7V and the maximum charging voltage is 4.2V.

Never charge 3.6V LiFe and 3.6V 18350 Lithium Ion packs with the onboard charger. Charging or using the wrong battery chemistry/polarity may cause permanent damage to the PCB and in certain situations cause fires.

Check the voltage and condition of the battery regularly and never charge the device unattended. Only charge in safe areas away from combustable materials. Refrain from charging the radio unit if it was exposed to water or was damaged in any way. RadioMaster does not assume any responsibility for any adverse consequences caused by the use or misuse of this product.

1.5. Manual and firmware download

ZORRO is pre-installed with factory approved EdgeTX firmware and is also capable of operating OpenTX. To download the latest manual or stock factory firmware, please visit the RadioMaster website: **https://www.radiomasterrc.com**

When updating your radios firmware we would encourage you to use EdgeTX Buddy.

EdgeTX

http://edgetx.org/ (Information about EdgeTX)

https://buddy.edgetx.org/ (easy to use tool for FW updates)

OpenTX

https://www.open-tx.org/ (Information as OpenTX)

1.6. Specifications

Size： 174*86*157.5mm

Weight： 355g（No battery）

Frequency： 2.400GHZ-2.480GHZ

Transmitting power： Module dependant

Antenna gain： 2db

Battery： 3.7V 18350 Lithium Ion

Charge port： USB-TypeC

Operation voltage： DC 6.6-8.4v

Range： > 2km @ 20dbm

Firmware： EdgeTX（Transmitter)

Channels： Up to 16 (Rx dependent)

Display： 128*64 Monochrome LCD display

Gimbals： High precision potentiometer/ Hall-effect sensor (Package dependent)

External module：8Pin Nano Port

Upgrade method： USB/SD card & EdgeTX Companion PC software

1.7. Warranty and repair

Should any issues arise with your radio system's hardware, please keep the proof of purchase and contact the retailer where you made the ZORRO purchase. . You may also visit our warranty support page https://www.radiomasterrc.com/contact

The limited warranty covers defects in workmanship for one year from the date of purchase

1.8. Disclaimer

OpenTX/EdgeTX are open source firmware. No warranty or implied warranty is given for the quality and reliability of this firmware. If not handled properly, the RC model can cause serious injury or even death. If you decide to use OpenTX/EdgeTX firmware, you are solely responsible for your model. Any injury or damage caused by using OpenTX/EdgeTX firmware The authors of OpenTX/EdgeTX and RadioMaster assume no responsibility. Use with caution.

1.9. Legal status and copyright

2. First boot

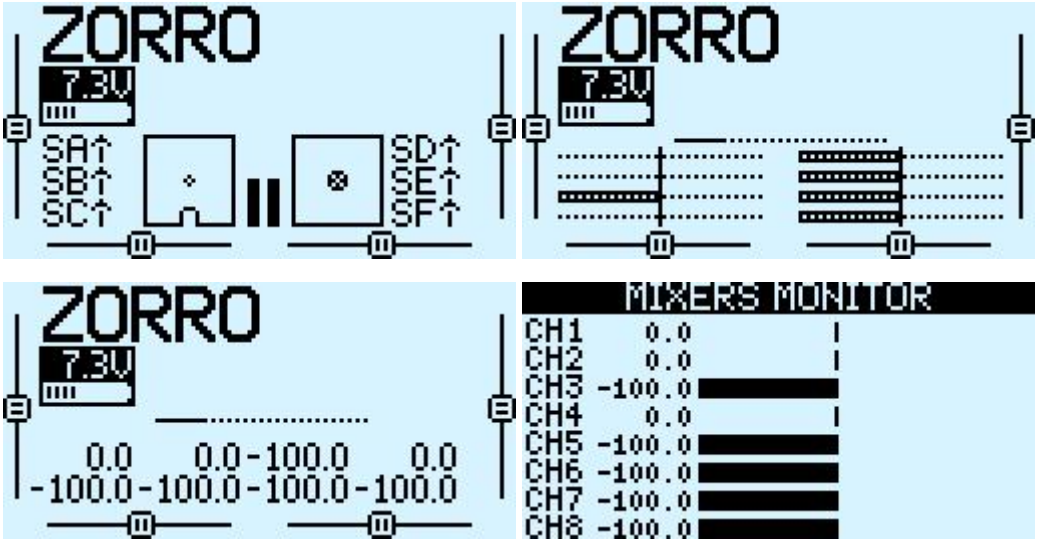
Press and hold the power button to boot. Before entering the main interface, the system will check the position of the throttle stick and switch and other startup conditions. If the startup conditions are not met, there will be a corresponding error prompt. You need to clear it or press any key to move forward Throttle warning: This is a warning that the throttle is not at the lowest position when the radio is turned on. You can set the throttle stick to the lowest position or press any key to skip. You can also turn off the throttle state option in the MODEL SETUP menu. Throttle alarm.

Switch warning: This is a warning that a switch on the radio -control is not in the default position. (The default setting is that all switch directions are up ↑)

Failsafe not set warning: This is a warning that the radio-control fail-safe protection is not set.

Alarm off warning: A similar warning will sound if the volume is set to mute.

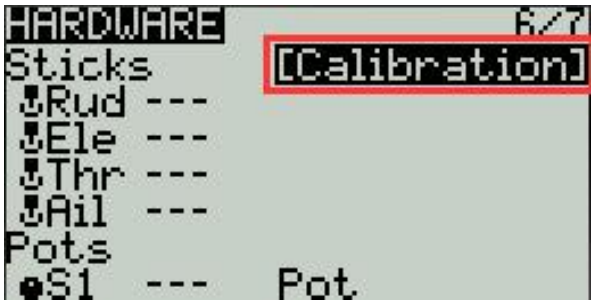
Main page: Below is an example of the default main page of the system, you can customize the display elements in the page as required.



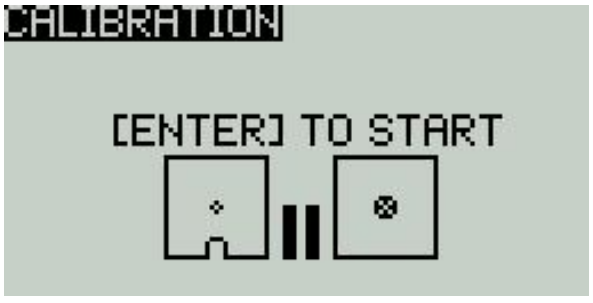
2.1. Calibrating Gimbals

Each ZORRO radio unit is calibrated during the QC process, however due to varying shipping conditions we suggest calibrating your radio prior to first use.

A. In the system settings, scroll to the HARDWARE page, select calibration, then press OK to enter the settings.



B. Follow the text prompts at the top for calibration. The first step prompts, press the confirmation key to start



C. In the second step, place all the gimbals, knobs, and side sliders in the middle position. The system obtains the midpoint value, and then press the confirmation key to continue to the next step.

D. For the third step, move all the gimbals, knobs, and side sliders of to their respective maximum and minimum positions. The system will record the maximum and minimum values. After all the above steps are completed, press Enter key to complete the calibration, and the system automatically returns to the previous page.

2.2. Set the default Gimbal mode and the default channel output order.

In the system settings, turn the page to the RADIO SETUP page, select the scroll wheel to the bottom of the page, you can see:

Rx channel ord (Receiver channel order)

Mode （Gimbal mode）

Because the channel input order of the built-in multi-protocol transmitting module of the RadioMaster ZORRO is AETR, in the Default channel order option, select AETR.

The Mode (gimbal mode) can be selected according to your personal preferences:

Mode 1 (right-hand throttle / Common in Asian and some European markets)

or

Mode 2 (left-hand throttle / Common in North American markets)

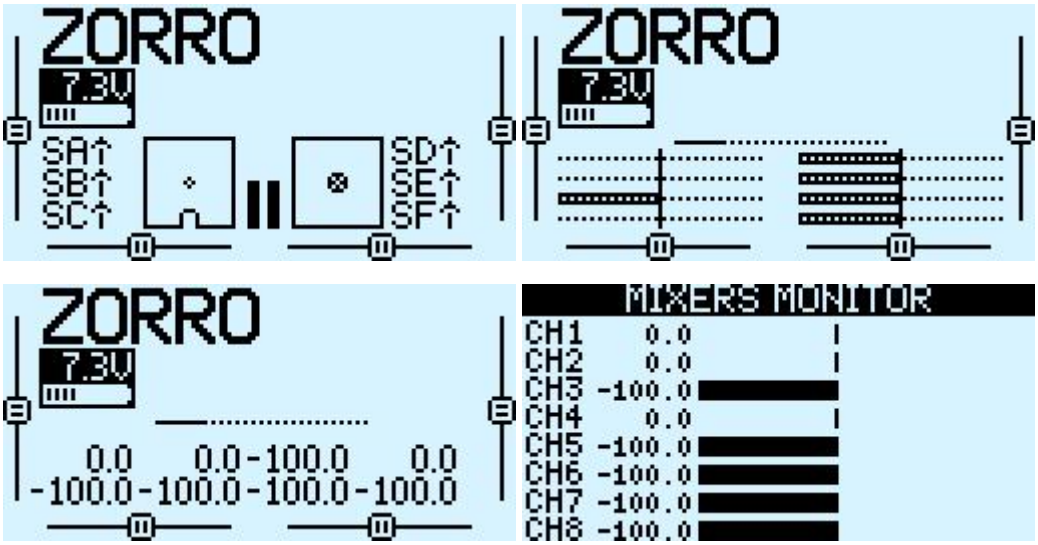
The icons on the right from left to right indicate the names of the gimbals corresponding to the position of the gimbal on the radio control. Left gimbal horizontal / Left gimbal vertical / Right gimbal vertical /Right gimbal horizontal

Rud（Yaw）/ Thr（Thrust）/ Ele (Pitch) / Ail（Roll）

3.Radio menu

3.1. Main interface

The default startup screen is as follows. The user can modify the content to be displayed to customize the main interface.



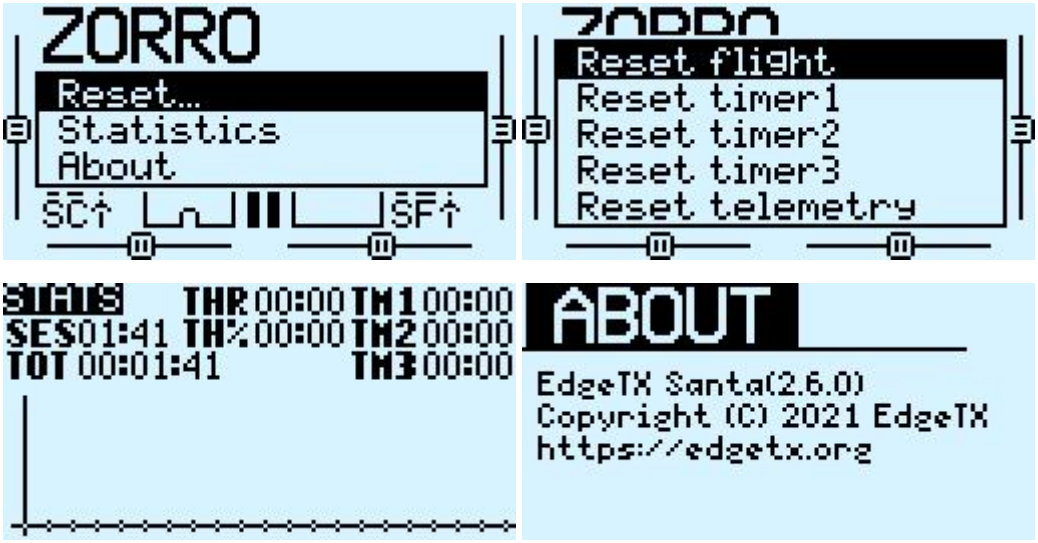
The main interface can display the following information:

Model name, TX voltage, gimbal/switch position and trim location. Scroll to show the channel position, values and channel monitor.

3.1.1. Reset, Statistics and About

Press and hold the ENT key to show the Reset, Statistics and

About information. The Reset menu allows for the reset of flight data, timers and telemetry information.



3.2. System settings

Long press the left SYS button to enter the system setting page. The system setting page is divided into 7 sections.

- TOOLS： Tool page, which includes the setting function of the spectrum analyzer and some third-party equipment, such as the setting function of TBS Crossfire, Frsky specific receiver settings, and Graupner's receiver HoTT protocol settings.

- SD CARD： SD card page. In this page, you can view the contents of the SD card, and quickly set the startup screen, model pictures, and the function of flashing the built-in /external module firmware from firmware files loaded on to the SD Card.

- RADIO SETUP： The radio-control setup page, this page is the basic functions of the radio control and the settings in the default parameters of the radio control

- GLOBAL FUNCTIONS： This page can customize various global functions. Global functions are similar to special functions in model parameters, but global functions are shared by all model, while functions in model parameters are only used by the current model.

- TRAINER： Trainer aka Coach function page. In this page, you can set the control ratio of each channel from the student mode radio control in the coach mode, and the intervention ratio of the radio control in the coach mode.

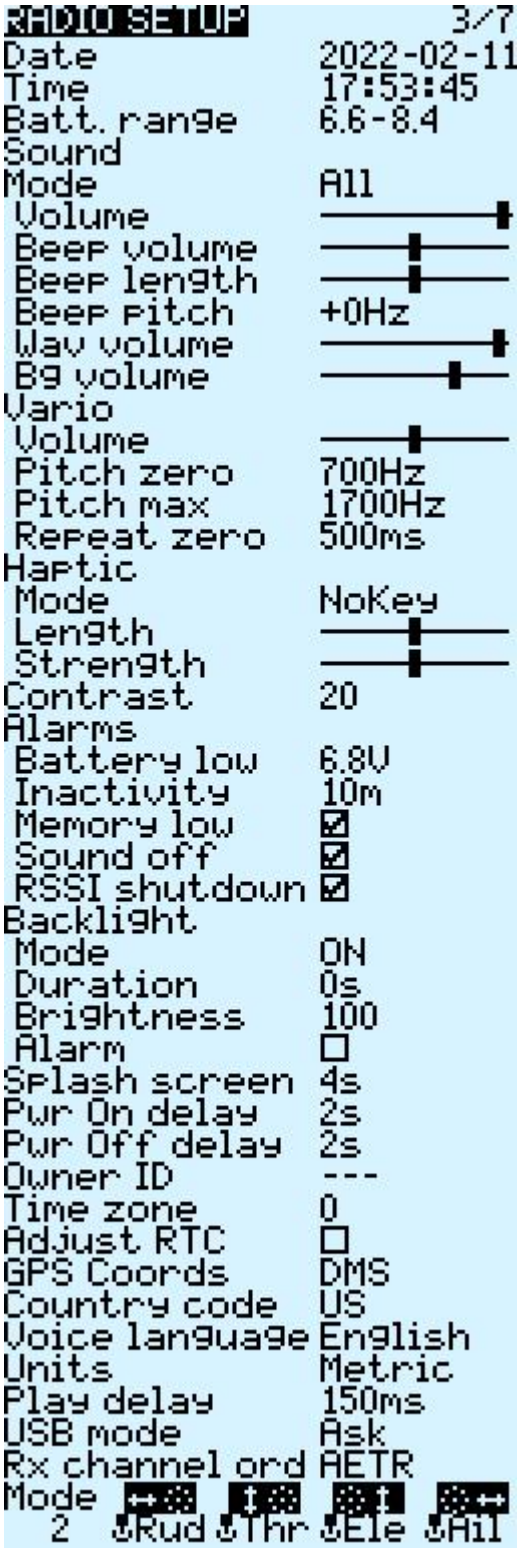
- HARDWARE： Hardware setting page. In this page, you can calibrate the gimbal and voltage, set the name of the gimbal, set the functions and names of switches and knobs, and view the underlying parameters of the hardware.

- VERSION： On this page, you can view the radio controller hardware type, EdgeTX firmware version, and the functional items included in the current firmware.

3.2.1 TOOLS

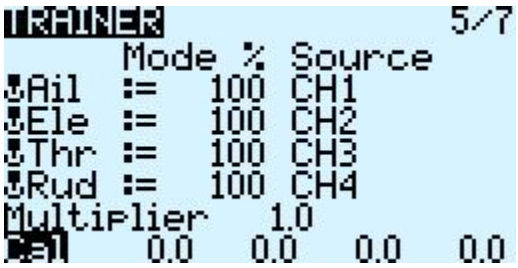
3.2.2 SD CARD

3.2.3 RADIO SETUP



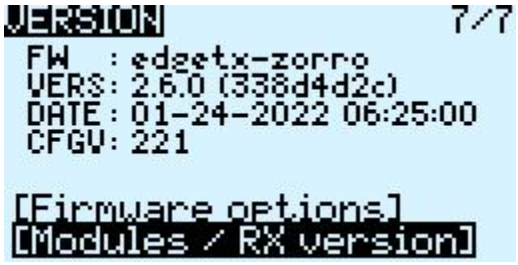
3.2.4 GLOBA FUNCTIONS

3.2.5 TRAINER



3.2.6 HARDWARE

3.2.7 VERSION

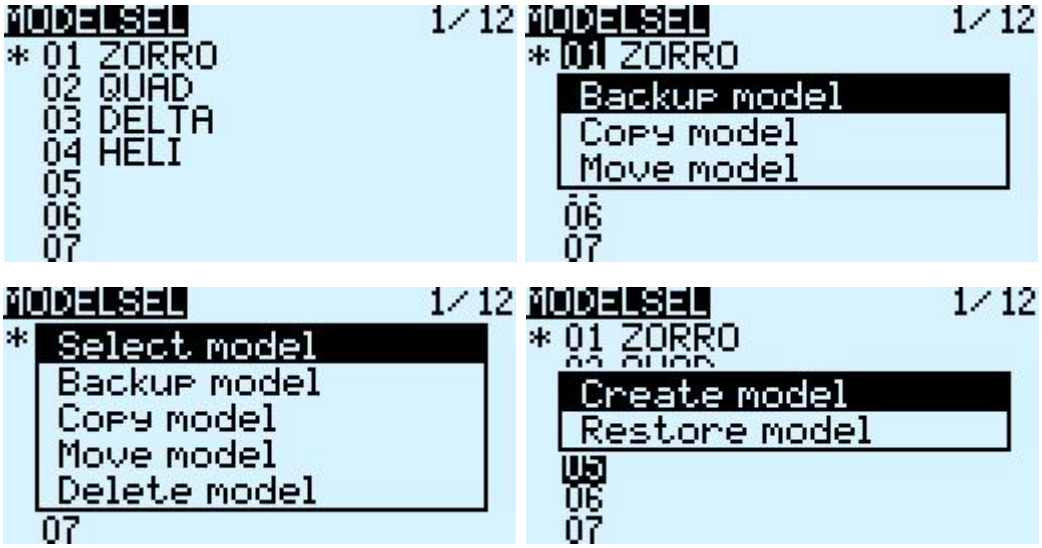


3.3. Model selection

3.3.1. Create model and model selection

In the main interface, press and hold the ENT key to show the menu

Select to enter the model selection page, which is used to select, create, switch, delete and copy models. Note: The model currently in use cannot be deleted, only models that are not in use can be deleted



3.4. Model settings (Model Setup)

3.4.1 Model settings (Model setup)

Model Setup Detailed options:

Model name: Enter your model name here.

Timer1-3:

Up to 3 fully programmable timers that can count up or down.

ON	Timer is always on
Tht	Timer always on once throttle is not all the way down
THs	Timer on when throttle is not all the way down
TH%	Timer speed proportional the throttle THR 100% Timer 1 second intervals, THR 50% Timer 2 second interval
Time Value	Setting the timer to a value above 00:00 puts it into count down mode

Name: Name the timer

Persistent: Timer retains its value when the Tx is powered of and on or the model is changed

Minute call: Required SD card with sound pack installed. At each minute the value spoken.

Countdown: -Countdown broadcast, default 10s (10 seconds)

Silent	Quiet mode
Beeps	Beep
Voice	Voice broadcast countdown
Haptic	Vibration alert

E.Limits: Expand the limit. After checking, set the channel rudder limit to ± 125% (default maximum ± 100%).

E.Trims: Fine-tuning extension, allowing fine-tuning to cover the entire gimbal range, instead of ± 25%

Trim Step: Modify the precision of the fine-tuning step. The accuracy can be modified according to actual requirements.

T-Reverse: Throttle reverse

T-Source: Throttle operation source (input source), because the throttle trigger timer is used, such as the THs function, it is usually set to the throttle channel instead of the gimbal, so that the throttle lever operation triggers the timer correctly

T-Trim-Idle: Throttle trim only affects the low position, where trim only affects the idle part of the throttle travel and does not touch the entire throttle range.

Preflight Checks: Pre-flight check, when booting or loading the model, the system will check the following default settings, if it does not match the following model settings, the system will pop up a security warning page

Checklist: Show checklist

T-Warning: Throttle status warning, when the radio control is powered on or the model is loaded, if the throttle stick is not at the lowest position, a warning will be issued

S-Warning: Switch position check, defines whether the radio-control checks whether the switch is in a predetermined position when the radio control is powered on or when loading a model. To set them, place all the switches in the way you like, and then press and hold ENT (the confirmation key), the system will save all current switch positions as default values

Pot warn: Check the position of the knob and slider. The default position of the preset knob and slider is the same as above.

Ctr Beep: Center prompt sound, select whether the gimbal, knob and slider will emit a prompt sound when reaching the center point.

Glob.Funcs: Use global function settings, choose whether to apply global function settings to the current model

Internal RF: Built-in wireless RF module, built-in 4in1 multi-protocol RF module, CC2500 or ELRS module, please refer to multi-protocol RF module manual for usage

External RF: External RF module, compatible with many mainstream RF modules

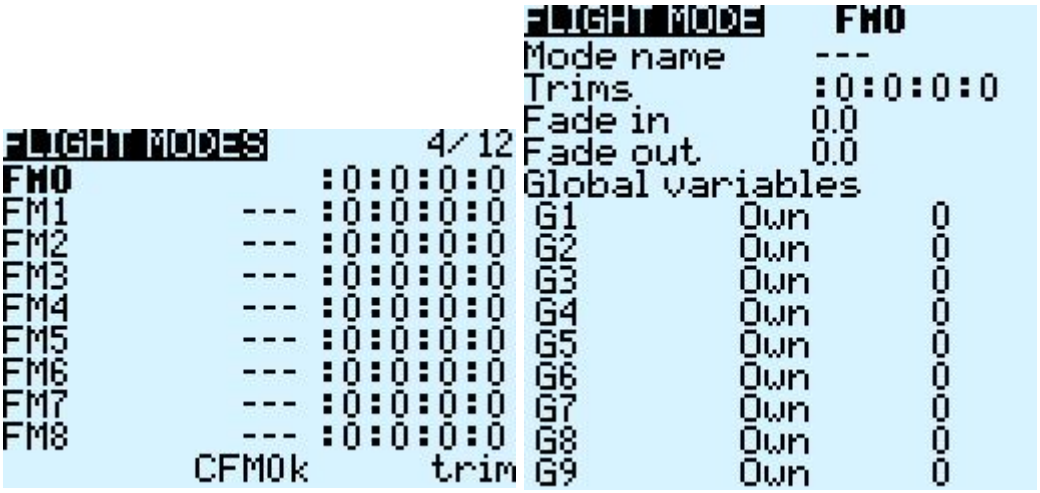
Trainer: Trainer Mode

Mode:

Master/Jack	Audio cable connection, coach host mode
Slave/Jack	Audio cable connection, student slave mode
Master/Multi	4in1 multi-protocol module coach host mode (This function needs to add an external 4in1 multi-protocol module as coach input receiver RX mode)

3.4.2 Flight Mode (Flight Modes)

The flight mode allows you to set the corresponding fine-tuning value for a specific mission or flight behavior. This item is mainly used for fixed-wing gliders to use different fine-tuning values in different environments. You can customize the fine-tuning value of 1-6 channels, and you can set it for each flight. Mode setting smooth slow-in slow-down time.



There are 8 flight modes plus the default FM0 available. The first item of FM1-FM8 requires a trigger switch. When no switch is on, FM0 is enabled by default.

Mode name	Define a name for the flight mode
Trims	Adjust the fine-tuning value of 1-6 channels according to your actual needs
Fade in Fade Out	Slow Ease In / Ease Out Time Settings
CFM0k trim	At the bottom of the screen (below FM8) you are reminded to check the fine-tuning of each flight mode. According to the currently selected FM number, the corresponding reminder message is displayed, for example, if the flight mode FM2 is active, it will display "CFM2k trim"

3.4.3. Global variables (Global Variables)

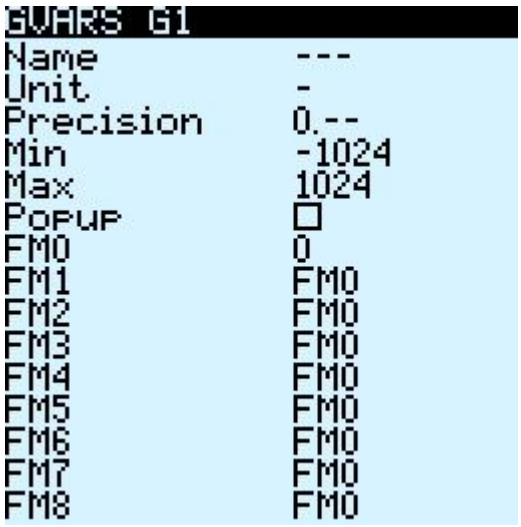
Global variables are customizable values that can be used as temporary values for custom operations. In complex functions, the values of global variables are automatically modified through certain trigger conditions for conditional judgment or any other purpose. Global Variables can be used as input or output real-time adjustment parameters, and can also be used as parameters in flight mode and curve definition. Global variables can be used in any place where numerical values can be entered to achieve some automated control.

They are also specific flight modes, which avoids having to use separate mixing lines with different values for each flight mode. This greatly simplifies mixing pages and makes them easier to understand.

By using the "Adjust GVx" option in the Special Functions page, you can even adjust global variables on the fly, so you can quickly optimize settings such as double-rate ratio, exposure, differential, flap to elevator conversion, and more. If pop-ups are enabled (indicated by! Next to the GV label), when the variable is updated, a pop-up window with the variable name and new value will be displayed on the main view.

"Global" means that global variables can be used to set pages for the entire model, but not for all models. Each model has its own set of global variables.

There are 9 global variables available. 0 being the default value.



Modify the value directly or press and hold the ENT key to pop up the sub-menu to change the type and parameter of the global variable.

Name: Setting name

Unit: Units, switchable between normal and%

Precision: Precision, which can be used in decimal mode. You can set this mode corresponding to the percentage.

Min: Minimum value, which can be limited when the value is changed dynamically

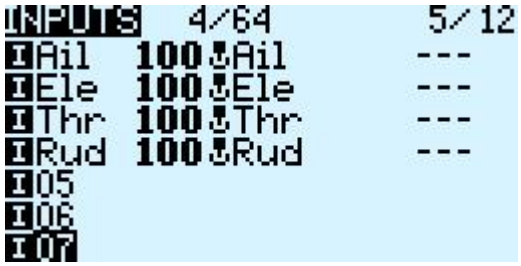
Max: Maximum value, which can be limited when using dynamic change values

FM0-FM8: You can specify a value for each flight mode or set it to be the same as the other flight modes. Press and hold the ENT key to switch the input value and select the flight mode in this field. When editing a value, it will increment / decrement by 1 or 0.1, depending on the "Precision" setting above.

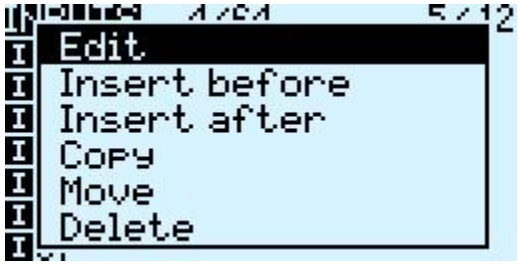
3.4.4. . Input Source (Inputs)

The Inputs page defines the input source. Before outputting to the channel, you can make preliminary settings for the input source, such as limiting the amount of operation, increasing the curve, using the switch pair to switch, etc.

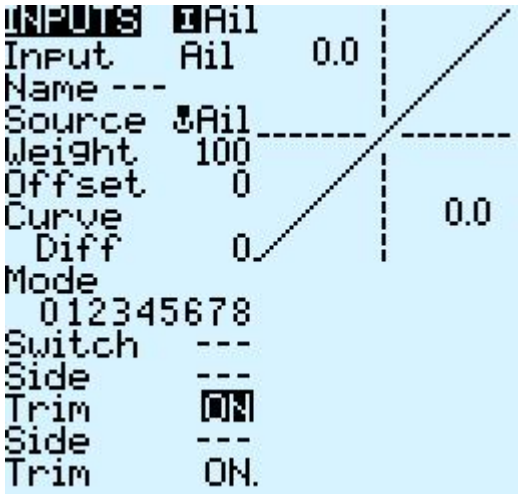
The input source can be a physical operation source such as a gimbal, knob, or switch of the radio control, or it can be a global variable Gvar, a logical switch, telemetry data, etc.



To set an entry, press and hold the ENT key on the current entry and a submenu will pop up.



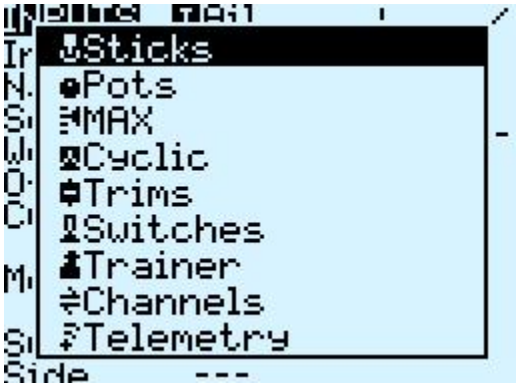
Select Edit to change settings



Input: Name of the current entry. Use the scroll wheel to select a letter or number. Press and hold the ENT key to switch between upper and lower case. Press the ENT key to switch to the next character.

Name: Because each entry can have multiple lines of configuration, you can give each line a name to avoid confusion in the future

Source: Press and hold the ENT key to enter the input source selection menu. Scroll up or down to the desired category and press ENT to select the corresponding input source



Weight: Normal range is a value between ± 100% will be zoomed to the gimbal operation. If you enter a negative value, for example -100% means reverse the output. Note that channel inversion should not use negative values on the Inputs page, and to reverse channels should be reversed on the Outputs page.

Offset: Midpoint offset setting

Curve: Curve settings

<table>
<tr><td>Diff</td><td colspan="2">Adjust the travel amount on one side with the midpoint as the boundary</td></tr>
<tr><td>Expo</td><td colspan="2">Expo curve setting. Increasing a positive value will make the gimbal smoother and smoother when approaching the midpoint, while increasing a negative value will make the gimbal more acute when approaching the midpoint.</td></tr>
<tr><td rowspan="6">Func

Preset function</td><td>X>0</td><td>Func

Preset function</td></tr>
<tr><td>X<0</td><td>Positions above 0 (midpoint) follow the gimbal output, operations below the midpoint are all fixed to the midpoint value of 0</td></tr>
<tr><td>|X|</td><td>The opposite of the previous one</td></tr>
<tr><td>f>0</td><td>Absolute values, negative values less than the midpoint will always become positive values, and the actual performance is a V-shaped curve</td></tr>
<tr><td>f<0</td><td>Below the midpoint 0 is fixed at midpoint 0, above the midpoint is fixed at 100, the actual performance is that the gimbal becomes 0 and 100 to switch, there is no intermediate process</td></tr>
<tr><td>|f|</td><td>The opposite of the previous one</td></tr>
<tr><td>Cstm</td><td colspan="2">Call custom curve (CV1-CV32), custom curve is set in curve page CURVE</td></tr>
</table>

Mode: Select the corresponding flight mode, and the output trimming value that affects this entry can be set by the flight mode entry

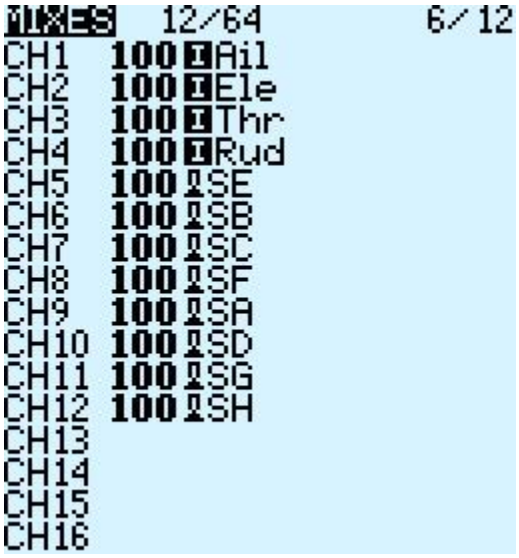
Switch: Select the switch to activate this item (Note: This setting is added to this item to add multiple lines of different settings to switch, if there is only one line setting, do not set the activation switch, otherwise the switch will cause this item to be completely invalid)

Side: Unilateral setting with the midpoint as the boundary. No matter how this item is set, it will be set to unilateral effect by Side.

x>0	All below the midpoint are fixed at 0, and normal output above the midpoint
x<0	All above the midpoint is fixed at 0, and normal output below the midpoint

Trim: You can choose whether the fine-tuning is effective for this entry, or you can define a fine-tuning that affects this article separately.

3.4.5. Mix control (Mixer)



Mixing page for channel settings

The mix control page allows you to combine as many input sources as you want and map them to any one or more of the 32 output channels. Finally use the next page (Outputs) to make these purely logical outputs to fit the model device

You have complete flexibility in controlling the mixing from any input to any output channel.

A mix puts one input into one channel. The inputs are configured in the Inputs page, which defines any input type.

The mixing control page can also use other channels as the source of the current channel, and output from the current channel after re-mixing. It can also mix one or more channels to another or multiple channel outputs, which can combine very powerful complex functions.

All inputs range from -100% to + 100%. Gimbals, knobs, sliders, channels, global variables, and coach input.

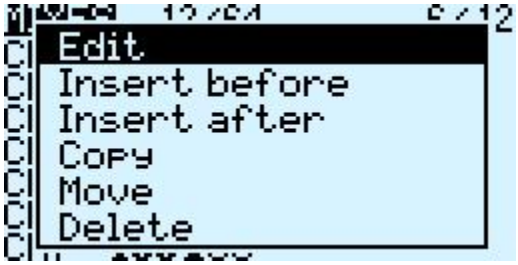
If you want the servo of the No. 2 plug connected to the receiver to be controlled by lifting (ELE), you only need to create a mixing entry on CH2 and use the Ele input as the source of operation.

Each channel can have many lines, and you can choose the operation between each line. Long press the ENT key and select Insert Before / After to create a new line.

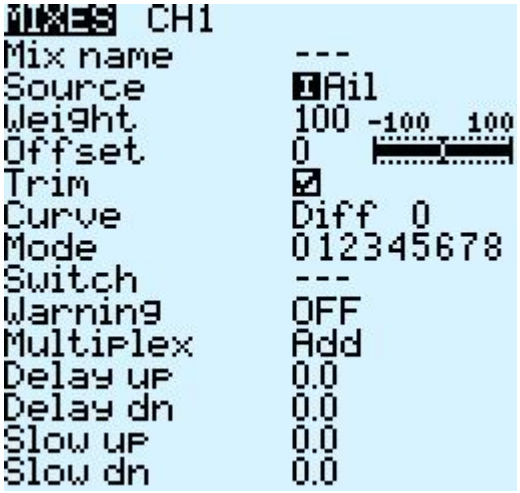
By default, all lines on the same channel are added together, and the next line can choose to be superimposed or multiplied with the channel value of the previous line, and replaced completely.

Please note that the currently active row of settings will be displayed in a bold font, making it easy to recognize the item currently in use at a glance. The CH1 channel shown in the figure is input by the Ail gimbal, and the three states of the SA switch are used to switch three travel amounts.

To edit a mixing control, use the scroll wheel to select the mixing control item up and down, and press and hold the ENT key to enter the editing submenu. Select Edit and press the ENT key momentarily.



Detailed settings for mixing entries



Mix name: Name setting Use the scroll wheel to select letters and numbers, and press and hold the ENT key to switch between upper and lower case. Short press the ENT key to set the next character.

Source: Long press the ENT key to pop up the input source category menu.

Weight: Channel travel amount, the range is -500 / + 500. The default value is 100. Negative values indicate reverse channel output.

Offset: Midpoint offset, you can add the offset of the input value, positive or negative. Range is -500 / + 500

Trim: You can choose whether the fine-tuning is effective for this entry, or you can define a fine-tuning that affects this article separately.

Curve: Curve settings

Diff	Adjust the stroke amount on one side with the midpoint as the boundary	
Expo	Expo curve setting. Increasing a positive value will make the gimbal smoother and smoother when approaching the midpoint, while increasing a negative value will make the gimbal more acute when approaching the midpoint.	
Func Preset function	X>0	Positions above 0 (midpoint) follow the gimbal output, operations below the midpoint are all fixed to the midpoint value of 0
	X<0	The opposite of the previous one
	|X|	Absolute values, negative values less than the midpoint will always become positive values, and the actual performance is a V-shaped curve
	f>0	Below the midpoint 0 is fixed at midpoint 0, above the midpoint is fixed at 100, the actual performance is that the gimbal becomes 0 and 100 to switch, there is no intermediate process
	f<0	The opposite of the previous one
	|f|	Above the midpoint is fixed at + 100%, and below the midpoint is fixed at -100%. The actual performance is that the gimbal becomes -100%

		and + 100% to switch. There is no intermediate process.
Diff	Adjust the stroke amount on one side with the midpoint as the boundary	

Mode: Select the corresponding flight mode, and the output trimming value that affects this entry can be set by the flight mode entry

Switch: Select the switch to activate this item (Note: This setting is added to this item to add multiple lines of different settings to switch, if there is only one line setting, do not set the activation switch, otherwise the switch will cause this item to be completely invalid).

Warning: Set the alert tone

Multiplex: Superposition method, output after superimposing with the value of the previous stroke amount

Add: Additive superposition, the current value is added to the value of the previous line and output

Multiply: multiplication, the current value is multiplied by the value of the previous line and output

Replace: direct replacement, the value of the previous line is directly replaced by the value of this line

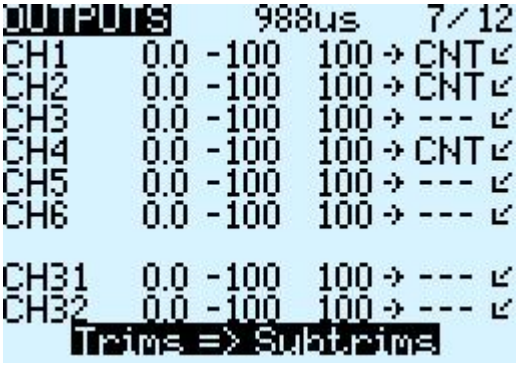
The combination of these operations allows the creation of complex mathematical operations and is often considered one of the biggest benefits of using EdgeTX.

Delay Up/Dn: The response of the output can be delayed as the input changes. (In seconds).

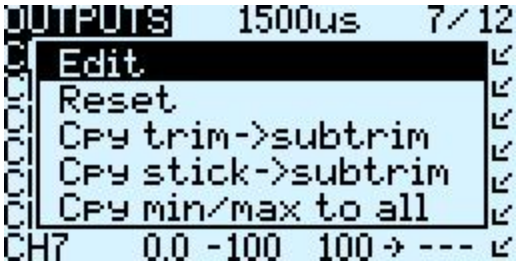
Slow Up/Dn: Regarding input changes, the response of the output can be slowed. For example, slow speed can be used to slow down retraction driven by a normal proportional servo. The output will cover the time in seconds from 100 to + 100%.

3.4.6. Output (Outputs)

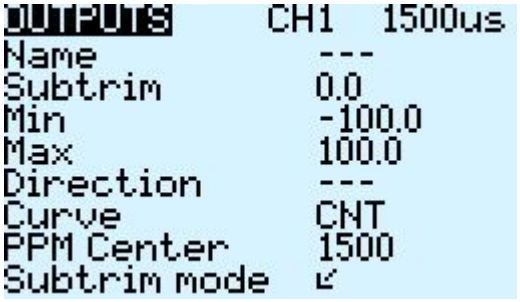
Total output page, final channel output overall settings



To quickly set the high/low and center points, press enter on the desired channel to open the quick-access menu



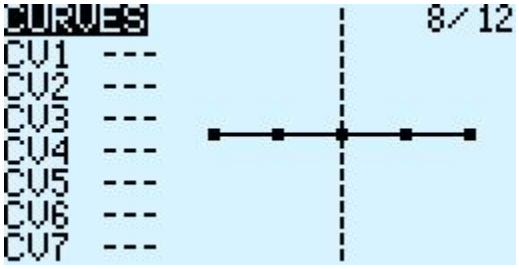
Select Edit to change specific output values



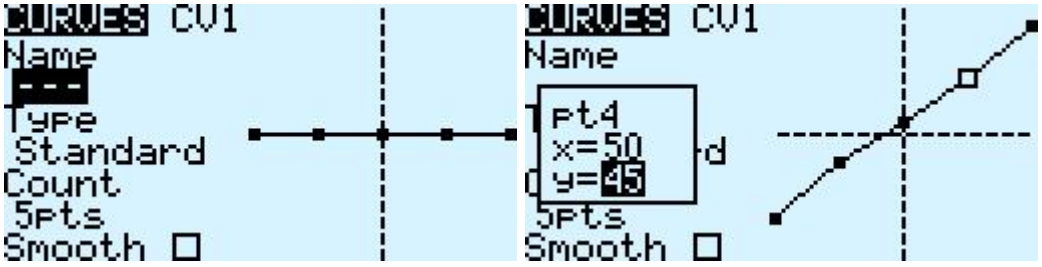
3.4.7. Curves

The curve can be used to modify the control response in the Inputs, Mixes, or Outputs page. Standard curves containing Expo and Differential can be used directly in these sections. This page is used to customize any kind of curve.

Up to 32 curves could be set per model.



The curve can be between 2 and 17 points and can have a fixed or user-definable x coordinate.



X value represents input, such as the course of the gimbal from low to high

Y value represents output, such as the process of channel output from low to high

Name: Name the curve, easy to find when recalling the curve in other settings

Type: Curve type

Standard	Standard type, only Y point (output) can be edited, ranging from -100 to 100
Custom	Custom types, both X (input) and Y (output) points are editable, ranging from -100 to 100

Count: The number of points on the curve, between 2 and 17.

Smooth: If checked, create a smooth curve through all points.

When customizing, move the cursor to X and Y coordinates, and change the position of each coordinate point according to your needs.

Depending on the type selected above, this allows writing the X coordinate of a standard curve, or the X and Y coordinates of a custom curve.

Long press the ENT key on the coordinate point to enter the submenu:

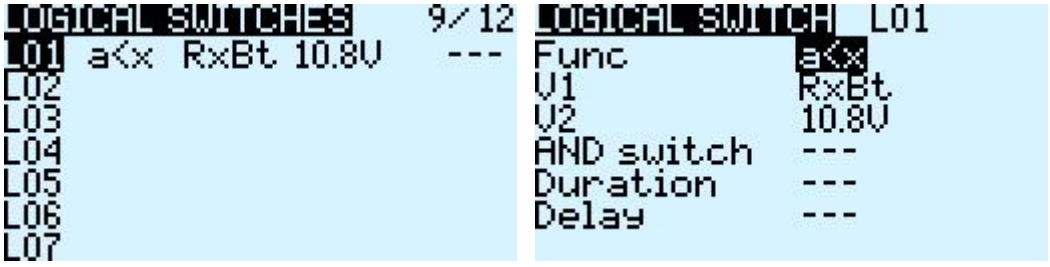
Preset: Select presets with slopes of -45 °, -33 °, -22 °, -11 °, 0 °, 11 °, 22 °, 33 °, 45 °. When defining more complex curves, choose reasonable presets Will reduce some steps.

Mirror: Mirror the curve vertically.

Clear: Clear the current curve.

3.4.8. Logic switches (Logical Switches)

The logic switch is a user-programmed virtual switch. Like the physical switch, the logic switch is also a switch, but unlike a physical switch, which can be moved by hand, the logic switch is an internal switch triggered by certain user-programmed conditions. The judgment condition you set allows the radio control to automatically turn on or off the logic switch to achieve a certain or a series of automated actions.



The setting of the L01 example in the figure is expressed as follows: When the return value V1 is less than 11.0V, the L01 switch is automatically turned on. In the settings of other pages, L01 has the same function as the physical switch. You can define the corresponding function for L01 on or off. In this way, a switch is automatically executed according to the parameters that change in real time.

The radio-control system provides 64 logic switches, each of which has three judgment methods:

1. Compare the values of parameters a and b, a corresponds to V1, b corresponds to V2, a and b can be any source, such as input source, channel, switch, or return item, etc.

2. Compare the value of parameter a and data x, a corresponds to v1, x corresponds to v2, and x is a fixed value, which is used to compare with parameter a

3. Parameter a can be compared with its own calculation result. For example, the change of parameter a itself can affect the current state of the logic switch.

Functions

a=x	Triggered when the parameter v1 is equal to the data v2. For example, if the thr gimbal is less than -90, the current logic switch is turned on when the thr gimbal is less than -90%.
a ~ x	Triggered when the parameter v1 is approximately equal to the data v2, approximately equal to the range of about 10%
a>x	Triggered when parameter v1 is greater than data v2
a<x	Triggered when parameter v1 is less than data v2
|a|>x	Triggered when the absolute value of parameter v1 is greater than v2, the absolute value is that it will become positive no matter whether it is positive or negative
|a|<x	Triggered when the absolute value of parameter v1 is less than v2
AND	AND operation is triggered when both parameters v1 and v2 meet the conditions. For example, v1 is the switch SA ↑ and v2 is SB ↑, which indicates that the current logic switch can be turned on when both SA and SB switches are in the ↑ position.
OR	OR operation, which can be triggered when one of the parameters v1 and v2 meets the conditions, or when all the conditions are met

XOR	Exclusive OR operation, triggered when one of the parameters v1 and v2 meets the conditions, not triggered when all the conditions are met or all the conditions are not met
Edge	Is a momentary switch (very short duration, about 30 ms), it will be triggered when V1 meets the conditions V1: Can be physical switch, logic switch, trim button V2: It is divided into two parts [t1: t2], t1 is the minimum value, and t2 is the maximum duration of V1. The logic switch is triggered only after t1 when V1 meets the conditions, and is closed before t2. If t2 is left as "---" then only t1 is applicable. When V1 changes from on to off (ie falling edge), the logic switch will be triggered, and then the logic switch will be turned on for 1 processing cycle (about 30 ms). If t2 is set to "<<", the logic switch (ie, rising edge) is triggered when V1 changes from off to on.
a=b	Triggered when the parameter v1 is equal to the parameter v2. For example, when the value of the thr gimbal and the value of the ail gimbal are equal, the type of v2 at this time is not digital data, but a source
a>b	Triggered when parameter v1 is greater than parameter v2
a<b	Triggered when parameter v1 is less than parameter v2
△≥x	△ is the mathematical symbol Delta (difference value). It is triggered when the difference of the parameter v1 itself is greater than or equal to the value of data v2. Switch, this item only judges the difference when v1 changes from small to large
|△|≥x	Triggered when the absolute value of the difference of the parameter v1 itself is greater than or equal to the value of v2. This judges the absolute value. Since the negative value also becomes positive, a change from v1 to v or from v1 to trigger the current logic switch
Timer	The switch that automatically loops all the time. V1 is the on time and v2 is the off time. It can be defined by v1 and v2 to automatically cycle

	at constant intervals.
Sticky	v1 can only switch on, v2 can only switch off

AND Switch: With the arithmetic switch, this item can set any physical switch and logic switch. The current logic switch can be triggered when the switch set by this item and the current item meet the conditions

Duration: Hold time, the length of the current logic switch after it is triggered. If there is no parameter, the default is always on. If this item is set for time (0.1-25 seconds), the current logic switch will automatically turn off after this time.

Delay: Delay, after the trigger is turned on, the range is 0.0 to 25 seconds.

3.4.9. Special Functions

The combination of logic switches, special functions, global variables, and pass back items opens up a variety of exciting new features for the RadioMaster TX12. E.g.:

-Changes in battery voltage data returned by the receiver can trigger voice alerts

-Altitude data returned from the barometer on the aircraft, real-time broadcast of the aircraft's altitude

-By defining voice for the switch, real-time voice broadcast operation on the radio controller

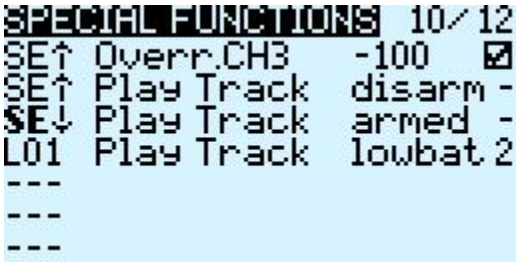
-Use logic switches and global variables to let the radio controller perform a single or a series of automated actions

-Call lua scripts with switches or logic switches for more advanced custom functions

-Use the knob to adjust the volume

-Use the switch to adjust the backlight brightness

In addition to a few of the commonly used methods listed above, the ever-changing features allow you to realize your imagination



The three examples in the picture are represented as:

SF1: When the SE switch position is ↑, the CH3 channel will be covered by -100. Usually this setting is used to lock the throttle.

SF1: When the SE switch position is - , Play the sound file “disarm.wav”.

SF1: When the SE switch position is ↓, Play the sound file “armed.wav”.

SF4: When the logic switch L01 is automatically turned on, lowbat (low battery voltage) warning sound will be broadcasted. The right-most 2 means that the voice will be broadcasted every 2 seconds. Automatically turn on when

Each model can have 64 special functions. In addition, there are 64 global settings that are common to all models. To use the global function, please enter the Global Functions page in the radio-control system settings to set it.

Each setting is activated with a trigger switch. You can select physical switches, logical switches, fine-tuning buttons, and flight mode. There are two other special options, ON and Ones (which are always enabled when the machine is turned on), and One (which is performed only once when the machine is turned on)

Press and hold the ENT key to enter the sub-menu for displaying sources by category. Scroll up or down to select the desired category and press the ENT key.

The following functions are triggered by the switch selected above

Overr.CHn	Override channel value, “n” in word CHn is channel number.
Trainer	Coach mode enable switch, it is recommended to set to SH rebound switch, this switch is used to activate or stop the operation of the student machine
Inst.Trim	One-touch saves the current gimbal position as a fine-tuning value
Reset	Reset, you can choose to reset all or reset one way individually. The content of the reset option is the same as that in the main interface.
Set Tmr	Used to set the timer, set the timer time and turn on when the switch is turned on
Adjust	Adjust the global variable Gvar and enter a fixed number directly Press and hold the Ent pop-up menu to change the way to set Gvar. There are three options: Mixer Source: Set the value of Gvar with an input source

	Global var, another global variable Inc / Decrement: increase or decrease
Volume	Select a knob or slider to adjust the volume
SetFailsfe	Use the switch to set the receiver's runaway protection anytime, anywhere
Play Sound	Play a sound ! 1x: Play sound once, not at startup 1x: Play sound once. 1s-60s: broadcast at intervals (seconds)
Play Track	Play wav file in SD card, single broadcast and loop broadcast are the same as above
Play Val	Voice broadcast value, can broadcast values from any source, such as real-time values such as gimbal, voltage, altitude, time, etc.
Lua Script:	Call the specified script, and the script file should be placed in the / SCRIPTS / FUNCTIONS / folder of the SD card.
BgMusic	Background music, loop play wav files, take effect immediately after power on
BgMusic II	Pause background music
Vario	Broadcast Vario value
Haptic	shock
SD Logs	Start recording logs, save on SD card, can set time interval 0.2-25.5 seconds
Backlight	To control the brightness of the backlight, you must first define the backlight ON and OFF brightness in the system settings. This uses the switch to switch the corresponding ON and OFF brightness of the backlight.
Screenshot	Take a screenshot of what is displayed on-screen
RacingMode	Active Racing mode

3.4.10. Digital Transmission and Telemetry

Each value received via digital transmission is considered a separate sensor with its own properties. Multiple identical sensor types can be connected, but the physical ID must be changed. For example, a sensor for each battery in a 2-6S lithium battery, or monitoring

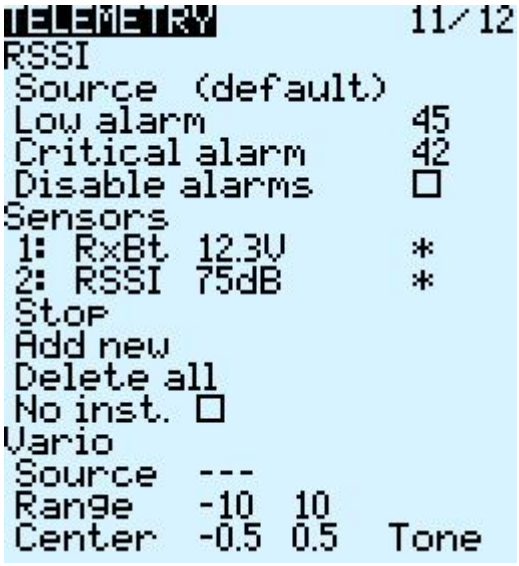
individual motor currents in a multi-motor model. Each sensor can be reset individually with special functions.

Receiver Signal Strength Indicator (RSSI): The value transmitted by the receiver in the model to the radio controller, indicating the strength of the received signal. The warning can be set to warn when it is below the minimum, indicating that you are in danger beyond the flight range. Factors affecting signal quality include external interference, long distances, poor steering or antenna damage, etc.

It is not an absolute measurement, but a number that represents the ratio of the signal to some initial "good" value. The number is relative, but can indicate that the model may be close to the range limit of the controlling aircraft.

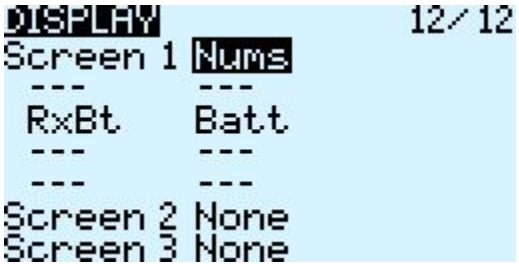
When the return signal is completely lost, the radio will prompt “Lost return signal”. Please note that due to a failure of the return link, the radio controller can no longer warn you of RSSI or any other alarm conditions, so no further alarm sounds.

Telemetry settings：



3.4.11. Display

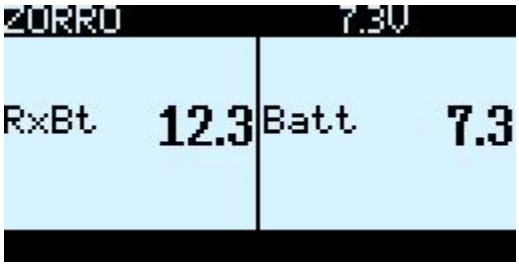
4 customizable display options are available here



Num: Values shown numerically, each page shows up to 8 items

Bar: Values shown graphically, each page shows up to 4 bar graphs

Script: Able to load third party display scripts or customized display scripts



The displayed information can be customized by holding the 【Page<】 button from the home screen. Using time and battery as examples, the screen can show up to 4 parameters simultaneously.

3.2.12 Binding & RF Module Firmware updates

The Zorro radio control comes in several different internal radio frequency versions. As these projects are constantly evolving, please visit the links below depending on your version for the most up to date information.

Radio Frequency (RF) types

Multi-protocol (CC2500 and 4in1)

https://www.multi-module.org/using-the-module/binding

https://www.multi-module.org/using-the-module/firmware-updates

ELRS

https://www.expresslrs.org/2.0/quick-start/transmitters/tx-rm-internal/

Team Black Sheep Crossfire

https://www.team-blacksheep.com/tbs-crossfire-manual.pdf