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# TBS MAMBO Radio

Revision 2021-07-23

*Compact all-in-one Remote Control Radio with TBS Tracer system*



The first radio with TBS Tracer built-in. And it fits your existing TBS Crossfire module through the JR bay! TBS Tracer is the world's lowest latency radio link and builds upon the rock-solid reputation of the TBS Crossfire code base. With the continued development and expansion of the TBS ecosystem, you will remain on the bleeding edge of capabilities paired with the ease of use and overall robustness that TBS products are known for.

## Key features

- Ergonomic All-in-one (AIO) radio
- Integrated TBS Tracer Micro Tx- up to 1W
- Runs TBS FreedomTX, a temporary OpenTX fork
- Industry's lowest latency - only achievable with an AIO solution!
- Beginner friendly
- Unconventional switches on top for transportability
- Full-size digital hall gimbals (same as in Tango 2)
- Embedded antenna for super clean profile
- TBS CLOUD support (future proof)
- Solid build with quality components
- JR-bay for external modules
- Runs with common 18650 batteries



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## Specifications

<b>Type:</b>	All-in-one (AIO) integrated radio
<b>RC system:</b>	Built-in TBS TRACER MicroTX
<b>Output power:</b>	25mW to 1W, location-specific restrictions apply (!)
<b>Frequency Bands:</b>	2.4GHz band
<b>Antenna:</b>	Embedded antenna, Optional external SMA port
<b>Holding style:</b>	Pinch, thumb, and hybrid friendly
<b>Default stick mode:</b>	Mode 2, throttle and yaw left (user-changeable)
<b>Display:</b>	3.5" LCD-Panel, 128 x 96 pixels
<b>Battery:</b>	2x 18650 Lithium-ion battery (not included), USB-C charging (1A at 5v)
<b>Runtime:</b>	Approx. 6 hours
<b>Channels:</b>	8- or 12-channels (Tracer), more to be unlocked via software update (free)
<b>Operating range:</b>	Variable depending on output power and radio environment
<b>Gimbals</b>	Full-size Digital Hall Gimbals (Tango 2 Gimbals, upgradeable to PRO/folding)
<b>Controls:</b>	2x Quad full-size hall gimbals 2x Two-position switches 2x Three-position switches 1x 2-position switch 1x momentary button 3x Configuration buttons 1x Rocker switch 1x Power-on button
<b>Ports:</b>	3.5mm headphone audio-jack for OpenTX voice support USB-C for software updates, simulator and charging Internal Crossfire/Tracer Rx port for wireless trainer (not yet usable)
<b>Neck-strap mounting:</b>	integrated
<b>Speaker:</b>	1W, for OpenTx voice support
<b>Simulator compatibility:</b>	Yes, over USB-C
<b>Working temperature:</b>	0 - 40°C
<b>Size:</b>	W 185 x L160 x H60mm (without Gimbals)
<b>Weight:</b>	565g (excl. batteries)
<b>Kit contents:</b>	1x TBS MAMBO Radio Controller, 1x SD-card pre-setup, 1x Set of softer gimbal springs



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## Attention

These Long Range Systems are capable of radio frequency transmissions and output power that may be not allowed in your country.

**Please always check your local RF legislation to set the frequency and output power according to the regulation.**

A general rule for RC aircrafts is that they must be controlled always under sight of view, check your RC regulation to keep up to date with regulations.

## Getting ready

Getting set up and ready to fly is a quick and simple task. In most cases plug&play when using TBS equipment.

## FAQ

If you got any question after reading this manual you should visit the [TBS FAQ](#) section

## Note

This manual is written based on FreedomTx 1.29, *Tracer 5.41* and *WiFi 1.41*. If some functions are not available for you, please update your system to this (Beta) or a later version.

## Updating

In order to update and configure your Mambo and the in-build Tracer, you need the TBS Agent X, which you can download from the [TBS shop](#).

To update your Tracer, connect it by the USB-port of the transmitter and run the update by Agent X.

For detailed instructions on how to use the Agent X, have a look at the [Agent X manual](#).



## Overview

The following diagrams indicate the essential input controls (green) and features (red) of the radio.



## Detailed overview



Power button, Left gimbal, Display and speaker



Right gimbal, rocker switch



JR bay with installed TBS Crossfire module



Grip pads on the back



Audio jack



USB port



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## Getting ready

Getting set up and ready to fly is a quick and simple task. In most cases plug&play when using TBS equipment.

## Power up

Press and hold the Power-button for three seconds until the animation completes. The TBS MAMBO screen will welcome you.

## USB Joystick

Plug-in a USB-C cable and a menu will appear where you can activate USB joystick mode. This mode works out of the box with the most common simulators available.

## SD card content

The latest SD card content for sound files and scripts can be found on the [TBS website](#).

[How to update the sd card \(video\)](#) (Tango 2 video series). Please make sure you download the correct content for your FreedomTX or OpenTX version.

The maximum allowed size is 32GB. Cards must be formatted in FAT32 format (on bigger cards only 32GB will be available then).

## FAQ

If you got any question after reading this manual you should visit the [TBS FAQ](#) section

## How-To videos

A short playlist on how to backup and update the sd card, TRACER and the MAMBO fw, as well as how to set up switch warnings [can be found here](#).

*Note: the video series is recorded for the TBS Tango 2 radio. The same steps apply to the Mambo and Tracer!*



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## Configuration controls

To navigate and configure the radio, the left-side buttons and right-side selector wheel are used. These are the control inputs for the configuration menu system:

- **Menu**
  - Quick-press enters the model setup. First page is the TBS Agent Lite (LUA)
  - Long-press enters the radio configuration
- **Page**
  - Quick-press skips through the different configuration views
  - Long-press enters the telemetry view or navigate to the previous page (in the menu)
- **Exit**
  - Go backwards or exit the configuration menus
- **Enter**
  - Single-press engages a configuration menu item
  - Double-press enters stick trim menu
  - Long-press enters the model select menu
- **Rocker**
  - Scroll through the available menu items or setting options



## Setup

The radio comes ready to go. Simply bind (push and hold MENU, enter Agent Lite/ Tracer TX menu, and select the BIND command) to your favorite model and you're ready to fly. However, if you are not a Mode 2 (throttle left) pilot, you will need to make some changes.

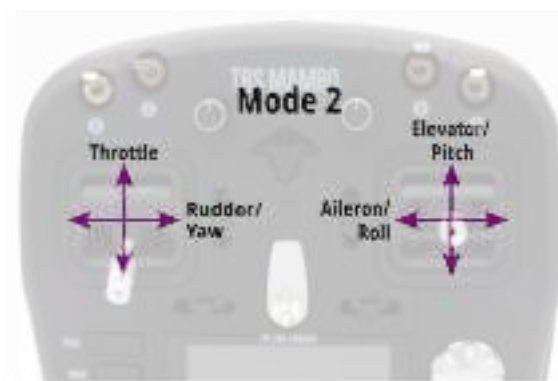
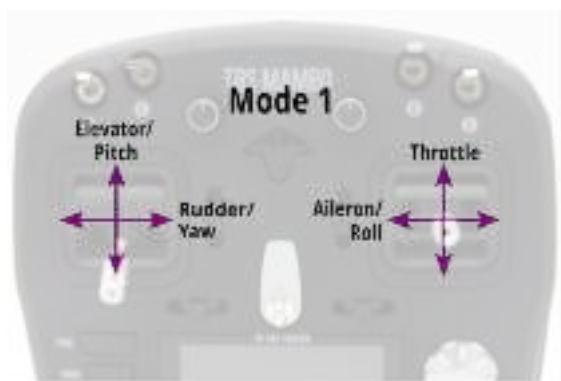
### Changing stick mode

When talking about stick modes we are referring to how the remote is configured to control the airplane i.e. which sticks operate which controls on the aircraft. You can swap the stick gimbals by opening up the remote, covered later on in the manual.

By default the remote is set up with Mode 2, which is the most common type used.



1. Long-press the Menu-button to enter the Radio Setup
2. Scroll down to the end using the Rocker-switch
3. Change the Mode to the desired type
4. Follow the instructions later in the manual to change the throttle stick to the other side, if required



## Changing channel mixing and end-points

For detailed channel mixing, rates, and end-point settings, it is recommended to set up these on the flight controller side (CleanFlight, BetaFlight, RaceFlight, APM, PX4, Pixhawk, etc.), for anything else than flying wings.

### Flying Wings

The TBS Mambo supports channel mixing for flying wings . The mixing, end-point, and reverse settings can be configured in channel settings, after you have set up a new flying wing model.

Mixes	10/64	4/11
CH1	100	Thr Engine
CH2	50	Ele D-EleR
+=	-50	Ail D-AilR
CH3	50	Ele D-EleL
+=	50	Ail D-AilL
CH4	100	
CH5	100	
CH6	100	
CH7	100	
CH8	100	
CH9	100	

1. Quick-press the Menu-button to enter the Model Setup
2. Change to the Mixer screen by pressing the Page-button
3. Use the Rocker and Enter-switch to select a channel

More information can be found in relevant online tutorials explaining the operating and mixing principles of OpenTX

If you create a new model, you can follow the wizard which will help you set it up by selecting *Delta* as type.



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## Radio configuration menu

Changing settings on the TBS Mambo 2 is done using the OLED display and controlled using the Rocker-switch/Enter-button. **Long-press the Menu-button** to enter the radio configuration menu.



## Tools



Browse your LUA tools

- Here you can quickly access your LUA tools scripts like BetaFlight or Kiss Lua.
- For a script to be listed in this place they must be located under *SD card\SCRIPTS\TOOLS*



## Memory card



Browse and look up the contents of the SD-card

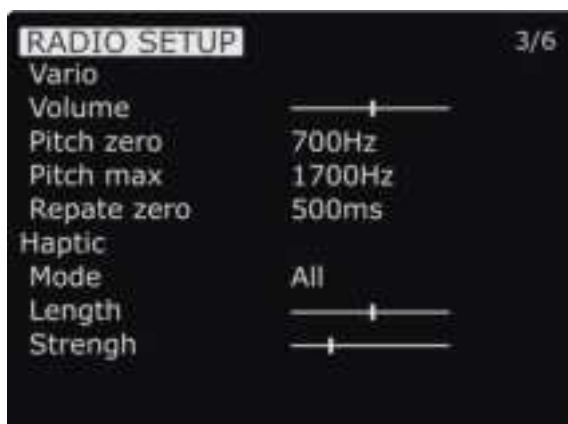
- Use the **Rocker-wheel** and **Enter-button** to browse
- You can update the SD card contents by connecting the USB and selecting the SD card operation mode. The SD card will be recognized as a mass storage. For the latest SD card contents, visit the [TBS Shop Page](#).

## Radio setup



Configures the major features of the radio

- **Date** - Current date
- **Time** - Current time, no timezone or daylight
- **Battery range** - Span of the graphical radio battery meter on the main views, must be 3.4 to 4.2V for Mambo
- **Sound** - Mode, Master volume, individual volumes of all mixed sources (Beeps, sound files, variometer, background music), beep duration and pitch



Continuation of radio setup

- **Vario** - Generates the tone/sound of a glider variometer, uses altitude or vertical speed telemetry data
- **Haptic** - For physical tactile feedback





Continue of radio setup

- **Alarms** - Audible alarms
  - **Battery low** - Beep when battery reaches this threshold
  - **Inactivity** - Reminder if you have forgotten to turn the radio off
  - **Memory low** - Be notified when the SD-card runs low on memory
  - **Sound off** - If the alarms inadvertently have been turned off
  - **RSSI shutdown** - Warning is announced when the radio is being shutdown with a receiver on and connected
  - **Backlight** - When the Display should turn on.



Continuation of radio setup

- **Splash screen** - How long to display the start-up screen
- **PWR off delay** - How long you need to hold the power button to start the radio
- **PWR on delay** - How long you need to hold the power button to shut the radio down
- **Time zone** - specifies Universal Time Coordinated (UTC) offset for local longitudinal time zone
- **Adjust RTC** - Correct built-in real-time clock by GPS
- **GPS coords** - GPS format for telemetry sensor
- **Voice language** - Which audible package to use for alerts
- **Units** - Metric and imperial units for telemetry values



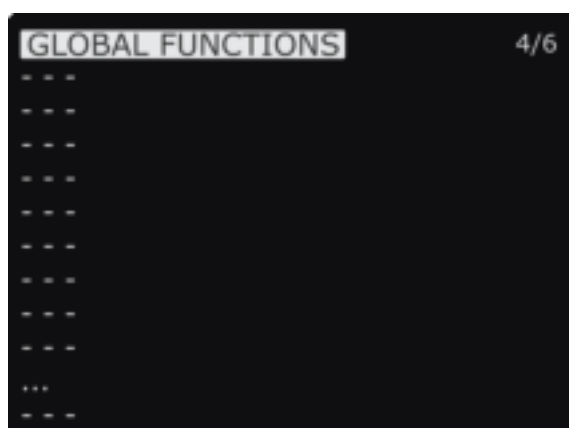


- **Play delay** - Delays for playing any sound
- **USB mode** - Set which mode to use when USB-C cable is connected

Continuation of radio setup

- **Rx channel order** - Determines the order in which the four primary controls (Rudder, Elevator, Aileron, and Throttle) are inserted on channels 1-4 when creating a new model
- **Mode** - Determines which sticks move which controls on the airplane
- **Invert Rotary** - inverter the way the rotary works when selecting stuff (not the general menu navigation)

## Global functions

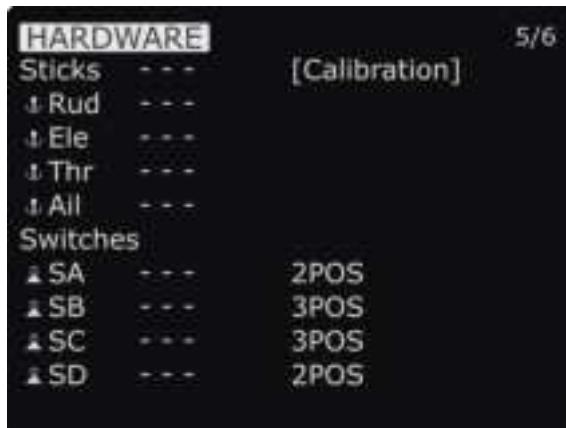


This is the place where switches can be used to trigger special functions such as soundtrack playback, speech output of variables etc.

- Global functions are special functions that are applied across all planes.



## Hardware



Configure all the installed input sticks, switches and buttons

- **Calibration** - Starts the stick calibration
- **Sticks** - Perform the calibration of the hall-effect magnetic gimbals
- **Switches** - Sets the type of switches



- **Battery calibration** - Use a multimeter to measure and input the voltage
- **RTC battery** - shows the actual RTC battery voltage
- **Check RTC** - checks the voltage of the RTC battery

## Version



Current build and version of the OpenTX firmware

- As the Mambo is branch of the OpenTX codebase it needs it specific build
- **Firmware Options** - shows the included software modules



## Calibration



Re-perform the gimbal stick calibration

- The calibration can be entered on [page 6](#) *[CALIBRATION]*
- If the initial calibration was incorrect, re-do it by pressing the Enter-button and follow the instructions
- **IMPORTANT:** on the final step, do NOT move the sticks to their combined extremes (e.g. top-left, top-right, bottom-left, bottom-right).  
**Move the sticks in a “+” pattern**

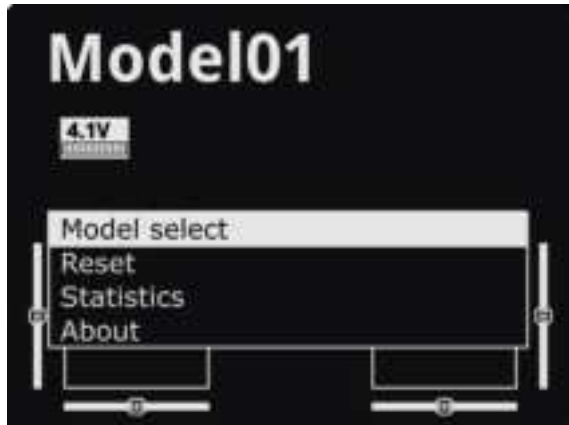


## Model selection/ configuration menu

All the model specific settings are accessible by pushing the Menu-button. Here you configure the currently active model (name visible on the home screen).

To change the active model, **long-press Enter** and choose the "Select Model" view.

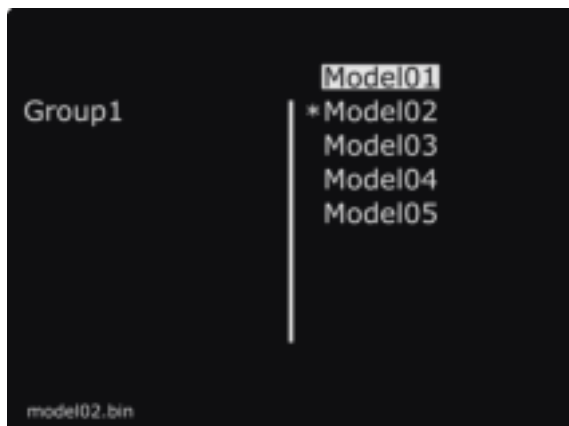
### General overview



Perform model actions and see metrics

- **Model Select** - Create/select/delete models
- **Reset** - Clear flight, timers and telemetry
- **Statistics** - Metrics on the model and radio

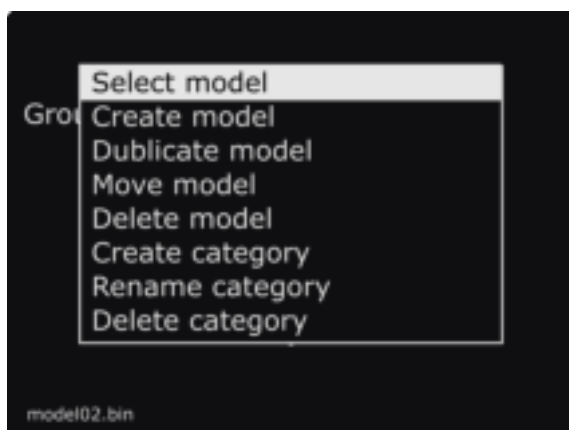
### Model select



Manage your models and categories

- **Left column** - Lists categories, navigate through them with **PAGE**
- **Right column** - Lists individual models for your quads, airplanes, deltas, etc.

### Manage models



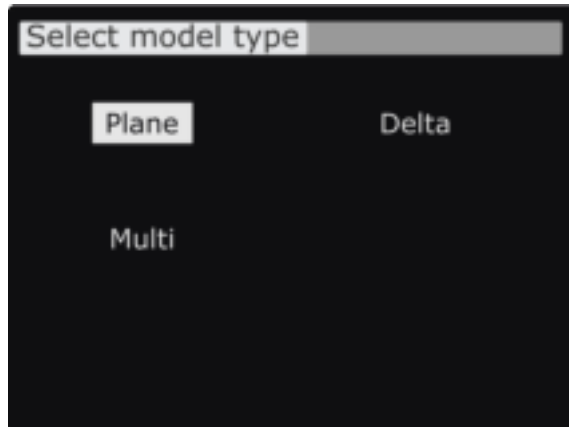
Manage your models and categories

- **Select model** - Activate the selected model
- **Create model** - Initiate the new model wizard
- **Duplicate model** - Copy the selected model
- **Move category** - moves the selected model to a new category
- **Delete model** - Remove the selected model
- **Create category** - Make a new category 'folder'



- **Rename category** - Give the selected category a new name
- **Delete category** - deletes the category, only possible when there is no model in it

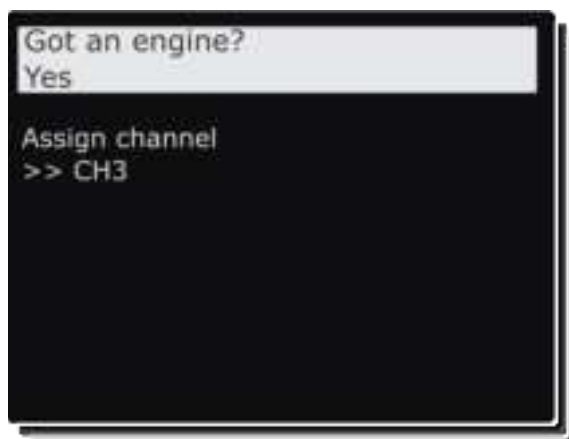
## Create models



When creating a new model the wizard guides you step-by-step. This can be aborted any time by pressing **EXIT**

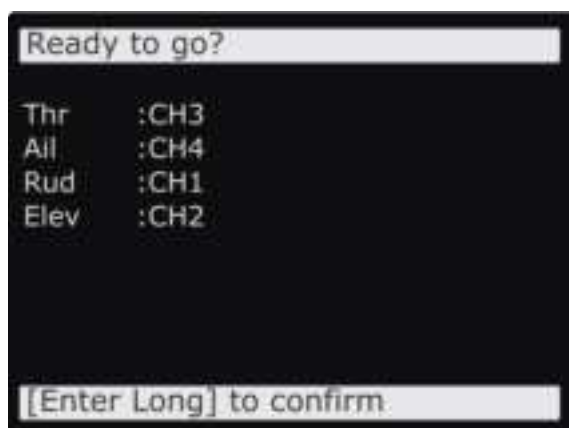
Press the Page-button to go to the next screen

- **Select model type** - Pick the base for the new model, the type of aircraft



Answer each step to generate the final model base

- **Got an engine** - Determines whether to assign throttle - select which channel to use, here CH3.



Summary of the selections made, can be changed afterwards

- **Control surface** - Assigned to the designated channel



## OpenTX configuration menu

Changing detailed OpenTX settings can be done in the main OpenTX configuration menu. **Quick-pressing the Menu-button** to enter the configuration menu and switch screens with the Page-button.



## OpenTX setup



Configures the general OpenTX features

- **Model name** - Specify profile name
- **Timer1/Timer2/Timer3** - Countdown timers
  - **Name** - Specify timer name
  - **Persistent** - When the timer will be set to 0
  - **Minute** - Notification every minute passed
  - **Countdown** - notification style when the time is over



- **Extended limits** - Allows servo travel past 100%
- **Extended trims** - Allows trims to cover the full stick range
- **Show trims** - Display trims on main screen
- **Trim step** - Graduality of trims
- **T-Reverse** - Throttle direction reversed





- **T-Source** - Throttle input control source
- **T-Trim** - Throttle trim allowed
- **Preflight** - Trigger alert when the following checks fail
  - **Checklist** - Display contents of text file
  - **T-Warning** - Throttle high warning
  - **S-Warning** - Defined switch state warning
- **Center beep** - Beep when passing the center position of the sticks
- **External RF** - Settings when an external module is connected.  
Off when internal Tracer is used
- **Global functions** - Use global functions
- **Model Match** - allows you to bind a receiver to just this model.

## Flight modes



Create flight presets that can activate a particular attitude or characteristics of the model

- **FM0-FM8** - Flight mode slots
  - Each of the flight mode slots can be named, has a selectable activation switch (physical or logical), a trim selection array, and slow up/down parameters for smooth transitions between modes.



FLIGHT MODE		FMO
Mode name		
Trims	:0 :0 :0 :0	
Fade in	0.0	
Fade out	0.0	
Global variables		
G1	Own	0
G2	Own	0
G3	Own	0
G4	Own	0
...	...	...
G9	Own	0

Configure the selected flight mode

- **Mode name** - Identifiable name
- **Trims** - R, E, T, A when shown mean the mode has its own trim setting for that control
- **Fade in** - Smooth transition time in-between mode change
- **Fade out** - Same delay for transition out
- **Global variables** - Commonly shared values
  - **G1-G9** - Specific configuration screens

## Inputs

INPUTS		4/64	3/11
Ail	100	↓Ail	---
Ele	100	↓Ele	---
Thr	100	↓Thr	---
Rud	100	↓Rud	---
05			
06			
07			
08			
09			
...			
32			

Allows setting one or more input formatting rules to each stick axis

- **Rud/Ele/Thr/Ail** - Specific input configuration screens

## Mixer

Mixes		10/64	4/11
CH1	100	Ail	Yaw
CH2	100	Ele	Pitch
CH3	100	Thr	Throttle
CH4	100	Rud	Roll
CH5	100	↓SA	Arm
CH6	100	↓SB	Beep
CH7	100	↓SC	Mode
CH8	100	↓SD	
CH9	100	↓SE	
...			
CH32	100		

This is where the actions on the controls will be mapped to servos

- **CH1-CH32** - Servo/output control channel, specific configuration screens
- Note: If no mixer is set up you will not see any stick movement on the receiver side



## Outputs

OUTPUTS		1501us	5/11
CH1	0.0	-100 100	-> --- Δ
CH2	0.0	-100 100	-> --- Δ
CH3	0.0	-100 100	-> --- Δ
CH4	0.0	-100 100	-> --- Δ
CH5	0.0	-100 100	-> --- Δ
CH6	0.0	-100 100	-> --- Δ
CH7	0.0	-100 100	-> --- Δ
CH8	0.0	-100 100	-> --- Δ
...			
CH32	0.0	-100 100	-> --- Δ

On the output screen each channel can be adapted to the mechanical characteristics of the model

- **CH1-CH32** - Servo/output control channel, specific configuration screens

## Curves



Custom curves can be used either in input formatting or mixers

- **CV1-CV16** - Curves, specific configuration screens

## Logical switches

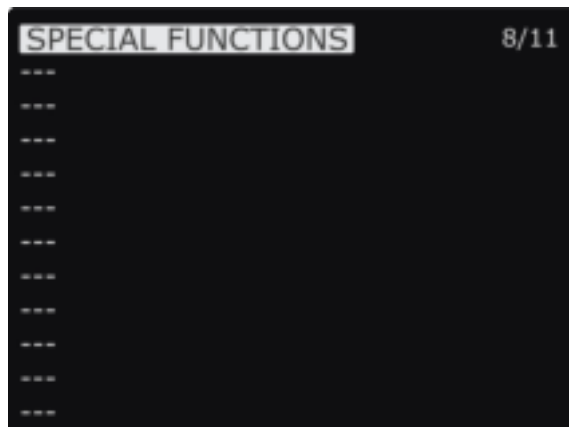
LOGICAL SWITCHES	7/11
L01	
L02	
L03	
L04	
L05	
L06	
L07	
L08	
L09	
...	
L64	

These are logic switches that are used to compare values and combine various conditions

- **L01-L64** - Logical switch, specific configuration screens



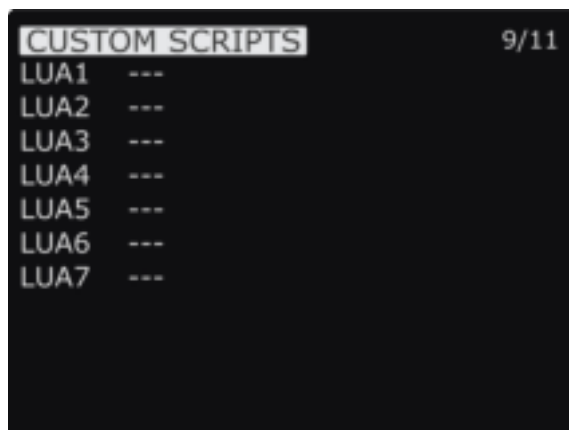
## Special functions



This is the place where switches can be used to trigger special functions such as soundtrack playback, speech output of variables etc.

- **1-64** - Special function, specific configuration screens

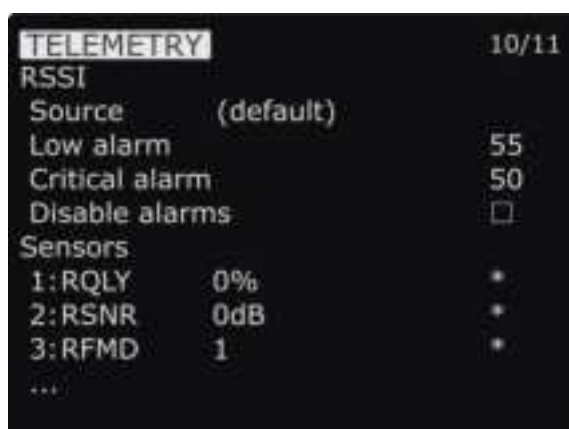
## Custom scripts



Select and configure Lua scripts and their inputs, these can be used to perform complex mixes

- **LUA1-LUA7** - Lua script, specific configuration screens

## Telemetry

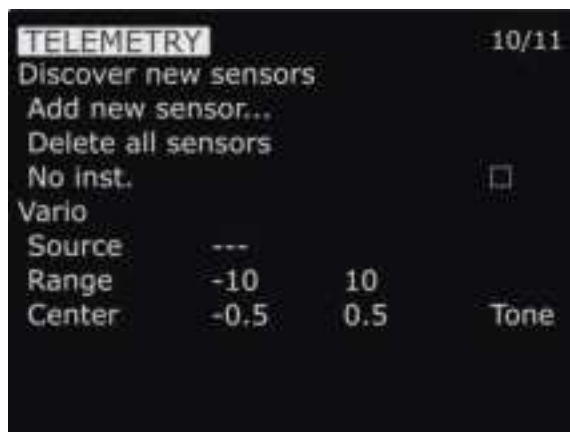


This groups all the basic telemetry-related settings.

- **RSSI** - Receiver Received Signal Strength Indicator
  - **Source** - Specify data source
  - **Low alarm** - Threshold low
  - **Critical alarm** - Threshold critical
  - **Disable alarms** - Inhibit alarms
- **Sensors** - Detailed informations on the Tracer related Sensors can be found in the Tracer manual

**Set the Warning/ Critical level to 75 and 65**





- **Start/ Stop discovery** - Start/ End sensor search
- **Add a new sensor** - Manually add sensor
- **Delete all sensors** - Remove all
- **No insta.** - disable it for the Mambo
- **Vario** - Generates the tone/sound of a glider variometer
  - **Source** - Specify data source
  - **Range** - Usable signal range
  - **Center** - Equilibrium value

## Display



The display screen is where the telemetry view screens are configured

- **Screen 1-4** - Specific telemetry values or scripts
- Show them by long pressing the page button on the main screen



## Usage

### External module

If you want to use your mambo with an external JR-style module like the TBS Crossfire you need to open the cover on the back by pushing the two clips to the middle and slide in your module.



Now enable the external module in the model settings and select the correct protocol type for your module. For the TBS Crossfire you need to use it to CRSF.

**If you use a Crossfire standard/ Lite TX at 2W make sure *dynamic power* is enabled or /and you use an external LiPo to power the module. Otherwise the battery life will be greatly reduced! Crossfire must be on fw 6.07**



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## Neck-strap

The neck-strap hooks into the center of the radio. It is made of metal, so it will last a life-time. There you can use a neck strap of your choice. We recommend the ETHIX neck strap, which is available from TBS or your favorite FPV dealer.



## Bind

Connecting to a new Tracer receiver is simple and done via the Agent Lite .



1. Press and hold the Menu-button and select *TBS Agent Lite*, then select *Mambo Tracer/ Bind*
2. Connect power to the Tracer receiver. If the receiver is not flashing slow green, press the Bind-button on it
3. Select the Bind-menu item, follow the messages on the display and wait for the binding process to complete.

If you have issues during the binding, check the Tracer manual as well as the FAQ section for other problems.

## Model ID

When you bind a receiver you can set up if it should only bind to a specific receiver. This feature is useful if you use a Model without flight controller or different fc types or model settings. The ID must be set up **before** the binding! Otherwise you need to rebind your receiver.



1. Navigate to the model settings
2. Scroll down to Receiver ID
3. ID = 0...99: this model will only bind to receivers previously bound to this id

The details on Model Id/ receiver Number can be found in the [Tracer manual](#)



## Set failsafe

Configuring the Tracer failsafe state settings is done via the Agent Lite. Your model needs to be bound and running for the failsafe setting to work. This setting is only needed on models without FC. On all other models, navigate in the receiver settings to failsafe type and set it to CUT.



1. Press and hold the Menu-button and select *TBS Agent Lite*, then select *Mambo XF/ Set Failsafe*
2. Arrange the switches and sticks into the desired failsafe state
3. Select the Set failsafe-menu item and wait for the failsafe to be stored on the receiver

## Set up switch warning



1. Press the Menu-button and navigate with the PAGE-button to the SETUP page
2. Scroll down to the switch warning setup (S-Warning)
3. Bring all your switches in the position you want them to be monitored
4. Hold the Enter button. Now the positions are saved
5. To disable it on setain switches, short press enter
6. With the scroll wheel you can navigate to the switch
7. Hit the enter button to disable this switch warning or enable it again

A previously disabled switch will not be activated again by these steps. You need to enable it by yourself.



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## Installing the battery

The radio is powered by two 18650 Lithium-Ion batteries. To install them, open the battery compartment on the back of the radio and push them in. Make sure to install them in the right direction to avoid shorts or reverse polarity.



## TRACER functions

For the detailed information on the functions of the in-built TRACER model, please check out the [TRACER manual](#). In there you can find wiring examples, in-depth explanation on the telemetry sensors and many more.

## Stick trim

Adjusting the stick trim while in use is easy. Push the trim buttons to change the trim for each stick



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## Battery protection

The battery protection in the remote is based on nominal voltage, as follows:

Battery voltage	Condition
3.81V and over	Battery level 4, fully charged
3.71V	Battery level 3
3.61V	Battery level 2
3.41V	Battery level 1, beep tone and battery icon flashing
3.38V	Power on allowed, critical level, beep tone and battery icon flashing
3.34V	Shutdown voltage, 20 seconds countdown prompt, recharge as soon as possible

The MAMBO can be charged during the flight. In case your battery becomes empty while you are in the air, simply connect a power bank with 1A power output.

## Alert prompts

The remote will raise an alert when one of the following events happen:

1. Battery low alert - described in the previous section
2. Telemetry data about the low RSSI
3. Telemetry lost alert
4. When a timer is expired
5. Inactivity alarm

More alerts can be programmed by the OpenTX "Special Function" menu.



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## Inside the radio

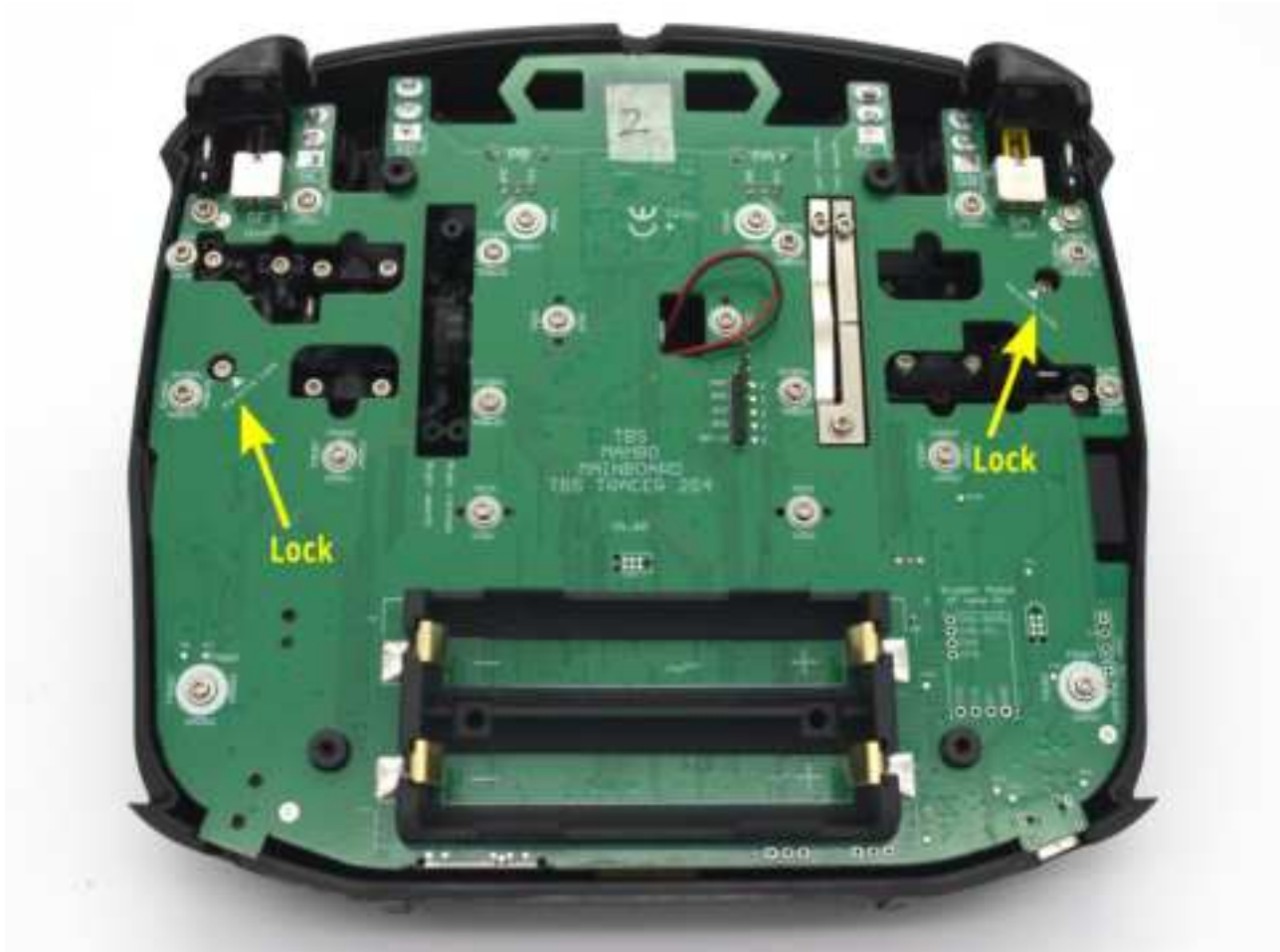
To change the stick mode, travel range, throttle ratchet, or gimbals, you will need to open up the remote control. Warranty will still remain intact, of course.

Then remove the four (4) screws, as indicated in the following photo with a M2.5 hex driver. Now, the back housing lifts off.



## Changing the flight stick mode

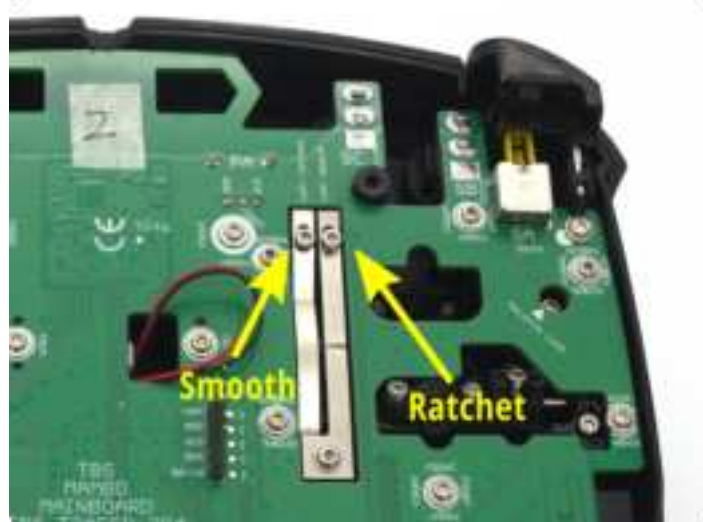
Different flight modes will have the throttle on either the left- or right-side, requiring it to be non-sprung. Modifying it is a matter of screwing in the throttle-lock screw and loosening the other. The rest is changed in the radio configuration menu.



## Adjusting throttle ratchet strength

The radio comes with a smooth throttle from the factory. Adjusting how easy it moves can be adjusted by using a screwdriver and turning the left screw on the metal bracket, as shown in the following photo. Counter-clockwise to decrease the tension and clockwise to increase the tension.

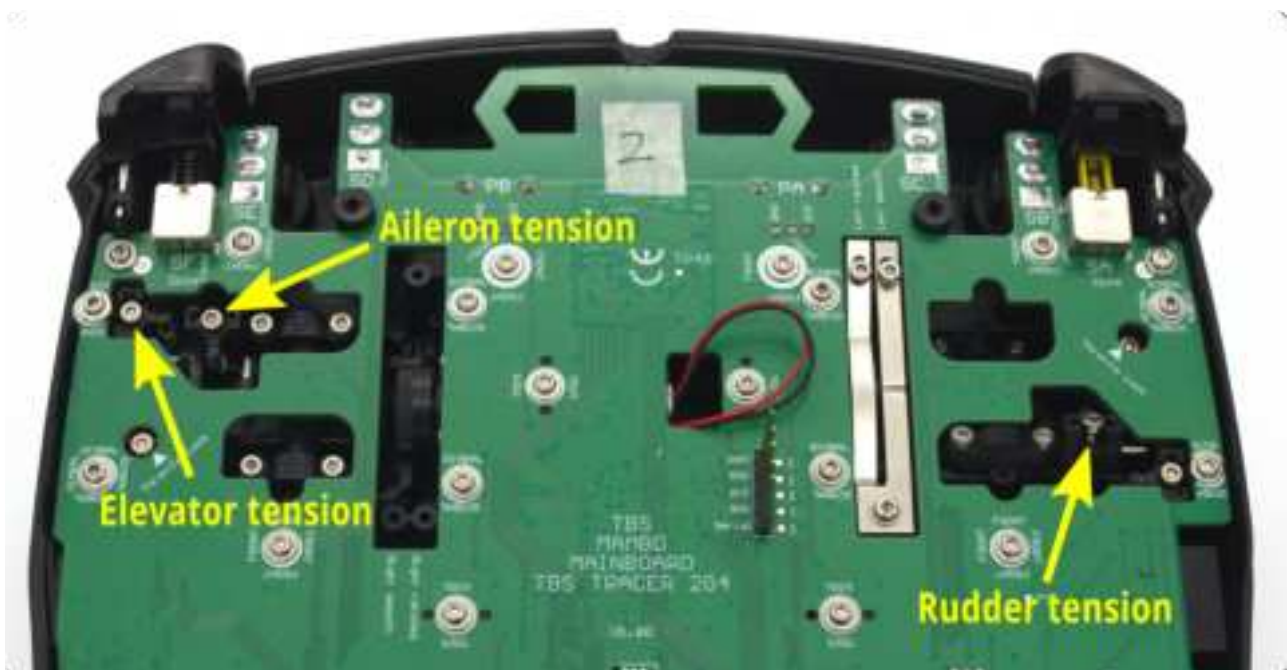
If you rather prefer a ratchet/clicking stick, loosen the left screw entirely and increase the tension of the right screw.



## Adjusting stick tension

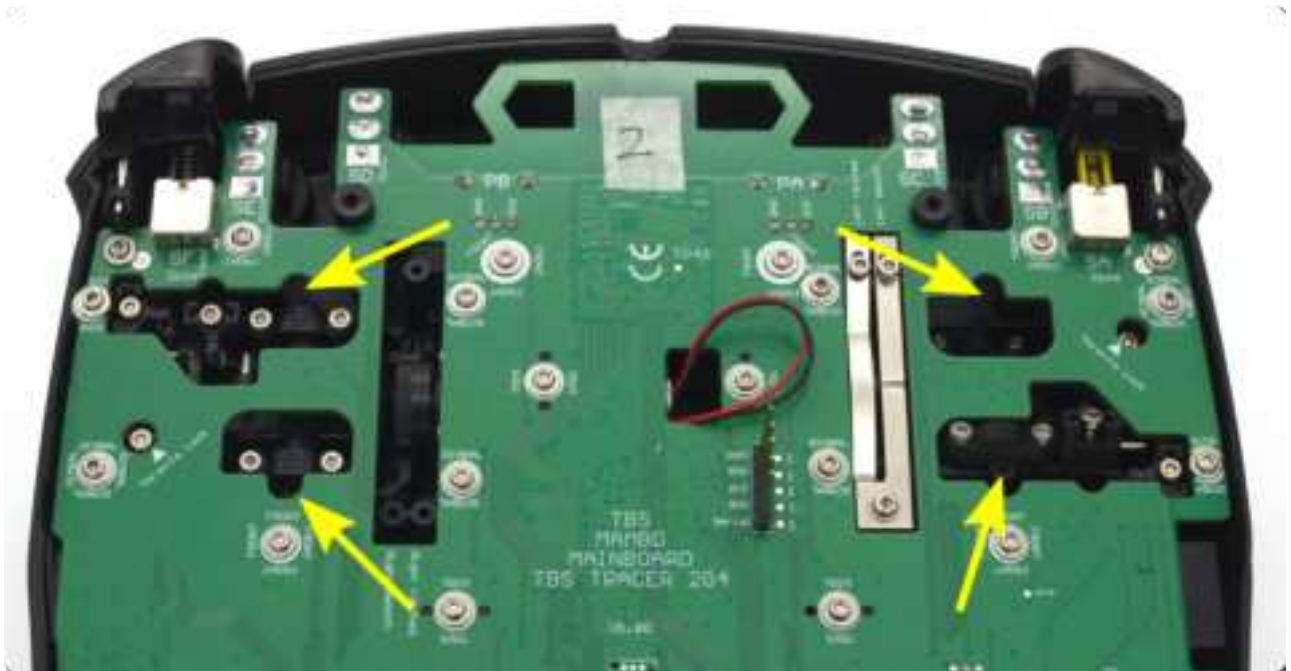
If the sticks feel too rigid or too soft, the tension of the springs can be changed by adjusting the tension screws. The locations are shown in the following photos.

Turn clockwise to increase the tension (more rigid), counter-clockwise to decrease the tension (softer).



## Adjusting stick range

The range of motion of the elevator and throttle can be adjusted (on the standard model, the range screws need to be purchased separately.) The default is no limit. Adjust the screws shown in the following photo. Clockwise to increase the limit. There are 2x M1.4x6 machine thread screws included with every Mambo. Recalibration is required after adjustment!

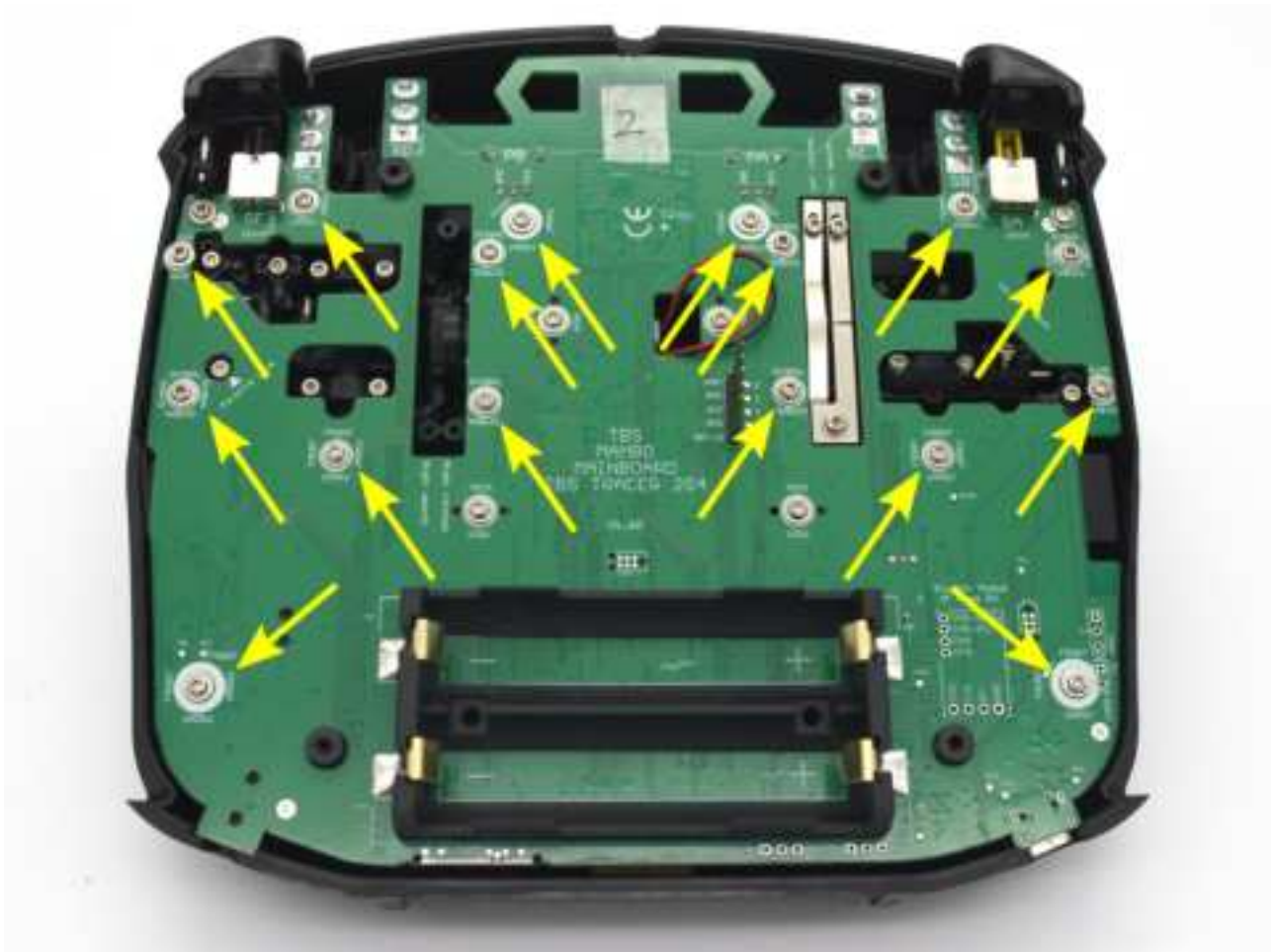


## Upgrading / changing the gimbals

Remove the four (4) nuts holding the switches with the removal tool



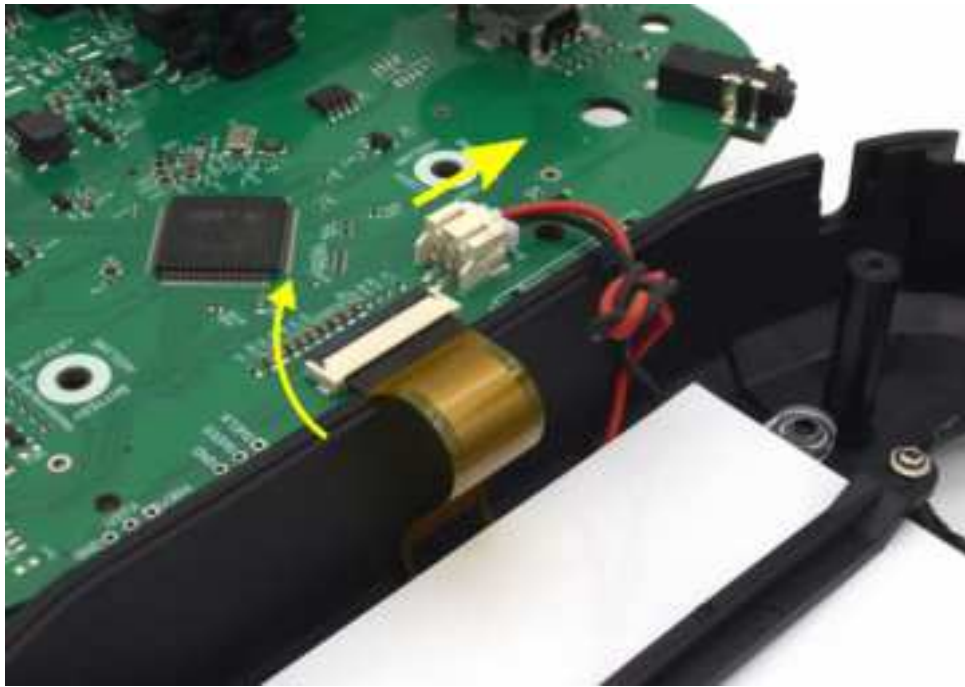
Then remove the sixteen(16) screws holding the mainboard to the housing and gimbal. Do not remove the trim switch screws!



Disconnect the speaker cable



Lift the mainboard about 1cm at the bottom, then pull the main board along with the gimbals out. If you push the switches gently, the board will pop out easily. Disconnect the display and backlight cable



The gimbal support pegs are inserted on the mainboard holes and easily pulled out. Insert the new gimbal(s) and re-assemble the radio. Flap the pcb over the front shell, slide the switches into their holes, place the trim switches with a tweezer and gently push it in. Install the screws holding the pcb.

Gently tighten the switch nuts down and not overtighten them!

There are no electrical connections between the gimbal and the remote. Recalibration will be required after this step!



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## Changing gimbal springs

The radio comes with a set of softer springs that provide less tension sticks. The difference from the stock springs is that these are approx. 20-30% less stiff, giving a smooth soft response.



*Left: stock, right: soft*

Remove the gimbals from the radio and unscrew the spring tension holder, as shown in the following photo. Unhook the stock springs and re-attach the new ones. This can be a bit tedious and only recommended for experienced users. A special trick is to first attach the springs to the lever, keeping tension on it with a tweezer, and then installing back the plastic holster and looping in the spring. This can be performed without removing the gimbals from the radio, but it is recommended to disassemble the radio for this step.



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## Installing external antenna

The radio comes with a built-in antenna, but it can be extended with an external SMA connector so different antennas can be used. Remove the mainboard from the housing to expose it.

Plug the U.fl connector on to the pcb. You can secure it with some silicon glue for an extra level of security.

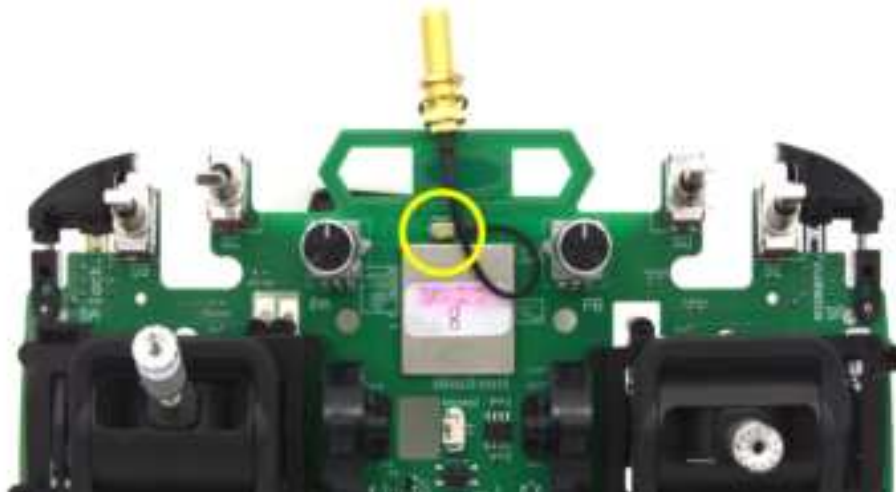
Cut a 7mm mm hole for the SMA connector with a knife, drill or dremel. Do not cut the complete notch as it is designed to hold the nut of the SMA connector. The easiest way to do this the right way is to pre-notch the center of the cutout, and then use a drill or a dremel with the correct diameter bit to remove a half-circle on each side.



Feed the antenna wire around the internal pcb antenna and place the new SMA connector with the included washers in the hole, re-assemble the radio and tighten the nut down.

To activate the external antenna, hold the *Menu* button, start the *Agent Lite/ Mambo Tracer / General/ TX*  
*Antenna: EXTERNAL*





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## Additional informations

### TBS CLOUD

All TBS TRACER transmitters and the Fusion video receivers include a built-in WiFi module which allows you to connect all your gear through the TBS Cloud. This allows to use features like VTX follow\*, dynamic VTX power\* and other upcoming features.

*\*[TBS Fusion](#) video receiver required*

### Menu

- **WiFi Client**
  - **AP Mode:** enables/ disables the WiFi module
  - **Default SSID:** enables/ disables the SSID broadcast of TRACER TX hotspot
  - **SSID:** SSID/ name of the selected external hotspot
  - **Password:** password for external selected hotspot
  - **Connect:** manually connect to the network. Only necessary when a new network is chosen in *SSID* option
  - **Scan:** scans for WiFi networks. Found networks can be chosen under *SSID*, manual reconnect by *Connect* is required
  - **Forget WiFi:** erases all saved networks and their passwords
  - **Upgrade:** starts the self update for the WiFi firmware. **Disabled at the moment**
- **UDP**
  - **MAVLink:** enables/ disables the sending of MAVlink data over the wifi
  - **Port:** change the UDP port where the telemetry will be send
- **WebUI**
  - **AP Lock:** enables/ disables password authentication for TRACER TX internal WiFi hotspot
  - **Password:** set up a password for TRACER TX internal WiFi hotspot
  - **Login:** enables/ disables password authentication for TRACER TX internal Web Ui
  - **Password:** set up a password for TRACER TX internal Web Ui
- **About**
  - **WiFi:** name of the WiFi hotspot/ Network your TRACER is connected to
  - **IP:** IP address the TRACER module was assigned by WiFi network
  - **Server:** connection status
  - **Firmware:** version number of the WiFi firmware
  - **Hardware:** hardware revision of the WiFi module
  - **Bootloader:** version number of the WiFi Bootloader firmware
  - **Serial Number:** serial number of the WiFi module



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## Initiate the WiFi module

To use the Cloud functions, you need to initiate the WiFi module first:

- Download and unpack the firmware files for the WiFi module from [TBS](#)
- Connect the TRACER TX to your radio and power it up
- On your PC or phone search for a new WiFi network like "TBS\_MAMBO\_AP\_xxxxxx"
- Connect your pc with this network. On Windows machines this can take up to one minute
- Open your browser and enter IP in the address bar: 192.168.4.1
- Click on *Select file* and search for the unpacked firmware files you downloaded before



- Hit *Update* and wait for the website to reload
  - **Do not shut down your radio during WiFi module updating process**
- Now you can see the WiFi module of your TRACER TX in *menu/ LUA script and Agent X*

[Here](#) you can find the whole process as video



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## Connection to a WiFi hotspot

Once your WiFi module is initiated, you can now connect to an external hotspot. The easiest way is to connect it by the **Web-ui**:

- Connect the TRACER TX to your radio and power it up
- On your PC or phone search for a new WiFi network like "TBS\_XF\_AP\_xxxxxx"
- Connect your pc/ phone with this network. On Windows machines this can take up to one minute
- Open your browser and enter ip in the address bar: 192.168.4.1
- Open the *WiFi* tab
- Click on Scan to search for available WiFi hotspot/ networks
- Click on the name of the found network you want to connect to - the name will be entered for you
- Enter your password and hit Connect/ Disconnect
- When you refresh the WebUi page after a few seconds, you will see the IP address assigned by the WiFi network for TRACER TX

**Note: if WiFi hotspot/ network has no internet connection, cloud based features will not work.**

**Agent X/ M/ L menu work as well:**

- Connect the TRACER TX to your radio and power it up
- Navigate in the TRACER menu to *WiFi/ General*
- Hit *Scan* to search for available networks
- Under *SSID* you can select the found network
- Enter password for the selected WiFi hotspot/ network in *Password* option
- Select *Connect* to start the manual connection to the selected WiFi hotspot/ network
- Done

## Firmware upgrade

Download the Agent X installer from [team-blacksheep.com/products/prod:agentx](http://team-blacksheep.com/products/prod:agentx) (Windows7/8/10 and macOS) - no drivers needed to use the application, but an Internet connection is required to download the latest firmware versions. **Make sure you use the Agent X version 2.0.33 or later.**

Detailed information on how to use the Agent X can be found [here](#).

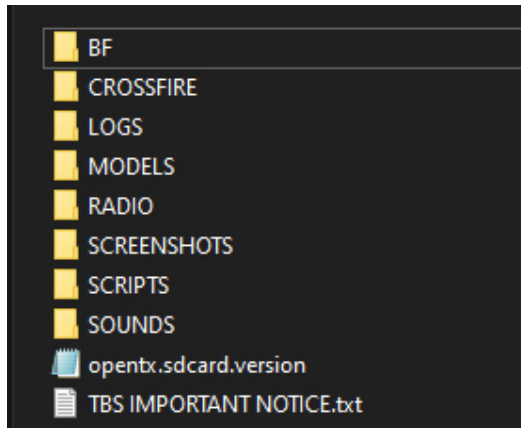
A video series on how to upgrade your radio can be found [here](#).



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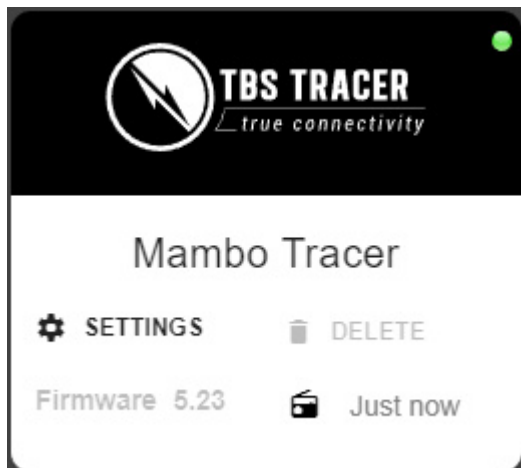
## Backing-up the SD-card content

This backup is not necessary for the update itself, but it can save you some trouble if something goes wrong. Keep it safe on your pc.



1. Power up your Mambo and connect it by USB-C
2. In the prompt, select *USB Storage (SD)*
3. Wait for your pc to mount the drive
4. Copy the following folders to your pc:
  - **/Models**
  - **/Radio**
  - **/Crossfire**
  - **/Logs**

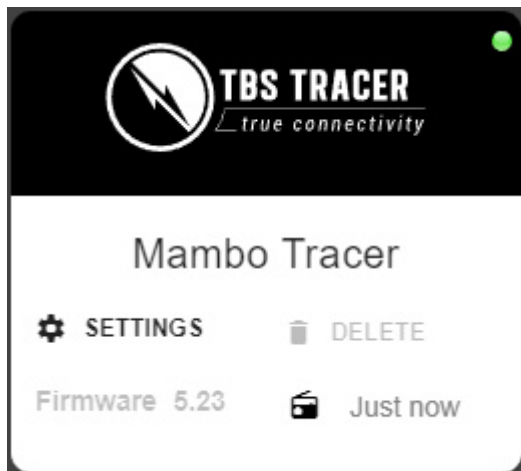
## Update FreedomTX



1. Power up your Mambo and connect it by USB-C
2. open the Agent X
3. In the prompt, select *USB Agent (HID)*
4. Wait for the Mambo to show up (green/orange dot)
5. Click on *Manage*
6. Navigate to the *Firmware* tab
7. Select a firmware version and click on *Upgrade/refresh/ downgrade*
8. Hit *Update* and wait for the Agent to finish it



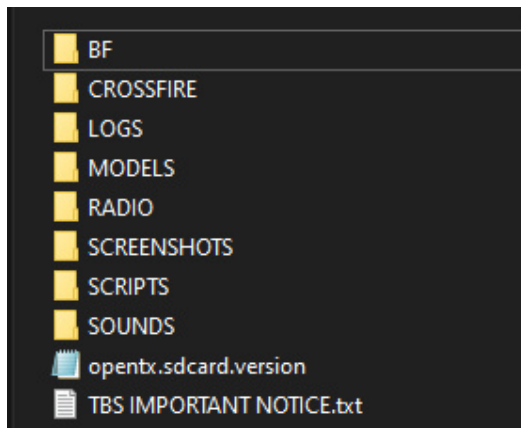
## Update the build in Tracer



1. Power up your Mambo and connect it by USB-C
2. In the prompt, select *USB Agent (HID)*
3. Wait for the Mambo XF to show up (green/ orange dot
4. Click on *Manage*
5. Navigate to the *Firmware* tab
6. Select a firmware version and click on *Upgrade/ refresh/ downgrade*
7. Hit *Update* and wait for the Agent to finish it

## Update the SD card content

You can download the content manually from the [Mambo shop page](#) when you scroll down - make sure to select the correct version depending on your FreedomTX version.



1. Power up your Mambo and connect it by USB-C
2. In the prompt, select *USB Storage (SD)*
3. Wait for your pc to mount the drive
4. Copy the complete content in to the SD card of the Mambo and override the existing files

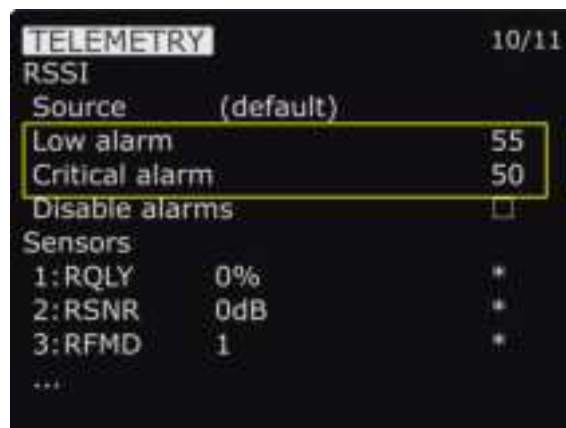


## Programming examples

The required sensors only show up once they are found by the sensor search on the telemetry page.

### LQ warning (audio)

FreedomTX will warn you based on the LQ sensor. There is no extra setup required. The warning level can be set up in the *Model settings/ Telemetry*



### Self-holding switch (Switch F)

If you want the momentary switch F to behave like switch A, you can set up the *Sticky* function in the *Special Functions* page:



When this is done, you can use the LSx you created in the mixer instead of the button:



## Instant trim



## How does it work

Hold the sticks in the position where your plane is flying leveled and hit the button where you assigned the function to. Now the stick position will be used to set the trim values



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## FAQ

- After binding, the receiver shows a double pattern and I get no signals in BF/ INAV/ ...
  - This is an authentication error on the Tracer. To solve it:
    - Shut down your drone and the Tango
    - Power up the Tango
    - Set it in Bind-mode
    - Power up the receiver
    - Push the bind button on the receiver
  - After a few seconds the green led on the receiver should switch to a constant green light
- I get movements BF/ INAV/ ... on the 4 sticks but not from any switch
  - You need to assign the switches in the "Mixer" page of your model to a channel you'd like it to be. For detailed informations on the mixer page, have a look at [Painless360's opentx video series](#)
- In the Agent X/ Lite/ M the Tracer and WiFi module do not show up
  - Navigate in the Model settings, page 1 and disable the external module/ enable the internal module
- How to enter bootloader mode
  - Make sure the device is turned OFF and unplug the USB connector.
  - Hold the button down (**Button PAGE for FreedomTX** / **Button MENU for Tracer**) and plug in the USB - Hold the button until AgentX detects the Mambo devices



Manual written and designed by kamikatz-fpv and ivc.no in cooperation with TBS.

