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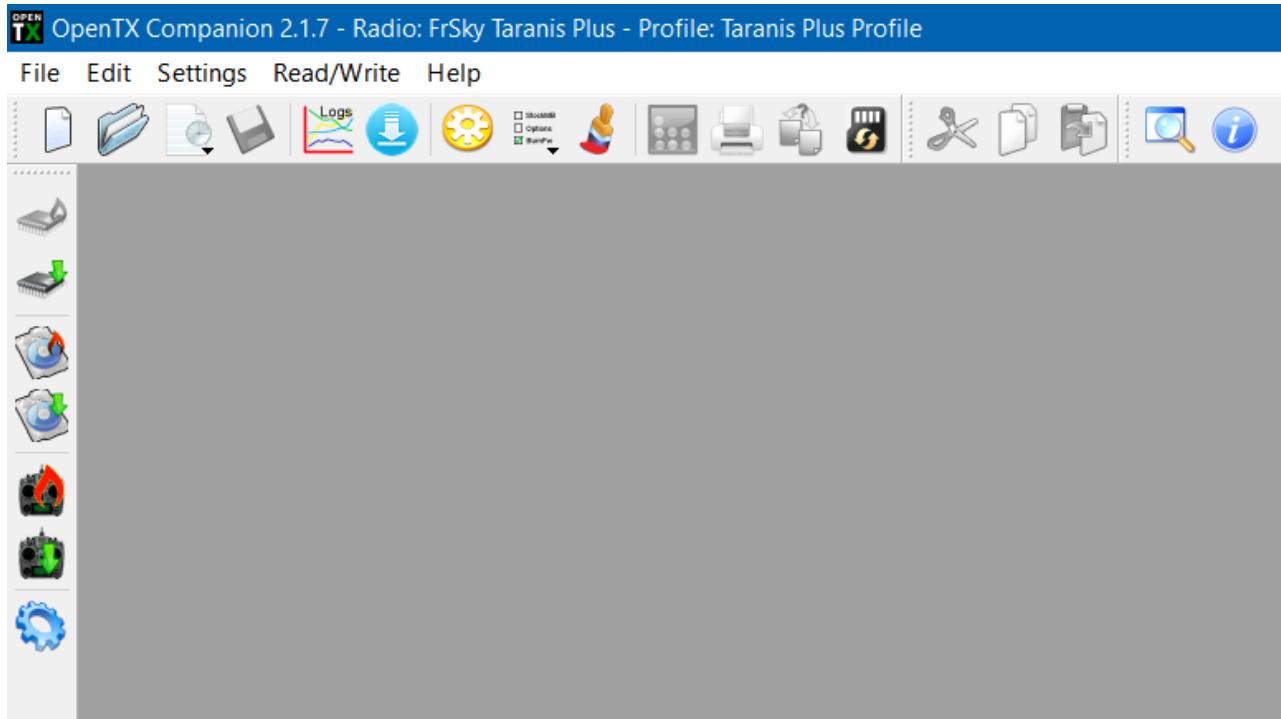
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This reference section is split into four parts for downloading convenience. It uses the **OpenTX Companion** as the starting basis, with references made to the Taranis transmitter screen programming as appropriate. This was done to improve clarity. Also being able to see the whole screen on the **Companion** makes it easier to translate to the transmitter screen knowing that a particular feature will be found within that page, but maybe not visible on the screen at the opening of the page. This reference section covers **OpenTX** from version 2.1 onwards. It is NOT backward compatible as there are significant differences between this version and earlier versions. In particular the telemetry programming offered in 2.1 is completely different to earlier versions. **OpenTX** will work on other transmitters, and some functions may vary from the Taranis 9XD used here.

It is the sole responsibility of the user to ensure that the setting up of their transmitter functions as expected on the model.

OpenTX Companion 2.1

This is the opening page of **OpenTX Companion**. Using the **Companion** one can load and save models from the transmitter to the computer and back again. It also allows copies of these model memories to be stored on the computer. Different “themes” can be used on the screen. The screen below is



Yerrico Classical



Write models and settings to radio.

Read models and settings from radio.

Write backup to radio.

Backup radio to file.

Write **OpenTX** firmware to radio.

Read **OpenTX** firmware from radio.

Configure communications. This is normally set automatically so should not need altering.

Open TX The Basics



New **Eepe** file. The **Eepe** file is the file that saves all the model settings data. This data file is stored on a eprom (a memory chip) in the transmitter.



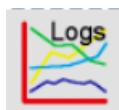
Open an existing **Eepe** file stored on the computer.



Lists recent models and settings **Eepe** files saved on disk. Default is a list of 10. This can be changed in the **Companion Settings**.



Save **Eepe** file to the computer. Thus one can quickly have a copy of every model setting on the transmitter stored on the computer as a backup. Save with a different filename (e.g. add the date to the filename) to have regular restore points if a problem arises with the model settings.



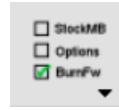
The telemetry logging page.



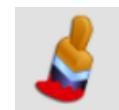
Check for firmware downloads (i.e. new versions of **OpenTX**).



The **Companion Settings Menu**. This stores the settings needed to run the **Companion** correctly.



Radio profile. This feature allows the user to set up different profiles if, say, they have more than one transmitter.



Edit radio splash image. This is the image that first appears when the transmitter is switched on.



The simulator. (Greyed out if no model selected.)



Print out the model settings. (Greyed out if no model selected.) This gives a good summary of all the settings for that model.



Compare models. This brings up a screen which lets the user drag two models from the model select screen for comparison.



Synchronise SD Cards. With the transmitter connected, just click 'Synchronize SD'. It compares the SD card and the SD card folder on your hard drive, and copies files which are only on one to the other. i.e. if a file is on the SD but not your computer's copy, it will be copied across. The opposite is also true so if you add a new file to your computer's version of the SD card, it will be copied to the SD card. It would appear not to be a true synchronisation as it seems to only compare filenames, and copy any that do not exist... there's no file size / modification date check so it won't copy a newer version of the same file etc.



Cut model. This will delete the selected model. Cut, copy and paste have the same functions as on most computer programs.



Copy model. Copies the selected model.



Paste model These latter two options provide a quick and easy way of duplicating one model if two models are very similar.



Check for updates to [OpenTX Companion](#).



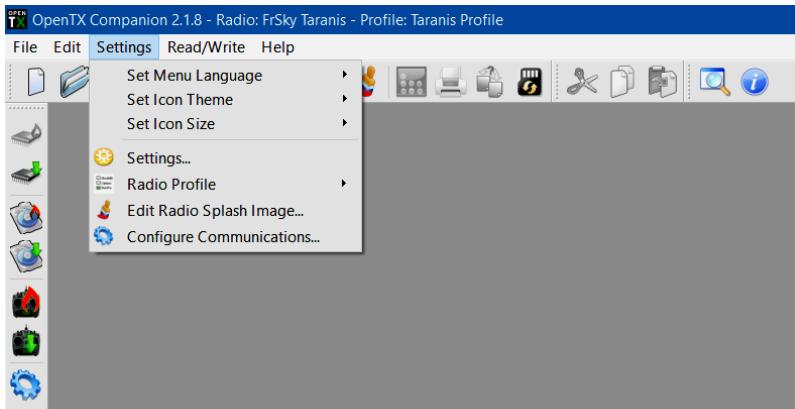
Information about [OpenTX Companion](#) version.

Open TX The Basics

1. The OpenTX Companion Screen

The menu headings at the top of the screen largely match the icons displayed below these headings and down the side. However, this **Settings** drop-down menu is different and has several unique options. These are:

- Set Menu Language
- Set Icon Theme
- Set Icon Size



If you don't like the screen layout, the icon bars can be moved. Hover the mouse pointer over the dotted bars next to an icon group, and when the screen pointer changes, drag and move the icon group. If the horizontal groups are moved to either side of the screen they will change to vertical groups.



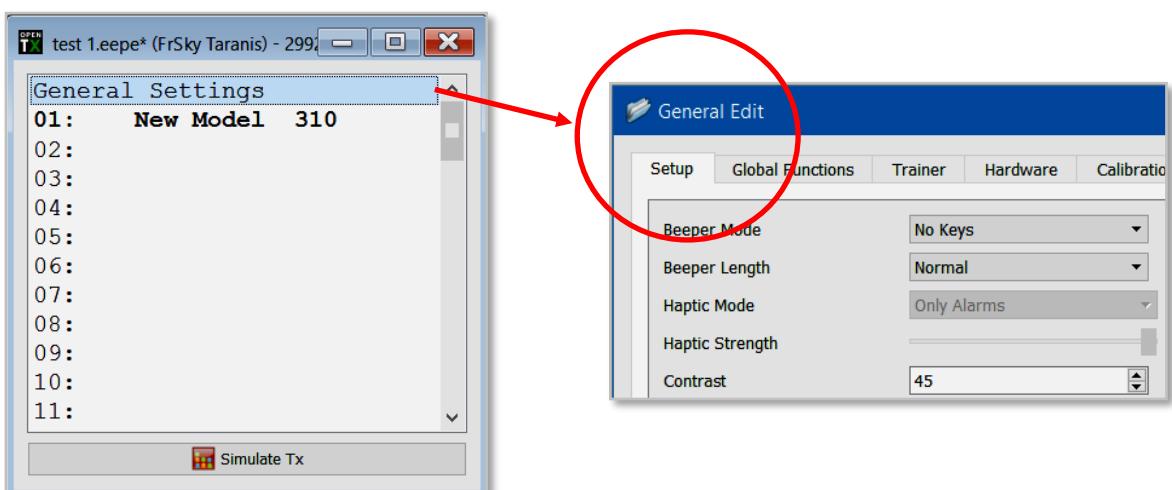
2. Radio Profiles

These allow the storing of setting for different transmitter sets and easily switching between them. For example, if you have 2 different radios (say a Taranis 9XD and a Taranis 9XE) with different firmwares or board types it is not convenient to have to redo all the settings (firmware selection, ticking options, etc.) every time you want to do operations on the other radio. So you can configure all settings, choose an empty profile with the number box, type a name to identify the particular radio, and click save. Do the same for the second radio. You will now be able to select the correct profile for the radio you are about to work on with the profile selector button and menu entry on **OpenTX Companion's** main window. Note that the profiles can also store and retrieve each radio's joystick calibration and hardware settings (voltage alarms, audio modes, etc.) from the **General Settings** page of an open document. This allows copying a document from one radio to the other without needing recalibration or re-entering the hardware settings.

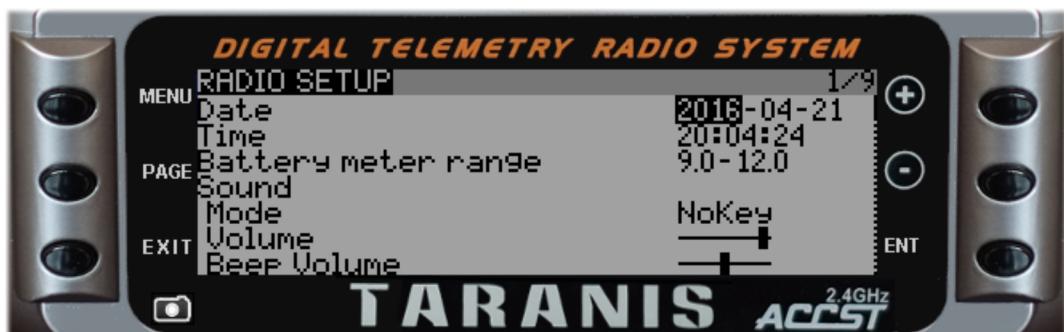
3. Settings Menus

These settings menus can become very confusing. There are actually three settings menus.

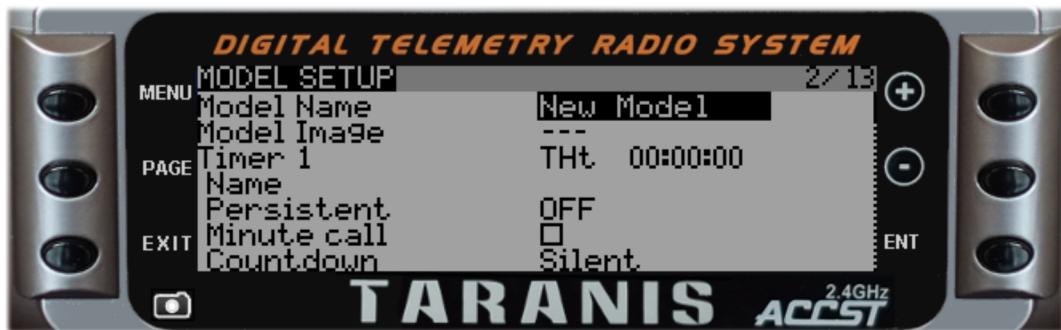
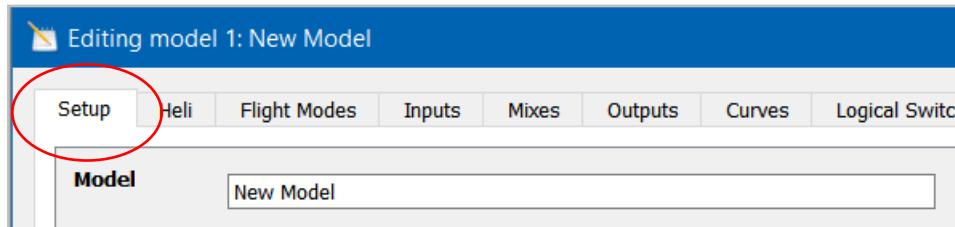
- The **Companion Settings Menu** accessed from this page is the settings menu to correctly configure the **OpenTX Companion**. There is no similar menu available on the transmitter. This menu is covered in more detail later in this section.
- The **General Settings Menu** is accessed from the **Companion** when an **Eepe** file is opened or a new **Eepe** file is started. Then a new window will appear, and at the top of that has a small option at the top labelled **General Settings**. This is the settings menu where all the basic settings for the transmitter can be changed.



On the transmitter menu system, this almost identical menu is called the **Radio Setup**.



- Finally there is the **Model Settings** menu for each model, this is the first screen on the **Model Editor** on both the **Companion** and the transmitter.



Firmwares

What is firmware?

In electronic systems and computing, firmware is a type of software that provides control, monitoring and data manipulation of engineered products and systems. Typical examples of devices containing firmware are embedded systems, such as traffic lights, consumer appliances, remote controls and digital watches, computers, computer peripherals, mobile phones, and digital cameras. The firmware contained in these devices provides the low-level control program for the device.

On the Taranis transmitter there are three different firmwares. The first and most obvious is **OpenTX** itself. However this does not do everything. There is one circuit board in the back of the Taranis with its own firmware. This is the internal XJT module. This firmware takes all the control signals from **OpenTX**, encodes them and transmits them to the receiver. It also looks for telemetry data from the receiver and makes this available back to **OpenTX**. This firmware has been designed and is maintained by FrSky, NOT the **OpenTX** team. The third firmware is actually the bootloader. This is a piece of software that allows the transmitter to communicate with a computer. It is also part of the **OpenTX** software.

As well as these three pieces of firmware, there is also all the data created by **OpenTX** and you, the user, which contains all the settings for each of the models programmed. When stored on a computer this data file has

the file extension: **.eepy** Hence the file with all the model information stored in it is called the **Eepy** file. This is kept in an eprom (a type of computer memory chip) in the transmitter. It can also be saved to the computer, and saved to the SD card in the transmitter. Clearly it is advisable to save copies to either the computer or the SD card, or both. Even better is to save fresh copies every time a new model is added or one is edited.

The Bootloader and **OpenTX** firmwares are maintained by the **OpenTX** team, FrSky maintain the transmitting firmware. Updates of each can be found on the appropriate websites. The **OpenTX** team have been very clever, by including routines in their firmware which will allow the FrSky firmware in both the transmitter and any receivers to be easily upgraded too.

Finally of course there is the **OpenTX Companion**, a separate piece of software which is stored on, and used by, the computer.



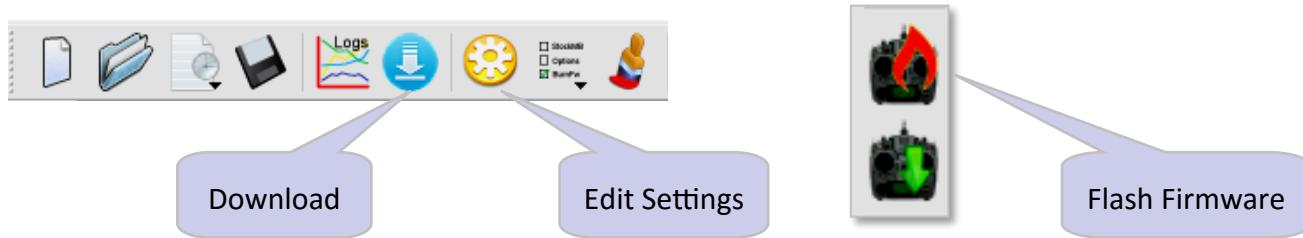
Instead of months of therapy, can't I just have a firmware upgrade?

Updating the Firmwares

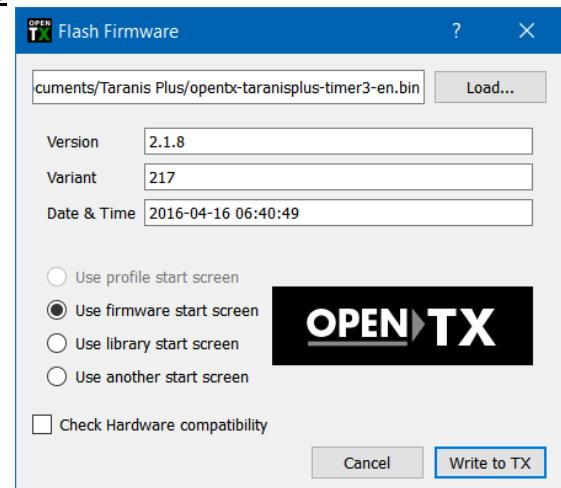
There are two methods for updating the **OpenTx** firmware. The first, and simplest is to use **OpenTX Companion**.

Method 1, Using OpenTX Companion

OpenTX Companion will automatically look for newer versions of the program and will upload them on request. It will then copy newer firmware versions to the transmitter.



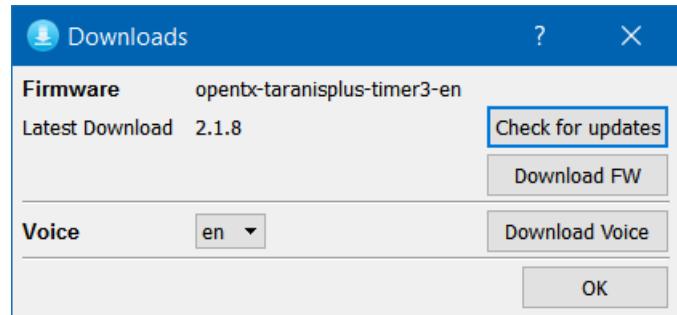
1. Make sure you have the right transmitter identified in **Edit Settings** before you do anything else.
2. Next use the **Download** icon to download the newer version.
3. **ALWAYS** carefully read the update notes that come with the download. Occasionally these will contain warnings if changes are made which will affect the control of a model.
4. Connect the transmitter to the computer with the transmitter switched off.
5. Click on the **Flash Firmware** icon to start the process. The following window should appear:
6. Select any options required and then click on **Write to TX** to update the firmware.
7. If the transmitter is switched on in Bootloader mode when connected to the computer, then this method will still work, but the Bootloader itself will not be updated.



Method 2, Using the Transmitter

This method copies the new firmware file onto the SD card of the transmitter, so that the transmitter can update itself. This method has the advantage of allowing one to go back to an earlier version of **OpenTX** for whatever reason.

1. Make sure you have the right transmitter identified in **Edit Settings** in the **Companion** before you do anything else. (Click on the **Settings** icon, then select **Settings** to get to this screen.)
2. From **OpenTX Companion**, click on **Downloads** and when the following window opens, click on **Download FW**.
3. Then go to the computer directory where the **OpenTX** files are stored and find the latest file downloaded. It will look something like this, depending which settings were enabled in the **Edit Settings** screen of the **Companion**.



4. The various bits between hyphens indicate which options were set in **Edit Settings**. The date will show which is the latest file.
5. Copy the latest file to the SD card in the **FIRMWARES** directory. This can be done with the transmitter in Bootloader mode connected to the computer, or by simply plugging the SD card directly into the computer.
Note: The second filename shown above is too long to be recognised by the transmitter, so it must be shortened to no more than 28 characters plus the ".bin" extension. Longer filenames will be recognised by the computer, however.
6. With the transmitter in bootloader mode but not connected to the computer, click on **Write Firmware** to update.

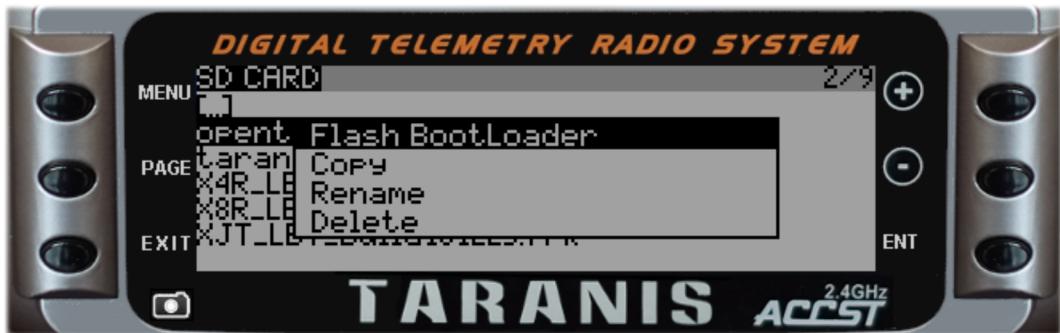


7. This does not, however update the Bootloader - it cannot update itself whilst it is in use, so another operation is needed. On the transmitter, go to the **Radio Setup** menu, and page to screen 2 of 9, the SD card screen. Scroll down to **FIRMWARES** and select the appropriate firmware to update.



On the screen above the first firmware displayed is 28 characters long, the longest **OpenTx** will display. **Any longer, and the file simply does not show in the list.**

8. Moving down to the file, another window opens up:



Now the Bootloader can be updated.

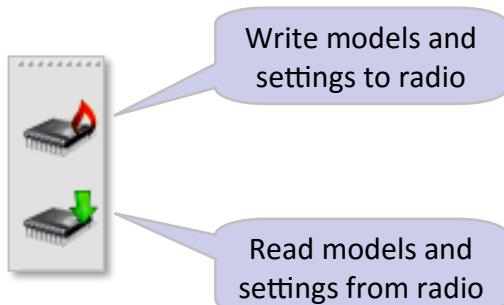
9. The other options here allow the file to be copied, renamed or deleted.

While it is important that the **Companion** and the transmitter firmware are upgraded to the same version, the Bootloader does not need to be upgraded every time, though it is worth checking the upgrade notes to see if there are any significant changes to the Bootloader.

Using the OpenTX Companion

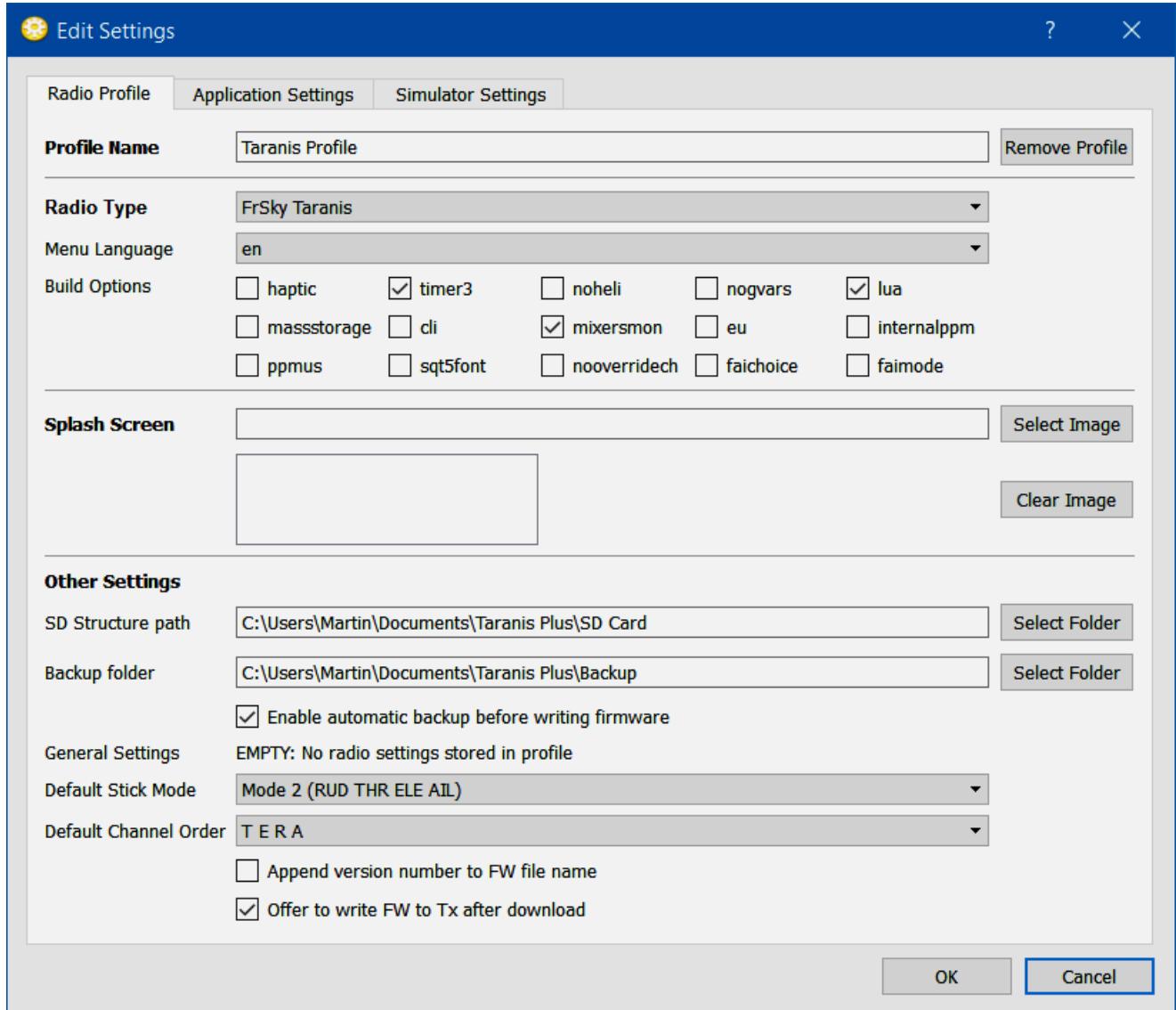
Use of the OpenTX Companion

The normal sequence of use of the **Companion** is to load any models from the transmitter onto the **Companion** using the read icon. This ensures that any changes made in the field are not lost. Once the models have been read into the **Companion**, any editing or changes can be made and then “written” back to the transmitter. At the same time, the changed **Eepe** file as it is usually called can be saved to the computer. Always save the file with a new filename, that way any previous **Eepe** files can be reloaded back onto the transmitter if a problem is found. The easiest way to save with a new filename is to always include the full date in the filename. Using this procedure every time means that if any model settings are changed during a flying session these will appear on the **Companion** too.



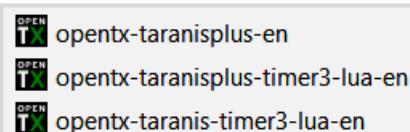
Edit Settings, Radio Profile

Before using the **Companion**, the user must go the **Companion Settings Menu** to customise the **Companion** for their transmitter.



Note:

There are different firmwares available depending on the settings given above, not only for the radio type, but also to cater for some of the tick boxes in the **Build Options**. E.g.



Open TX The Basics

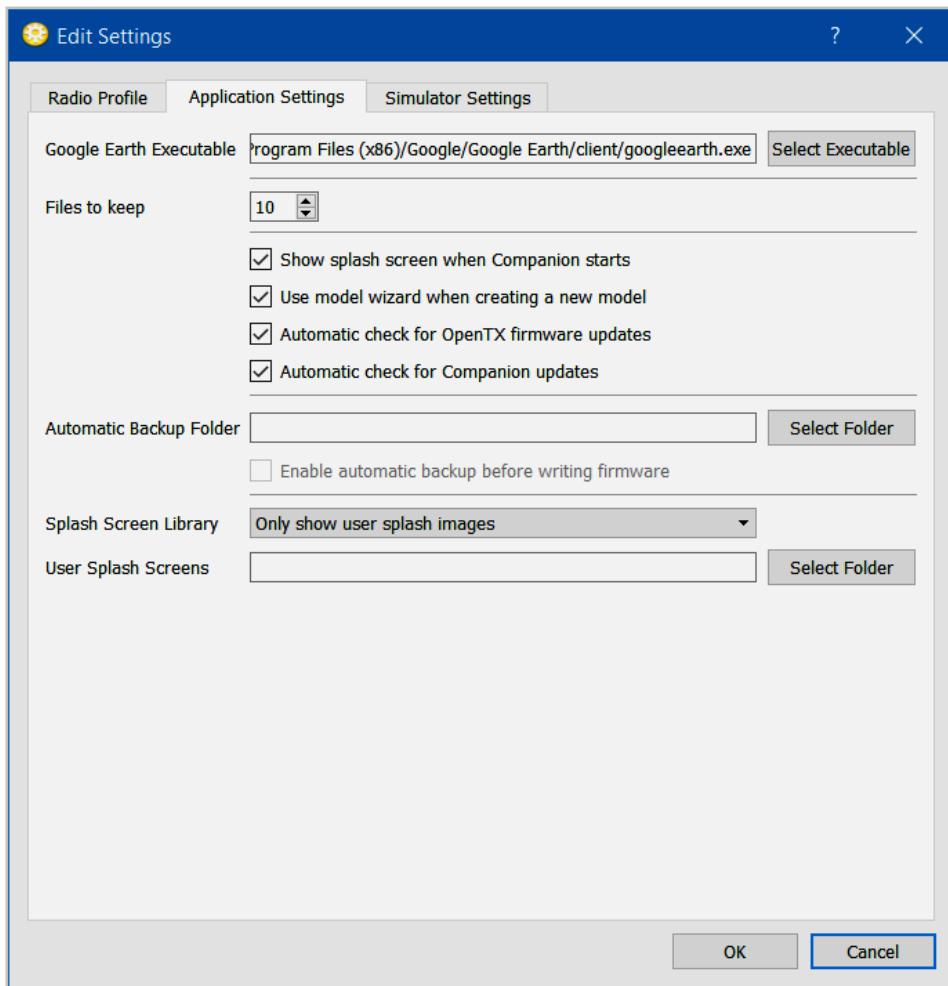
The Companion: Edit Settings, Radio Profile

Function	Options	Notes
Profile Name		It is possible to have different profiles if using more than one transmitter.
Radio Type		It is very important to select the right radio.
Menu Language		
Build Options	timer 3 nohelicopter nogvars lua massstorage cli mixersmon EU internalppm ppmus sq5font nooverridech fia choice fia mode	Adds a third timer Disables and hides the helicopter editing screen. Disables and hides the global variables screen. Use with caution, in rare cases it can cause problems. Enable the use of LUA scripts. Use of LUA scripts are outside the scope of this guide. Instead of joystick emulation, USB connection is mass storage. Instead of joystick emulation, USB connection is command line interface. Add mixers output view to the channels monitor screen on the transmitter, pressing ENT switches between the views. Removes the DR8 FrSky protocol which is not legal in the EU. Displays PPM signals in microseconds (as in PWM modulation) instead of %. Support for internal PPM module hack. A heavier weight font which some think shows up better on Taranis screen. Disables Override Channel functions. Allows FAI Mode to be left OFF for practice to be turned ON for competition. Ticking this will prevent most telemetry being available.

The Companion: Edit Settings, Radio Profile

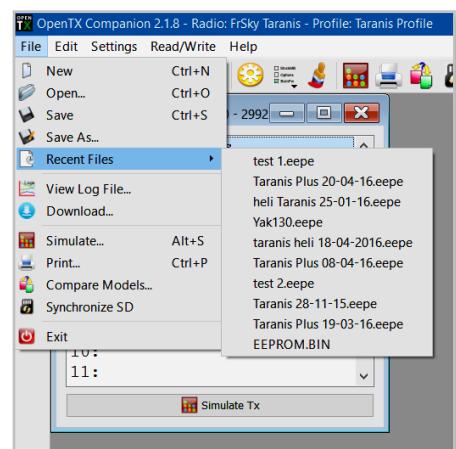
Function	Options	Notes
Splash Screen		The screen image that shows when the Companion is first loaded.
SD Structure Path		This path must be given for the Companion to be able to access splash screens, model picture files and sounds. There needs to be a copy of the SD card stored on the computer.
Backup folder		The file location of where backup files will be stored on the computer
Default Stick Mode		Modes 1 to 4 allowed.
Default Channel Order		JR/Spektrum channel order: TAER Hitec/Futaba channel order: AETR Or just choose your own to suit your own needs.

The Companion: Edit Settings, Application Settings



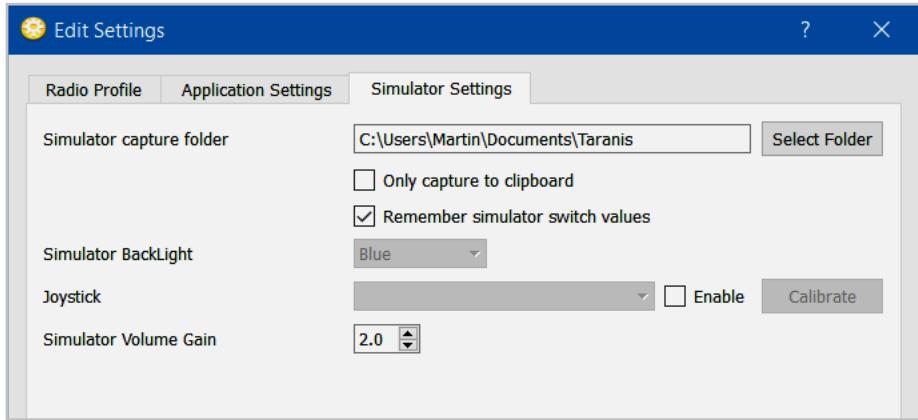
This screen is mostly self-explanatory. The **Google Earth Executable** file path is needed if using GPS telemetry to be able to display track of flight using Google Earth. It is the file path of where Google Earth is located on the computer. (See telemetry section).

Files to keep is a little misleading. It actually means the number of **Eepe** files that will be displayed in the drop down box when you go to **File** and the **Recent Files** as shown here:



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The Companion: Edit Settings, Simulator Settings



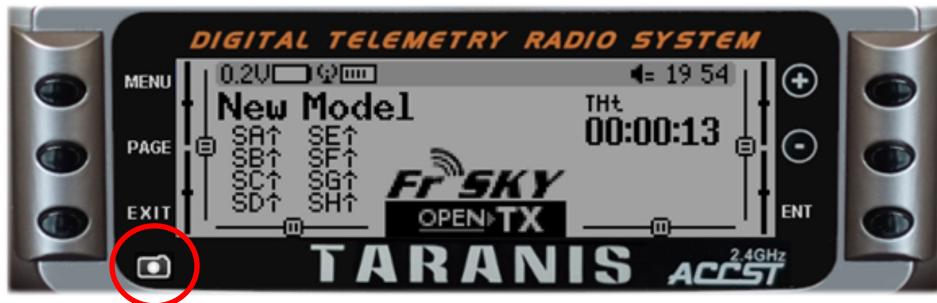
Simulator Capture Folder Allows joystick and switch positions to be saved. Useful when switching between different radio profiles.

Simulator Backlight Changes the colour of the simulator transmitter screen.

Joystick This allows a joystick to be connected to the computer to use with the [OpenTX Simulator](#)

Simulator Volume Gain This allows the volume of the simulator to be adjusted to suit the computer being used. The simulator will give all spoken warnings, bleeps and messages in exactly the same way as the transmitter does.

It is possible to “capture” the Taranis screen shot and save to disk. Simply select a folder for the screen shots to be saved to. To capture a screen, click on the small camera icon in the bottom left hand corner of the Taranis screen on the simulator:

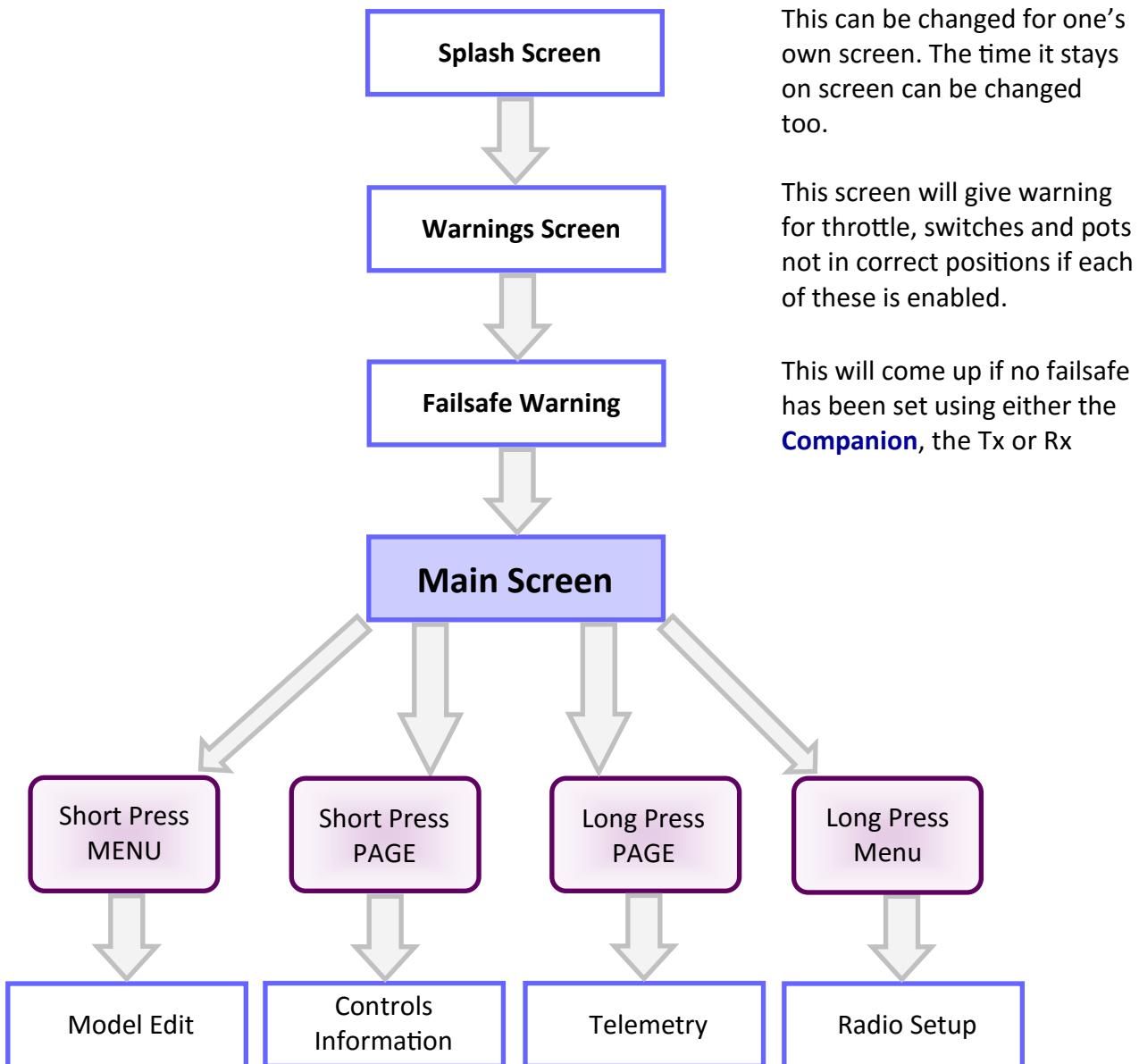


and you will save the following:



Open TX The Basics

The Transmitter Menu System



Note:

Along with the above screens, there is the **Bootloader** screen which enables the firmware to be updated, the EEPROM to be restored if a backup was made, or to simply connect the transmitter to a computer. See the **How To** section for information on accessing the **Bootloader**.

The Transmitter Radio Setup Screens

There are 9 screens in the **Radio Setup** menu system. A short press of **PAGE** is used to scroll through them. Screen 5 provides more information than available on the **Companion**. Switch test on page 6 tests the 4 joystick trims and the 6 buttons either side of the transmitter screen. Page 8 corresponds to the **Hardware** screen in the **General Settings** menu on the **Companion**. Screen 9 is unique to the transmitter and is for calibrating the joysticks and sliders. It is useful to check these calibrations from time to time. On screen instructions are provided for how to do this.



The Transmitter Radio Setup Screens

SWITCH TEST 6/9

Minus 0	Trim -	+
Plus 0	↔	0 0
Page 0	↑	0 0
Enter 0	↓	0 0
Exit 0	○ ↑	0 0
Menu 0	○ ↔	0 0

ANALOG INPUTS 7/9

A1: 0000	0	A2: 0000	0
A3: 0000	0	A4: 0000	0
A5: 0000	0	A6: 0000	0
A7: 0000	0	A8: 0000	0
A9: 0000	0	Battery Calib 0.20	

HARDWARE 8/9

Sticks	
Rud	[REDACTED]
Ele	---
Thr	---
Ail	---
Pots	
S1	Scr Pot with detent

CALIBRATION 9/9

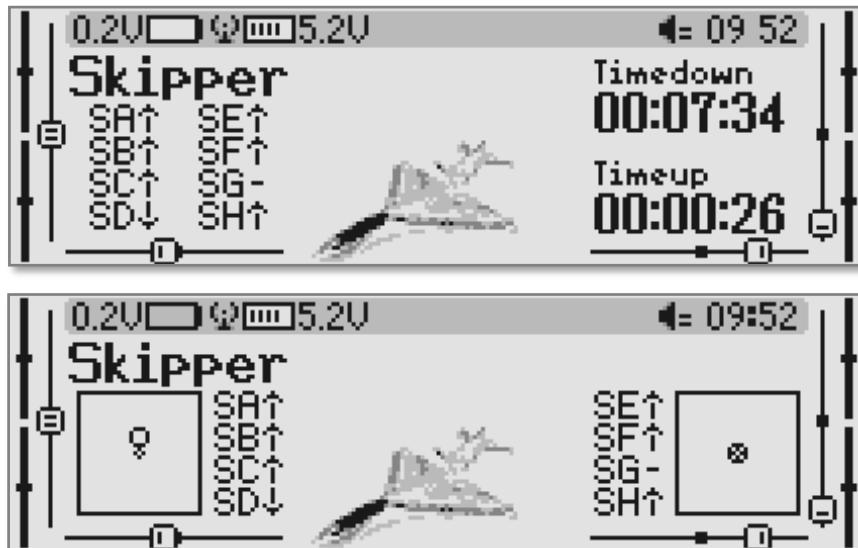
[ENTER] TO START

Open TX The Basics

The Transmitter Controls Information Screens

There are 4 screens in the **Controls Information** menu system. The first screen is the main screen. This screen shows the physical states for toggle switches. Stick trims are shown graphically along the sides and bottom. Knob and slider positions are depicted graphically along both side outer edges. When enabled by the **Model Setup** menu, the clock timers are also displayed. In this case each timer has been given a name. The model name and a picture is also displayed if these are entered.



The next screen now shows the position of the joysticks and the switch positions. The third screen shows the toggle switches and the state of the 32 **Logical Switches**. Each logical switch is shown by either a dash, a hollow block or a filled block and they are grouped in fives. In the red box below, **LS1** and **LS2** are not programmed, **LS3**, **LS4** and **LS5** are programmed but only **LS4** is currently “true”.

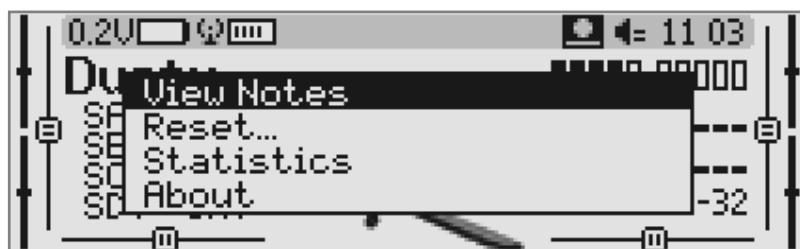


The last screen shows the value for each of the 32 channels ranging from -100% to 100%.

CHANNELS MONITOR			
Thrott	-64.6	CH9	0.0
Elevat	9.5	CH10	0.0
Rud	-1.8	CH11	0.0
Ail	5.7	CH12	0.0
CH5	0.0	CH13	0.0
CH6	0.0	CH14	0.0
CH7	0.0	CH15	0.0
CH8	0.0	CH16	0.0

The Transmitter Controls Information Screens

A long press of the **ENT** button on the main screen will bring up another sub menu. There are two useful headings here. The first brings up any notes created for the model and stored on the SD card. These notes will always appear when the model is first selected, and can contain any information you wish to keep with the model. This sub menu gives the option to bring up the notes anytime without having to restart the transmitter. There is information on how to create notes in the **How To** section of this user guide. The reset option allows timers and telemetry to be reset.



The Transmitter Telemetry Screens

There are a maximum of 4 telemetry screens available screens. They need to be set up in the **Model Edit Telemetry** screen before they become active.

SKIPPER	0.20	Tmr1	02:29	Tmr2	05:31
Cels	11.16	Curr+	11.9	RSSI+	94
Cmin	3.72	Cspn	35	RSSI-	0
SWR	30	RxBt	54	T1	02:29
Time	10:26				

SKIPPER	0.20	Tmr1	02:12	Tmr2	05:48
GAlt	1837	1°23'24.89"W			
GAlt+	4035	54°34'35.04"N			
GSpd+	40.0				

The Transmitter Model Edit Screens

There are 13 model editing screens. These largely match the screens in the [OpenTX Companion Model Editing](#) window. The first screen is the model select screen.

MODEL SELECTION 29698 bytes free 1/13

- * 01 Skipper 749
- 02
- 03
- 04
- 05
- 06
- 07

MODEL SETUP 2/13

Model Name	Skipper
Model Image	Skipper
Timer 1	THT 08:00
Name	Timedown
Persistent	OFF
Minute call	<input type="checkbox"/>
Countdown	Silent

HELI SETUP 3/13

Swash Type	---
Swash Ring	0
Long cyc. source	---
Weight	0
Lateral cyc. source	---
Weight	0
Coll. Pitch source	---

FLIGHT MODES 4/13

FMO	:0 :0 :0 :0 0.0 0.0
FM1	--- :0 :0 :0 :0 0.0 0.0
FM2	--- :0 :0 :0 :0 0.0 0.0
FM3	--- :0 :0 :0 :0 0.0 0.0
FM4	--- :0 :0 :0 :0 0.0 0.0
FM5	--- :0 :0 :0 :0 0.0 0.0
FM6	--- :0 :0 :0 :0 0.0 0.0

INPUTS 3/64 0.0 5/13

I Thr	100	& Thr	---
I Ele	60	& Ele	SD↓ hi rates
	80	& Ele	SD- lo rates
	100	& Ele	---
IRud	100	& Rud	---
IAil	40	& Ail	SA↓ hi rate
	60	& Ail	SA- lo rate

The Transmitter Model Edit Screens

There is no separate **Global Variables** menu on the **OpenTX Companion**, it is included in the **Flight Modes** setting screen.

MIXER 4/64		Thrott	0.0	6/13	
CH1	100	I	Thr		Throttle
CH2	70	I	Ele	E25	ELE
CH3	85	I	Rud	E25	Rud
CH4	70	I	Ail	E30	AIL
CH5					
CH6					
CH7					

OUTPUTS 1500us		7/13	
CH1	Thrott	0.0	-100.0 - 100.0 → --- 1500Δ
CH2	Elevat	0.0	-100.0 ← 100.0 ← --- 1500Δ
CH3	Rud	0.0	-100.0 - 100.0 → --- 1550Δ
CH4	Ail	0.0	-100.0 → 100.0 → --- 1500Δ
CH5		0.0	-100.0 - 100.0 → --- 1500Δ
CH6		0.0	-100.0 - 100.0 → --- 1500Δ
CH7		0.0	-100.0 - 100.0 → --- 1500Δ

CURVES		8/13	
CV1		5pts	
CV2		5pts	
CV3		5pts	
CV4		5pts	
CV5		5pts	
CV6		5pts	
CV7		5pts	

GLOBAL VARIABLES		9/ 13	
GV1	0	0	0 0 0 0 0 0 0 0 0
GV2	0	0	0 0 0 0 0 0 0 0 0
GV3	0	0	0 0 0 0 0 0 0 0 0
GV4	0	0	0 0 0 0 0 0 0 0 0
GV5	0	0	0 0 0 0 0 0 0 0 0
GV6	0	0	0 0 0 0 0 0 0 0 0
GV7	0	0	0 0 0 0 0 0 0 0 0

LOGICAL SWITCHES		10/ 13	
L1	a~x	JRud	0 --- --- ---
L2	---	---	0 --- --- ---
L3	a~x	Cmin	3.40U --- --- ---
L4	a<x	Cmin	3.20U --- --- ---
L5	a~x	Tmr1	02:00 --- --- 10.0
L6	a~x	Tmr1	01:00 --- --- 10.0
L7	a~x	Tmr1	00:00 --- --- 10.0

There is no **Custom Scripts** screen on the **OpenTX Companion** menu system, although they can be loaded into the simulator.

SPECIAL FUNCTIONS				11 / 13
SF1	SA↑	Play Track	aillow	1x
SF2	SA-	Play Track	ailmed	1x
SF3	SA↓	Play Track	ailhigh	1x
SF4	SH↓	Play Value	Cels	1x
SF5	SH↓	Play Value	CsPn	1x
SF6	SH↓	Play Value	Tmr2	1x
SF7	---			

CUSTOM SCRIPTS			2223 bytes	12 / 13
LUA1	---			
LUA2	---			
LUA3	---			
LUA4	---			
LUA5	---			
LUA6	---			
LUA7	---			

TELEMETRY				13 / 13
RSSI				
Low Alarm		48		
Critical Alarm		42		
Sensors		Value		ID
1: Cels		---	2	
2: GAlt		---	4	
3: GSpd		---	4	

Sources

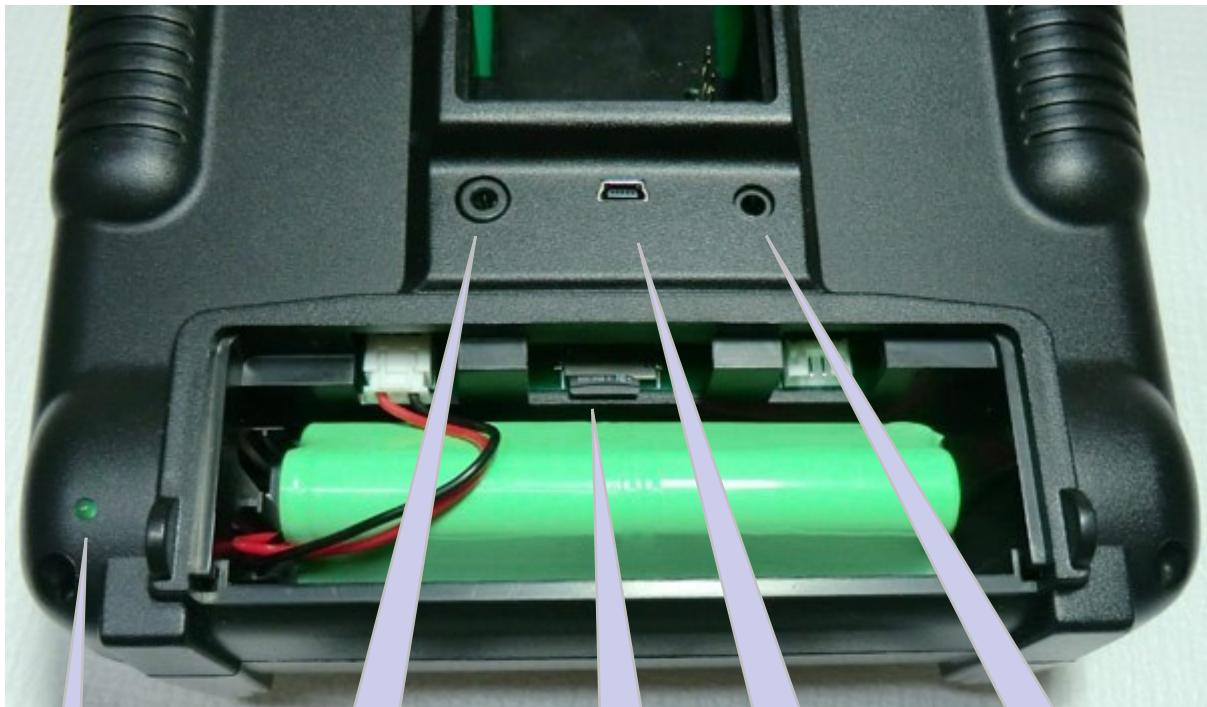
As you work through this guide you will come across various source functions. There are some specialist ones in the **Special Functions** screen. The ones available in **Inputs** and **Mixes** are shown here:

Source	Available in Inputs	Available in Mixes	
Rud	✓	✓	Rudder
Ele	✓	✓	Elevator
Thr	✓	✓	Throttle
Ail	✓	✓	Aileron
S1	✓	✓	Slider 1
S2	✓	✓	Slider 2
S3	✓	✓	Slider 3 (if fitted)
LS	✓	✓	Left Slider
RS	✓	✓	Right Slider
TrmR	✓	✓	Rudder Trim
TrmE	✓	✓	Elevator Trim
TrmT	✓	✓	Throttle Trim
TrmA	✓	✓	Aileron Trim
SA to SH	✓	✓	Switches A to H
L1 to L32	✓	✓	Logical switches 1 to 32
CR1 to 3	✓	✓	Cyclic 1 to 3
TR1 to TR16	✓	✓	Trainer inputs 1 to 16
CH1 to 32	✓	✓	Channels 1 to 32
Batt	✓		The transmitter battery
Time	✓		Current time
Timer 1 to 3	✓		The three timers
LUA		✓	LUA script
MAX	✓	✓	Set source = +100
I[]		✓	Input []

Open TX The Basics

The Taranis X9D Transmitter

This view of the back of the Taranis X9D shows the position of the trainer port, USB socket and speaker socket together with the location of the Micro SD card.



Charging Light

Trainer Socket

SD Card

USB Socket

Speaker Socket

When you first plug the supplied charger into the socket to the left of this charging light on the side of the transmitter, the green LED on the back of the transmitter will blink for approximately 30 seconds then go to a steady ON state. This indicates that the battery is charging. When the battery is fully charged, the light goes OFF.