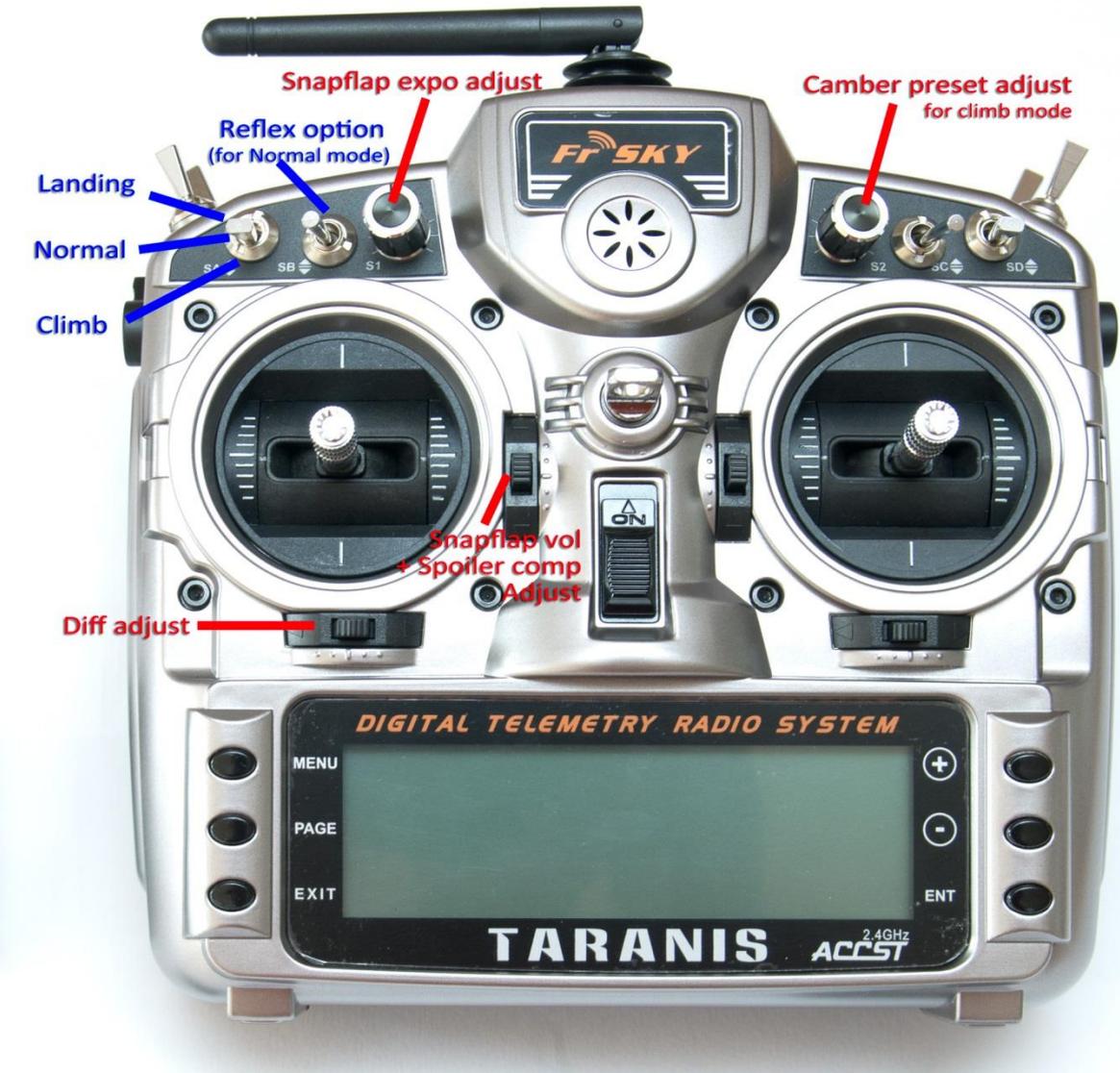


F3F template for Taranis and Horus

Version 4.2

Setup Guide

Mike Shellim
28 Dec 2017



Contents

1	Introduction	3
1.1	ZIP package contents	3
1.2	Requirements.....	3
1.3	Nomenclature	3
1.4	Features overview.....	4
2	Assignments and flight modes	5
2.1	Control assignments	5
2.2	Channel assignments	5
2.3	Flight mode operation	5
2.3.1	Flight mode switching	5
2.3.2	Pump mode.....	5
2.3.3	Calibration mode.....	5
3	Installing <i>F3F Setup</i> in your transmitter.....	6
3.1	Transferring the template.....	6
3.2	Check mixer sources	6
4	Configuration Part 1: calibrating the servos	7
4.1	Set servo rotation.....	7
4.2	Calibrate centres and limits	8
5	Configuration part 2 - setting up travel and mixing.....	10
6	Pre-flight.....	12
6.1	Mix adjusters summary.....	12
6.2	Fail safe and battery alarm	12
7	Customisations.....	13
7.1	Pump mode.....	13
7.2	Flight mode selection and switches	13
7.2.1	Landing mode via a switch	13
7.2.2	Landing mode via throttle stick.....	13
7.3	Adjusting spoiler stick deadband	14
7.4	Reversing the spoiler stick	14
8	Identifying errors	14
9	Making your own modifications	15
10	Safety/disclaimer	15
11	Contact.....	15

1 Introduction

F3F Template is a competition-proven setup for slope sailplanes. It offers quick setup, simple operation, and in-flight adjustments of key mixers. An integrated CAL mode takes care of mis-matched linkages.

Application

- For 6-servo gliders
- V-tail and X-tail versions
- Any stick mode

Flight modes

- NORMAL, CLIMB, PUMP (*new in v4.1*) and LANDING
- Reflex option for NORMAL mode
- Voice confirmation
- Switch customisations

In-flight adjustments

- adjuster for snapflap volume
- adjuster for snapflap expo
- adjuster for aileron diff
- adjuster for camber preset
- adjuster for spoiler-to-elevator compensation

Spoiler functions

- Aileron differential suppression
- Reverse Diff
- Spoiler/elev compensation with multi-point curve
- Optional 'instant spoiler' mode
- Adjustable spoiler deadband

Control surface calibration

- 'CAL' mode for adjusting servo centres and limits
- Balancing curve for flaps for accurate tracking
- Full rotation on flap servos

Misc.

- Channels 7-9 free for motor etc.

Before starting, please look at the [Support page](#) for any known issues which may affect your setup.

1.1 ZIP package contents

The contents of ZIP package are as follows:

Filename	Description
F3f_v42_userguide.pdf	this document
F3f_v42_reference.xls	settings reference
F3f_v42x.eepe	EEPROM image contains versions: 'X' for cross- and T-tail, 'V' for V-tail
*.wav	Sound files

1.2 Requirements

The following are required:

- Transmitter / operating system
 - Taranis X9D/X9DP/X9E and OpenTx 2.1 or 2.2
 - or
 - Horus X10/X10S/X12S/Taranis Q-X7 and OpenTx 2.2
- USB cable for connecting the transmitter to your PC
- OpenTx Companion for transferring models between tx and computer
- Familiarity with OpenTx's menu navigation and data entry

1.3 Nomenclature

The terms 'spoiler' is used for the 'crow' function. ('Spoiler' is often used in the UK.)
The term 'Combi' is used for aileron-to-rudder mix.

1.4 Features overview

Flight modes

- There are five flight modes: CLIMB, PUMP (optional), NORMAL, REFLEX and LANDING.
- Relevant mixers are activated automatically on change of flight mode:

	Spoiler	Snapflap	Camber	Reflex	Ail to Rudder
Climb			X		X
Pump		X			X
Normal		X			X
Reflex		X		X	X
Landing	X				X

Control travel

- Travel/expo for the main controls may be set individually per flight mode, for all flight modes, or for groups of flight modes (Inputs menu).

Trims

- Aileron trim is global across all flight modes.
- Elevator trim is stored per flight mode.
- Rudder and throttle trims are repurposed (see below).

Camber presets

- Preset camber is active in CLIMB mode, adjustable via rotary knob.
- Negative camber may be configured for REFLEX mode.

Aileron-to-flap mix

- Aileron-to-flap mixing is configurable per flight mode.

Spoiler compensation

- Spoiler compensation cancels pitch effects due to spoiler.
- Compensation is adjustable during flight, via the throttle trim.
- Non-linear compensation can be adjusted via a curve.

Differential

- Diff is applied to ailerons and flaps.
- Diff is adjustable using the rudder trim.
- Diff settings are stored per flight mode.

Roll rate enhancement

- Aileron diff is reduced to zero, as spoiler is deployed.
- Reverse diff can be configured to further lower the down-going aileron as spoiler is deployed.

Combi Rudder

- Combi rudder (aileron to rudder mix) is stored per flight mode.

Snapflap

- Snapflap is available in NORMAL, REFLEX and PUMP modes.
- Snapflap volume is adjustable via the throttle trim, independently for flight modes above.

Pump mode

- PUMP mode (new in v 4.1) is for 'pumping' during the 30-second climbout in an F3F comp
- PUMP mode is optional, and disabled by default.

2 Assignments and flight modes

2.1 Control assignments

Stick assignments are according to stick mode (MODEL SETUP menu).

Control assignments as follows:

Control	Function
Throttle stick	Spoiler/crow
Rudder trim	Diff adjustment (per flight mode)
Throttle trim	Snapflap volume (PUMP, NORMAL, REFLEX modes) Spoiler compensation (LANDING mode)
Rotary knob S1 (F1 for X9E)	Snapflap expo
Rotary knob S2 (F2 for X9E)	Camber preset adjust (CLIMB mode)

2.2 Channel assignments

Channel #	Vtail	Xtail
1		Right aileron
2		Left aileron
3		Right flap
4		Left flap
5	Right Vtail	Elevator
6	Left Vtail	Rudder
7-9		[free]

2.3 Flight mode operation

2.3.1 Flight mode switching

Switch SA selects between CLIMB, NORMAL/REFLEX, or LANDING.

Switch SB selects between NORMAL and REFLEX.

Flight Mode	SA	SB
LANDING	↑	[any]
CLIMB	↓	[any]
NORMAL	Mid	↑ or Mid
REFLEX	Mid	↓

2.3.2 Pump mode

PUMP mode is disabled by default. For info on setting up, see section 7.1.

2.3.3 Calibration mode

CAL is a special flight mode for calibrating the servos. When CAL is activated, mixers and trims are disabled. To activate CAL mode:

1. Apply full left aileron and full up elevator
2. Press and release SH
3. Release stick(s). The transmitter cheeps at 3 second intervals
4. To exit CAL mode, pull SH.

There are 3 sub-modes, selected via switch SA:

- SA-mid: calibrate servo end points
- SA↓: calibrate flap neutral
- SA↑: calibrate ailerons with reduced down-travel

3 Installing F3F Setup in your transmitter

3.1 Transferring the template

For this step you'll need OpenTx Companion and a USB cable to connect your transmitter to a PC.

All steps from this point forward should be followed in the sequence shown. Use the tick boxes to record your progress.

- Establish communication with your PC:
 - Taranis: press inwards on horizontal trims and switch on. Connect Taranis to computer via USB cable.
 - Horus: switch on transmitter then connect to the computer via USB cable.
- Copy sound (.WAV) files to the `\SOUNDS\{language}` folder on the SD card. For example, for English, copy to folder `"\SOUNDS\en"` (this folder should already exist on the card).
- Using OpenTx Companion, transfer the template to your transmitter as follows:
 - Open the F3F .eepe file. Versions for X/T and V tails are displayed in a window.
 - From the File menu, choose 'Read Models and Settings from Radio'. Your models appear in a second window.
 - Drag one of the F3F models into an empty slot in the model list.
 - Close the F3F window.
 - Right-click the new model and choose "Use as Default"
 - Write the modified list to the tx ('Write Models and Settings to Radio').
 - Close OpenTx Companion
- IMPORTANT:** on your transmitter, before going further **make sure your sticks are calibrated**– from the main screen press **[long Menu], [Page...]**. Remember to cal all knobs and sliders. Failure to calibrate is the main cause of problems, for example jumping neutrals and inability to activate certain flight modes.
- Using the transmitter on its own, familiarise yourself with the flight modes. At the end of this step, you should know how to activate:
 - CLIMB, PUMP (if enabled), NORMAL, REFLEX and LANDING modes
 - CAL mode, including the three sub-modes
- Check that the flight mode sounds are working correctly. If not, check (a) sound files copied to correct folder (see above), and (b) check the WAV volume in the **RADIO SETUP** menu.

3.2 Check mixer sources

The template's native tx is the X9D. If using a transmitter other than the X9D, then the following mixers must be checked for the correct source, and amended if necessary.

Channel → mixer	Source(X9E only)	Source(All other transmitters)
CH10 (AilCm) →Camber	F2	S2
CH11 (FlapCm) →Camber	F2	S2
CH20 (ExpAdj) →ExpAdj	F1	S1

To check the mixer sources, open the **Mixers** menu and scroll down the list.

If source is not according to table above, then:

- Press {long enter} to open the mixer editor
- Select the correct source. *Tip:* You can use the dropdown menu, or simply move the control.
- Press OK.

4 Configuration Part 1: calibrating the servos

Configuration of your model is in two parts: servo calibration, followed by mixer adjustment. This section is concerned with calibration. The goals of servo calibration are:

- (a) Achieve a symmetrical setup at the servo level and
- (b) Maximise control surface movements
- (c) Linearise control surface responses.

Correct calibration is essential for diff to work correctly, and for the flaps and ailerons to track precisely.

4.1 Set servo rotation

In this step, you'll power up the tx and rx, and set the direction of rotation of the servos:

- Switch on the transmitter (do not power up the receiver yet)
- Enter CAL mode. The tx will cheep every 3 seconds.
- Throttle stick to centre
- Switch SA to **middle**
- Open the **OUTPUTS** menu
- Power up the receiver
- While still in CAL mode, check the direction of each control surface according to the table below. Reverse outputs as necessary. **Pay particular attention to the notes regarding aileron and elevator!**

Stick command	Control surface	Notes
<input type="checkbox"/> Aileron stick right →	RtAil goes up ↑ LtAil goes up ↑	Ailerons move together in CAL mode
<input type="checkbox"/> Thr stick forward ↑	RtFlap goes up ↑ LtFlap goes up ↑	Ignore "INVERT THROTTLE" warning when reversing.
<input type="checkbox"/> V-TAIL only: Ele stick forward ↑	RtVee goes up ↑ LtVee goes up ↑	Elevator(s) operate in reverse direction to normal in CAL mode
<input type="checkbox"/> X-TAIL only: Ele stick forward ↑	Ele goes up ↑	
<input type="checkbox"/> X-TAIL only: Rud stick right →	Rud goes right →	As normal

To reverse an output:

1. Skip to the *Direction* field, then
2. Press **[Enter]**, and immediate **[Exit]**

```

OUTPUTS 1464us Direction 7/13
CH1 RtAil 0.0 -150.0→150.0 ← CV11 1500Δ
CH2 LtAil 0.0 -150.0→150.0 → CV12 1500Δ
CH3 RtFlap 0.0 -150.0→150.0 → CV13 1500Δ
CH4 LtFlap 0.0 -150.0→150.0 ← CV14 1500Δ
CH5 RtVee 0.0 -150.0-150.0 ← CV15 1500Δ
CH6 LtVee 0.0 -150.0-150.0 → CV16 1500Δ
CH7 0.0 -100.0-100.0 → --- 1500Δ
    
```

- Exit CAL mode and enter NORMAL mode.
- Check for correct direction of aileron, elevator and rudder (**note: the flaps can't be checked yet**).

4.2 Calibrate centres and limits

Next, calibrate servo centre and limits. Note:

- Centre and limits are specified using curves. Min/Max/Subtrim should be left at their default values (-150,150,0 respectively).
- When setting the end-points, consider all combinations of inputs. For example, when setting the upper end point for the ailerons, allow sufficient movement for roll and spoiler inputs. If the end point is short, then the servo may stop before the commanded travel is reached; this may or may not be acceptable to you. **If you don't know what control surface movements are required, simply set your end-points to the maximum possible, subject to linkage geometry.**
- The throttle response is stepped in CAL mode, this aids tracking adjustment.
- Depending on the model, you may wish to calibrate the ailerons first, before the flaps.

Channel	Calibration procedure
CH 4 – Lt Flap	<p>Start by calibrating left flap (CH4). You'll set end points only, ignore flap neutral for now:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Set switch SA to middle position <input type="checkbox"/> Enter CAL mode <input type="checkbox"/> In the OUTPUT menu, highlight CH4(LtFlap) <input type="checkbox"/> Skip to curve field CV14(LtF), and press [long ENTER] to open curve editor <ul style="list-style-type: none"> ○ Throttle stick back (↓), adjust point 1 for lower end point. Allow enough movement for both spoiler and aileron inputs. ○ Throttle stick forward (↑), adjust point 3 for upper end point. Allow enough for any aileron-to-flap mixing. ○ Adjust point 2 so it lies on the straight line thru points 1 and 3. <input type="checkbox"/> Move throttle stick from one end to the other, observing step intervals. If necessary fine tune point 2 to equalise intervals (i.e. optimise linearity).
CH 3 – Rt Flap	<p>Next, calibrate the right flap (CH3). You adjust a 5-point curve to precisely match the left flap.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Enter CAL mode <input type="checkbox"/> Set switch SA to middle position <input type="checkbox"/> In the OUTPUT menu, highlight RtFlap <input type="checkbox"/> Skip to curve field CV13(RtF), press [long ENTER] to open curve editor <input type="checkbox"/> Adjust points 1 – 5 to exactly match the left flap: <ul style="list-style-type: none"> ○ stick fully back, adjust point 1 ○ stick ½-back, adjust point 2 ○ stick to centre, adjust point 3 ○ stick to ½-forward, adjust point 4 ○ stick fully forward, adjust point 5 <p>To match the end points on left and right sides, it may be necessary to reduce one or other end points for the left flap.</p>
Flap neutral	<p>Next, set the flap neutral:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Enter CAL mode <input type="checkbox"/> Set switch SA to down position. An adjustable offset is applied to each flap. <input type="checkbox"/> Open the GLOBAL V. menu. <input type="checkbox"/> Highlight GV5(FNu) and skip to the FM0 column. <input type="checkbox"/> Adjust GV5(FNu) for correct neutral. If the flaps are not perfectly in line with each other, then redo calibration for RtFlap above, paying particular attention around the neutral position.

Channel	Calibration procedure
<i>V-Tail</i> CH 5 – RtVee CH6 – LtVee	Calibrate V-tail (applies to V-tail version only) <ul style="list-style-type: none"> <input type="checkbox"/> Enter CAL mode <input type="checkbox"/> In the OUTPUT menu, highlight CH5(RtVee) <input type="checkbox"/> Skip to curve field CV15(ERv), press [long ENTER] to open curve editor <ul style="list-style-type: none"> o Ele stick to centre, adjust point 2 for correct neutral o Ele stick forward (↑), set point 3 to upper limit o Ele stick back (↓), set point 1 to lower limit. Allow for spoiler comp. <input type="checkbox"/> Repeat for CH6(LtVee) and CV16(RLv) <input type="checkbox"/> Check equal travel up/down; left and right surfaces match
<i>X-Tail</i> CH 5 – Ele	Calibrate elevator (applies to X-or T-tail only) <ul style="list-style-type: none"> <input type="checkbox"/> Enter CAL mode <input type="checkbox"/> In the OUTPUT menu, highlight CH5(Ele) <input type="checkbox"/> Skip to curve field CV15(ERv), press [long ENTER] to open curve editor <ul style="list-style-type: none"> o Ele stick to centre, adjust point 2 for correct neutral o Ele stick forward (↑), adjust point 3 to upper limit o Ele stick back (↓), adjust point 1 for to lower limit <input type="checkbox"/> Check travel is equal up & down
<i>X-Tail</i> CH 6 – Rudder	Calibrate rudder (applies to X-or T- tail only) <ul style="list-style-type: none"> <input type="checkbox"/> Check you're still in CAL mode <input type="checkbox"/> In the OUTPUT menu, highlight CH6(Rudder) <input type="checkbox"/> Skip to curve field CV16(RLv), press [long ENTER] to open curve editor <ul style="list-style-type: none"> o Rudder stick to centre, adjust point 2 o Rudder right (→), adjust point 3 o Rudder left (←), adjust point 1 <input type="checkbox"/> Check equal travel left/right
CH 1 – Rt Ail CH 2 – Lt Ail	Finally, calibrate ailerons: <ul style="list-style-type: none"> <input type="checkbox"/> Enter CAL mode <input type="checkbox"/> Set switch SA to down position. The flaps will go to their calibrated neutrals. <input type="checkbox"/> In the OUTPUT menu, highlight CH1(RtAil) <input type="checkbox"/> Skip to curve field CV11(RtA), then press [long ENTER] to open curve editor <ul style="list-style-type: none"> o Aileron stick to centre. Set Point 2 for correct centre o Move aileron stick right (→). Set point 3 to desired upper limit. o Move aileron stick left (←). Attempt to adjust point 1 so that down-travel = up-travel. <p>If down-travel is insufficient to complete this step, then move SA to the up position – this reduces aileron movement by 50%, and sends the flaps to their calibrated neutrals. Now, re-adjust point 1 so that down-travel = the (reduced) up-travel. When you exit CAL mode, full rate will be restored; don't worry if down-travel is excessive – later adjustments to input and diff will reduce it.</p> <input type="checkbox"/> Repeat for CH2(LtAil) <input type="checkbox"/> Check: constant rate up/down for each aileron, and check left and right ailerons match. Readjust if necessary.

Exit CAL mode, enter Normal mode.

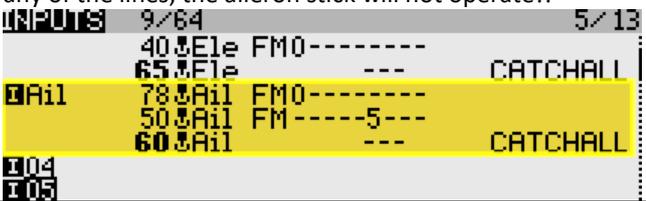
Check that surfaces respond to aileron, elevator and rudder inputs. Don't worry if the movements are excessive, they'll be adjusted later. **Note that flaps will not respond yet.**

Well done, calibration is complete!

Back up your template now.

5 Configuration part 2 - setting up travel and mixing

This is where your model comes to life!

Control / mix	Adjustment point	Adjustment procedure
<input type="checkbox"/> Ail rate/expo	INPUTS→I Ail	<p>Set the default aileron movement. Focus on the up-travel (down-travel is governed by Diff adjusted via rudder trim)</p> <ol style="list-style-type: none"> 1. Enter NORMAL mode 2. Open the INPUTS menu 3. Highlight 'catchall' line in I Ail section. 4. Open the input editor 5. Set <i>weight</i>. 6. Click on Diff dropdown, select <i>Expo</i>, and set required value. ('Diff' must be left at zero.) <p>If different rates are required for specific flight modes, then create additional Input lines <i>above</i> the 'catchall' line. Each line should have relevant mode(s) revealed and the rest blanked out. Flight mode numbers as follows:</p> <p>FM0 = NORMAL FM2 = LANDING FM3 = PUMP FM4 = CLIMB FM5 = REFLEX</p> <p>IMPORTANT SAFETY NOTE: The 'catchall' line must be the last line, with all flight modes enabled and no switches. This will ensure safe operation if a flight mode is omitted in any preceding lines (if the active flight mode is not specified in any of the lines, the aileron stick will not operate!!</p> 
<input type="checkbox"/> Rud travel/expo	INPUTS→I Rud	As above
<input type="checkbox"/> Ele travel/expo	INPUTS→I Ele	As above
<input type="checkbox"/> Aileron→flap mix	GLOBAL.V→GV1(A2F)	<p>Aileron-to-flap mixing is configured per flight mode.</p> <ol style="list-style-type: none"> 1. Open GLOBAL.V. menu, highlight GV1(A2F). 2. Adjust mix for each flight mode: <ul style="list-style-type: none"> -Activate NORMAL mode, adjust for FM0 -Activate LANDING mode, adjust for FM2 -Activate PUMP mode, adjust for FM3 -Activate CLIMB mode, adjust for FM4 -Activate REFLEX mode, adjust for FM5 <p>Note: down-going movement will be affected by ail diff setting (adjusted via rudder trim)</p>
<input type="checkbox"/> Camber preset	GLOBAL.V→GV4(FCm)/FM4 GLOBAL.V→GV3(ACm)/FM4	<p>Preset camber is available in CLIMB mode. It's adjustable via S2 (X9D) or F2 (X9E). In this step, you (a) will set the limit of adjustment and (b) the operating camber.</p> <p>Start with flaps:</p> <ol style="list-style-type: none"> 1. Rotate S2 (X9D) or F2 (X9E) fully clockwise. 2. Activate CLIMB mode 3. Open the GLOBAL.V. menu, highlight GV4(FCm) 4. Adjust value in FM4 column for desired limit of adjustment. 5. To set aileron camber, repeat steps 3 & 4 using GV3(ACm). 6. Finally, rotate S2/F2 for desired 'operating' camber.

Control / mix	Adjustment point	Adjustment procedure
<input type="checkbox"/> Reflex	GLOBAL.V→GV4(FCm)/FM5 GLOBAL.V→GV3(ACm)/FM5	Reflex (negative camber) can be set up in REFLEX mode. In this step, you'll set the reflex individually for ailerons and flaps. To set reflex for flaps: 1. Activate REFLEX mode. 2. Open the GLOBAL.V menu 3. Highlight GV4(FCm) and skip to FM5 column 4. Adjust value for required reflex (+ve value) 5. To set reflex for ailerons, repeat steps above, but using GV3(ACm).
<input type="checkbox"/> Spoiler→Flap <input type="checkbox"/> Spoiler→Ail	GLOBAL.V→GV3(ACm)→FM2 GLOBAL.V→GV4(FCm)→FM2	In this step, you'll set the flap and aileron movements for the crow function. Start with flaps: 1. Activate LANDING mode 2. Open the GLOBAL.V menu, highlight GV4(FCm) 3. Skip to the FM2 column 4. Using the throttle stick, apply full crow 5. Adjust GV4(FCm) for <i>downward</i> flap deflection 6. Adjust GV3(ACm) for <i>upward</i> aileron deflection.
<input type="checkbox"/> Combi rudder	GLOBAL.V→GV2(A2R)	Combi rudder is set per flight mode. 1. Open GLOBAL.V menu, highlight GV2(A2R). 2. Enter +ve values only: -Activate NORMAL mode, adjust for FM0 -Activate LANDING mode, adjust for FM2 -Activate PUMP mode, adjust for FM3 -Activate CLIMB mode, adjust for FM4 -Activate REFLEX mode, adjust for FM5 3. Check that the rudder moves in the correct sense
<input type="checkbox"/> Reverse diff	GLOBAL.V→GV6(RvD)	In this step, you can increase the travel of the down-going aileron when both full crow and full aileron are applied. This improves roll response at full crow. To set this up: 1. Activate LANDING mode 2. Open GLOBAL.V menu, highlight GV6(RvD), skip to FM2 3. Apply full crow and full aileron 4. Adjust GV6(RvD) so that the down going aileron is a little below the centre position. NOTE: this measure for improving roll response is in addition to aileron diff suppression, which is automatically applied.
<input type="checkbox"/> Snapflap	MIXERS→CH11(FlapCm)→Snap MIXERS→CH10(AilCm)→Snap	Snapflap (elevator to flap mixing) is active in NORMAL, REFLEX, and PUMP modes. The amount can be adjusted using the throttle trim. In this step, you'll set the maximum possible snapflap, first for flaps, then for ailerons. Then you'll set the operating snapflap for each flight mode. Start with the flaps: 1. Activate NORMAL mode 2. Move throttle trim fully back (max snapflap) 3. Open MIXERS menu, go to CH11(FlapCm) 4. Select the 'Snap' line and open the mixer editor 5. Hold full up elevator (full back on the stick) 6. Adjust mixer <i>weight</i> to provide max possible snapflap. 7. For the ailerons: repeat steps 3-6 but using CH10(AilCm). 8. While in NORMAL mode, adjust throttle trim for operational setting. Repeat this step in REFLEX and PUMP modes.

Control / mix	Adjustment point	Adjustment procedure
☐ Spoiler→Ele compensation	MIXERS→CH19(SpComp)→Spoilr	<p>Spoiler (crow) compensation is used to counteract pitch changes. The amount of compensation is adjustable using the throttle trim. In this step, you'll set (a) the limit of adjustment and (b) the 'operating' compensation:</p> <ol style="list-style-type: none"> 1. Activate LANDING mode. 2. Deploy full spoiler. 3. Move throttle trim fully forward (max compensation). 4. Open MIXERS menu, go to CH19 5. Highlight 'Spoilr' line, [long ENTER] to open mixer editor 6. Adjust <i>weight</i> for desired max possible compensation 7. Move throttle trim for correct operating compensation. <p>NOTE: intermediate response can be adjusted in curve 'SpC', adjust if necessary after flight tests.</p>

Congratulations, you've finished setting up your model! Please back up your template now.

6 Pre-flight

6.1 Mix adjusters summary

Here's a summary of the live mix adjusters – you may want to print a copy for field use:

Adjustment	Adjuster	Flight modes	Notes
Aileron Diff	Rudder trim	[all]	Rudder trim right = more roll response/less diff. Range of adjustment = 10 - 70%, trim centre = 40%. Stored independently for each flight mode.
Spoiler comp	Throttle trim	LANDING	Trim back = zero comp, trim forward to increase For non-linear response adjust points 2-4 of 'SpC'
Snapflap volume	Throttle trim	NORMAL, REFLEX, PUMP	Trim forward = zero snapflap, trim back to increase Stored independently for NORMAL, REFLEX and PUMP modes
Snapflap expo	S1 (X9D), F1 (X9E)	NORMAL, REFLEX	Centre=linear. Clockwise = late, CounterCW = early
Camber	S2 (X9D), F2 (X9E)	CLIMB	Clockwise = more camber

6.2 Fail safe and battery alarm

Before flying with this setup for the first time, remember to:

- set the failsafe
- set the battery alarm threshold to suit your battery chemistry, for both the tx and rx.

7 Customisations

The next section describes optional customisations. To avoid confusion, apply these only after the basic setup is complete (except for PUMP mode (7.1 below)). Mixer settings etc. will not be affected by these changes.

7.1 Pump mode

'Pumping' is a technique for gaining height during the 30-second launch phase in F3F competitions. It makes use of the wind shear adjacent to the slope. An optional PUMP mode is available for this. To enable PUMP mode in the template:

1. Open the **FLIGHT MODES** menu
2. Highlight PUMP line
3. Change switch from '---' to 'L11'.

To activate PUMP mode in flight:

1. Enter CLIMB mode
2. Pull SH and release

PUMP is cancelled automatically when you switch to another flight mode.

7.2 Flight mode selection and switches

This section shows how to change (a) the flight mode switch(es) and (b) activation method for LANDING mode.

7.2.1 Landing mode via a switch

This is the default configuration. With this scheme, the active flight mode depends on two switches.

- **SwMain** (3-pos) selects the main flight mode NORMAL, LANDING, CLIMB.
- **SwRFX** (3-pos) selects REFLEX over NORMAL mode.

This table shows the adjustments. For **SwMain** and **SwRFX** choose from **SA, SB, SC, SD, SE, or SG**:

Menu point	Setting	Default
FLIGHTMODES→LANDING (FM2)	SwMain (↑↓ or -)	SA↑
FLIGHTMODES→CLIMB (FM4)	SwMain (↑↓ or -)	SA↓
FLIGHTMODES→REFLEX (FM5)	SwRFX (↑↓ or -)	SB↓
LOGICAL SWITCHES→L11→first param	<i>same as</i> CLIMB mode	SA↓

Note: NORMAL mode is selected when **SwMain** is in the third (unassigned) position. The default is SA-middle.

7.2.2 Landing mode via throttle stick

In this configuration, LANDING mode is activated automatically as the throttle stick is deployed. A 3-position switch selects the remaining flight modes.

This table shows the necessary adjustments. Substitute your chosen 3-position switch for **SwMain**:

Menu point	Setting	Example
FLIGHTMODES→'LANDING' (FM2)	L5	
FLIGHTMODES→'CLIMB' (FM4)	SwMain (↑↓ or -)	SA↓
FLIGHTMODES→'REFLEX' (FM5)	SwMain (↑↓ or -)	SA↑
LOGICAL SWITCHES→L11→first param	<i>same as</i> CLIMB above	SA↓

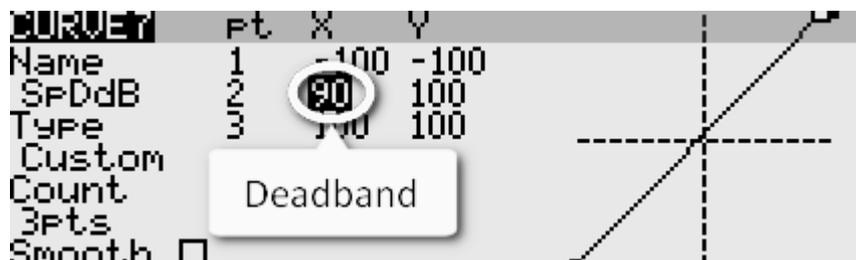
Note: NORMAL mode is selected when **SwMain** is in the third (unassigned) position. In the example above, it would be SA-middle.

7.3 Adjusting spoiler stick deadband

The spoiler stick response incorporates some deadband at the idle end to prevent accidental deployment. A small amount of deadband is also desirable to allow for pot drift and ratchet slip.

The default deadband should be fine for most pilots, however it can be adjusted as follows:

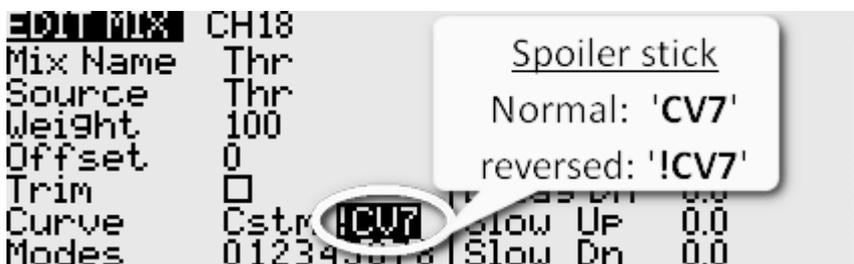
- 1 Go to Curves menu
- 2 Open Curve 7 ('Sdb')
- 3 Change pt2 -> X. Decrease X to increase the deadband. Recommended max value is 95.



7.4 Reversing the spoiler stick

By default, zero spoiler corresponds to throttle stick fully forward. If you prefer zero spoiler with throttle fully back, then reverse the response as follows:

- 1 Open the mixer editor for CH18 (ThDdBd)→Thr
- 2 Skip to the Curve field
- 3 Change the curve from 'CV7' to '!CV7' (note leading exclamation mark).



8 Identifying errors

OpenTx doesn't provide an Undo button. Fortunately, Companion offers a useful tool for tracking down errors:

- 1 Start Companion
- 2 Open the (unedited) .eepe file
- 3 Open your working EEPROM
- 4 Click on **FILE->COMPARE FILES** to open the Compare window, then drag the corresponding models into it.

Compare files generates a list of differences, and any errors should be easy to spot. It's not a bad idea to do a quick check before your first flight.

9 Making your own modifications

Before making your own modifications, please study the Excel documentation carefully and make sure you understand the implications of any changes. The recommended workflow is:

- 1 Setup your model first, as described in this guide
- 2 Backup your work
- 3 Apply your modifications incrementally, testing and backing up as you go along.

10 Safety/disclaimer

Pretty obvious really, but worth repeating: **it's up to the user to make sure that the controls respond correctly under all conditions**. The author will not be responsible for the consequence of any bugs in the setup or documentation.

***Remember to test your setup thoroughly...
...if in doubt, don't fly!***

11 Contact

If you find any errors in the documentation, please contact me via <http://rc-soar.com/email.htm> – you 'll be helping the author and your fellow users of this setup! Feedback and suggestions are also welcome and appreciated.

Happy flying ☺
Mike Shellim