

F3F template for Taranis and Horus

Version 5.0

Setup Guide

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1 Introduction

F3F Template is for slope racers with 6 servos. It's optimised for F3F and has been proven in by several competition pilots both in the UK and abroad. It offers quick setup, simple operation, and in-flight adjustments of mixers. An integrated CAL mode ensures perfect tracking of control surfaces.

Application

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

Flight modes

- NORMAL, REFLEX, CLIMB, PUMP, and LANDING
- Voice confirmation on change of mode
- Flight mode switch layout is customisable

In-flight adjustments

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

Crow functions

- Choice of deployment methods
- Automatic differential suppression
- Reverse Diff
- Crow/elev compensation with multi-point curve
- Adjustable deadband on crow control.

(optional) Advanced snapflap mix

- In-flight adjustable snapflap deadband. Uses Lua script (supplied)

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 **read through this document once**

- visit the [Support page](#) for any issues which may affect your setup.

1.1 Requirements

The following are required:

- Taranis X9D/X9DP/X9E/Q X7 or Horus X10/X10S/X12S
- OpenTx 2.2.1 or greater (2.2.0 is buggy and is not supported).
Note: if you wish to use the enhanced snapflap script, then OpenTx must be built with 'Lua' option ticked in Companion→Settings.
- OpenTx Companion
- USB cable for transmitter <-> PC

1.2 Package contents

The contents of ZIP package are as follows:

Filename	Description
F3f_v50_userguide.pdf	This document
F3f_v50_reference.xls	Settings reference
F3f_v50?.otx	EEPROM image contains versions: 'X' for cross- and T-tail, 'V' for V-tail
*.wav	Sound files
snp410.lua	(optional) advanced snapflap script
snp410InstallGuide.pdf	Install guide for advanced snapflap mix

1.3 Overview of features

Flight modes

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

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

Rates and expo

- Rates/expo may be set per flight mode.

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 and reflex

- In CLIMB mode, camber is adjustable via a rotary knob.
- In REFLEX mode, reflex camber may be pre-configured.

Aileron-to-flap mix

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

Crow->elevator compensation

- Crow compensation is adjustable during flight, via the throttle trim.
- Compensation can be non-linear, adjustable via a curve.

Differential

- Diff is adjustable during flight, using the rudder trim.
- Diff settings are stored per flight mode.

Roll rate enhancement

- Aileron diff is suppressed, as crow is deployed.
- 'Reverse' diff can be configured to further lower the down-going aileron as crow is deployed.

Aileron to Rudder mix

- Aileron to rudder mix is set per flight mode.

Snapflap

- Snapflap is available in NORMAL, REFLEX and PUMP modes.
- Snapflap volume is independent for each flight mode, and adjustable in flight via the throttle trim.
- Snapflap expo is adjustable via a knob. Adjustment is global for all flight modes
- [optional] Snapflap deadband is adjustable in flight via optional Lua script. Adjustment is global.
- Audio alerts at 5% and 95% snapflap, to aid tuning.

Pump mode

- PUMP mode is optional, for 'pumping' during the 30-second climbout in an F3F comp.
- PUMP mode is disabled by default.

2 Assignments and flight modes

2.1 Control assignments

Control	Function	
Throttle stick	Crow brakes	
Rudder trim	Diff adjustment (per flight mode)	
Throttle trim	Snapflap volume (PUMP, NORMAL, REFLEX modes) Crow compensation (LANDING mode)	
Rotary knob S1 (F1 for X9E)	Snapflap expo adjust	
Rotary knob S2 (F2 for X9E)	Camber preset adjust (CLIMB mode)	
SC	Snapflap alerts on/off	
LS (left slider)	Snapflap lower deadband	<i>If optional Lua script installed</i>
RS (right slider)	Snapflap upper deadband	

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 modes

2.3.1 Main flight modes

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

Switch SB selects between NORMAL and REFLEX.

Flight Mode	SA	SB
LANDING	↑	[any]
CLIMB/PUMP	↓	[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 6.3.

2.3.3 Calibration mode

CAL is a special flight mode for calibrating the servos. In CAL mode, mixing 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

SA selects between three sub-modes:

- SA-: for calibrating servo end points
- SA↓: for calibrating flap neutral
- SA↑: for calibrating ailerons, but using 50% throws

To exit CAL mode, pull SH.

Let's start the configuration!

Please follow the sequence as shown, use the tick boxes to record your progress.

3 Installing the template

3.1 Transferring template to transmitter

- ☐ 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 .otx file. Versions for X/T and V tails are displayed in a window.
 - ☐ If you're using a transmitter other than the X9D, you may see a window with translation errors and warnings. You can safely ignore these *unless you're using a Q X7!*
If you have a Q X7, then there will be two critical errors for sliders LS, RS – to resolve this, go to the Mixers menu, then delete the mixes for CH24 and CH25 (these mixes are not needed for the default setup). This only needs to be done for the version (X- or V-tail) that you intend to use.
 - ☐ 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:** before going further **make sure your sticks are calibrated**. This can be done from the SYSTEM menu. Remember to calibrate the knobs and sliders. Failure to calibrate is one of the main causes 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 Checking mixer sources

The template's targets the X9D. If using another transmitter, open the **MIXERS** menu, and check the following mixers for the correct source:

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

If source is not correct then:

- ☐ Highlight the line and press **{long enter}** to open the mixer editor
- ☐ In the Source field, select the correct source. *Tip:* Pick from the list, or simply move the control.

4 Calibrating the servos

The first task is to calibrate the servos, in other words set the direction of rotation, and the end points. The goals are:

- Maximise the servo movement subject to linkage constraints
- Linearise responses
- Equalise responses left/right

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

4.1 Setting servo rotation

In this step, you will set the direction of rotation of the servos:

- ☐ Switch on the transmitter (do not power up the receiver yet)
- ☐ Enter CAL mode
- ☐ Throttle stick to centre, Switch SA to **middle**
- ☐ Open the **OUTPUTS** menu
- ☐ Switch on the receiver
- ☐ While still in CAL mode, set the direction of control surfaces 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 ↑	
<input type="checkbox"/> V-TAIL only: Ele stick forward ↑	RtVee goes up ↑ LtVee goes up ↑	Elevator(s) operate in reverse direction to normal
<input type="checkbox"/> X-TAIL only: Ele stick forward ↑	Ele goes up ↑	
<input type="checkbox"/> X-TAIL only: Rud stick right →	Rud goes right →	

To reverse a control surface:

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

```
OUTPUTS 1484us 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 that the flaps will not function yet** –they will only work when the mixing is configured in the last section.

4.2 Calibrating servo centres and limits

In this section you'll adjust the servo centres and limits using CAL mode. When setting limits, consider all the inputs. For example, when setting flap limits, allow for simultaneous crow and aileron commands. Otherwise the flaps may stop before the commanded position is reached.

If you don't know the movements required for your model, then set servo end-points to maximum subject to restrictions below.

Please note:

- All adjustments are made in CAL mode
- Centres and limits are adjusted using curves - *do not alter min, max or subtrim!*

Channel	Calibration procedure
CH 4: LtFlap	<p>Start with left flap. You'll set end points only, ignoring flap neutral.</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 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 crow 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's 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: RtFlap	<p>Next, calibrate the right flap. You will 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 CH3:RtFlap <input type="checkbox"/> Skip to curve field 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 via an offset mix.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Enter CAL mode <input type="checkbox"/> Set switch SA to down position. <input type="checkbox"/> Open the GVAR menu. <input type="checkbox"/> Highlight row FNu column FM0, and press {Enter} <input type="checkbox"/> Adjust for correct neutral. If the flaps are not perfectly in line with each other, then redo calibration for CH3:RtFlap above, paying particular attention around the neutral position.
V-Tail CH 5: RtVee CH 6: LtVee	<p>Calibrate V-tail (applies to V-tail version only)</p> <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 ERv, press [long ENTER] to open curve editor <ul style="list-style-type: none"> ○ Ele stick to centre, adjust point 2 for correct neutral ○ Ele stick forward (↑), set point 3 to upper limit ○ Ele stick back (↓), set point 1 to lower limit. Allow for crow comp. <input type="checkbox"/> Repeat for CH6:LtVee and curve RLv <input type="checkbox"/> Check equal travel up/down; left and right surfaces match

Channel	Calibration procedure
<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 ERv, press [long ENTER] to open curve editor <ul style="list-style-type: none"> ○ Ele stick to centre, adjust point 2 for correct neutral ○ Ele stick forward (↑), adjust point 3 to upper limit ○ 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 RLv, press [long ENTER] to open curve editor <ul style="list-style-type: none"> ○ Rudder stick to centre, adjust point 2 ○ Rudder right (→), adjust point 3 ○ Rudder left (←), adjust point 1 <input type="checkbox"/> Check equal travel left/right
CH 1:RtAil CH 2:LtAil	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 RtA, then press [long ENTER] to open curve editor <ul style="list-style-type: none"> ○ Aileron stick to centre. Set Point 2 for correct centre ○ Move aileron stick right (→). Set point 3 to desired upper limit. ○ 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.

Well done, calibration is complete!!

- ☐ Exit CAL mode, enter Normal mode.
- ☐ Check that surfaces respond to aileron, elevator and rudder inputs. Don't worry that the movements are excessive, they'll be reduced in the next section. **Note: the flaps will *not* function yet (they will only work after mixer configuration).**
- ☐ Make a backup copy of your template now.

TIP: always perform a CAL check:

- at the start of each flying session
- after a hard landing
- after swapping out a faulty servo for a new one
- whenever you suspect drifting neutrals

It only takes a moment!

5 Adjusting control travel and mixing

This is where your model comes to life!

Control / mix	Adjustment point	Description
<input type="checkbox"/> Ail rate/expo	INPUTS→ TAil	<p>Set the default aileron stick rate</p> <ol style="list-style-type: none"> 1. Activate NORMAL flight mode 2. Open the INPUTS menu 3. In TAil section, highlight 'catchall' line 4. Open the input editor 5. Adjust <i>weight</i> for required upward travel. <i>Note:</i> down-travel is affected by diff setting, adjusted via rudder trim. 6. To set <i>expo</i>, click on Curve field, choose 'expo', and set value. <p>To set rates individually for each flight mode, see section 6.1 <i>Note:</i> do not try to set aileron diff here (the 'Diff' curve affects stick diff, not servo diff).</p>
<input type="checkbox"/> Rud travel/expo	INPUTS→ IRud	As above
<input type="checkbox"/> Ele travel/expo	INPUTS→ IEle	As above
<input type="checkbox"/> Aileron→flap	GVARs→A2F	<p>Aileron-to-flap mixing is configured per flight mode.</p> <ol style="list-style-type: none"> 1. Open GVARs menu, skip to row A2F. 2. Activate flight mode to adjust. The column will be highlighted. 3. Skip to highlighted column. 4. Adjust GVAR for required aileron to flap response. <p><i>Note:</i> down-going flap movement will be affected by diff setting (adjusted via rudder trim)</p>
<input type="checkbox"/> Camber preset	GVARs→FCm GVARs→ACm	<p>Preset camber is available in CLIMB mode. It's adjustable via S2 (F2 for 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/F2 fully clockwise. 2. Open the GVARs menu 3. Skip to row FCm 4. Activate CLIMB mode, and go to highlighted column 5. Adjust GVAR for desired camber limit. 6. Repeat steps 3-5 for ailerons, using GVARs→ACm. 7. Finally, rotate S2/F2 for desired operating camber.
<input type="checkbox"/> Reflex	GVARs→FCm GVARs→ACm	<p>Reflex (negative camber) can be set in REFLEX mode. In this step, you'll set the reflex individually for ailerons and flaps.</p> <p>To set reflex for flaps:</p> <ol style="list-style-type: none"> 1. Open the GVARs menu 2. Activate REFLEX mode, the active column is highlighted. 3. Skip to row FCm, and then to highlighted column. 4. Adjust value for required reflex (+ve value) 5. To set reflex for ailerons, repeat steps above, but using GVARs→ACm
<input type="checkbox"/> Crow→Flap <input type="checkbox"/> Crow→Ail	GVARs→ACm GVARs→FCm	<p>In this step, you'll set the flap and aileron movements for the crow function. Start with flaps:</p> <ol style="list-style-type: none"> 1. Open the GVARs menu 2. Activate LANDING mode. The corresponding column is highlighted 3. Using the throttle stick, apply full crow 4. Skip to row FCm, then to highlighted column 5. Adjust FCm for <i>downward</i> flap deflection <p>To adjust ailerons:</p> <ol style="list-style-type: none"> 6. Go to row ACm and skip to highlighted column. 7. Adjust GVAR for <i>upward</i> aileron deflection.

Control / mix	Adjustment point	Description
<input type="checkbox"/> Ail to rudder	GVARs→A2R	Aileron to rudder mix is set per flight mode. 1. Open GVARs menu, skip to row A2R 2. Activate flight mode to adjust. The column is highlighted. 3. Skip to highlighted column. 4. Adjust GVAR for required aileron to rudder mix (+ve value).
<input type="checkbox"/> Reverse diff	GVARs→RvD	In this step, you can adjust 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. Open GVARs menu, 2. Skip to row RvD 3. Activate LANDING mode. The active column is highlighted 4. Skip to highlighted column. 5. Apply full crow and full aileron 6. Adjust GVAR 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→Snap MIXERS→CH10→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 4. Select the 'Snap' line, press [long ENTER] to open mixer editor and highlight <i>weight</i> field. 5. Hold full up elevator (full back on the stick) 6. Adjust <i>weight</i> to provide max possible snapflap. 7. For the ailerons: repeat steps 3-6 but using CH10. 8. While in NORMAL mode, adjust the throttle trim for the desired initial setting. Repeat this step in REFLEX and PUMP modes.
<input type="checkbox"/> Crow→Ele compensation	MIXERS→CH19→Crow	Crow→ele compensation is used to counteract pitch changes as crow is deployed. The amount of compensation is adjusted using the throttle trim. In this step, you'll set (a) the limit of adjustment and (b) the 'operating' compensation: 1. Activate LANDING mode. 2. Deploy full crow. 3. Move throttle trim fully forward (max compensation). 4. Open MIXERS menu, go to CH19 5. Highlight 'Crow' line, [long ENTER] to open mixer editor 6. Adjust <i>weight</i> for desired max possible compensation 7. Move throttle trim for desired operating compensation. How to adjust ele trim and crow compensation during test flights: 1. Activate LANDING mode. 2. Deploy <i>minimum</i> crow, trim for level flight using <i>elevator</i> trim. 3. Deploy <i>maximum</i> crow, adjust compensation using <i>throttle</i> trim Partial-crow response can be adjusted in curve 'SpC', adjust points 2-4, do not adjust end points. (Of course this must be done after landing.)

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

6 Making basic customisations

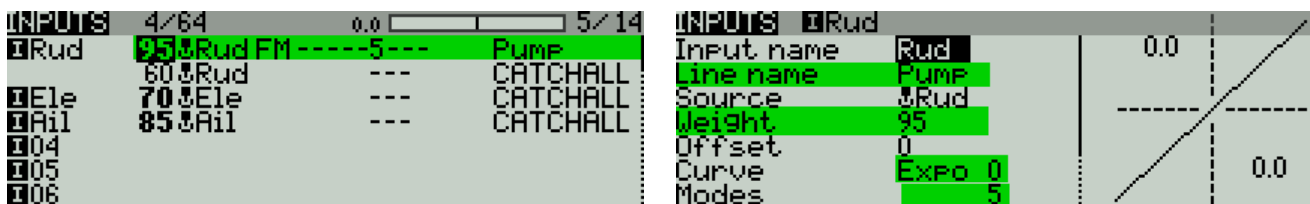
The next section describes optional customisations. Mixer settings etc. will not be affected by these changes. **Please make a backup copy of your setup first.**

6.1 Setting ail/ele/rudder rates & expo – per flight mode

Flight modes can each be assigned their own rates. For example you may wish to increase the rudder rate in PUMP mode. This can be done by adding one or more directives in the INPUTS menu:

1. Open the INPUTS menu.
2. Scroll down to the appropriate input (Ail, Ele or Rudder), then to the 'catchall' line.
3. Press {**long Enter**} and Insert a new line **before** the 'catchall' line, and open the input editor.
4. Specify the desired *weight* and *expo*. Optionally enter a descriptive *line name*. Do not alter *input name*.
5. Tick applicable flight mode(s), and untick the rest. Flight modes are as follows: FM0 = Normal, FM2 = Landing, FM3 = Reflex, (FM4 not used), FM5 = Pump, FM6 = Climb.

The example below shows changes required to add high rudder rate (95%) for Pump mode (FM5):



SAFETY NOTE: Always keep the 'catchall' lines with (a) all flight modes ticked, and (b) *switch* set to '---'. These lines provide the default rates for any flight modes not specified in the previous lines. Catchalls are **essential for safe operation**, and **must be specified as the last (or only) line** in each control group.

6.2 Configuring 'Autocrow'

Autocrow allows you to activate Landing mode by pulling on the Crow stick, that is to say, without the need to engage a switch first. Many pilots prefer this style. When Autocrow is enabled, the following changes occur:

- LANDING mode is activated directly, by pulling the crow stick
- The old landing mode switch (default **SA↑**) is reassigned to REFLEX mode
- The previous reflex mode switch (default **SB**) is released for re-use.

Autocrow is enabled in the LOGICAL SWITCHES menu:

Option	Logical switch	Description
AUTOCROW	L02 Disable: 99 Enable: 100	Enables or disables Autocrow

6.3 Configuring pump mode

PUMP mode is disabled by default. When enabled, PUMP mode is activated as follows:

1. Enter CLIMB mode
2. Quick pull SH↓

PUMP mode is cancelled when another flight mode is active. Optionally, it can also be toggled on/off via SH↓.

PUMP mode is configured as follows:

Option	Logical switch	Description
PUMP	L03 Disable: 99 Enable: 100	Enables or disables PUMP flight mode for this template.
TOGGLE_PUMP	L04 Disable: 99 Enable: 100	Allows PUMP mode to be toggled on/off using SH↓.

6.4 Reassigning flight mode switches

The flight mode switch assignments are 'soft' and specified via logical switches L05–L09. The first parameter (V1) is the switch and position.

Flight mode	LS	V1 (Default assignment shown)	Notes
CAL & PUMP modes	L05	SH↓	Must be 2P <i>spring</i> switch (safety!)
LANDING mode (or REFLEX mode if Autocrow enabled)	L06	SA↑	Main flight mode switch. Specify the <i>same</i> 3P switch but with <i>different</i> positions (↑↓–)
NORMAL mode	L07	SA–	
CLIMB mode	L08	SA↓	
REFLEX mode	L09	SB↓	Regular (non-spring) 2- or 3P switch.

6.5 Configuring the crow stick

The crow stick incorporates some deadband to prevent accidental deployment. The amount of deadband can be adjusted as follows:

- 1 Go to the Curves menu and open Curve 7 ('SDB')
- 2 Change pt2 -> X. Decrease X to increase the deadband. Recommended value is ~90.

To reverse the crow stick:

- 1 Open the mixer editor for CH18→CrowCtl
- 2 Skip to the Curve field
- 3 Change the curve from 'SDB' to 'ISDB' (note leading exclamation mark).

6.6 Configuring the snapflap expo adjuster

By default snapflap expo is assigned to S1. You can assign it to a different control as follows:

- 1 Open the mixer editor for CH20→SnExpCtl
- 2 Change the source as required.

To reverse the direction, change the sign of *weight*.

6.7 Configuring camber preset adjuster

By default the camber preset adjustment is assigned to S2. You can alter this as follows:

- 1 Open the mixer editor for CH10→Camber
- 2 Change the source as required.
- 3 Repeat for CH11→Camber

To reverse the direction, change the sign of *weight* in each mix.

6.8 Configuring snapflap alerts

To aid optimisation of snapflap, alerts can be sounded in NORMAL, REFLEX and PUMP modes.

- A short beep as snapflap starts (> 5%)
- A longer beep as snapflap approaches the maximum (>95%)

Beeps are enabled by switch SC↓. The thresholds and switch can be changed by editing logical switches L31 and L32.

6.9 Advanced snapflap script (optional)

A Lua script **snp410.lua** is provided for advanced snapflap tuning. Its use is optional – it's designed for competition tuning and is not needed for sport flying. The script offers dynamic adjustment of snapflap deadband. This is in addition to volume and expo adjustments provided with the default setup. Separate instructions are provided.

Note:

- To use the script, OpenTx must be built with the 'Lua' build option (in Companion Settings->build options)
- The script parameters are provided via channels 24 and 25. If the script is not required, these can be freed for reuse.

7 Other stuff

7.1 Field notes

The table below shows the adjustments you can make from the transmitter. Take a copy to the slope!

Adjustment	Adjuster	Flight modes	Notes
Aileron Diff	Rudder trim	[all]	Trim right = more roll response/less diff. Trim left = less roll/more diff. Range of adjustment = 10 - 70%, trim centre = 40%. Stored independently for each flight mode.
Crow compensation	Throttle trim	LANDING	Trim fully back = zero comp, trim forward to increase For non-linear response adjust points 2-4 of curve 2 'SpC'
Snapflap volume	Throttle trim	NORMAL, REFLEX, PUMP	Trim fully 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

7.2 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.

7.3 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.

7.4 Identifying errors

Companion offers a useful 'Compare files' tool for tracking down errors. If you suspect an error:

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

Any errors should be easy to spot. It's not a bad idea to do a quick check before your first flight.

7.5 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.

***Test your setup thoroughly
If in doubt, DO NOT FLY!!***

7.6 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