

F3J Setup

for FrSky Taranis

Version 3.0

Setup Guide

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1 Introduction

F3J Setup for Taranis is a full-feature setup for F3J and TD sailplanes for sport and competition. It offers a quick route to a competition ready setup without the need for advanced programming skills.

The setup is quick to configure. Furthermore, key mixes can be adjusted in flight to speed up flight testing. Full documentation is provided allowing advanced users to modify the setup to personal taste.

Key features

- For F3J/TD thermal soarers with 6 servos
- V- and X-tail versions provided
- 6 flight modes:
Launch, Zoom,
T1(thermal), T2(cruise), T3(speed)
Landing, KAPOW

'Live' adjusters

- for launch preset
- for thermal camber
- for aileron diff
- for spoiler compensation
- for snapflap volume (T3-speed)
- for reflex (ZOOM)

Advanced mixing

- Aileron diff suppression
- Reverse diff
- KAPOW mode (for hitting the landing spot!)
- Snapflap option (T3-speed)
- Spoiler compensation with multi-point curve
- Combi (aileron to rudder mix)
- Automatic mix activation per flight mode

Other

- 'Calibration' mode for precise adjustment of servo centres and limits
- 5-pt bal curve for precise tracking of flaps
- Full travel on flap servos

1.1 ZIP file contents

Filename	Description
F3j_v30_userguide.pdf	this document
F3j_v30_reference.xls	settings reference
F3j_v30x_setup.eepe	EEPROM image, contains versions: 'X' for cross- and T-tail, 'V' for V-tail
F3j_*.wav	Sound files

1.2 Requirements

The following will be required:

- X9D or X9E transmitter + OpenTx (see [change log](#) for supported versions of OpenTx)
- USB cable for connecting the transmitter to your PC
- OpenTx Companion on your PC, for transferring models between tx and computer
- A good familiarity with OpenTx's menu navigation and data entry

1.3 Nomenclature

The term 'spoiler' (popular in the UK) is used to denote crow braking.

The term 'Combi' means aileron-to-rudder mixing.

KAPOW is the name of a flight mode for 'nailing the spot' in TD competitions (after Bob McGowan).

1.4 Features overview

Flight mode/mixer matrix.

	Spoiler (crow)	Spoiler comp	Snapflap	Camber / reflex	Diff	Ail>Flap	Combi	Rev Diff
Launch				S2	Rud trim	<i>p</i>	<i>p</i>	
Zoom				S1	Rud trim	<i>p</i>	<i>p</i>	
T1-thermal				LS	Rud trim	<i>p</i>	<i>p</i>	
T2-cruise					Rud trim	<i>p</i>	<i>p</i>	
T3-speed			Thr trim	<i>p</i>	Rud trim	<i>p</i>	<i>p</i>	
Landing	<i>p</i>	Thr trim			Rud trim	<i>p</i>	<i>p</i>	<i>p</i>
KAPOW				<i>p</i>	Rud trim	<i>p</i>	<i>p</i>	

Mix adjusters in **BOLD**

p = preset during configuration

Trimmer functions

- Aileron trim is shared across all flight modes
- Elevator trim is individual per flight mode
- Rudder and throttle trims are repurposed for other functions (see below)

Camber/reflex mixes

- Camber(or reflex) may be defined for Launch, Zoom, T1-thermal, T3-speed and KAPOW flight modes:
 - Camber for T1-thermal is adjustable via LS
 - Camber for Launch is adjustable using S2 (F2 on X9E)
 - Reflex for Zoom is adjustable via S1 (F1 on X9E)
 - Reflex for T3-speed is preset during configuration
 - Reflex for KAPOW is preset during configuration

Spoiler compensation (spoiler to elevator mix)

- Spoiler compensation is used to counteract pitch changes when deploying full spoiler.
- The amount of spoiler compensation can be adjusted during flight via the Throttle trim.
- Non-linear compensation can be defined by editing a curve.

Differential

- Diff is applied to ailerons and flaps.
- Diff is adjustable in-flight, via rudder trim.
- Diff settings are stored per flight mode.

Roll rate enhancement

- Aileron diff is automatically suppressed as spoiler is deployed.
- Adjustable 'Reverse diff' increases roll-induced down-aileron movement, when spoiler is deployed.

Combi

- Combi rudder mixes aileron to rudder.
- Combi is preset per flight mode.

Snapflap

- Snapflap (i.e. elevator to flap mixing) can optionally be set for T3(speed) mode.
- Snapflap may be adjusted in flight using the throttle trim lever

KAPOW mode

- Kapow is activated from landing mode by pushing full down on elevator stick
- Applies reflex to ailerons and flaps, over-riding normal crow function.

2 Assignments and flight modes

2.1 Control assignments

Flight controls are assigned according to MODEL SETUP→Stick Mode.

Secondary controls are assigned as follows:

Control	Function	Flight mode
Rudder trim	Aileron diff adjust (per flight mode)	<i>all</i>
Throttle trim	Spoiler compensation adjust	LANDING
	Snapflap volume	T3(speed)
Left slider LS	Thermal camber adjust	T1(thermal)
Left pot S1 (X9D) or F1 (X9E)	Zoom reflex adjust	ZOOM
Right pot S2 (X9D) or F2 (X9E)	Launch camber adjust	LAUNCH

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		[free]
8		[free]
9		[free]

2.3 Flight modes and mixers

Seven flight modes are provided.

Two are for the launch phase: LAUNCH, ZOOM

Three are for normal flight: T1-THERMAL, T2-CRUISE, T3-SPEED

Two for landing: LANDING, KAPOW.

LAUNCH and ZOOM modes take precedence, then LANDING/KAPOW, and finally T1, T2 & T3.

Flight Mode	OpenTx ID	Activation	Priority	Mixers active	
LAUNCH	FM2	SE↓	V. High	Camber	
ZOOM	FM3	SE –	V. High		
KAPOW ¹	FM4	SE↑ + <i>throttle back + elev fully forward</i>	High	Camber	
LANDING	FM5	SE↑ + <i>throttle back</i>	Mid	Crow	
T1-Thermal	FM6	SA↓	SE↑ + <i>throttle fully forward</i>	Low	Camber
T2-Cruise	FM0	SA -		Low	
T3-Speed	FM7	SA↑		Low	Camber, Snapflap

¹KAPOW is disabled by default.

2.4 'Calibration' mode

A special 'CAL' flight mode is provided for calibrating the servos. When CAL is activated, mixers and trims are disabled, and the raw stick commands are passed through to the outputs. To enable 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

To exit CAL mode, pull SH.

New in v3: There are 3 sub-modes, activated via switch SA:

- SA-: calibrate servo end points
- SA↓: calibrate flap neutral (*new*)
- SA↑: calibrate ailerons which have reduced down-travel (*new*)

3 Uploading the setup to your EEPROM

In this step you'll upload the setup to your transmitter's EEPROM. 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: switch on the transmitter whilst pressing inwards on the horizontal trim levers. Then using a suitable USB lead, connect the Taranis to the computer. The Taranis' SD card should appear as an external drive.
- Copy the sound (.WAV) files to the **/SOUNDS/{language}** folder on the SD card e.g. for English, folder = **/SOUNDS/en**. NOTE: there are some new sound files in v3.
- Using OpenTx Companion
 - Open the F3J .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 active EEPROM appears in a second window.
 - Drag one of the F3J models into an empty slot in your EEPROM.
 - Close the F3J .eepe window.
 - In the EEPROM window, right-click the new model and choose "Use as Default"
 - Write the modified EEPROM to the tx (Write Models and Settings to Radio).
 - Close OpenTx Companion
- IMPORTANT: make sure your hardware is properly calibrated** – if in doubt, calibrate now: from the main screen press **[long MENU]**, then **[PAGE]** till you reach the CALIBRATION menu. Calibrate all knobs and sliders. *Bad calibration is the main cause of problems e.g. jumping neutrals, inability to select certain flight modes etc.*
- X9E Users only:** Open the MIXERS menu, and using the mixer editor:
 - Scroll to **CH10** and highlight mix 'CmbAdjT1'. Open mix editor, and set *Source* = 'LS'.
 - Repeat above for CH11
- If you wish to use KAPOW mode, open the FLIGHT MODES menu, go to KAPOW, alter switch from '---' to 'L10'.
- Using the transmitter on its own, familiarise with the flight modes (see sections above). At the end of this step, you should know how to activate:
 - LAUNCH, ZOOM, T1-THERMAL, T2-CRUISE, T3-SPEED, LANDING and KAPOW (if enabled)
 - CAL mode, including the three sub-modes.
- Check flight mode sounds are working correctly. If not, check that the sound files are in the correct location.

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
- (b) Maximise control surface movements
- (c) Linearise control surface responses.

All the adjustments in this section are made in CAL mode.

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

4.1 Set servo rotation

The first task is to 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.
- Set switch SA to **middle**
- Open the **OUTPUTS** menu
- Power up the receiver
- The table below shows the direction of each control surface in **CAL mode**. Use it to set the correct direction for channels 1-6. **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 ↑	When reversing one of these outputs, you may see an “INVERT THROTTLE” warning – just ignore.
<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 change the direction of 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 3 CU11 1500Δ
CH2 LtAil 0.0 -150.0→150.0 → CU12 1500Δ
CH3 RtFlap 0.0 -150.0→150.0 → CU13 1500Δ
CH4 LtFlap 0.0 -150.0→150.0 ← CU14 1500Δ
CH5 RtVee 0.0 -150.0-150.0 ← CU15 1500Δ
CH6 LtVee 0.0 -150.0-150.0 → CU16 1500Δ
CH7 0.0 -100.0-100.0 → --- 1500Δ
    
```

- Exit CAL and enter T2-CRUISE mode. Check for correct direction of aileron, elevator and rudder (*note: the flaps cannot be checked yet*).

4.2 Calibrate servo centres and end points

Next, calibrate the servo centres and end-points. This is done in the **OUTPUTS** menu, by means of *output curves*. The servo end-points you set will be ‘hard’, i.e. the servos can never travel beyond these points. This allows you to protect against servo over-travel and thus avoid damaging your linkages.

When setting the end-points, consider all possible inputs. For example, when setting up the end points for flaps, allow enough movement for both roll and crow inputs. If the end points are too conservative, then the servo will stop early leading to some deadband at the controls; this will often be acceptable and/or unavoidable – some judgement is required.

If you don't know the movements required for your particular model, simply set your end-points to the maximum possible, subject to linkage geometry and equal movement on both sides.

New in v3: all adjustments are made using output curves. Min/Max/Subtrim must be left at their default values (-150,150,0 respectively).

Channel	Calibration procedure
CH 4 – Lt Flap	<p>Start by calibrating left flap (CH4). You'll first set the end points, then adjust the centre point to provide a linear response. Ignore the flap neutral, it will be adjusted in a later step.</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 CH4 <input type="checkbox"/> Skip to curve field 'CV14', 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 for both crow and aileron inputs. ○ Throttle stick forward (↑), adjust point 3 for upper end point. Allow 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'll 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 <input type="checkbox"/> Skip to curve field 'CV13', 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('FINeut') and skip to the FM0 column. <input type="checkbox"/> Adjust GV5 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	<i>(V-tail version only)</i> Calibrate V-tail <ul style="list-style-type: none"> <input type="checkbox"/> Enter CAL mode <input type="checkbox"/> In the OUTPUT menu, highlight CH5 <input type="checkbox"/> Skip to curve field 'CV15', 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 and CV16, ensuring that movements match CH5. <input type="checkbox"/> Check equal travel up/down; left and right surfaces match
<i>X-Tail</i> CH 5 – Ele	<i>(X-tail version only)</i> Calibrate elevator <ul style="list-style-type: none"> <input type="checkbox"/> Enter CAL mode <input type="checkbox"/> In the OUTPUT menu, highlight CH5 <input type="checkbox"/> Skip to curve field 'CV15', 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	<i>(X- tail version only)</i> Calibrate rudder <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 <input type="checkbox"/> Skip to curve field 'CV16', press [long ENTER] to open curve editor <ul style="list-style-type: none"> o Rudder stick to centre, adjust point 2 for centred rudder o Rudder right (→), set point 3 for max right movement o Rudder left (←), set point 1 for max left movement <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', then press [long ENTER] to open curve editor <ul style="list-style-type: none"> o Move aileron stick to centre. Set Point 2 for correct centre o Move aileron stick right (→). Set point 3 to desired upper limit, allowing for both crow and aileron movement. o Move aileron stick left (←). Attempt to adjust point 1 so that down-travel = up-travel. If the down-travel is restricted by the hinge geometry, then move SA to up position – this reduces aileron movement in CAL mode by 50%. Now, try again: adjust point 1 so down-travel = (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. <input type="checkbox"/> Repeat all steps above for CH2/CV12. Ensure that movements match CH1. <input type="checkbox"/> Check: constant rate up/down for each aileron, and check left and right ailerons match.

- Finally, exit CAL mode. Move the sticks, checking that aileron, elevator and rudder control surfaces move in the correct direction. *Note:* flaps cannot be checked yet.

Well done, the calibration is now complete! Please backup your EEPROM to the SD card now as follows:

- From the Main Info screen, **[long MENU]**
- Press **[Page]** till the **VERSION** menu appears, then follow the instructions. The process may take a few seconds.

5 Configuration part 2 - setting up travel and mixing

This is where you model comes to life!

Control / mix	Adjustment point	Adjustment procedure
<input type="checkbox"/> Aileron rate	INPUTS→Ail	<p>Set the default aileron rate. Focus on the up-travel (down-travel is governed by diff adjustment via rudder trim)</p> <ol style="list-style-type: none"> 1. Enter T2-CRUISE mode 2. Open the INPUTS menu 3. Scroll down to the Ail section 4. Highlight 'CATCHALL' line 5. Open the input editor, skip to the <i>weight</i> field 6. Set <i>weight</i> for default aileron movement 7. Select <i>Expo</i> from the diff dropdown, and set required expo value. <i>Note: 'diff' must be zero.</i> <p>If different rates are required for particular flight modes, then insert additional lines <i>before</i> the CATCHALL line. Each line should have relevant flight mode(s) shown and the rest blanked out. SAFETY NOTE: The last line must be the CATCHALL line, with all flight modes enabled and no switches.</p> <p>Flight mode numbers as follows: FM0:T2-CRUISE FM2: LAUNCH FM3: ZOOM FM4:KAPOW FM5:LANDING FM6:T1-THERMAL FM7:T3-SPEED</p> <p>NOTE ensure <i>Diff</i> is set to zero in all input lines (diff here affects stick diff, not servo diff).</p>
<input type="checkbox"/> Elevator rate	INPUTS→Ele	<i>As above</i>
<input type="checkbox"/> Rudder rate	INPUTS→Rud	<i>As above</i>
<input type="checkbox"/> Aileron→flap	GLOBALVARS→GV1("Ail2FL")	<p>Aileron to flap mixing is set per flight mode.</p> <ol style="list-style-type: none"> 1. Open GLOBALVARS menu, highlight GV1 line ("Ail2FL"). 2. Activate the flight mode you want to adjust. 3. Skip to highlighted column. 4. Adjust GVAR value for required aileron to flap mix. <p>Note: movement of down-going flap will be affected by diff setting.</p>
<input type="checkbox"/> Combi rudder	GLOBALVARS→GV2("Combi")	<p>Combi (aileron to rudder mix) is set per flight mode.</p> <ol style="list-style-type: none"> 1. Open GLOBALVARS menu, highlight GV2 line ("Combi"). 2. Activate flight mode to be adjusted. 3. Skip to highlighted column. 4. Adjust GVAR value for required aileron to rudder mix
<input type="checkbox"/> Spoiler→Aileron	GLOBALVARS→GV3("AiCamb")	<p>Sets the upward aileron movement due to spoiler.</p> <ol style="list-style-type: none"> 1. Open GLOBALVARS menu, highlight GV3 line ("AiCamb"). 2. Skip to column FM5 3. Enable LANDING mode 4. Move throttle stick back (full spoiler) 5. Adjust GVAR value for required up-aileron movement
<input type="checkbox"/> Spoiler→Flap	GLOBALVARS→GV4("FiCamb")	<p>Sets the downward flap movement due to spoiler.</p> <ol style="list-style-type: none"> 1. Open GLOBALVARS menu, highlight GV4 line ("FiCamb"). 2. Skip to column FM5 3. Enable LANDING mode 4. Move throttle stick back (full spoiler) 5. Adjust GVAR for required down-flap movement

Control / mix	Adjustment point	Adjustment procedure
<input type="checkbox"/> Camber presets	GLOBALVARS→GV3("AiCamb") GLOBALVARS→GV4("FiCamb")	<p>Camber adjustment depends on flight mode. Here's the procedure for each flight mode:</p> <p>For T3-SPEED (FM7) mode, adjust GV3, GV4 for preset reflex.</p> <p>For KAPOW (FM4), adjust GV3, GV4 for preset reflex.</p> <p>For T1-THERMAL (FM6) mode, first set LS to centre. Then adjust GV3 and GV4 for nominal camber. LS is master adjuster +/- 50%.</p> <p>For LAUNCH (FM2), rotate S2 (F2 if X9E) to centre, adjust GV3, GV4 for nominal camber. S2 is master adjuster +/- 50%.</p> <p>For ZOOM (FM3), rotate S1 (F1 if X9E) max clockwise, adjust GV3, GV4 for max possible reflex. S1 adjusts 0-100%.</p> <p>To adjust a GVAR:</p> <ol style="list-style-type: none"> 1. Open GLOBALVARS menu 2. Highlight GV3 (for ailerons) or GV4 (for flaps) 3. Activate flight mode to adjust 4. Skip to highlighted column 5. Adjust GVAR for required camber/reflex
<input type="checkbox"/> Reverse Differential	GLOBALVARS→GV6("RevDif")	<p>Increases travel of down-going aileron when full spoiler is applied, in order to improve roll response. To configure:</p> <ol style="list-style-type: none"> 1. Open GLOBALVARS menu, highlight GV5/FM6 2. Enable Landing mode 3. Apply full spoiler and full aileron 4. Adjust GVAR until lower aileron is at the desired position. <p>NOTE: this measure for improving roll response is in addition to aileron diff suppression, which is automatically applied.</p>
<input type="checkbox"/> Spoiler→Ele compensation	GLOBALVARS→GV7("MxComp")	<p>Spoiler (crow) compensation is adjustable using the throttle trim. To set max limit of adjustment,</p> <ol style="list-style-type: none"> 1. Open GlobalVars menu, highlight GV7/FM5 2. Enable LANDING mode. 3. Move throttle stick fully back (max spoiler) 4. Move throttle <i>trim</i> fully <i>forward</i> (max comp) 5. Adjust GVAR for max possible compensation. 6. Move throttle trim back for initial flight setting <p>Note: For non-linear response, adjust curve 'SpComp'.</p>
<input type="checkbox"/> Snapflap	MIXER→CH11 (FlapCm)→Snap MIXER→CH10 (AilCm)→Snap	<p>Snapflap (elevator to flap mixing) can be set in T3-Speed mode. It's set individually for flaps and ailerons. Master adjustment using throttle trim.</p> <ol style="list-style-type: none"> 1. Open MIXER menu 2. Select CH11->Snap line, and open editing menu 3. Skip to <i>weight</i> field 4. Enable T3-SPEED flight mode 5. Move throttle trim fully back (max snapflap). 6. Hold full up elevator 7. Adjust <i>weight</i> for desired max limit of snapflap adjustment 8. Close mixer editor 9. Repeat for CH10->Snap mix. 10. Using throttle trim, adjust overall snapflap for initial flight setting.

Congratulations, you've finished setting up your model!

Just one last thing....

Please back up your EEPROM again now!

6 Before you fly

6.1 Battery and fail safe

Before flying:

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

6.2 Field guide printout

Print a copy for field use:

Flight modes	Adjustment	Adjuster control	Notes
Launch	Launch camber	S2 (9XD), or F2 (X9E)	Provides +/- 50% fine tuning of Launch preset
Zoom	Zoom camber	S1 (9XD), or F1 (X9E)	Adjusts reflex 0 – 100%
T1-thermal	Thermal camber	LS	Provides +/- 50% fine tuning of T1-thermal preset
T3-speed	Snapflap volume	Throttle trim	Trim forward=zero snap, trim back = max snapflap
Landing	Spoiler comp	Throttle trim	Trim back=zero comp, trim forward =max comp
[all]	Aileron Diff	Rudder trim	Diff saved individually for each flight mode. Range is 0 - 80%
[all]	Aileron trim	Aileron trim	Shared by all flight modes
[all]	Elevator trim	Elevator trim	Saved individually per flight mode

7 Simple modifications

7.1 Launch/zoom switch

By default, LAUNCH and ZOOM modes are selected via switch SE. You can use a different switch by altering the settings in the table below. *A single 3-position switch must be used.* In the third (unassigned) position, the main flight mode switch will be active (§7.2).

Menu point	Setting	Default
FLIGHTMODES→LAUNCH (FM2)	Sw3pos (↑↓ or -)	SE↓
FLIGHTMODES→SPEED (FM3)	Sw3pos (↑↓ or -)	SE-

7.2 Main flight mode switch

By default, THERMAL, SPEED and CRUISE modes are selected via switch SA. You can use a different switch by altering the switch settings for THERMAL and SPEED modes. *A single 3-position switch must be used.* The third (unassigned) switch position selects CRUISE mode.

Menu point	Setting	Default
FLIGHTMODES→THERMAL (FM6)	Sw3pos (↑↓ or -)	SA↓
FLIGHTMODES→SPEED (FM7)	Sw3pos (↑↓ or -)	SA↑

7.3 Changing cal sub-mode switch

By default, the CAL sub-modes are selected via switch SA. You can use a different switch by altering three logical switches as shown below. *A single 3-position switch should be used for all sub modes.*

Menu point	Setting	Default
LOGICAL SWITCH→L7→2 nd param	Sw3pos ↑	SA↑
LOGICAL SWITCH→L8→2 nd param	Sw3pos -	SA-
LOGICAL SWITCH→L9→2 nd param	Sw3pos ↓	SA↓

7.4 Adjusting throttle stick deadband

The spoiler stick has some deadband defined, in order to prevent accidental deployment of spoiler. The amount of deadband can be adjusted via Curve 4 ("Thr2Sp"). Alter the X-value of the middle point to taste. Max recommended value is 95%.

7.5 Reversing spoiler operation

By default, spoiler is off when throttle is fully forward. To reverse the direction of operation:

- 1 Open the Mixers menu and skip to CH23.
- 2 Open the mixer editor
- 3 Change the curve from 'Curve4' to '!Curve4' (note leading exclamation mark)

7.6 Reversing camber adjuster

LS is the default control for camber adjustment in THERMAL mode. To alter the direction of operation,

- 1 Open the Mixers menu
- 2 Skip to CH10→CmAdT1
- 3 Open the mixer editor, and set weight = -50, then close mixer editor
- 4 Repeat steps 5 and 6 for CH11→CmAdT1

7.7 KAPOW flight mode

To enable/disable KAPOW mode:

- 1 Open the Flight Modes menu
- 2 Highlight the KAPOW flight mode line
- 3 To enable: set the switch to 'L10'
To disable: set the switch to '---' (default)

To adjust the elevator setting in KAPOW mode:

- 1 Create an elevator Input line for KAPOW according to the instructions in section 5.
- 2 Activate KAPOW, and adjust the weight in the new Input line for the correct elevator angle.

By default, in order to activate KAPOW it's necessary to apply a minimum amount of spoiler (crow) in addition to full forward elevator stick. Using a simple modification, you can remove the spoiler constraint so that Kapow can be engaged directly from all flight modes except LAUNCH and ZOOM:

- 1 Open the Logical Switches menu
- 2 Highlight L10.
- 3 In the AND field, change 'L6' to '---'

7.8 Zoom flight mode

The ZOOM flight mode is for the second phase of the tow. To enable/disable ZOOM mode:

- 1 Open the Flight Modes menu
- 2 Highlight the ZOOM flight mode line
- 3 To enable, set switch to 'SE-' (default)
To disable, set switch to '---'

8 Some notes on servo calibration (CAL mode)

- Servo calibration (in CAL mode) is for more than just the initial setup! You should check your calibration before flying each session - it will help identify any servo centring issues or bent linkages which might otherwise remain undetected.
- Never copy your trim settings to the subtrims. Not only is it unnecessary, it will trash your CAL settings.

9 Identifying mistakes

There is no 'Undo' button in OpenTx. Fortunately, it's easy to identify mistakes, using the COMPARE FILES menu in Companion. Follow these steps:

- 1 Start Companion
- 2 Open the (unedited) .eepe file
- 3 Open your working EEPROM
- 4 Open the COMPARE FILES window, then drag the corresponding models into it. Compare files generates a list of differences, and any errors should be easy to spot.

10 Making your own modifications

Before making your own modifications, please study the Excel documentation carefully and make sure you understand the implications. 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.

11 Safety/disclaimer

Pretty obvious really, but worth repeating: although this setup is well tested, **it's up to the pilot to make sure that the controls respond correctly under all conditions.** The author is not responsible for any consequences arising from errors in the .EEPE file or documentation.

Remember to test your setup carefully:

- before first flight

- after any modifications!

12 Contact

If you have any queries or suggestions, or if you find any errors in the documentation, or just want to say hello, then please contact me at <http://rc-soar.com/email.htm>.

Happy flying!

Mike Shellim