

# F5K template for ETHOS

Version 1.0

## Setup Guide

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F5K control layout (Mode 2 shown)

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# 1 INTRODUCTION

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## 1.1 DESCRIPTION

F5K is a full-feature template for electric-powered gliders with 2 servo wings and landing flaps. Key mixers may be adjusted in flight and special attention has been paid to motor safety. The default target is the X18/X20 family of transmitters, but the layout can be customized for other transmitters.

**PLEASE READ THROUGH THESE INSTRUCTIONS ONCE BEFORE STARTING**

## 1.2 REQUIREMENTS

The following are required:

- Transmitter running Ethos 1.4.12 or above
- USB cable TX <-> PC

## 1.3 PACKAGE CONTENTS

Filename	Description
f5k-ethos_10_setupguide.pdf	Setup guide
f5k-ethos_10?_reference.xls	Programming reference
f5k-ethos_10?.bin	Model file
f5k*.wav	Sound files

# 2 OVERVIEW

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## 2.1 CONTROL ASSIGNMENTS

Any stick mode (1-4) may be used. The stick mode is set in the **SYSTEM→STICKS** menu.

The default control assignments are shown in the table below. These are designed for the X18/X20. If you use a different transmitter, or prefer a different layout, then you can reassign the controls:

Assigned to	Default assignment	Switch type	Reassignment
THERMAL/SPEED/CRUISE selector	SA	3-pos	Section 7.1
LANDING	Throttle stick	Stick/slider or switch	Section 7.3
Motor	Slider left	Stick/slider or switch	Section 7.3
Camber (Thermal mode)	Slider right	Stick/slider or switch	Section 7.3
CAL mode	SH	Momentary	Section 7.2
CAL sub-mode selector	SA	2- or 3-pos	Section 7.4
Motor arming options 1, 2	SH	Momentary	Section 7.2
Motor arming option 3	SF	2-pos	Section 7.10
Aileron diff adjust	Rudder trim	Trim	n/a
Brake compensation adjust (LANDING mode)	Throttle trim	Trim	n/a
Motor compensation adjust (POWER mode)			

The text in this Guide refers to the default assignments. If possible, it's recommended to defer reassigning of controls until the basic setup is complete.

## 2.2 FLIGHT MODES

There are 5 flight modes: POWER, LANDING, THERMAL, CRUISE and SPEED. In the event of a conflict, POWER has highest priority, then LANDING, then THERMAL/ CRUISE/SPEED.

Flight Mode	Ethos ID	Activated by	Priority
POWER	FM2	Slider left ↑ (motor must be armed)	High
LANDING	FM3	Throttle stick ↓	Mid
CRUISE	FM4	SA —	Low
SPEED	FM5	SA ↑	Low
THERMAL	D	SA ↓	Low

## 2.3 FM/MIXER MATRIX

The table shows the mixers which are active in each flight mode.

Flight mode	Diff*	Motor Compensation*	Brake compensation*	Ail→ Rud	Variable camber	Camber preset	Snapflap
POWER	✓ (Rud trim)	✓ (Thr trim)		✓		✓	
LANDING	✓ (Rud trim)		✓ (Thr trim)	✓		✓	
CRUISE	✓ (Rud trim)			✓		✓	✓
SPEED	✓ (Rud trim)			✓		✓	✓
THERMAL	✓ (Rud trim)			✓	✓		✓

\* adjustable in flight.

## 2.4 CAL MODE

CAL mode is a special flight mode for calibrating the servos. Mixers and trims are ignored, allowing the servo centre and limits to be visualised.

To activate CAL mode:

1. Apply full left aileron and full up elevator, and hold.
2. Pull and release **SH**
3. Release sticks.

There are two sub-modes, selected via switch **SA**:

- **SA↑**, **SA—**: for calibrating end points, and balancing the ailerons. The ailerons move in 25% increments.
- **SA↓** for calibrating aileron neutral.

To exit CAL mode, pull **SH↓**.

## 2.5 CHANNEL ASSIGNMENTS

Channel assignments are as follows:

Channel #	Xtail	Vtail
1	Rudder	Left Vtail
2	Elevator	Right Vtail
3	Left aileron	
4	Right aileron	
5	Motor	

The left and right channels are not interchangeable – **please make sure your servos are plugged in correctly!**

## 2.6 OPERATIONAL OVERVIEW

### Rates and expo

- Rates/expo may be set globally or per flight mode.

### Trims

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

### Camber

- In THERMAL mode, camber is controlled via the right slider
- In SPEED, CRUISE and POWER modes, camber may be preset.
- Camber may be negative ('reflex').

### Brake->elevator compensation

- A variable mix which compensates for pitch changes as brake is deployed.
- Adjustable in flight, via the throttle trim.
- Non-linear compensation may be adjusted via a curve

### Motor->elevator compensation

- Variable mix which compensates for pitch changes as power is applied.
- Adjustable in flight, via the throttle trim.

### Aileron differential

- Aileron diff is adjustable independently per flight mode, using the rudder trim.

### Aileron to Rudder mix

- Aileron to rudder mix is global or per flight mode.

### Elevator-to-flap ('snapflap')

- Snapflap is configurable per flight mode. Up- and down-snapflap are set independently.

## 2.7 MOTOR OPERATION

The default method of arming the motor is as follows:

1. Motor lever to idle (**left slider**↓).
2. Apply full right-aileron and full up-elevator, and hold.
3. Pull **SH** and hold for 1 second until the startup sound.
4. Release **SH**.
5. Release stick(s).

The motor is now active. To disarm the motor, pull **SH** for 1 second until you hear the 'motor disarmed' alert.

### Power mode

POWER mode is activated automatically when the motor is running. This allows you to set different rates, expo etc. when under power.

### Failsafe

**⚠ The arming system does not protect against signal loss. Remember to set the failsafe, so the motor is commanded to 'off' (-100) on loss of signal.**

## 2.8 TIMER

Timer1 is configured as an automatic flight timer.

- To reset: arm the motor.
- To start: advance motor.
- To stop: disarm the motor.

The elapsed time is announced when the timer stops.

## 3 PREPARING THE TRANSMITTER

**⚠ SAFETY: disconnect the motor before proceeding !!**

### 3.1 TRANSFER FILES TO TRANSMITTER

1. Unzip the files in the package to your computer's hard drive.
2. Switch on the transmitter in bootloader mode and establish a USB connection.
3. Copy the model file **f5k10?.bin** to the \models folder on the SD card.
4. Locate the .wav sound files, select all and copy to the \audio folder on the SD card. (Do NOT copy to the 'en' subfolder!)
5. Disconnect USB and restart the transmitter.

Activate the model as follows:

6. Go to the **MODEL SELECT** menu and find the model 'f5k-10?'.  
7. Click and choose 'Set current model'.
8. Go to the **EDIT MODEL** menu and change the model name as desired.

### 3.2 CHOOSE THE TAIL TYPE (X- OR V-TAIL)

The first task is to select the tail type (conventional or V-tail). This is done in the **MIXERS** menu, via the *weight* parameter.

Mixer	Description	Mixer weight
60V_IsVtail	Tail type	0% = X- or T-tail (default) 1% = V-tail

### 3.3 CONFIGURE THE HARDWARE

Configure the hardware:

1. Do a hardware stick calibration if in any doubt (**SYSTEM**→**HARDWARE**→**ANALOGS CALIBRATION**).
2. Configure the transmitter RF module (**MODEL**→**RF SYSTEM**).

### 3.4 FAMILIARISATION

Using the transmitter on its own, practise the following:

- Activate **CRUISE**, **THERMAL**, **LANDING**, **POWER** and **SPEED** modes (see Section 2.2).
- Activate **CAL** mode and sub-modes (see Section 2.4).
- Verify that the sounds work when changing flight modes. If not, check that the sound files are in the correct location (see section 3.1).

## 4 CALIBRATE SERVOS

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In this section, you will

- Set servo directions.
- Calibrate servo limits.
- Equalise left and right sides (compensate for mechanical differences).

This section must be completed before configuring the mixers.

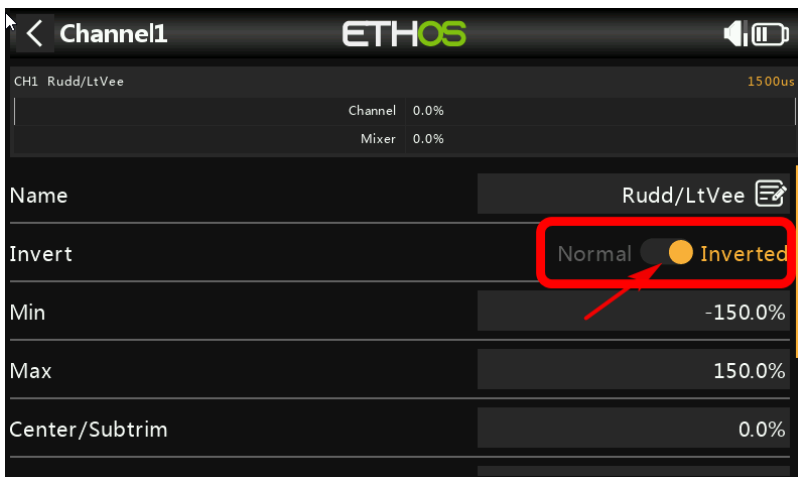
### 4.1 SET SERVO DIRECTION

Before starting, make sure that you selected the correct tail type (see section 3.2).

Now, set the servo rotation:

1. Switch on the transmitter and receiver
2. Move the aileron stick
3. If a servo moves in the wrong direction, open the **OUTPUTS** menu, and invert the channel:
4. Repeat steps above for elevator and rudder

*Note:* the throttle stick (for brakes) has no effect at this stage.



## 4.2 SET SERVO LIMITS AND CENTRES

In this section, you will (a) set the servo centres and absolute limits and (b) equalise left/right control surface movements. Note:

- All adjustments are made in **CAL** mode.
- Set servo limits to *maximum possible* as limited by mechanical constraints. Don't worry about individual control travels, the idea is to define the operating limits of the servos.
- Adjustments are made using curves. **Do not alter min, max or Subtrim!**
- You may need to experiment to see which point to adjust, as explained in each note.

**Note: in CAL mode the aileron stick does not function.**

Target	Calibration procedure
<i>X-Tail</i> <b>CH 1:Rudd</b>	<b>For X/T tail only</b> 1. Enter <b>CAL</b> mode 2. In the <b>OUTPUT</b> menu, highlight CH1:Rudd/LtVee 3. Skip to 'curve' field, open curve editor <ul style="list-style-type: none"> <li><input type="checkbox"/> Rudder stick to centre, adjust point 2 for correct neutral</li> <li><input type="checkbox"/> Rudder right (→), adjust end point 1 (or 3) for right limit</li> <li><input type="checkbox"/> Rudder left (←), adjust end point 3 (or 1) for left limit</li> </ul> 4. Equalise movement left and right
<i>X-Tail</i> <b>CH 2:Elev</b>	<b>For X/T tail only</b> <b>Note: in CAL mode, the elevator stick is reversed!</b> 1. Enter <b>CAL</b> mode 2. In the <b>OUTPUT</b> menu, highlight CH2:Elev/RtVee 3. Skip to 'curve' field, open curve editor <ul style="list-style-type: none"> <li><input type="checkbox"/> Ele stick to centre, adjust point 2 for correct neutral</li> <li><input type="checkbox"/> Ele stick forward (↑), adjust point 1 (or 3) point for <b>upper</b> (↑) limit</li> <li><input type="checkbox"/> Ele stick back (↓), adjust point 3 (or 1) for <b>lower</b> (↓) limit</li> </ul> 4. Check travel is equal up & down, reduce one or other limit if necessary.
<i>V-Tail</i> <b>CH 1: LtVee</b> <b>CH 2: RtVee</b>	<b>For V-tail only</b> <b>Note: in CAL mode, the elevator stick is reversed!</b> 1. Enter <b>CAL</b> mode 2. In the <b>OUTPUT</b> menu, open CH1:Rudd/LtVee 3. Skip to the 'curve' field, and open curve editor <ul style="list-style-type: none"> <li><input type="checkbox"/> Ele stick to centre, adjust point 2 for correct neutral</li> <li><input type="checkbox"/> Ele stick forward (↑), adjust end point 3 (or 1) for <b>upper</b> (↑) travel limit.</li> <li><input type="checkbox"/> Ele stick back (↓), adjust point 1 (or 3) for <b>lower</b> (↓) limit.</li> </ul> 4. Repeat for CH2:RtVee 5. Check equal travel up/down and that left/right surfaces match



Target	Calibration procedure
<b>CH 3: LtAil</b>	<p>Set the end points and centre for the left aileron servo.</p> <ol style="list-style-type: none"> <li>1. Enter CAL mode</li> <li>2. Switch SA up ↑</li> <li>3. In the <b>OUTPUT</b> menu, open CH3:LtAil</li> <li>4. Skip to the 'curve' field, and open the curve editor <ol style="list-style-type: none"> <li>1. Throttle stick back (↓), then adjust the absolute lower limit with curve point 1 or 3 (whichever works).</li> <li>2. Throttle stick forward (↑), adjust absolute upper limit with point 3 (or 1).</li> <li>3. Adjust point 2 so it's on the straight line through points 1 and 3. <i>Do not worry about the aileron neutral position, it will be set later via a mix.</i></li> </ol> </li> <li>5. Move throttle stick from one end to the other, observing step intervals. If necessary, you can adjust point 2 to make the response more linear.</li> </ol>
<b>CH 4: RtAil</b>	<p>Next, calibrate the right aileron. A 5-point curve is used, using the left aileron as a reference.</p> <ol style="list-style-type: none"> <li>1. Enter CAL mode</li> <li>2. Switch SA up ↑</li> <li>3. In the <b>OUTPUT</b> menu, open CH4:RtAil</li> <li>4. Skip to the 'curve' field and open the curve editor. Adjust the points to exactly match the left ail. Note: <i>the order of the curve points may be reversed, if the first point doesn't work, try the alternative (in brackets).</i> <ul style="list-style-type: none"> <li><input type="checkbox"/> Throttle stick fully back, adjust point 1 (or 5) for the lower limit of travel.</li> <li><input type="checkbox"/> stick ½-back, adjust point 2 (or 4)</li> <li><input type="checkbox"/> stick to centre, adjust point 3.</li> <li><input type="checkbox"/> stick to ½-forward, adjust point 4 (or 2)</li> <li><input type="checkbox"/> stick fully forward, adjust point 5 (or 1) for the upper limit of travel</li> </ul> </li> </ol> <p>To match the end points on left and right sides, it may be necessary to adjust the end points for the CH3:LtAil (see previous step).</p> <p>Do a final check. Pay particular attention the points adjacent to ail neutral.</p>
<b>Aileron neutral</b>	<p>Next, you'll set the aileron neutral position, by applying an offset mix.</p> <ol style="list-style-type: none"> <li>1. Enter CAL mode</li> <li>2. Switch SA down ↓, and listen for 'calibrate flap neutral'.</li> <li>3. Open the <b>MIXERS</b> menu</li> <li>4. Scroll to mix 55 V_AilNeutral</li> <li>5. Adjust mixer weight for correct neutral. The ailerons should line up precisely with each other. If not, then redo the calibration for CH4:RtAil above, paying particular attention to the two points adjacent to the neutral position.</li> </ol>

Check operation as follows:

1. Exit CAL mode.
2. Move the sticks, checking that aileron, elevator and rudder move in the correct sense. Note that **the brakes will not function yet** – they will be configured in the next section.
3. Don't worry that the travel of the ailerons and elevator are excessive – they'll be reduced in the next step.
4. Don't worry that up/down travel of the ailerons is not equal when out of CAL – they are now subject to differential.

**Well done - calibration is complete! please back up your setup now!**

## 5 CONFIGURE MIXERS

In the final step, you will finalise the stick rates, and configure the mixers.

Most adjustments are via 'VAR' mixes – these are grouped at the head of the mixer list.

### 5.1 RATES AND EXPO

This section is for setting rates (also known as 'control travel') and expo on the main flight controls.

Mixer	Adjusts	Notes
37 V_AilRates 38 V_EleRates 39 V_RudRates	Rates / control surface travel	Refer to the instructions for your model for the recommended control travels. Set the default travel by adjusting <i>weight</i> . You can override this for specific flight modes as follows: <ol style="list-style-type: none"> <li>1. Click 'Add new weight'</li> <li>2. Click adjacent down arrow</li> <li>3. Select category 'Flight modes', and choose the flight mode</li> <li>4. Set the desired rate</li> </ol> <b>Safety note: the default rate must provide sufficient control. Do not set it to zero!</b>
40 V_AilExpo 41 V_EleExpo 42 V_RudExpo	Expo	Go to the <i>Expo</i> field, and set the default expo. You can override the default for specific flight modes as follows: <ol style="list-style-type: none"> <li>1. Click 'Add new curve'</li> <li>2. Click adjacent down arrow</li> <li>3. Select category 'Flight modes', and choose the flight mode</li> <li>4. Set the desired expo</li> </ol>

### 5.2 BRAKES AND BRAKE → ELEVATOR COMPENSATION

This section is for setting up brake movement and elevator compensation.

Mixer	Adjusts	Notes
44 V_BraketoAil	Aileron down travel	To configure: <ol style="list-style-type: none"> <li>1. Enter LANDING mode.</li> <li>2. Deploy full brake.</li> <li>3. Adjust <i>weight</i> for desired downward movement of ailerons.</li> </ol>
53 V_BrakeComp	Max brake/ele compensation	Sets the maximum down compensation. The default compensation is 50% of elevator travel at max brake. This will be enough for most models, but can be altered by adjusting the weight of this mixer. To adjust <ol style="list-style-type: none"> <li>1. Enter LANDING mode</li> <li>2. Apply full brake</li> <li>3. Throttle trim fully forward.</li> <li>4. Adjust mixer weight for desired max down elevator</li> <li>5. Move throttle trim to recommended initial setting</li> </ol>

### 5.3 AILERON => RUDDER

This mix is useful for improving turn response. It's especially useful in LANDING mode.

Mixer	Adjusts	Notes
47 V_AilToRud	Aileron to rudder mix	Adjust weight for default aileron=>rudder mix. You can over-ride the default for specific flight modes - same method as rates (see section 5.1)

## 5.4 CAMBER

### 5.4.1 Variable camber (Thermal mode)

In THERMAL mode, camber can be varied in flight using the right slider. This mixer sets the range of adjustment.

Mixer	Adjusts	Notes
49 V_CmbMaxThml	Max camber	<p>Adjusts maximum camber in THERMAL mode. The minimum camber is 1/3 of the maximum. For example, if max camber is 6 degrees (slider fully back), the minimum camber will be 2 degrees (slider forward).</p> <p>To set max camber:</p> <ol style="list-style-type: none"> <li>1. Enable THERMAL mode.</li> <li>2. Move right slider back.</li> <li>3. Adjust mixer weights for required camber.</li> </ol> <p>Check camber range by moving slider forward and back.  <i>To reverse the camber slider, see section 7.4</i></p>

### 5.4.2 Camber /reflex presets

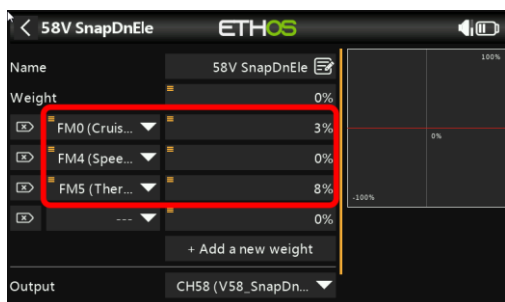
This section shows how to set camber presets for SPEED, CRUISE, LANDING and POWER modes. Negative camber ('reflex') is supported.

Mixer	Adjusts	Notes
48 V_CmbPresets	Camber presets	<p>To set a camber preset:</p> <ol style="list-style-type: none"> <li>1. Activate CRUISE, SPEED, LANDING or POWER mode.</li> <li>2. Edit the mixer weight for required camber.</li> </ol> <p><i>Tips:</i>            In SPEED mode, typically you would dial in negative camber ('reflex').            In LANDING mode, defines the camber on entry. You can set this to match the camber in THERMAL or CRUISE modes.</p>

## 5.5 ELE => FLAP ('SNAPFLAP')

Snapflap settings for up- and down-elevator are independently adjustable, per flight mode (CRUISE, SPEED, THERMAL).

Mixer	Adjusts	Notes
CH57:V_SnapUpEle	Snapflap with up-elevator	<p>To adjust:</p> <ol style="list-style-type: none"> <li>1. Apply full <i>up</i> elevator (stick fully back)</li> <li>2. Adjust weight for desired <i>down</i>-aileron travel.</li> <li>3. Repeat for each applicable flight mode.</li> </ol>
CH58:V_SnapDnEle	Snapflap with down-elevator	<p>To adjust:</p> <ol style="list-style-type: none"> <li>1. Apply <i>down</i> elevator (stick fully forward)</li> <li>2. Adjust weight for desired <i>up</i>-aileron travel</li> <li>3. Repeat for each applicable flight mode.</li> </ol>



Snapflap deadband is adjustable in curve CV:SnapDeadB (adjust points 2 and 3 only).

## 5.6 MOTOR TO ELEVATOR COMPENSATION

This mix counteracts pitch changes due to the motor. Compensation is adjustable in flight using the throttle trim. By default, the maximum compensation is +/-50% of elevator travel. You can alter the max compensation as follows:

Mixer	Adjusts	Notes
52 V_MotorComp	Maximum compensation	Sets the limit of compensation adjustment available from the throttle trim. SAFTEY: Should be adjusted with the motor disconnected.

# 6 THE FIRST FLIGHT

## 6.1 PRE-FLIGHT SAFETY CHECKS

Before the first flight, check the motor channel system:

1. Disconnect the motor and go to the **OUTPUTS** menu.
2. Move motor control to Off, and check that CH5 is -100%.
3. Move motor control to full power, and check that CH5 is +100%
4. Set the motor compensation to zero (enter **POWER** mode, then move the throttle trim to the centre).

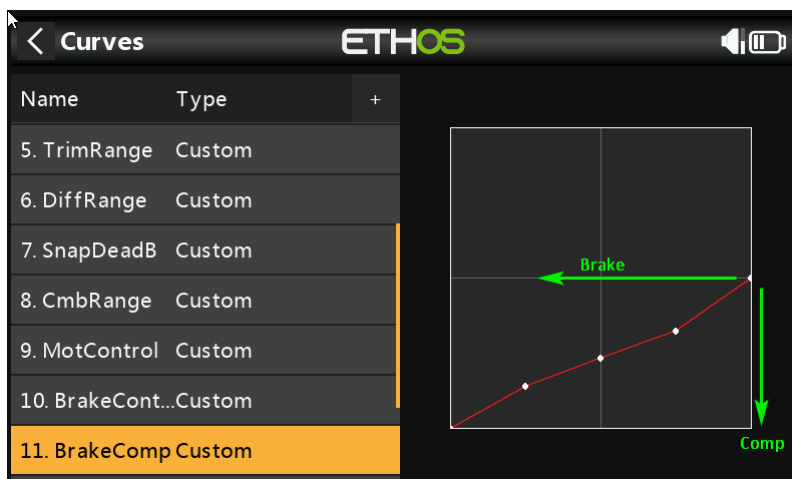
## 6.2 ADJUSTING BRAKE AND MOTOR COMPENSATION

### 6.2.1 Brake compensation

To adjust brake compensation during test flights:

1. Activate **LANDING** mode.
2. Apply *minimal* brake, and adjust **elevator** trim lever. This adjusts the 'base' trim.
3. Apply *maximum* brake and adjust the **throttle** trim. This adjusts the compensation.  
*Note:* Zero compensation is with **trim fully back**.

Once the maximum compensation has been adjusted, you can fine tune the intermediate values via curve CV:BrakeComp. Adjust points 2 to 4 only (do not adjust end points). The default curve has a typical 'S' shape.



### 6.2.2 Motor compensation

Optimise the trim under power as follows:

1. Apply minimal power, and adjust **elevator** trim. This sets the 'base' trim.
2. Apply full power and adjust **throttle** trim. This sets the compensation rate.  
*Note:* Zero compensation is with the **trim in the centre**.

## 6.3 SUMMARY OF IN-FLIGHT ADJUSTERS

Here's a summary of the adjustments that you can make in flight. Take a note and keep it in with your model.

Trim	Flight mode	Adjusts	Notes
Rudder trim	[Any]	Aileron Diff	Diff is set per flight mode, Default range is -30% to +70%. Trim centre corresponds to 20% diff
Throttle trim	Landing	Brake=>Ele compensation	Zero brake comp is with throttle trim <i>fully back</i> .
	Power	Motor=>Ele compensation	Zero motor comp is with throttle trim in <i>centre</i> .
Aileron trim	[All]	Aileron Trim	Aileron trim is global across all flight modes.
Elevator trim	[Any]	Elevator trim	Elevator trim is stored per flight mode.

## 7 CUSTOMISING YOUR SETUP

This section describes optional customisations. You can make these changes at any time. Before making changes, backup your setup (clone it from the **MODEL SELECT** menu).

### 7.1 REASSIGNING THE MAIN FLIGHT MODE SWITCH

The default mode switch is **SA**. However you can specify another 3-position switch:

Go to the **FLIGHT MODES** menu, then:

1. Set the switch for **SPEED** mode (3 pos switch, any position)
2. Set the switch for **THERMAL** mode (same switch as above, but different position)

**CRUISE** will be selected with the switch in the third (unassigned) position.

### 7.2 RE-ASSIGNING THE MOMENTARY SWITCH

Momentary switches **must** be used for (a) **CAL** mode and (b) for motor arming. By default, both are assigned to **SH↓**, however you can reassign them to other momentary buttons if your radio allows (for example the X20 has momentary buttons **SI** and **SJ**). To reassign these functions:

6. Go to the **LOGICAL SWITCHES** screen.
  - To reassign the CAL mode switch, edit LSW1:SW\_MOM\_CAL
  - To reassign the motor arming switch, edit LSW3:SW\_ARM\_12
7. Set *Value1* to your chosen momentary switch (select the *down* position).

### 7.3 REASSIGNING BRAKE, MOTOR AND CAMBER CONTROLS

Brake, motor and camber may be reassigned to any suitable control. Go the **MIXERS** menu, highlight the relevant mix (see table below), and open the mixer editor. Then change the source to a spare control of your choice.

Function	Assign to	Mixer	Default
Brake	Throttle stick, slider, or 3p switch	<b>MIXERS</b> → <b>17BrakeCtrl</b> → source	Throttle stick
Motor	Throttle stick, slider, or 3p switch	<b>MIXERS</b> → <b>18ThrotCtrl</b> → source	Left slider
Camber	Throttle stick, slider, or 3p switch	<b>MIXERS</b> → <b>20VariCamber</b> → source	Right slider

### 7.4 REVERSING BRAKE, MOTOR AND CAMBER CONTROLS

To reverse any of these controls, go to the **MIXERS** menu, highlight the relevant mixer (as shown in the table above), and open the mixer editor. Highlight the source field, then long press {Enter}. A popup for the options will be displayed – long press/click and choose 'negative'.

## 7.5 REASSIGNING THE CAL SUB-MODE SWITCH

The CAL submode switch (see section 2.4) is **SA↓** by default. It can be reassigned to any 2- or 3-position switch.

1. Go to the **LOGICAL SWITCHES** menu
2. In logical switch SW\_CAL\_NEUTRAL, set *value1* to the desired switch.

## 7.6 ADJUSTING BRAKE STICK DEADBAND

The brake stick response incorporates some deadband at the idle end to help prevent accidental deployment. The default value should be fine for most pilots; however it can be adjusted as follows:

1. Go to **CURVES** menu.
2. Open CV:BrakeControl.
3. Adjust point2→X. Default value is 85% (approx. 2 teeth on the throttle ratchet).

## 7.7 ADJUSTING MOTOR CONTROL DEADBAND

The motor control incorporates some deadband at the idle end to help prevent accidental deployment. The default value should be fine for most pilots; however it can be adjusted as follows:

1. Go to **CURVES** menu.
2. Open CV:MotControl.

Adjust point2→X. Default value is -75%.

## 7.8 SETTING THE LOW BATTERY ALARM

The low battery alert is disabled by default. When enabled, it sounds a “receiver battery low” alert every 3 seconds, as long as the voltage is below a configurable threshold.

To configure and activate the low battery alarm:

1. Go to the **LOGICAL SWITCHES** menu, open LSW41:RXBAT\_LOW.
2. Set the source to ‘LiPo’ or ‘Rx Batt’ as required (you may need to discover sensors)
3. Set *Value(X)* to threshold voltage.
4. Go to the **SPECIAL FUNCTIONS** menu, open SF14 (Play Track RXBAT\_LOW).
5. Set *State* to ‘enable’ and set the repeat interval.

## 7.9 SUPPRESSING ‘MOTOR ARMED’ ALERTS

By default, an alert is sounded every 15 seconds when the motor is armed but not running. If you’re confident with motor operation, you can suppress the repeats. To do this:

- Go to the Special Functions menu
- Locate SF10 (condition = ‘ARMED\_NOT\_RUN’)
- Press {long enter} to open the editor
- Set state to ‘disable’.

The alert will now sound once only, when the motor is armed.

## 7.10 SELECTING THE ARMING METHOD

You can choose between three arming methods as follows:

### Method 1(default): Push stick in corner and pull momentary.

This method is the default.

*To arm:* motor lever off. Full back on elevator stick, full right aileron, pull **SH↓** and hold until confirmation.

*To disarm:* pull **SH↓** until confirmation.

Settings:

- LSW3 - Value1= momentary switch (default **SH↓**). *Note: Must be momentary not a regular switch (safety)!*
- LSW5 - Value1 = ARM\_GEST\_1
- LSW6 - Value1 = DISARM\_GEST\_1

### Method 2: Pull momentary switch

This method is secure, and better suited if you need to disarm and re-arm in flight.

*To arm:* motor lever off. Pull **SH↓** until arming confirmation

*To disarm:* pull **SH↓** until disarming confirmation

Settings:

- LSW3 - Value1= momentary switch (default **SH↓**). Must be momentary *not a regular switch (safety)!*
- LSW5 - Value1 = ARM\_GEST\_2
- LSW6 - Value1 = DISARM\_GEST\_2

### Method 3: Smart switch

This method uses a smart switch. It offers fastest arming/disarming. At startup, the motor will be disarmed regardless of the position of the switch, so switch checks are not required. *This method is inherently less secure than methods 1 and 2, and is for experienced flyers.*

*To arm:* motor lever at idle position, then **SF↓** (if SF is down at startup, move switch up then down).

*To disarm:* **SF↑**

Settings:

- LSW4 - Value1= 2-p or 3-p switch (default is **SF↓**)
- LSW5 - Value1 = ARM\_GEST\_3
- LSW6 - Value1 = DISARM\_GEST\_3

## 8 MAKING YOUR OWN MODIFICATIONS

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If you wish to make your own modifications, please study the Excel documentation carefully and make sure that you understand the implications of any changes. Recommended workflow as follows:

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

## 9 DISCLAIMER

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Although this setup is tested, it's up to the pilot to make sure that the controls respond correctly under all conditions. The author will not be responsible for the consequences of any bugs in the setup or documentation or as the result of changes in Ethos.

***Remember to test your setup thoroughly before the  
first flight and after any modifications!***

***If in doubt, DON'T FLY!!***

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>.

Safe flying!

Mike Shellim