

MULTIPLEX®



Profi Tx – Example– Heron glider

Revision 1

5th July 2017

Profi – Example – Heron Glider

Revision history

Revision 1 – 21st Jan 2018 – Initial Issue

Profi – Example – Heron Glider

This example runs through the set up of my Multiplex Heron 4 servo wing Tee tail powered glider on the Profi (v3.56)

1 – Overview

2 – Control assignments, flight phases, mixer definitions, servo assignment

3 – Servo calibration

4 – Mixer settings

5 - Control settings

6 - Notes

Profi – Example – Heron Glider

1 – Overview

This example shows the setup of a Heron glider, with flight phase as follows

Speed – Reflex flap and aileron

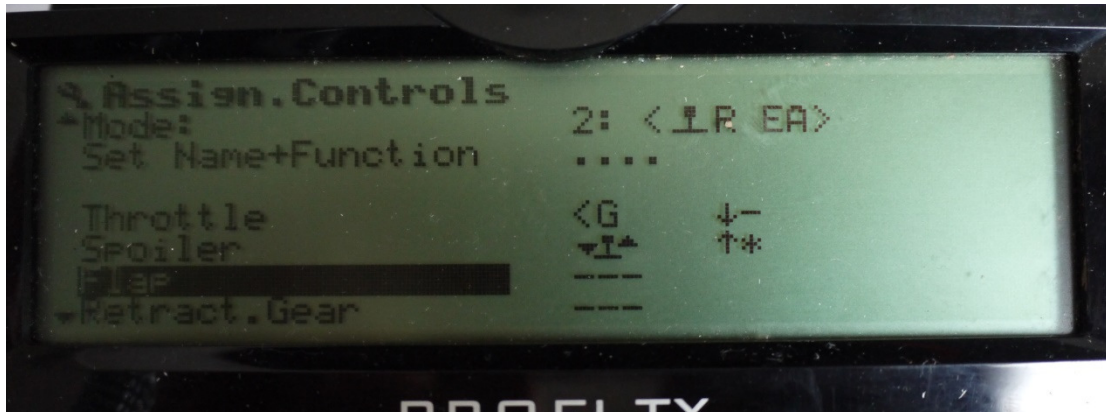
Normal – Flaps mixed with ailerons

Thermal – Thermal flap and aileron (full span camber)

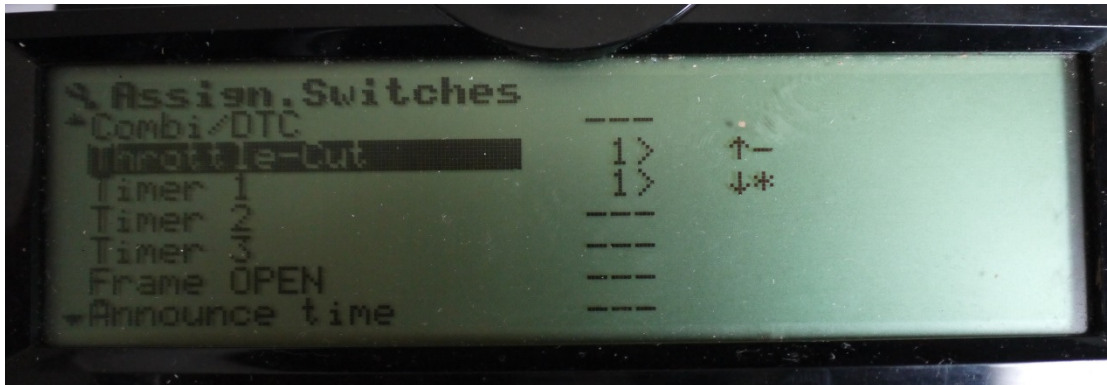
Landing – Crow braking on stick with elevator compensation

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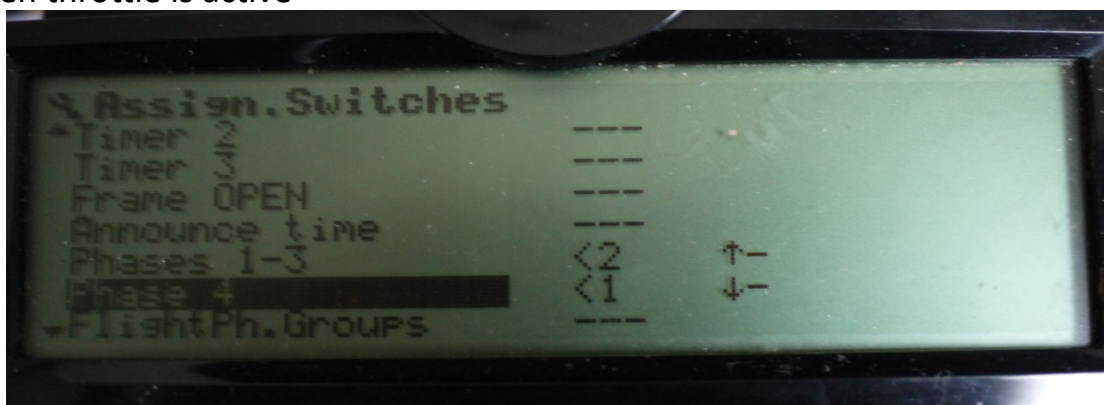
2 – Control assignments, flight phases, mixer definitions, servo assignment



Spoilers assigned to stick and throttle to slider G, mode 2 so stick is on left. Note no control assigned to flap as this is set by flight phase in controls menu



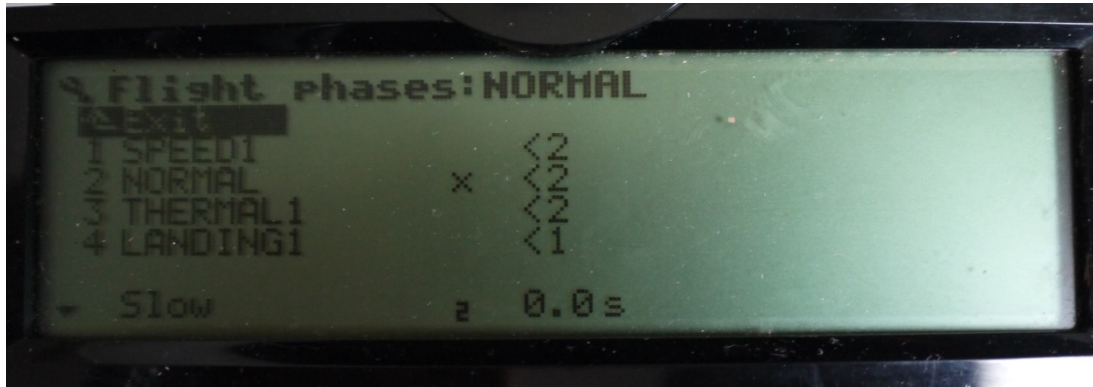
Throttle-cut and timer allocated to switch 1 on right hand side so that timer starts when throttle is active



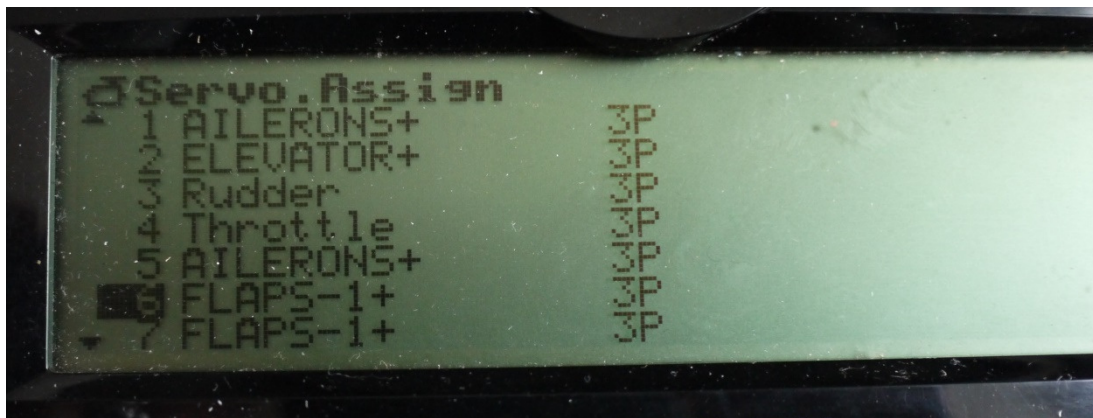
Flight phases 1-3 assigned to 3 position switch 2 on lefthand side and flight phase 4 to switch 1 on lefthand side, flight phase groups not used.

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2 – Control assignments, flight phases, mixer definitions, servo assignment



Flight phases named as SPEED1, NORMAL, THERMAL 1 and LANDING 1 (none after latest update 3.56 my Profi only announces LANDING on the LANDING1 flight phase, I think this is a bug in the sound files in the English language version), so with switch 2 up, SPEED1 settings are enable and down THERMAL1, when switch 1 is down LANDING settings are enabled



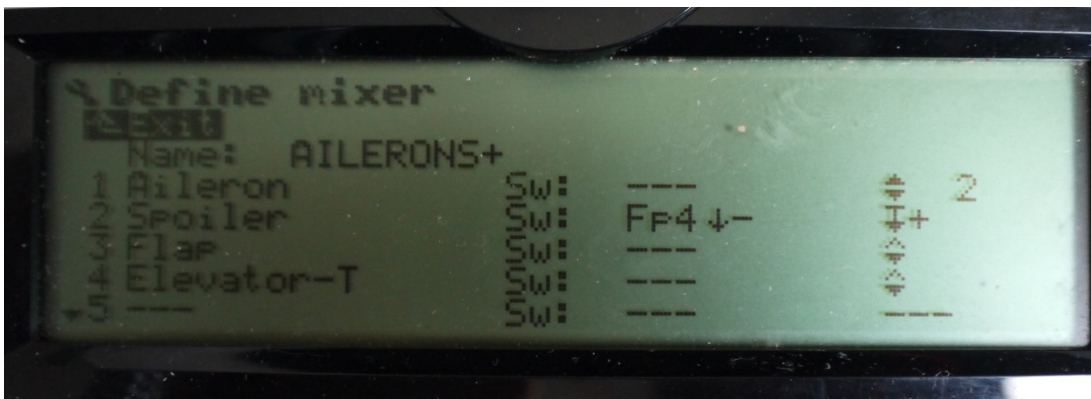
Servo assignment used, note if FLAP geometry on both flaps is significantly out and can't be matched with a 3 point curve then a 5 or 9 point calibration curve could be used

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2 – Control assignments, flight phases, mixer definitions, servo assignment



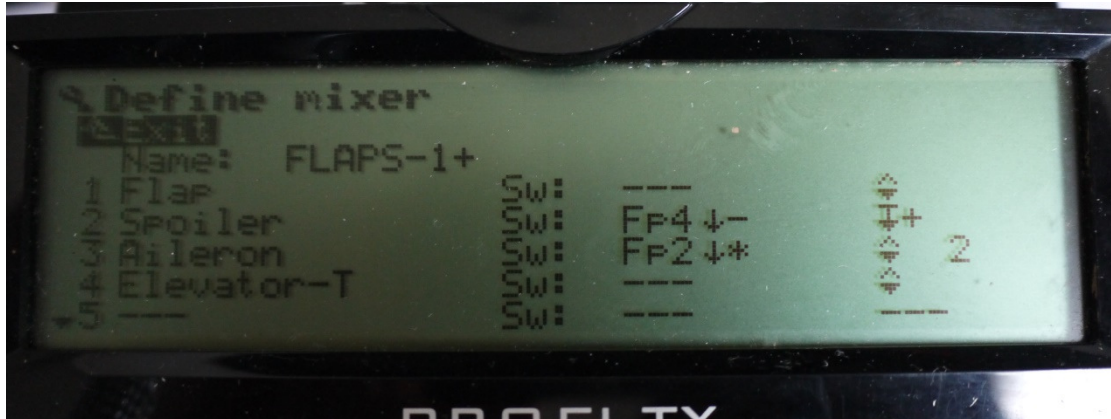
Mixer definitions are set up in the define mixer menu, which is in the setting menu, note this is the list of available mixer templates in the Glider+ model template which can cater for a glider wing with 8 separate control surfaces (4 per side), only FLAPS-1+, AILERON+ and ELEVATOR+ are used.



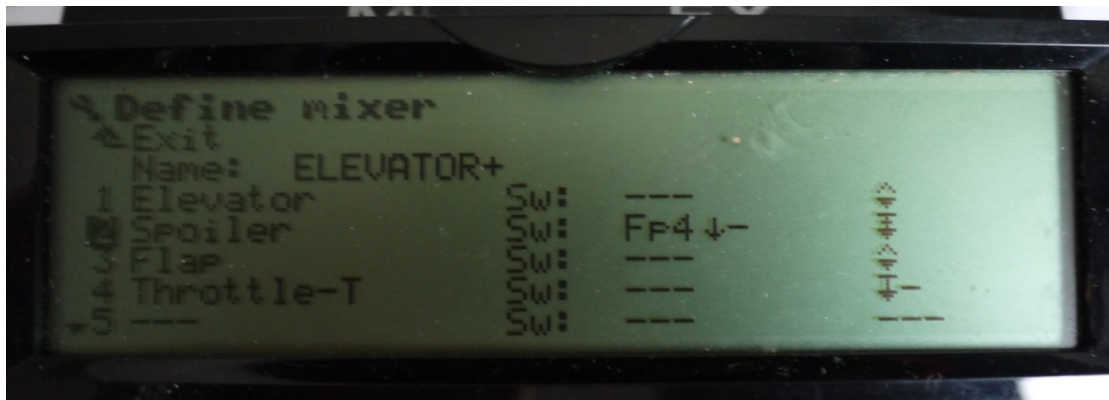
AILERONS + menu, this is the standard AILERONS + menu, note Aileron, Flap and Elevator (- trim) inputs are shown as active, but spoiler input (for crow braking) is active on Fp4. Note you cannot select Fp4 as the switch by toggling the switch but by scrolling through the switches using the programming wheel (or the -/+ buttons if you prefer)

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2 – Control assignments, flight phases, mixer definitions, servo assignment



FLAPS-1+ definition mixer uses standard FLAPS-1+ mixer template, note Flap and Elevator-T always active, Spoiler stick in Fp4 and Aileron stick in Fp2, the asterisk shows current active flight phase

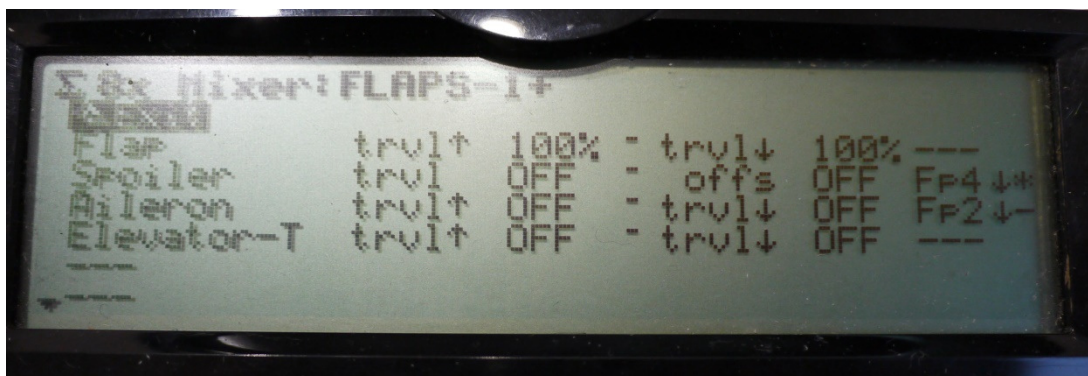


ELEVATOR + menu, this is the standard ELEVATOR + menu, note Elevator, Rudder, Flaps and Throttle - Trim inputs are always active, but spoiler input (for crow braking) is active on Fp4 only

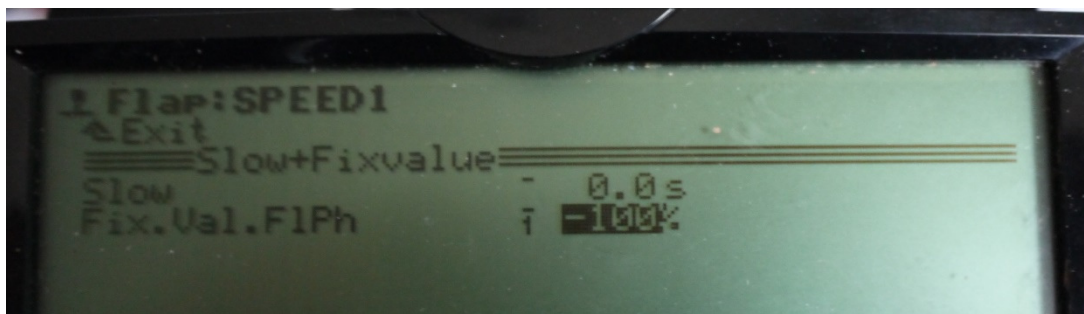
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3- Servo Calibration

For the mixers to work correctly, it is important that the servo are correctly calibrated, i.e. paired servos respond identically to a control input, if not any mixer adjustments will result in mis-matched movements. If your servo and linkage installations are exactly the same then the servo calibration curves will identical (and hats off to you!)



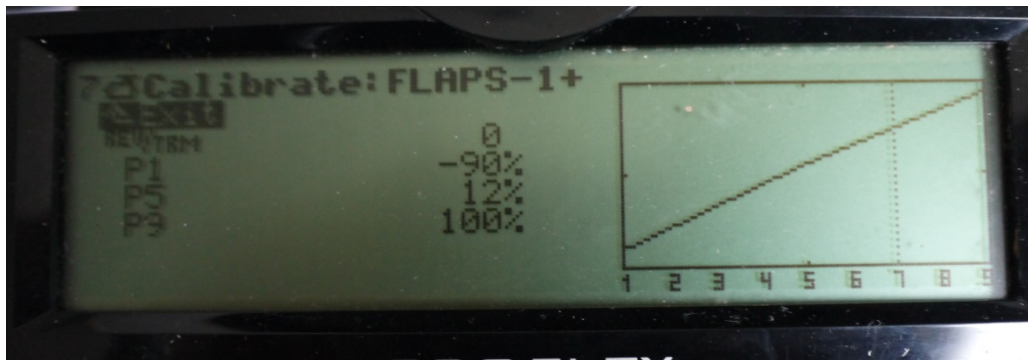
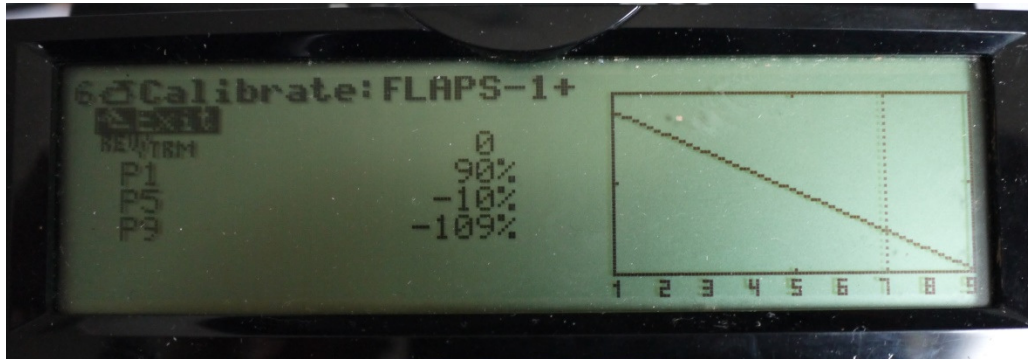
In order to calibrate the servos, it is important that there are no unwanted mixer effects affecting the set up, the input needs to be a clean +/- 100%, here you can see that the flap input in the Servos connected to the FLAPS-1+ mixers has been set to 100% in each direction with no other inputs.



As we have no specific flap control on this model but instead are using fixed values defined for each flight phase we need to enter the controls menu and set up - 100%,0% and -100% on the thermal, normal and speed flight phases, we can then calibrate the servos against these 3 points. An alternative would be to temporarily assign a slider for flap control and use that during servo calibration and then later either remove it from the controls assignment or by setting a flap control fixed value for each flight phase the control will be overridden by the fixed values (i.e. control will only work if the fixed value is set to OFF)

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3- Servo Calibration



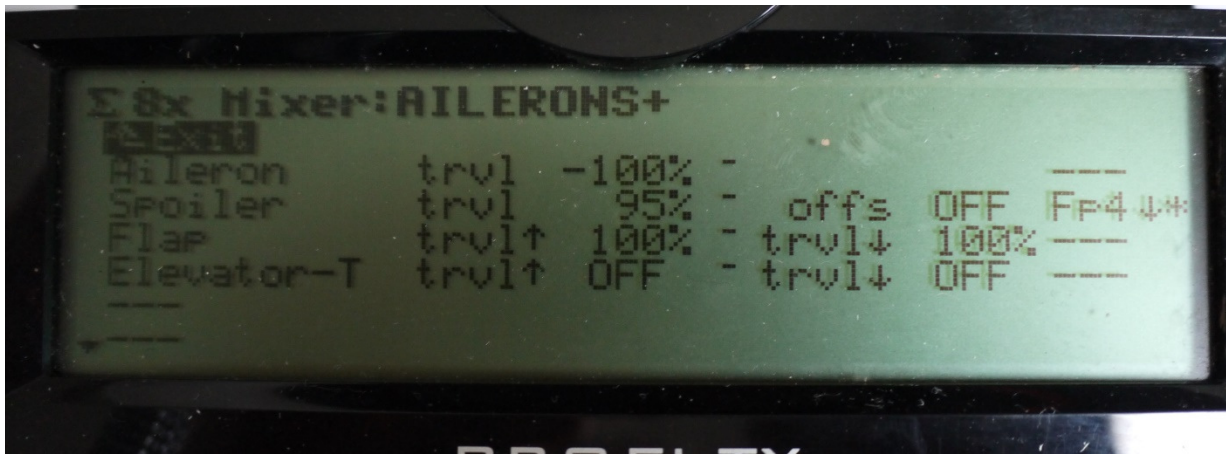
Then on one of the flap channels (no 6 above), set up a straight line curve which determines the maximum movement of these surfaces under all inputs, do not worry about setting actual thermal, speed, spoiler movements at this stage these will be determined in the mixer control settings, the purpose of this step is to determine the mechanical limits and then adjust the second FLAPS-1+ servo (7) so it's direction and movement matches that of the other at all three points (by changing the flight phases). Also do not use the servo curve to set the flap neutral position, just make sure both flaps are deployed the same amount when Fp2, Normal, is selected, the position will be adjusted in the mixer, via the spoiler offset setting.

HINT – if you start off with a +100 to -100 servo travel you may end up with some servo binding, so I usually tune down the movements to say +/- 25% before operating the control input, and then increase them accordingly.

Calibrate the AILERONS+ channels in a similar way with just aileron input (set 100%) in the mixer, do not set aileron differential at this point as this is set in the differential mixer and by selecting the spoiler option in differential, differential is removed as spoiler control raises the ailerons to give more down going aileron and hence more control authority.

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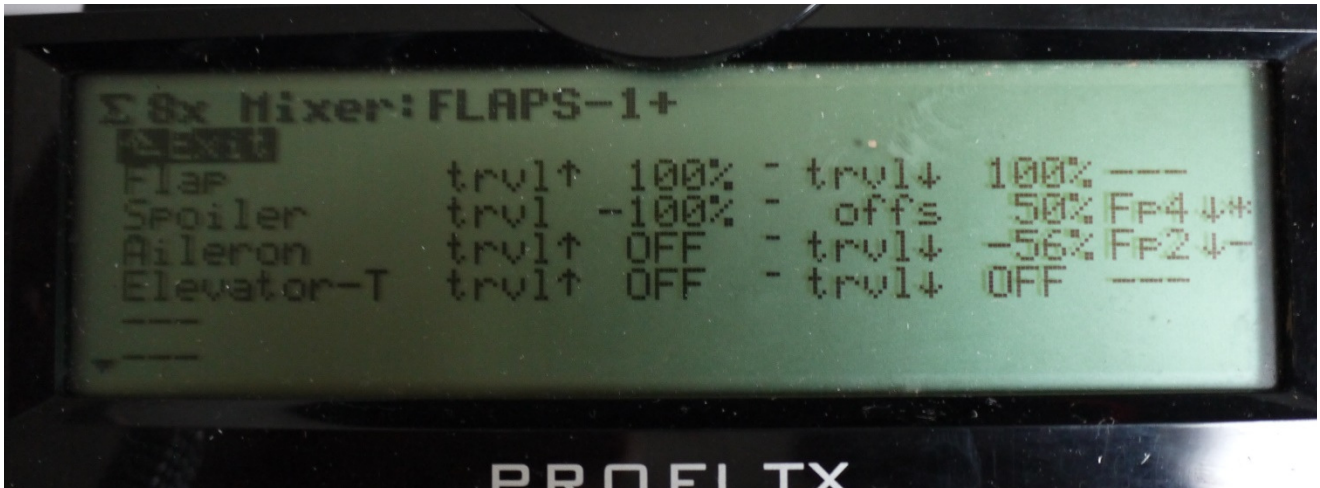
4- Mixer settings



AILERON+ mixer inputs, note aileron input is 100% (any differential is applied in the differential mixer menu and can be flight phase specific), Spoiler stick input (crow braking) set at 95% on Fp4, note the offset, this is always active, offset allows you to offset the servo arm if you want more travel in one direction than the other and then use offset to offset the centre point, allowing use of the full servo movement, this installation did not require this on the ailerons. Flaps input is active and set at 100% in either direction as the Flap input is now fixed in the controls menu.

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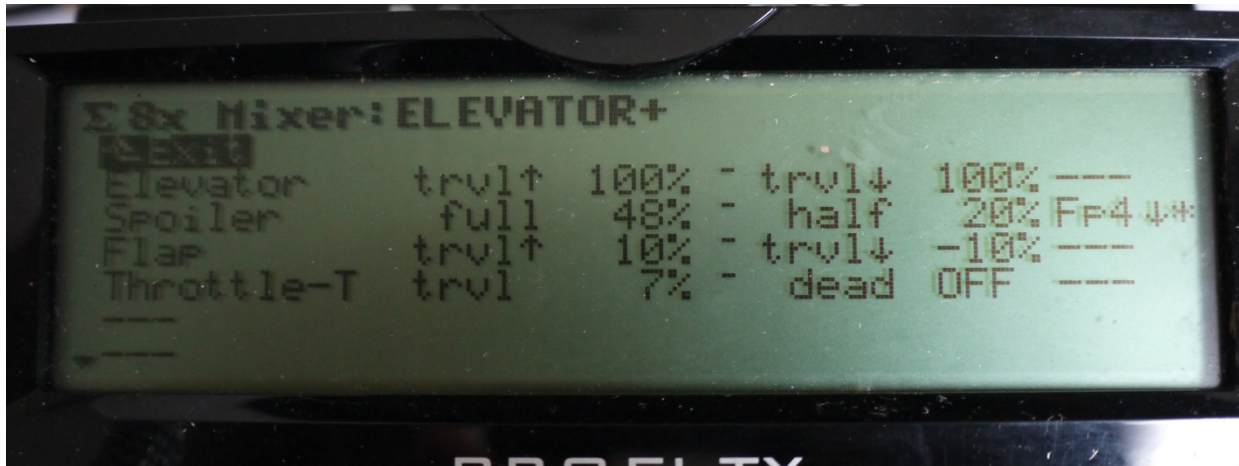
4- Mixer settings



FLAP-1+ mixer inputs,. Flaps input is active on all flight phases and actual travel is set in the controls menu. Spoiler stick input (crow braking) set at -100% on Fp4 (landing), note the offset, this is always active, offset allows you to offset the servo arm if you want more travel in one direction than the other and then use offset to offset the centre point, allowing use of the full servo movement, in this case an offset value of 50% was required to centralise the flap surfaces. Aileron input, for full span ailerons, is on Fp2 and travel settings allow you to have more movement in one direction than the other (i.e. more up flap movement), any aileron differential is applied on top of this, in this case the flaps only move upwards to assist the ailerons (as recommended in the Heron setup instructions)

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4- Mixer settings



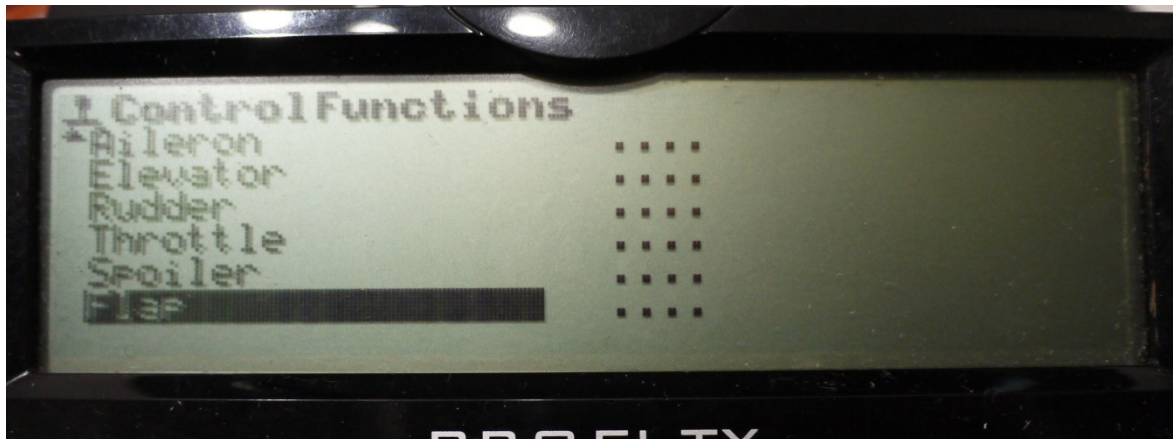
ELEVATOR+ mixer settings, travel set at 100% in either direction, but it could be adjusted here to give more up than down if required, total throw can be adjusted here or in the controls menu. Spoiler input set at 48% and 20% on Fp4 (LANDING) flight phase, this is to feed in down elevator as the spoiler crow braking is applied. Some down elevator is applied as the throttle is increased to stop the glider from climbing excessively, note a dead band can also be applied to delay the introduction of the down elevator mix but was not required in this case.

NOTE on my model the Throttle-T travel is assigned to one of the digiadjusters so I can adjust this in flight to stop the model zooming up when power is applied, allows the throttle elevator compensation to be tuned in one flight.

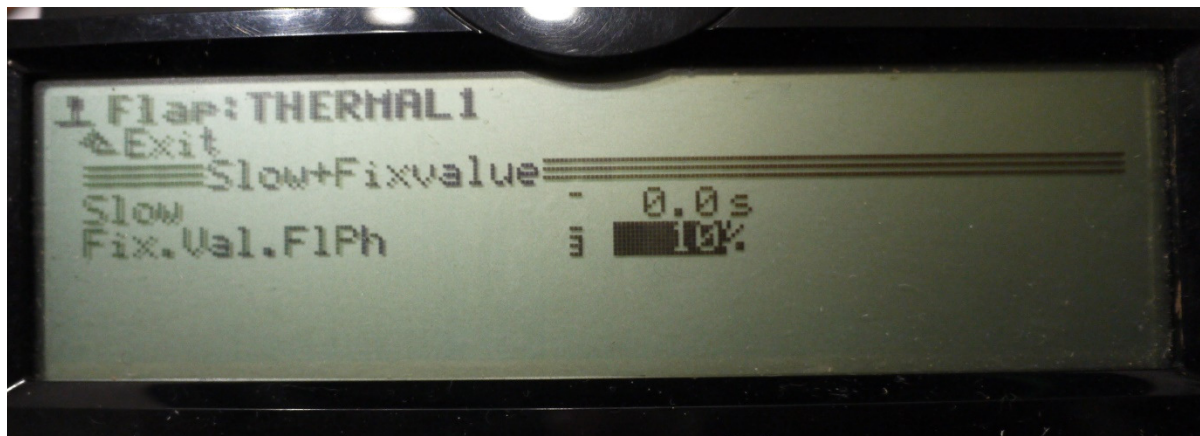
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5- Control settings

Control setting for dual rate, exponential for the main flight controls are set in the normal way to suit your preference, but flap travel is also set to provide fixed flap input per flight phase into the flaps and aileron mixers as follows



First enter the controls menu then select flap

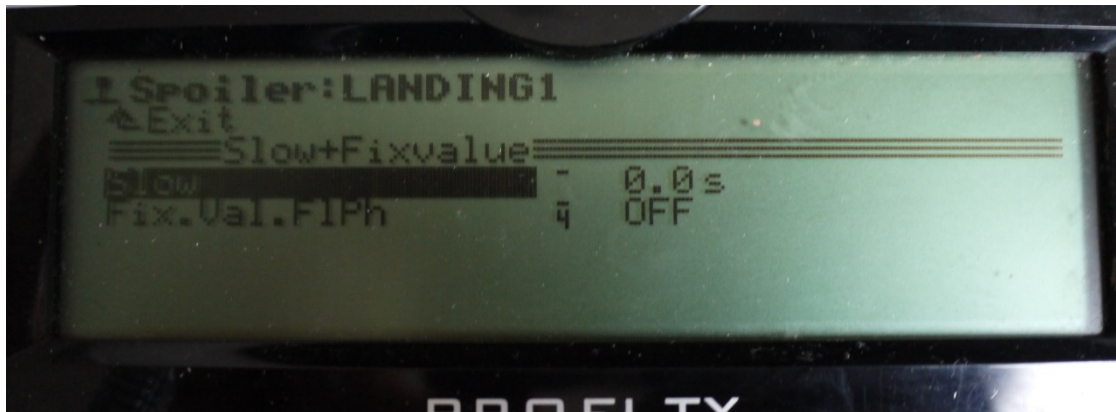


The adjust the fixed flap value per flight phase as required. Note you can also add a slow value to make the change come in more slowly if required. If we had a separate flap control (i.e a separate 3 position switch) then this would be active if the fixed value is set to OFF and the flap/Aileron camber/reflex would then be set in the mixer.

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5- Control settings

In the Spoiler control settings in the LANDING phase the spoiler input must be set to off or the spoiler control stick will not



Note that while in this example we have made the spoiler input to the AILERONS+ and FLAPS-1+ mixers only active in Fp4 by assigning this as a switch, the same effect could be achieved by leaving the switch out of the mixer definition and setting a fixed value for flight phases where we don't want the spoiler control (stick) to work.

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6 - Notes

- The mixer definitions are the standard templates, but you can change the type of curves, use any switch (rather than flight phases as shown here) to activate a mixer input.
- You can add further inputs to the mixer, you can have multiple inputs from one control and activate these on different flight phases, for example my HP 18 scale glider has two Flap inputs in the FLAPS+ mixer, the first is on the launch setting to allow flaps to be used for drag on aerotow, and then in the Thermal phase the flap movement is reduced for thermal flap settings.
- Also by using flight phases with fixed values for camber flap allows the elevator trim to be set to phasetrim on which means that the elevator is trimmed separately for each flight phase, so any pitch changes due to camber/reflex flap can be compensated by setting the trims
- Not covered here is the option to have flight phase groups, whereby you could have multiple Thermal and Speed settings (which would require some adjustment to the switching in the defined mixers).
- Note this tutorial/example is based on modification of my own HERON set up which has flaps settings on a slider, this has not been tested and the values are example only and would need to be set for your model.
- ANY QUESTIONS PLEASE ASK