The Taranis (Q) X7S – Pots with Global Variables

Written by: Author One, Author Two et al.

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DISCLAIMER

This document is for guidance only, it is the readers responsibility to understand the programming process and the effect on the model, and to thoroughly test the model operation before flight.

This document is not a complete, comprehensive or thorough guide to using the (Q) X7S.

No responsibility is accepted for any harm to persons or damage to property, howsoever caused, arising from the use of this document.

1 Using A Pot To Trim a Control Surface

There are two available pots, S1 and S2, where S2 has a centre-travel detent and S2 does not. This detent is useful for detecting mid-travel of the pot by feel. Either pot may be used to influence a control surface directly or by overriding a Global Variable value.

1.1 Use

Some values are finalised during flight testing - differential may be set by flying the airplane, noting the planes actions, landing, changing the values and flying again. It may be preferred that a trim adjusts the control surface for different flying conditions. One method to achieve this latter option is to set a potentiometer to influence the control surface during flight

WARNING

Using a pot to trim a control surface is to be set up with great caution. If possible, use a switch to activate and stop the adjustment action while testing.

Simply adding a proportion of S1 to the control surface will have the same effect as a trim adjustment – BUT both positive and negative, and so may reverse the control surface, making control of the aircraft difficult or unsafe.

1.2 Programming of the Pots

The simplest programming method is shown in Fig. 1.2a, and is for demonstration purposes only. At CH3, S1 is added, at 20%, to the elevator signal from INPUTS. With S1 in the centre, the elevator acts normally. Moving S1 either side adjusts the elevator position accordingly.

A better method is shown in Fig. 1.2a at CH4. Here the functionality is the same as for CH3, but with the advantage of the tactile detent for zero offset, and switch SA provided an on / off function to enable or inhibit the mixing.

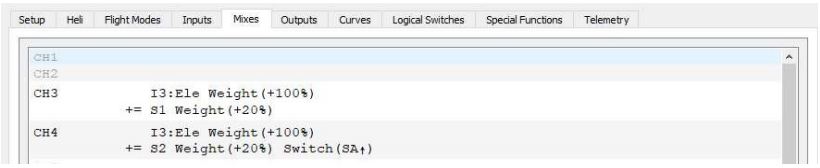

Figure 1.2a – Basic Programming a Pot to Trim a Surface

1.3 Linking a Pot to a Global Variable

Either pot may be linked to a Global Variable (GV) so that a control surface(s) may be adjusted in flight. This adjustment will affect ALL instances where the GV is used, and so may be used to fine-tune, say, elevator brake compensation, in flight. This particular function requires that adjusting the pot does not affect the neutral elevator position in normal flight, but adds a progressively larger amount of elevator as increased braking is applied.

The text below uses Companion to set up the model programming, but can be achieved using the Q X7(S) directly.

To implement this function requires setting up of the FLIGHT MODES page, INPUTS page, MIXES page and SPECIAL FUNCTION page. The method is described below.

1.3.1 FLIGHT MODES

The GVs are held in the Flight Modes page, Fig. 1.3.1a. The GV of interest here is CrE (Crow Elevator) so the pot is used to override this GV. The current value of CrE is notional, based on past experience, so set the pot to the value of CrE before flight testing.

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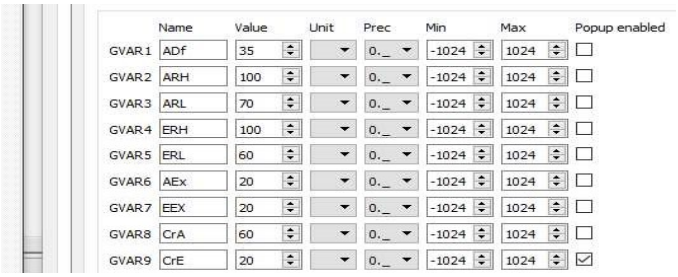

Figure 1.3.1a – Popup ticked

If the 'Popup Enabled' tick-box is ticked and the pot is moved, a pop-up will appear on the transmitter screen indicating the value currently supplied by the pot - Fig. 1.3.1b. The popup will disappear after a few seconds.

Figure 1.3.1b – (Q) X7S Display showing the GV Offset at Zero

1.3.2 INPUTS

Set a Line to manage the pot scaling and offset in INPUTS, in this case CH11, Fig 1.3.2a. These values (Weight and Offset both -50%) limit the pot influence on the surface and keep the travel direction one-way, not symmetrical about neutral. Weight gives the pot signal the amount of deflection, Offset restores the original neutral position.

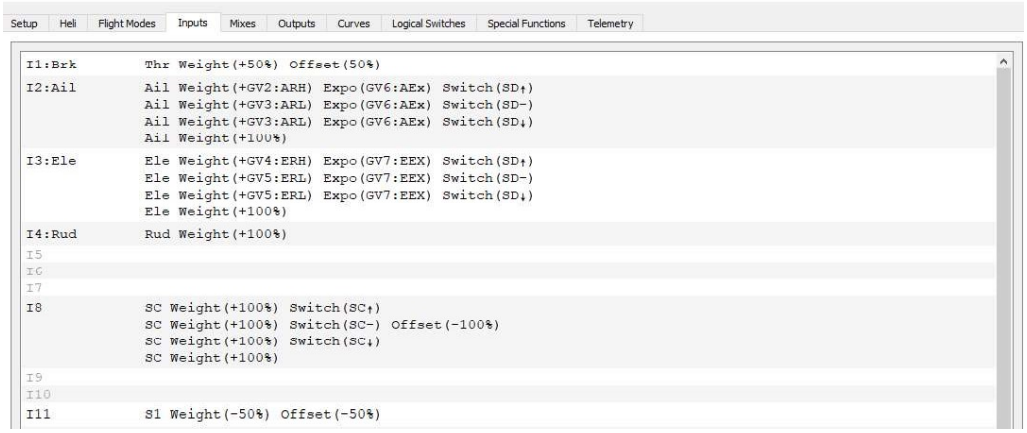

Figure 1.3.2a – INPUTS, S1 Input at I11

1.3.3 MIXES

The pot signal from INPUTS is added to the elevator in CH3, second line. .

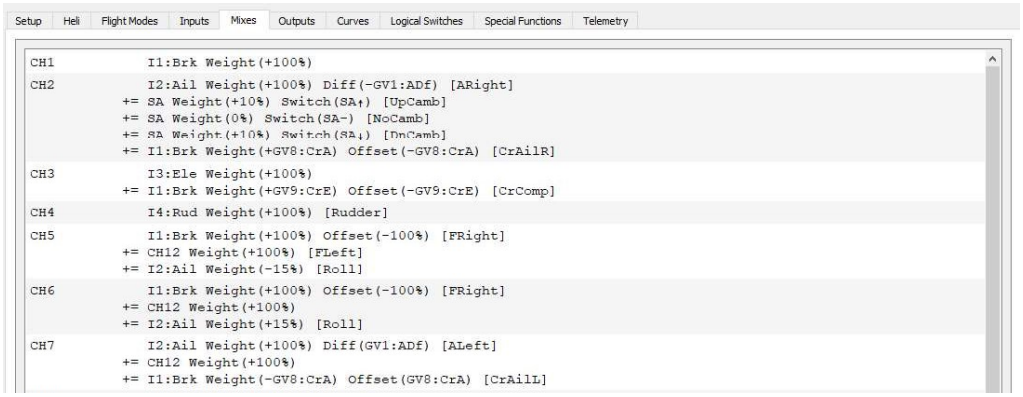

Figure 1.3.3a – MIXES, CH3 with Pot added to Elevator

1.3.4 SPECIAL FUNCTION

This programming tells what action is carried out on what parameter, and whether it is enabled or not. In this case the action is adjust GV9, the source is I11, and the effect is ON. To do this, navigate to SPECIAL FUNCTIONS screen. In the first available 'Switch' line, say 'SF1', from the drop-down menu choose FM0. Then, in the 'Action' column, select the required GV from the drop-down menu, in this case GV9:CrE. Next, in the 'Parameters' column, choose 'Source' and 'I11' from the drop-down menus. Finally, tick the ON tick-box in the 'Enable' column.

Now, the SPECIAL FUNCTION tab looking like Fig. 1.3.4a.

Figure A1.3.4a – Pot Linked to a GV via a Special Function.

1.3.5 Using the GV and S1

Note that with S1 anticlockwise, CrE is shown as Zero, Fig. 1.3.5a, and the elevator (CH3) is at 50%, ie the neutral position, Fig. 1.3.5b.

Figure 1.3.5a – (Q) X7S Display showing the GV Offset at Zero

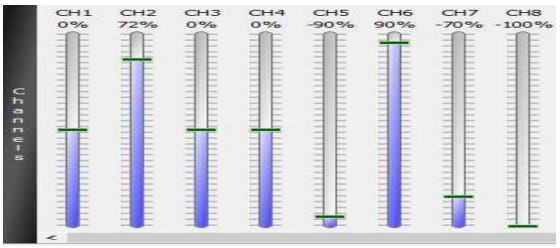

Figure 1.3.5b – Outputs with Elevator Stick Centre, S1 Anticlockwise

Now S1 is moved fully clockwise. The screen now shows –100%, Fig. 1.3.5c, and the elevator (CH3) is at –100%, Fig. 1.3.5d.

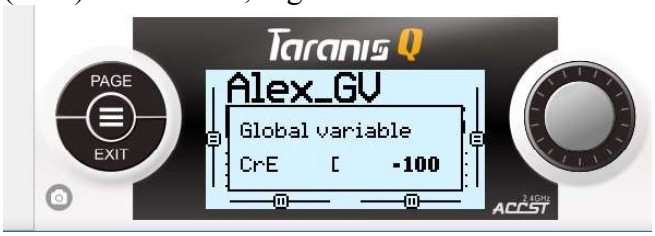

Figure 1.3.5c – (Q) X7S Display showing the GV Offset at Zero

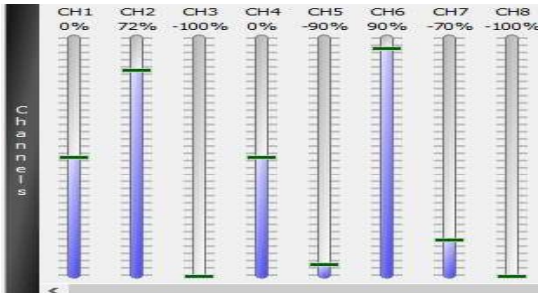

Figure 1.3.5d – Elevator at Maximum Mix with Brakes.

1.3.6 Finalising Settings

After test flying, and the trim value found, the GV value (in FLIGHT MODES) may be fixed to the S1 value shown on-screen.

With more complex mixes, such as thermal flap/ailerons it may be preferable to leave the control as it is for use in flight.