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WINGY

Template for flying wings and delta sailplanes
For OpenTx / FrSky transmitters

Setup Guide

Version 1.0

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1 Introduction

Wingy is a template for sailplanes with a **flying wing** or **delta** configuration. Suitable models include *Alula*, *Wildthing*, *Pibros* and others.

Wingy is quick to configure thanks to integrated servo calibration. Features include dual rates, and flight-adjustable aileron diff.

Please read through the instructions carefully once, before commencing setup!!

1.1 Package contents

Filename	Description
wingy10_SetupGuide.pdf	This guide
wingy10x.eepe	Model file
wngxxx.wav	Sound files

1.2 Requirements

- Taranis X9D, X9DP, X9E, Horus, Q-X7
- OpenTx (see change log for recommended versions)
- OpenTx Companion software + USB cable.
- Basic familiarity with OpenTx's menus and data entry

1.3 Stick and switch assignments

Stick assignments (mode1-mode4) are according to settings in **MODEL SETUP→STICK MODE**.
Other functions are assigned as follows:

Control	Function
SA	Dual rates (default switch can be changed)
SH	Exits CAL mode
Rudder trim	Adjusts aileron differential

1.4 Channel assignments

Channel #	Function
1	Right elevon
2	Left elevon
3-9	*[free]*

2 Operational Overview

Aileron differential

- Aileron differential is adjustable in flight (via rudder trim).
- Adjustment range is 0 - 50%.

Dual rates

- Hi or Lo rates can be selected for Elevator and Aileron.

3 Setting up your transmitter

Adjustments should be made in sequence shown. Use the tick boxes to record progress.

3.1 Copy *Wingy* to your transmitter

The first task is to copy the files to your transmitter:

3.1.1 Extract files from ZIP package

- □ Extract all files from .ZIP package and place in a folder

3.1.2 Connect transmitter to PC

- □ ***Taranis:*** Switch on the transmitter whilst pressing horizontal trim levers towards the centre
  Horus: Switch on the transmitter
- □ Connect the tx to the computer via USB. The transmitter's SD card will appear as an external drive.

3.1.3 Transfer sound files

- □ Copy the sound files to the /SOUNDS/{language} folder on the SD card. For example, English folder is "/SOUNDS/en".

3.1.4 Transfer model file

- □ Start OpenTx Companion
- □ Open file wingyxxx.eepe. *Note:* If using OpenTx 2.2 or above, the model data will be automatically converted to a newer format.
- □ From the File menu, choose "Read Models and Settings from Radio". The transmitter's model list is read and displayed in a second window.
- □ Drag *wingy* into an empty slot in your model list
- □ Close the wingyxxx.eepe window.
- □ In the model list, right-click *wingy* and choose "Use as Default"
- □ From the File menu, choose "Write Models and Settings to Radio".
- □ Close OpenTx Companion

3.2 Calibrate sticks

Ensure your sticks are properly calibrated! Failing to calibrate is one of the main causes of problems, from incorrect neutrals to not being able to select CAL mode. To calibrate sticks (Taranis X9D):

□ From the main screen press {long MENU}, then {PAGE} to the Calibration menu.

Remember to calibrate all sticks, knobs and sliders.

3.3 CAL mode and sounds

A special CAL flight mode (FM1) is provided for calibrating the servos. When CAL mode is active, all mixer, trim and rate commands are bypassed; the value from the Aileron stick is passed directly to the servos.

To enable CAL mode:

- Apply full left aileron and full up elevator (stick towards you), and hold
- Pull SH
- Release SH
- Release stick(s).

The aileron stick only is active. A beep sounds every 5 secs and a voice alert every 15 secs.
To exit CAL mode

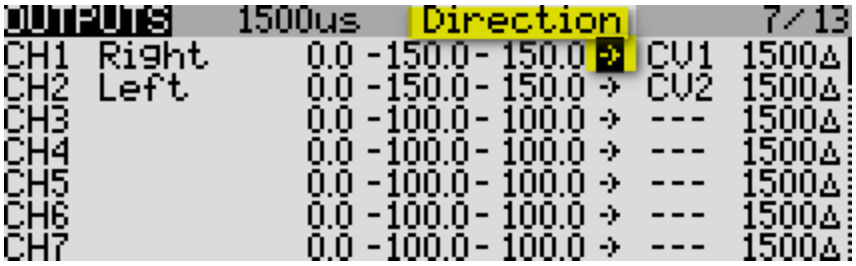
- Pull SH.

□ Using the transmitter on its own, familiarise with entering CAL mode
□ Verify that the 'CAL' and Hi/Lo rate voice callouts are working. If not, check that the sound files are in the correct location.

3.4 Set servo rotation

In this section, you'll set the rotation of the servos.

☐ Move the sticks and check that both elevons move correctly as for normal flight. If one or both elevons is reversed, then change the direction as follows:
- ☐ Open the **OUTPUTS** menu.
- ☐ Highlight the elevon channel in error, and click {ENTER}
- ☐ Skip to Direction field
- ☐ Press {ENTER}, and immediately {EXIT}. The elevon should now move correctly.



The elevons should now respond correctly to both elevator and aileron commands.

3.5 Calibrate servo centres and end points

In this section you'll configure the centres and end points of the servos. **All adjustments in this section must be made while in CAL mode**.

Notes:

- In CAL mode, **both elevons move together**. It may look odd, but it makes it easy to match movements on left/right side.
- When adjusting end points, allow for maximum simultaneous aileron and elevator commands.
- Calibration is adjusted via *output curves* – do not adjust min/max/Subtrim (they should be left at -150/150/0).

Channel	Calibration procedure
☐ CH 1 – Rt Elevon	Calibrate right elevon(CH1): ☐ Enter CAL mode ☐ In the **OUTPUTS** menu, highlight CH1 ☐ Skip to the Curve field labelled "CV1" (or "Rt" if using OTX 2.2) ☐ Press {LONG ENTER} to open the curve editor. ☐ Aileron stick in middle, adjust point 2 for correct neutral ☐ Aileron stick fully left (←), adjust point 1 for max downward travel ☐ Aileron stick fully right (→), adjust point 3 for max upward travel ☐ Check that up and down movement are equal, if necessary reduce one or other end point
☐ CH 2 – Lt Elevon	Calibrate left elevon (CH2) ☐ Still in CAL mode, calibrate left elevon (CH2) using curve "CV2" (or "Lt if using OpenTx 2.2). Follow the same steps as for right elevon above.

☐ While still in CAL mode, check that up/down movements match between CH1 and CH2. You can do this by sighting down the centre line. Adjust one or other channel as necessary.

☐ Exit CAL mode. Note that the down-going aileron movement will be reduced due to diff.

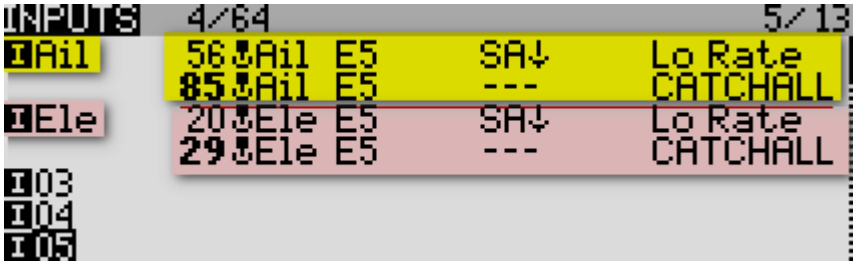
The movements will be more than required for flight; you will reduce these in the next section.

4 Finalise control surface movements

4.1 Adjust control responses ('rates')

Finally, adjust the aileron and elevator responses ('rates'). Refer to the instruction manual for your model. Rate adjustments are made in the **INPUTS** menu.

1. Open the **INPUTS** menu and highlight the line to adjust. Low rate is set in the 'Lo Rate' lines. High rate is set in 'CATCHALL' lines.
2. Move the rate switch (SA) to the corresponding position (low or high)
3. Press {LONG ENTER} and select Edit
4. Move the stick, and alter *weight* to achieve desired movement.



In the example above,

- Aileron high-rate = 85, low-rate = 56
- Elevator high-rate=29, low-rate = 20

The above scheme can be modified, e.g. for triple rates.
SAFETY NOTE: the last line should always be a 'catchall', with *all flight modes checked, and switch="---".* This is good defensive programming in case none of the previous lines is active (without a 'catchall', the control would be inoperative).

4.2 Adjust aileron differential

Adjust aileron differential by moving the the rudder trim. Default diff range is 0-50%; trim centre corresponds to 25% diff. The range of adjustment can be altered by adjusting Curve 3.
Moving the trim to the right decreases diff, and increases roll rate.

4.3 Adjust Expo

Expo is used to soften or sharpen responses around neutral. It can be set independently for each input line.

1. Select high or low rate as required
2. Open the **INPUTS** menu and skip to relevant line
3. Press {LONG ENTER} and select Edit
4. Skip to the Curve field and select Expo
5. Skip to the adjacent field and set the value

5 How to change the 'rates' switch

The default rate switch is SA. You can alter this by replacing references to SA in the Inputs and Special Functions menu. Note leading '!' in switch for SF5.

6 Before the first flight

Before using this setup for the first time, please:

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

7 Applying your own modifications

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

1. Set up your model first as instructed in this guide
2. Backup your work
3. Apply your modifications incrementally, testing and backing up as you go along.

8 Disclaimer

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 OpenTx.

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

If in doubt, don't fly!!

9 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.

Safe flying!
- Mike Shellim