EASY SIX-SERVO GLIDER PROGRAMMING FOR JR TRANSMITTERS

There is some good guidance on the internet about how to program JR 9+ channel transmitters. However the guidance often focuses on complex methods, meaning that the most simple method gets forgotten. Even the official JR manual makes it more complex than it needs to be! For example, you don't really need to manually adjust the subtrim of your flap servos to achieve maximum throws: the transmitter will do that automatically. So if you just want a simple way to program a six servo glider, here it is. It works well and does pretty much everything a six servo glider needs: big flap throws, crow braking, flight modes and so on. However the more complex methods might be appropriate if you want to bypass the transmitter's automation to do things your own way (there is a link for that at the end of this document).

Gary Parker, Version 2, January 2012

1. First you're going to set the basic parameters on the System menu. Hold down the **ENT** button (top left of the screen) while turning on the transmitter.

2. Choose **Model SEL** and select an empty model memory. (Press **LIST** to get back to the System menu.) Then choose **Type SEL** and set it to glider, **GLID**. (Press **LIST**.) Choose **MDL name** and give it a name. (Press **LIST**.) If your radio is pre-2.4Ghz you may need to set **MODULAT** to **PPM**.

3. Choose **Wing TYPE** and set **DUAL FLAP** to **ACT**. If you have a V-tail, set **V-tail** to **ACT**, or if you have a cross tail leave **V-tail** set to **INH**. (Press **LIST**.)

4. Choose **DeviceSEL** and set everything on it to these settings:

   > SPEED: INH
   > LAUN: FMOD SW
   > MOTO: SPOI STK: INH
   > FLAP: FLAP LEV: ACT
   > AUX2: SPOI STK: INH
   > AUX3: AUX3 LEV: INH
   > AUX4: AUX4 SW: INH
   > TRIM: COM

   Basically everything is inhibited except FLAP. However, if you have a motor, set **AUX2** to **SPOI STK** and **ACT**. (So set **AUX2** to **INH** for no motor, and set it to **ACT** for a motor.) That's the System menu finished with, so press **ENT** to get to the normal menu.

5. You need to have your servos plugged into your receiver in the normal JR glider order:

   > 1 = Left aileron
   > 2 = Right aileron
   > 3 = Elevator (or right ruddervator if you have a V-tail)
   > 4 = Rudder (or left ruddervator if you have a V-tail)
   > 5 = Right Flap
   > 6 = Left Flap
   > 7 = Battery (or speed controller if you have a motor)

6. Press **LIST**. Select **REV SW** and set the surfaces to operate in the correct direction. (Press **LIST** to get back to the menu.) Select **Sub Trim** and adjust your subtrims so all control surfaces are exactly where they should be, such as ailerons being perfectly in line with the wing. (Press **LIST** to get back to the menu.) Select **TRVL ADJ**. Set the travel to whatever you want to get the maximum surface movements you need. Anything between 100% and 140% could be good, but if you're not sure, leave

it all at 100% for now. (If you have a motor, you may find you need to leave **AUX2** at **100%** for the motor to work properly.) (Press **LIST** to get back to the menu.)

7. Select **D/R & EXP**. Scroll over to the right of the screen. There may be a graph or some text visible there. You want the text. If you see a graph, just scroll onto it and the text will appear. This is where you set up the flight modes. Set the options to this:

> **CRUI: Pos1**
> **LAUN: Pos0**
> **LAND: Pos2**

Staying on this screen, scroll back to the left and select **AILE**, **ELEV** and **RUDD** in turn and for each of these set dual rates and exponential to what you want. If in doubt, a good starting point would be to set the launch flight mode to be low rates, the cruise flight mode to be high rates, and the landing flight mode to have crow brakes applied: set **Pos-0** (launch flight mode) to **D/R 70%** with **EXP 30%**, set **Pos-1** (cruise flight mode) to **D/R 100%** with **EXP 40%**, and **Pos-2** (landing flight mode) to **100%** aileron, 100% rudder and **70%** elevator. (Press **LIST** to get back to the menu.)

8. Select **FLAP RATE** and set all the figures to **100%**. Flaps won't work properly without this crucial but easily forgotten step. (Press **LIST** to get back to the menu.)

9. Select Butterfly. Select **SW SELECT** (the word **SELECT** will become highlighted and then hidden toggle switches will appear). Set **CRU** to **POS0**, **LAU** to **POS0**, and **LND** to **POS1**. This sets the landing flight mode to apply crow brakes. The other toggle switches aren't used and should be left on **POS0** (in particular set **BTF** to **POS0** since it is usually defaults to **POS1** which you don't want). Set the **SPOI offset** to **+200**. Set the other settings to these:

> | SPOI>FPRN | 0: 0% |
> |---|---|
> | | 1: -20% |
> | SPOI-ELEV | 0: 0% |
> | | 1: -10% |
> | SPOI>FLAP | 0: 0% |
> | | 1: +100% |

This is setting crow braking to involve the flaps going down 100%, the ailerons going up 20% and the elevator going down 10%. You can set these to whatever suits you, but if in doubt this is a reasonable starting point. (Press **ENT**.)

10. What you have now is:

  a. Three flight modes controlled by the flight mode switch (the three-position switch located at the top right of the transmitter). With the switch towards you, you have low rates (for launching and relaxed flying). With the switch in middle position you have high rates (for aerobatics and so on). With the switch in the rear position you have crow braking (for landing – but don't forget you could strip servos if you land with the flaps down, so make absolutely sure you flick the flight mode switch back to the middle or front positions to retract the flaps just before the glider hits the ground).

  b. In addition to crow braking, you also have fine control over the flaps with the flap lever (the lever on the left hand side). When the lever is up, the flaps are up, and when the lever is down, the flaps are down. You can adjust the flaps any amount you want in any flight mode, such as having a tiny amount of camber if the lift is weak. However this lever must be back in the top position (no flaps) before you apply crow brakes using the flight mode switch. If you did both at the same time, the flap servos could get overdriven, which might eventually damage them.

11. Now you need to adjust your flap linkages on your glider. This is often thought to be a tricky process involving manually applying sub-trim to offset servos. Luckily that is not required with this programming: the transmitter automatically does the offsetting for you. It does a good job, too, giving you huge flap travel. All you have to do is set the flap servo arm at a suitable angle and make the control rod the right length so that when the flap lever is at the top, the flap is level with the wing. This is pretty obvious in practice. Put the arm on the servo at what you guess might be an appropriate angle, and then move the flap lever on the transmitter and check the arm doesn't hit the wing at its extremes of travel. For a wing where the servo arm and the flap control horn are both on the underside of the wing, you will probably want the servo arm pointing towards the rear of the wing when the flaps are aligned with the wing, so that when you apply flaps the arm can swing a long way forward without hitting the front of the wing. Once you have the servos and linkages correctly set up, you still have the ability to change things somewhat on the transmitter. For instance if you set the travel adjustment of the flaps to 150%, you'll have huge flap travel, but no ability to get the flaps above the wing. So you won't be able to mix flaps with ailerons if your ailerons prove to be too small to roll the plane as fast as you would like. But if you set the travel adjustment to 100%, you will lose a little flap down travel but you will gain up travel, which means you can use the flaps as additional ailerons (by setting the mix to say **50%** in the **AIL>FLP M** screen). Basically if you play with the plane and transmitter it will be much more obvious in practice than when reading about it!

12. Check you're happy with everything and go fly! Of course there are many other ways to do things, and if you want to try more complex programming, the "bible" is Sherman Knight's JR 9303 programming manual, available on the US Horizon Hobby website:
http://www.horizonhobby.com/Articles/Article.aspx?ArticleID=1459
The smart thing to do would be to leave the simple programming in one model memory and set up another model memory for the complex programming. Then you can easily try out both without messing anything up. (Luckily, the flap servo arms and control rods won't need changing even if you change to a "manual subtrim offset" programming method as used by Sherman Knight. So you can easily switch between the two model memories without having to change anything on the plane.)