

Setting Up a Spektrum DX6e for RC-Sailing

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Introduction:

Spektrum transmitters have long been among the most popular transmitters for radio sailing. The Spektrum DX6e is the model that I see the most currently. Spektrum's popularity has to do primarily, I think, with the fact that their products are full featured, very high quality, with very good documentation, and, I'm told, great product support. I am not a long-time Spektrum user, and I was very pleasantly surprised how quickly I could get the DX6e set-up. The documentation is so good that this article does not have the necessity of my similar article about the FlySky FS-i6, which has abysmal documentation.

This article is not, for the most part, a how-to on how to use a Spektrum DX6e. Rather it is written for the beginning or non-techy sailor. The issue isn't so much how-to, but rather which settings shall I use on this or that menu. The goal is to show you, step by step, how I set-up the DX6e for a typical small RC boat and a typical larger one.

I will show you the set-ups for my Micro Magic and my ODOM. You will note that they are nearly identical. In fact, they might be actually identical if I were to also use analog servos on my ODOM. The set-ups shown here should work well, with minor adjustments, for most other classes and servos.

Separately, it is important to note that I am not a top US rc-sailor. Rather, I am an active class secretary with a slightly geeky side. I suggest asking the best skippers in your class what transmitter set-ups they use and trying those out. But you can certainly start with this set-up, it works fine. A second disclaimer: I am not even a DX6e owner. Mike Wyatt was kind enough to loan me the transmitter and receiver that I used in this article. Thank you, Mike!

I doubt that this article will be useful to read if you aren't already familiar with the DX6e or, alternatively, if you don't have a powered up DX6e next to you.

Setup and Use:

- **About receivers:**

- The DX6e can be used with a number of Spektrum receivers. For this article I used an AR410 (SPMAR410 DSM2/DSMX). It is a small, light 4 channel receiver with an internal antenna. It has a bind button, so that you do not have to use a binding cable. It is very nice.
- Unlike all of the other brands of transmitters that I've used, you can assign any of the receiver channels to any of the transmitter controls. Pretty cool!
- Most current Spektrum receivers, including the 4-channel AR410, feature basic telemetry; so the receiver will, without modification or added devices, send receiver (boat) battery voltage to the transmitter. See: "Flight Log" section below.

- **About servos:**

- For this article, I am using standard servos in both my MM and my ODOM.
 - The MM has a Hitec HS-65HB rudder servo and a Hitec HS-485HB sail servo. Both are analog.
 - The ODOM has a Hitec HS-5245MG rudder servo and a Hitec HS-7955TG sail servo. Both are digital.
 - I think that it is likely that if you are using different servos or different servo swing arms, your personal settings will be somewhat different from those that I show here, though obviously, the principles will be identical.
 - The principles will also be the same for boats with sail winches, though the settings will differ.

- About all of the levers and switches:



Fig. 1



Fig. 2

- 1 - Sail Control Lever (I set-up for Receiver Channel 1)
 - Throttle (THR) in the manual and the menus.
 - Up and down.
 - I set it up so that down is trimmed in.
- 2 - Rudder Control Lever (I set-up for Receiver Channel 2)
 - Aileron (AIL) in the manual and the menus.
 - Side to side.
 - I set it so that pushing the lever to the right turns the boat to the right.
- 3 - Sail Trim tab
 - Set it in the middle while we are setting up the transmitter. You can use it like a traveler to trim the sails in ~10 degrees or out ~15-20 degrees if the wind changes during a race.
 - Check that it is midline at the beginning of the day..
- 4 - Rudder Trim tab
 - You can use this to center your rudder mid-point if it comes out of adjustment and needs a fine adjustment.
- 5 - Other Trim tabs
 - Not useful for RC sailing as far as I know.
- 6 - Bind button

- Used to bind a new receiver to your transmitter. I will not discuss this at length here. There are multiple YouTube videos that explain this.
- I will note that the bind button on the Spektrum AR410 receiver is really nice. You can wire your receiver all up as you want it, press the receiver bind button so that the receiver LED flashes, then press the receiver bind button, turn on the receiver, release the receiver bind button, and the receiver and transmitter will pair.
 - You can also bind by going to “System Setup”, scrolling to and clicking “Bind”.
- The Many Switches
 - The DX6e has 7 switches. You can pretty much pair any of them up with any servo and/or transmitter function. Amazingly :-), this is all pretty well described in the manual.
 - 7 - Switch A
 - I didn't use this.
 - 8 - Switch B
 - I set this up linked to Throttle Curve (Sail Servo Control Curve in sailor speak). It allows for three jib and main sheet endpoints and sensitivities. This is very useful, and I will show you how to set this up.
 - 9 - Switch C
 - I didn't use this.
 - 10 - Switch D
 - I didn't use this, but it can be used in place of Switch B to select Sail Servo Control modes, if you prefer this switch location.
 - 11 - Switch F
 - (There isn't a physical Switch E on the DX6e.) I didn't use this.
 - 12 - Switch G
 - I didn't use this.
 - 13 - Switch H
 - I didn't use this.
- 14 - The Roller Bar
 - This is the main control for all of setup. Its use will be explained below.

- **About the menu system:**
 - The Main Screen

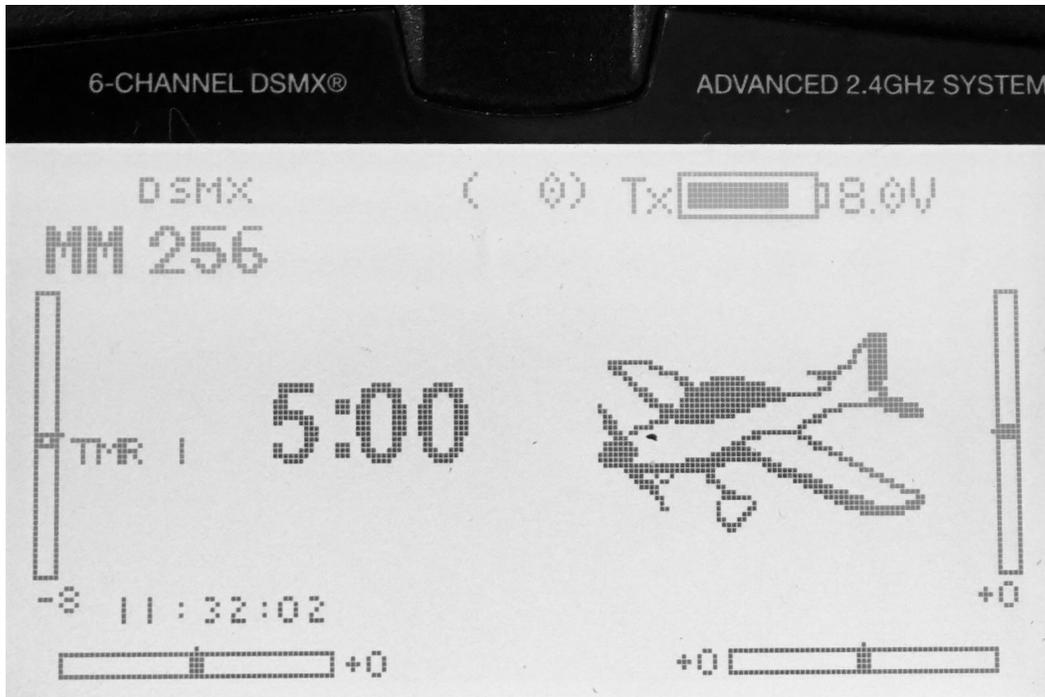


Fig. 3

- This is fine, but no cigar. It could show more, but it works, so learn to use it.
 - Upper right: Transmitter battery level
 - I couldn't get it to also display the Receiver battery level on the Main Screen. (See Other Screens, directly below)
 - Middle: Boat Name. MM 256 in this case.
 - If you have more than one boat linked to this transmitter, the boat name is also the currently selected model.
 - Middle: Timer.
 - Restarts when you press clear. This can be used as a visual start count down timer if you are hearing impaired.
 - Far Left: The little bar shows the trim setting for the jib and main sheets.
 - I will discuss this below.
 - Lower Edge Left: Another trim setting bar.

- We don't use this one.
 - Lower Edge Right: The little bar shows the trim setting for the rudder.
 - I will discuss this below.
 - Far Right: Another trim setting bar.
 - We don't use this one either.
- Other Screens
 - If you scroll right with the scroll wheel without pressing it down first (which takes you to the setup sub menus), you will get to some useful screens
 - Monitor: Shows the current state of the various controls. In our case, we really only care about THR (Sails) and AIL (Rudder).
 - I only rarely use this screen, basically for troubleshooting.
 - Flight Log: Shows the trim tab displays, just like the Main Screen, and, importantly, **your receiver battery volts**.
 - It would be much nicer to have this on the main screen, but at least you have it here.

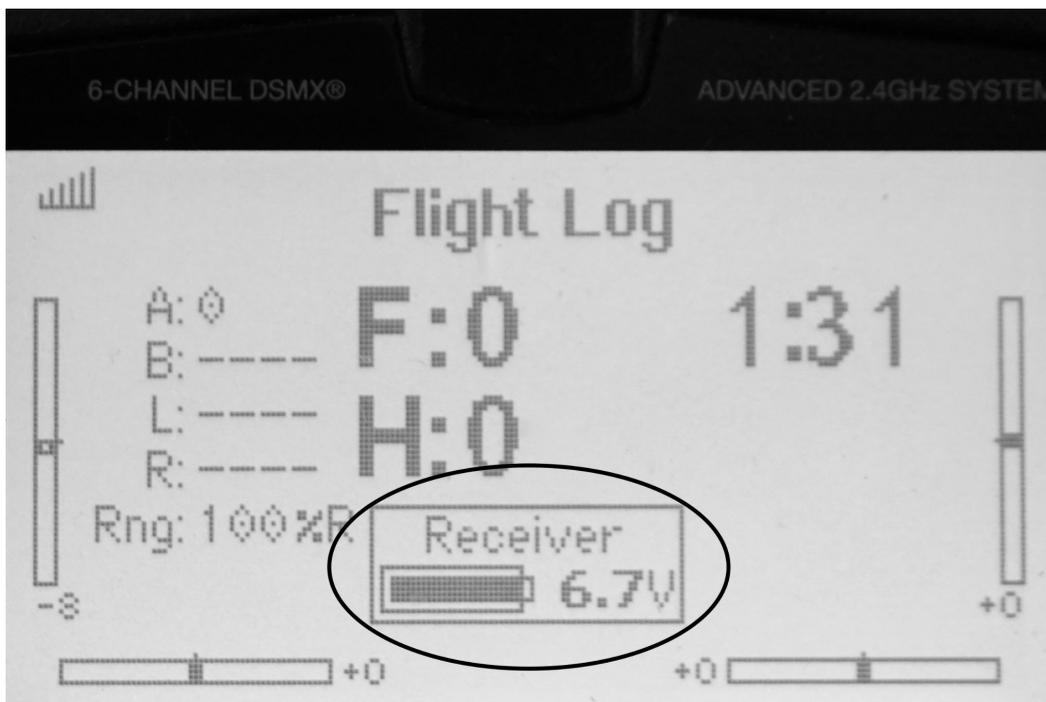


Fig. 4

- As above- the actual RX voltage is displayed on the “Flight Log” screen (this does not need to be adjusted on setup).
 - Low voltage audible warnings for the RX (receiver/boat) battery pack voltage. The default setting is a low voltage of 4.3 volts, which is probably OK without changing, or you can modify or you can modify depending on what type of battery you use. This is done in the form of setting a minimum voltage using the “Telemetry” screen. Click on the RX voltage reading under “Telemetry. The “RX Voltage” in Telemetry has to have the warning set to “Tone” instead of “Inhibit”.
 - Less importantly, the “Flight Log” “Telemetry Lost” feature is factory-set at “Inhibit”, you could change that to “Tone” also, which indicates that the telemetry function is not working.
 - To test, turn the boat and transmitter “on”, then turn the boat off- it should set off a beeping warning in the transmitter (you just took the RX voltage to zero by turning off the boat). You could also hook up a battery that you know is weak, below the set minimum voltage and it should give the audible warning.

- **Using the Menu System:**
 - Navigation is straightforward and consistent, though you do need to get used to using the scroll/selection bar:
 - To get to the Menu System (“Function List”), simply press on the scroll bar.
 - Down is scroll right, Up is scroll left.
 - Menu choice selection is also consistent and straight-forward. Just press the scroll bar (usually, the menu box you want to deal with starts to flash). Then you deal with that choice by scrolling through the options with the scroll bar, and press the scroll bar when you’ve finished (usually the box stops flashing).
 - Exiting a menu is easy. Just scroll to the top “<Main Screen>” for the main menu, or “List” for sub-menus, and press the scroll bar and you’ll be out of the menu.
 - My overlong description here makes all of this sound much harder than it is in practice.

- **The System Setup Menu:**

- You will likely only use the System Setup menu for initial transmitter set-up and when you want to link the DX6e to a new boat.
 - Scroll way down to the System Setup submenu and select it.
 - Answer “Yes” to the caution question and you are in.
- Model Select:
 - You can set up the DX6e for up to 250 boats. :-)
 - Select Model Select.
 - Scroll and select “Add New Model”, then “Create”
 - Select the Airplane “icon”.
 - Select Model Name and add the model name, here “MM 256”.
 - Note the line at the bottom shows all the available numbers and letters, making it easier to find the ones you want, vs. trying to follow them one by one in the other indicator
 - Select Aircraft Type, and assure that Wing and Tail both say Normal.
 - Select Channel Assign
 - On the RX Port Assignments menu,
 - Select 1 THRO: Throttle
 - Select 2 AILE: Aileron
 - Be sure to also label the controller externally with some tape with your name and maybe phone number in case someone finds it.

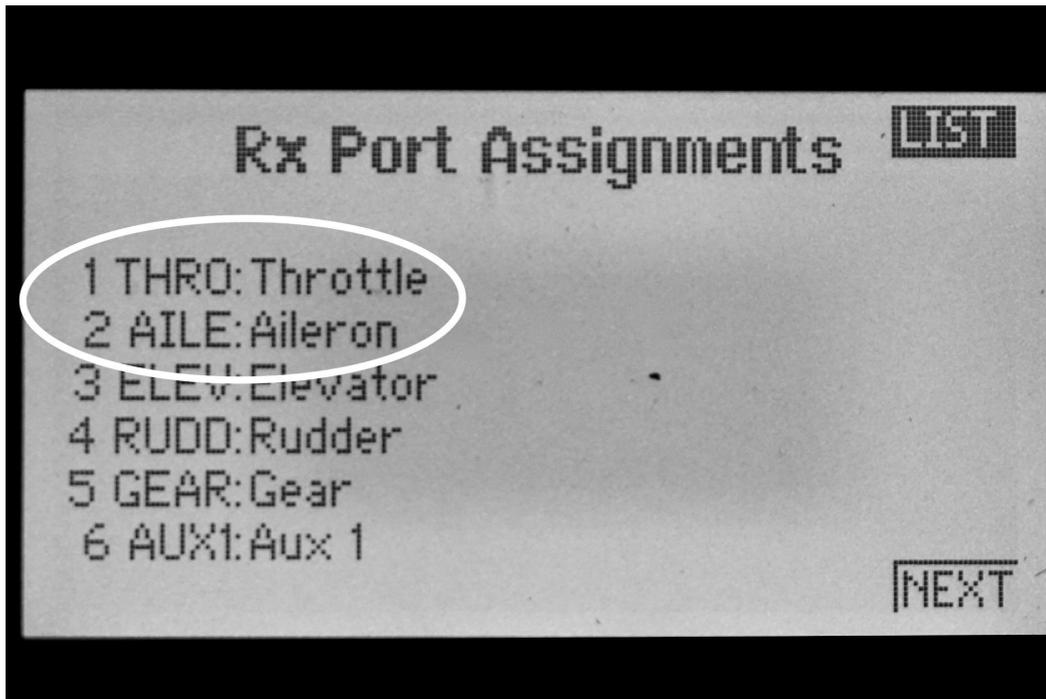


Fig. 5

- **The Servo Setup Submenu:**

- Select Servo Setup
 - Scroll to Travel and select.
 - Scroll from Travel, past Sub Trim, to the Reverse submenu, select this
 - Scroll THR and reverse it (for Left Lever down is sheets in), select, and exit the submenu
 - You will get a message that you need to rebind. Do this.
 - I am using a Spektrum AR410 receiver. It is very easy to bind.
 - Leave everything attached to the receiver.
 - Turn off the transmitter.
 - Press the bind button on the receiver. The receiver LED will start flashing.
 - Press and hold the bind button on the transmitter and turn on the transmitter. Then release the bind button, and the transmitter and receiver will bind.
 - If you are using another receiver, simply follow the Spektrum instructions, which are excellent.

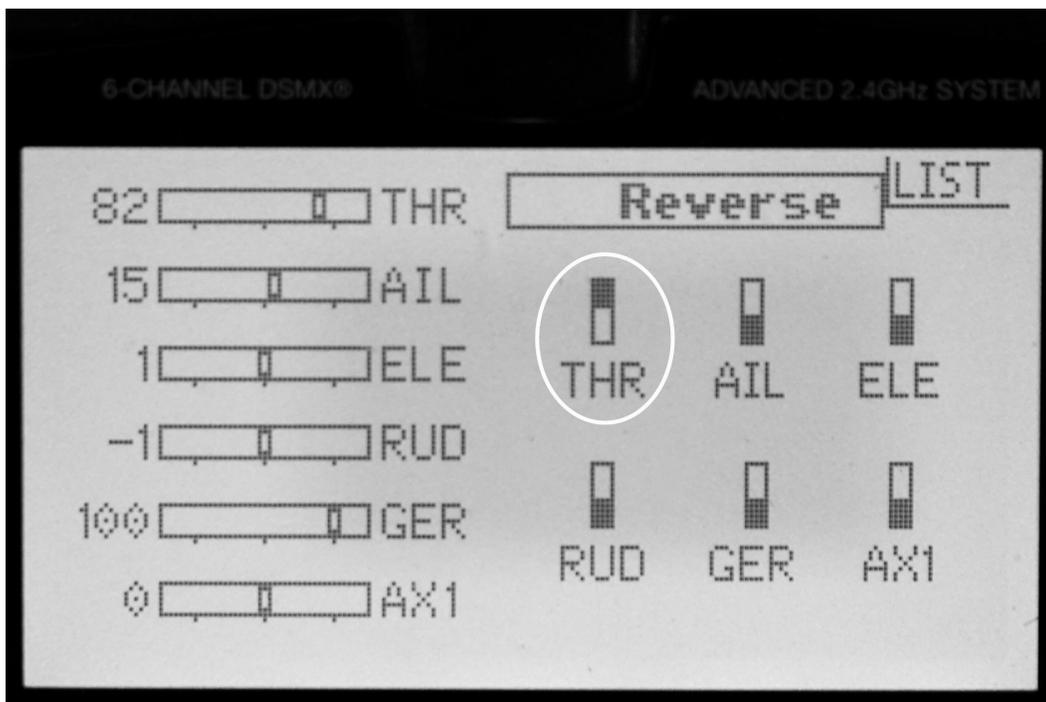


Fig. 6

- Rudder (Right Stick):
 - End Points:
 - Mark the bottom of your hull for 45 degrees port and starboard rudder throw, mid-line, and 3 degrees starboard and port rudder throw.
 - Note that you do not want the boat to be totally neutral rudder going upwind, but rather to have 2-3 degrees weather helm. This is faster upwind. (I'm not sure if this is also true for boats that have the rudder attached to the aft end of the keel.)
 - Adjust your rudder mechanism such that the rudder is mid-line with the receiver on and the trim marking on the transmitter screen is also midline.



Fig. 7

- Now select Servo Setup, scroll to Travel.
 - Scroll to AIL and select.
 - Move the right stick to the left, press the scroll bar so that a single box is blinking and scroll with the scroll bar until your rudder hits the 45 degree mark, then do the same with the right stick all the way right.

- You'd think you'd set it to the same number on each side, but my experience is that only rarely is the setting the same for each side.

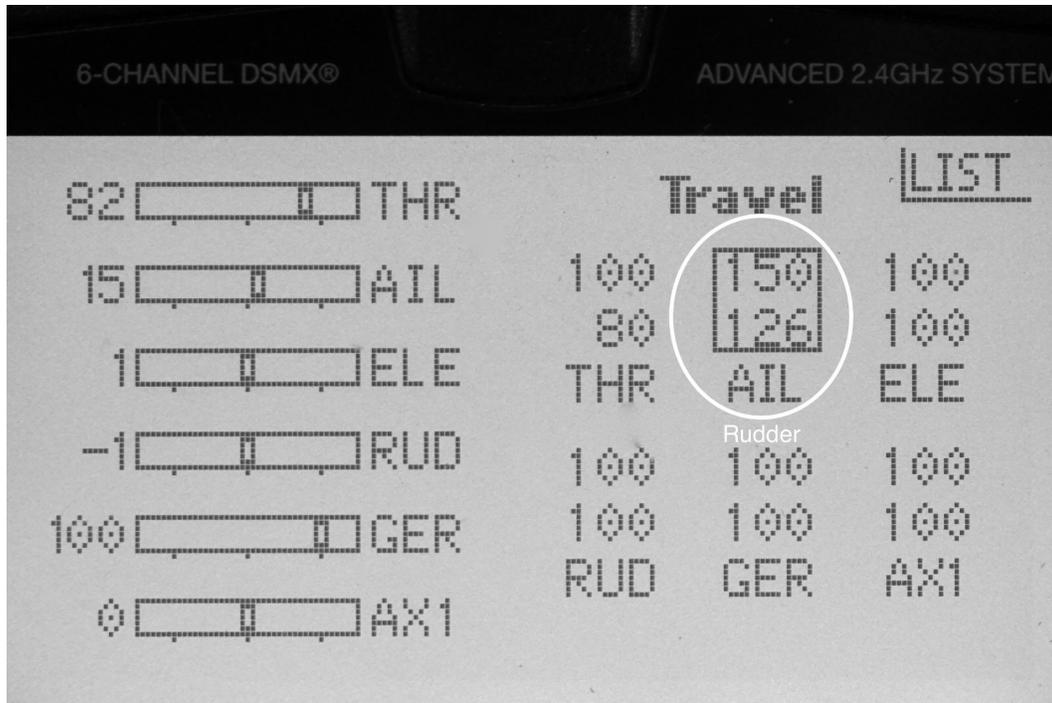


Fig. 8

- Dual Rate / Exponential: The preset sensitivity is linear. I find that it is way too sensitive and really promotes oversteering. I like the rudder to be really soft for most of its throw to avoid oversteering.
 - Select the D/R and Expo submenu.
 - Assure that Channel: Aileron and Curve:1.
 - Leave Dual Rate at 100% for both inputs.
 - Change Expo to 60% for both inputs.

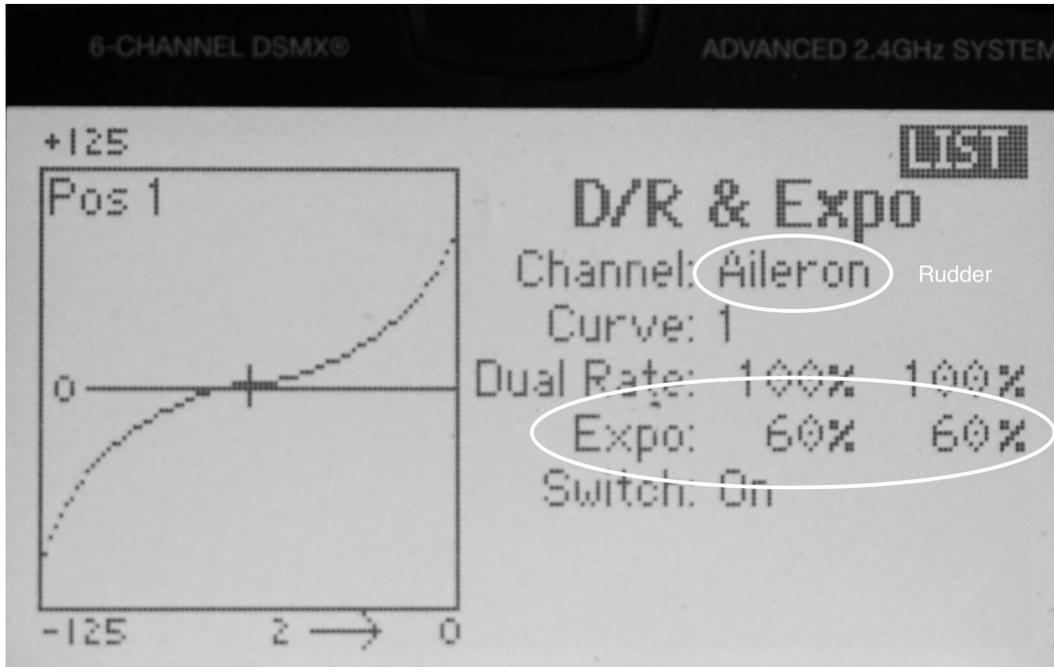


Fig. 9

- Try this out. If it is too soft for you, try Expo 20% and 40% to see which you like best.
 - Note that while initial steering is very soft, as soon as you get past about 10 degrees of rudder throw, it becomes very aggressive (i.e exponential), AND that the softer you set it initially, the more aggressive it will get after the initial 10 degrees or so.
- This is a great time to practice a little:
 - Put your boat on its side.
 - See how much stick travel is 2-3 degrees on each side, then how much is 10, 20, and 30 degrees.
 - I'm weird, but I do this before each time I sail.
- Rudder set-up is identical on my MM and my ODOM.
- Main and Jib Sheets (Left Stick):
 - Unlike the FlySky FS-i6 that I set-up in my other article, the DX6e allows for 3 separate sheet trim modes.
 - Normal is as it sounds, your normal upwind sheet position. On a Micro Magic that is the end of the mainboom at the edge of the cockpit floor. On an ODOM that is mainboom either at or just inside the transom corner.

- Pinch mode trims in about 5 degrees, so that on both the Micro Magic and the ODOM the mainboom is near midline.
- Puff mode eases the sheets 5 to 10 degrees (you can adjust this to your liking.)
- I use Normal mode 99% of the time, but switch to Pinch mode when I need to pinch up and away from another boat, pinch to a nearby windward mark, etc.
 - Note that your boat needs to be moving well before switching to Pinch mode. Your boat will not accelerate well from standstill sheeted in tight in Pinch mode.
 - Also, you need to remember to put Switch B into position 1 (normal) each time you turn on your transmitter, and particularly when you are tuning your boat.
- Puff mode works just great for very quick reaction to puffs.
- I set the three modes up so that only the sheet in endpoints are different, the sensitivity curves are identical for all three modes.
- Normal, Pinch, and Puff Modes:
 - Decide whether you want to use Switch B or Switch D. Both are 3 position switches, and both work well for this.
 - Switch B is on the upper edge of the transmitter. You can't see it well, but it is an excellent position to move with your forefinger while sailing.
 - Switch D's position is a little harder to reach while sailing, but the switch is visible.
 - I use Switch B.
 - Assure that Switch B is set to 0.



Fig. 10

- Assure that the sheet trim marking on the screen is midline.



Fig. 11

- Set up your rig so that you have mast rake, camber, and twist in exactly your usual settings, then adjust the main and jib sheets mechanically so that the slot is correct.
- Select Servo Setup, scroll past Travel, to THR (Throttle). Move the left stick all the way down and the upper number will be highlighted. Select it by pressing the scroll bar down. Adjust the mainsheet with either the scroll bar or mechanically to set the mainboom to a little off of the midline. (Pinch mode) Press the roller bar again so that the box stops flashing.



Fig. 12

- You need to make a decision concerning the maximum sheet eased setting for downwinds: MMs don't have sidestays, so that you can easily ease more than 90 degrees to sail by the lee. This is sometimes useful.



Fig. 13

- On the other hand you can set the sheets for optimal downwind running (usually about 85 degrees.) (The actual optimal downwind running boom angle depends on how much twist you are sailing with.)



Fig. 14

- Move the Left Stick all the way up and the THR adjustment box will shift to the lower number. Press the roller bar and the box will start flashing. Now scroll with the roller bar to set the maximum sheet out endpoint to main boom at either 85 degrees or 110 degrees. Exit the Servo Setup menu.



Fig. 15



Fig. 16

- Assure Switch B is in position 0. (This will become your Pinch mode.) Select the Throttle Curve sub menu.
 - Set 1 to 0%, 2 to 5%, 3 to 15%, 4 to 40% and 5 to 100%.
 - Leave Expo: Inh
 - Assure Curve: 0
 - Scroll to Switch and select by pressing the scroll bar, then scroll to Switch B and select by pressing the scroll bar.
 - Assure that the little rectangular bow bottom right shows that Switch B is in position 0.

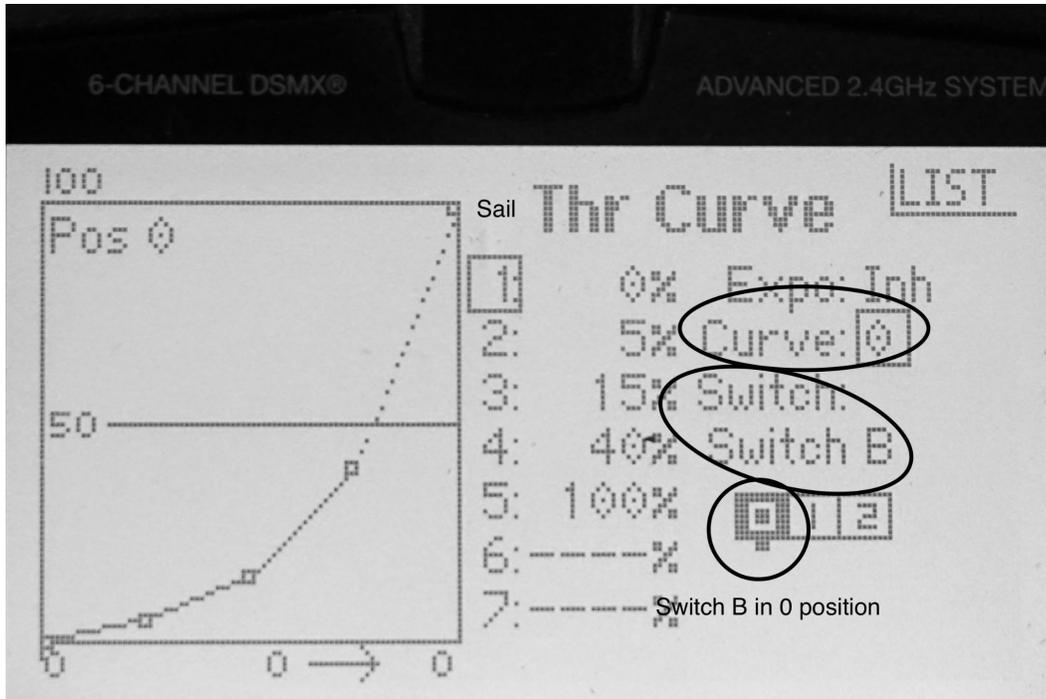


Fig. 17

- Now switch Switch B to position 1. (This will become your Normal mode.) On the throttle Curve submenu scroll to Curve and press the scroll bar to select. Scroll to 1 (Curve:1) and press the scroll bar to select. The submenu should show Curve: 1 and Switch B in position 1.
 - Set 1 to 3%, 2 to 8%, 3 to 18%, 4 to 43% and 5 to 100%.

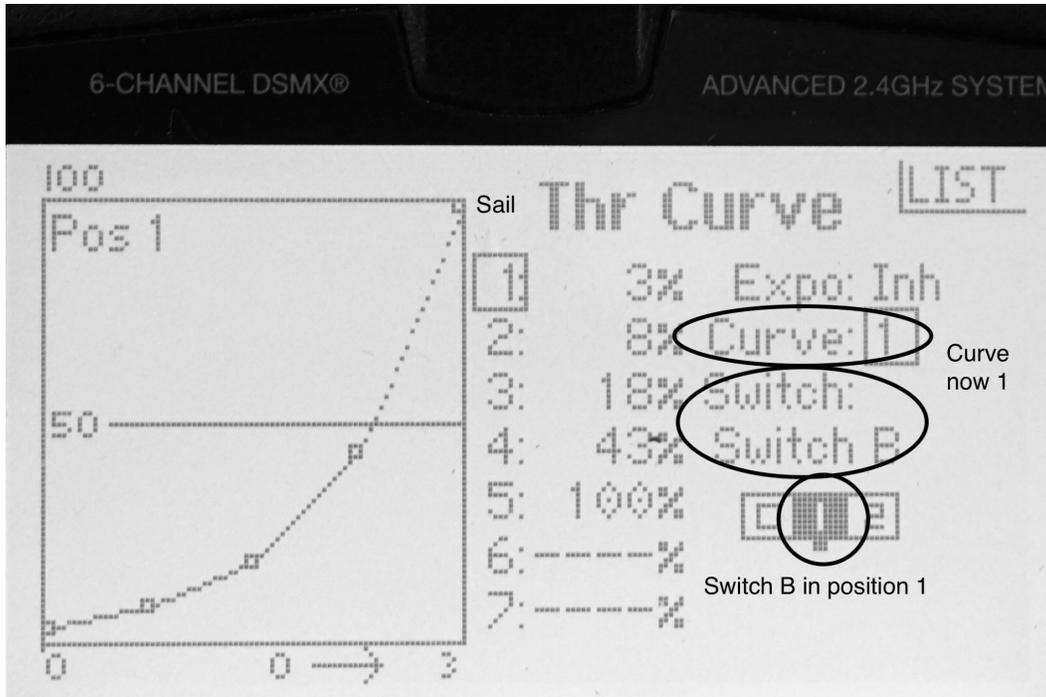


Fig. 18

- Now switch Switch B to position 2. (This will become your Puff mode.) On the throttle Curve submenu scroll to Curve and press the scroll bar to select. Scroll to 2 (Curve:2) and press the scroll bar to select. The submenu should show Curve: 2 and Switch B in position 2.
 - Set 1 to 8%, 2 to 13%, 3 to 23%, 4 to 48% and 5 to 100%.
 - Exit the submenu and you are done.

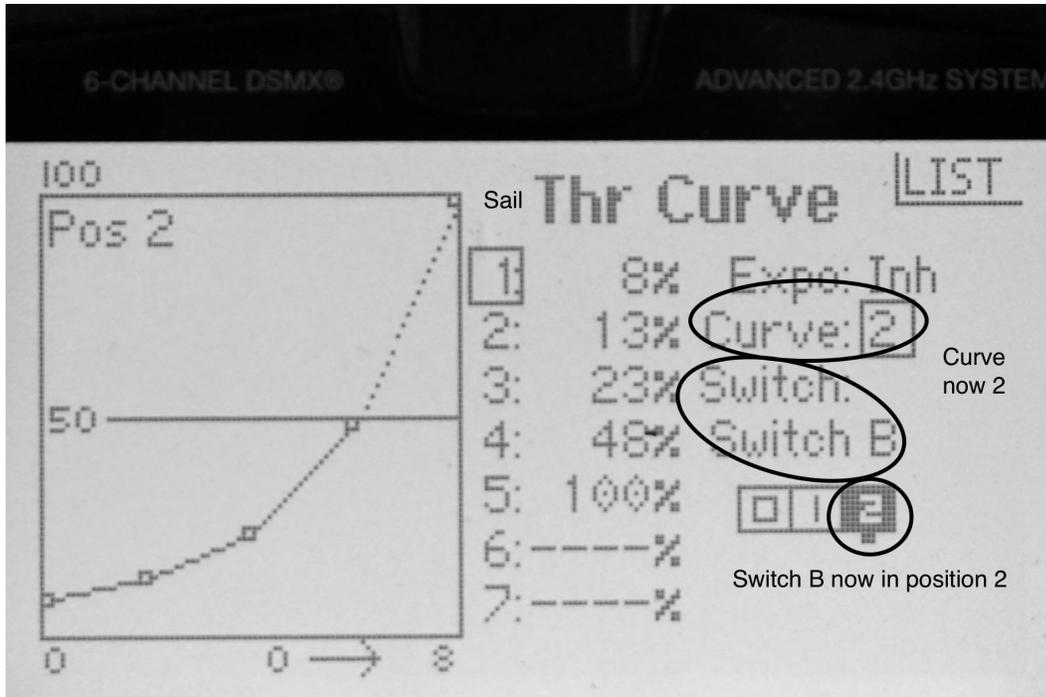


Fig. 19

- Note that if these settings are too soft you can try 1 to 0%, 2 to 10%, 3 to 25%, 4 to 50% and 5 to 100% for switch position 0 (Pinch), 1 to 3%, 2 to 13%, 3 to 28%, 4 to 53% and 5 to 100% for switch position 1 (Normal), and 1 to 8%, 2 to 18%, 3 to 33%, 4 to 58% and 5 to 100% for switch position 2 (Puff).
- And if you'd like more difference between Pinch and Normal modes you can try something like 1 to 5%, 2 to 10%, 3 to 20%, 4 to 45% and 5 to 100% for switch position 0 (pinch) (and obviously, consider pulling the base (Pinch) mainboom position further inboard before you do this.)
- And if you'd like more difference between Normal and Puff modes you can try something like 1 to 10%, 2 to 15%, 3 to 25%, 4 to 50% and 5H to 100% for switch position 2 (Puff).
- Obviously, you sail with Switch B in position 1 (Normal) until you are overpowered, then flick to position 2 (Puff) for the puff, and back to position 1 when it is time to sheet back in.

