

PROGRAMMING GUIDE FOR A SIX-SERVO SAILPLANE

SPEKTRUM DX6 - DX9 - DX18 G2

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The DX18 G2 takes the best from many different radios combining them to become one of the most feature laden sailplane radio to date. Some of the DX18 G2 sailplane features include: (with a comparison table for the DX9 and DX6)

- Two types of V-tail setup and V-Tail differential.
- Dedicated Motor Programming.
- Activation of Landing Mode with the Flap Stick.
- Six-servo wing programming.
- Ten Flight Modes.
- Telemetry for voltage, altitude and Data Logger.
- Each trailing edge servo can be independently trimmed in each flight mode and each wing type.
- For the Scale guy's, up to 18 channels and 15 non-dedicated mixes.
- Battery life in excess of 15 hours.
- Two transmitter antenna fixed at 90 degrees to each other to provide antenna diversity.
- Digital trim for the throttle stick so you can cross trim the elevator.
- Voices.
- Wireless connection between two radios for master / student buddy boxing.
- Left and Right Trimmers.
- Left and Right Sliders.

DX6	DX9	DX18
Yes	Yes	Yes
Yes	Yes	Yes
Sorta	Sorta	Yes
4	6	6
5	5	10
Yes	Yes	Yes
No	Yes	Yes
6/6	9/8	18/15
2.5 – 3.5 Hr	8-10 Hr	15-18 Hr
1	2	2
Yes	Yes	Yes
Yes	Yes	Yes
No	Yes	Yes
No	Yes	Yes
No	Yes	Yes

The DX6 and DX9 share the same core programming with the DX18, with a few less features. Because of the core programming, this DX18 G2 template will work on all three radios. Not all of the features in this template will appear on the DX6 and DX9. This Guide will try to identify the differences in **dark brown text**.

The programming provided by this template and guide is for a six-servo sailplane. The template does all the heavy lifting. The guide then shows you how to tweak the template for your aircraft. Using the template along with sufficient time spent on the aircrafts mechanicals will result in an aircraft that is nearly ready to fly!

Here is what the template includes:

- Elevator and Ailerons on the right stick.
- Rudder and Flaps on the left stick.
- Aileron to Rudder Mix.
- Left Trimmer trims flaps together. **Left Trimmer is not available on the DX6**
- Right Trimmer trims ailerons together. **Right Trimmer is not available on the DX6**

- Five flight modes are active, Speed, Thermal, Cruise, Launch, and Land.
- Four Dual rates have been preset. Speed Mode starts with the smallest rate, increasing to thermal then cruise and launch with the highest rates for Landing Mode.
- Camber (trailing edge) presets have been included for each Flight Mode. Trailing edge is drooping for launch, droops less for thermal, neutral for cruise / land and slightly up for speed.
- In addition to Camber on a Flight Mode Switch, Camber adjustment on the left slider is also active. Camber is adjustable with the slider in all modes except for launch. **Sliders are not available on the DX6.**
- Pulling the flap stick below 92% activates Landing Flight Mode. (Automatically changing rates, differential, aileron to rudder mix, flap to aileron mix, and activating the flap to elevator compensation.) **The kick points in the DX6 and DX9 are 33 1/3% and 66 2/3% of flap stick travel and cannot be changed from within those radios. But, the DX6 and DX9 will accept the 92% of this template. If you want to change the 92% kick point, the menu for changing the value is only found in the DX18. Find a DX18 and make the changes then load that .SPM into the DX9 and DX6 and the kick points will be changed.**
- A rough Flap to Elevator compensation curve is included in landing mode.
- Aileron to Flap Mix in Cruise Mode. (Approximately 20%)
- Differential for Aileron and Flaps for each Flight Mode.
- More down elevator in Speed and Cruise Mode so you can push over at the top of a zoom.
- More down elevator in Land Mode so you can push over at the spot.
- As a safety feature, the radio will not turn on until you retract the flaps and turn off the Launch Mode.
- Appropriate voices for each flight mode and a 10 minute count down timer,
- Elevator to Flap Mix (Snap Flaps)

The architecture of the DX software revolves around **Flight Modes**. If you want to use them all, the DX18 G2 has up to 10 flight modes to play with. This guide will only activate five of them. **DX6 and DX9 only have 5 flight modes.**

The DX series benefits from **automatically expanding menus**. The Sailplane Type you choose at the beginning of programming a new model determines the depth of the subsequent menus. When you select a type of sailplane, the transmitter only displays the programming necessary for that Sailplane Type. If you select a single servo wing, many features are simply not available, because Aileron Differential, Camber Presets or the ability to use Ailerons to double as Flaps cannot be done with just one servo. Select a two Servo wing in Sailplane Type and the menu expands to include these features. The expanding choices can also occur in other locations in the programming. If you then choose a two aileron, two-flap wing, differential appears in subsequent features, but it is only available for ailerons. If, under Mixes, you elect to mix Ailerons to Flaps, a new line for flap differential appears. If AIL > FLP is active in only one Flight Mode, Flap Differential only appears under that Flight Mode. If you select a six servo wing, a new line for Tip Aileron differential appears. Pretty cool. **Six servo wing is not available on the DX6**

If you are concerned about the voltage in your aircraft while it is still in the air, the DX Series provides **telemetry** for your sailplane. Currently, the telemetry that is of interest to sailplane pilots includes battery voltage, altitude, Data Logger information, Variometer, GPS and a G Load sensor. You can see the quality of the reception for each independent receiver antenna, altitude, battery voltage, location or G Load in real time from your transmitter and/or hear a voice stating the information.

Battery charging is built into the DX line of radios, but it only charges at 200 mah. That means no more rapid field charging at the last minute. The up side is DX18 battery lasts from 15 to 18 hours on a single charge! **The DX9 lasts from 8 to 10 hours, the DX6 comes with AA alkaline batteries but a Lithium Ion upgrade is available.** The charge port on the transmitters is not polarity-dependent. Never connect an external battery charger to your DX Series transmitter.

DO YOU FLY TWO AIRPLANES AT A CONTEST? The DX series has a feature called Direct Model Access. While the transmitter is powered up, you can go directly to Model Select by pressing the Clear and Back buttons at the same time.

The DX18 G2 offers **unprecedented flexibility**. Virtual mixing, any stick, slider or trim can be turned into a switch, any switch position, or combination of switches and sticks can be mixed, 10 flight modes, 15 non dedicated mixes, 18 channels, just to name a few. **The DX6 and DX9 offer fewer features.** This flexibility allows more than one method to achieve a particular result. Because two different programming methods may conflict with each other, use this guide from the beginning. If you start in the middle because you have already done some programming, you will likely run into a conflict and not even know it. If a conflict occurs, it is WAY easier to start with a fresh template than to try to figure out where the problem is.

A note on switches. In the digital world, an ON or OFF designation no longer exists. Instead, each position of the switch is assigned a numerical designation. A two position switch designations are 0 and 1. A three position switch designations are 0, 1 and 2. Each independent switch position can be given a different value. Mixing A to B makes a good example of how this works. If position 0 is given a value of 0, in the digital world, this results in **no mixing**. If position 1 is assigned a value of 50 and position 2 is given a value of 100, the two remaining positions will mix A to B at 50% and 100%. For those that still need an OFF switch just set the value to -0-.

In addition to the switches, the DX18 also allows you to **turn any Stick, trim, knob or slider into a switch** with assignable “kick” points. **The DX6 does not have L or RTrim, siders or a knob. Kick Points are only adjustable from within the DX18.** This flexibility allows the Flap Stick to become a Landing Mode switch, automatically switching to Landing Mode by pulling down the Flap Stick.

All of the functions used in this guide and the template have a default value. The values have been included to make sure everything moves as soon as you load the template and manually adjust the mechanical linkages. The amount of movement may not be correct or the direction may be backwards, but everything should move. **IF YOU FOLLOW THE SECTION ON SETTING UP THE MECHANICALS, IT WILL BE CLOSE.**

IT IS IMPORTANT TO UNDERSTAND THAT THE VALUES IN THE TEMPLATE ARE GENERIC IN NATURE AND YOU MUST MODIFY THE VALUES FOR YOUR AIRCRAFT.

IF YOU SPEND A LOT OF TIME SETTING UP YOUR MECHANICALS, YOU MAY ONLY NEED SOME TWEAKING.

Because Flight Modes are active, each screen may have as many as five independent Flight Mode versions. If you see a Flight Mode name on any screen, the Flight Mode can be changed by simply flipping a Flight Mode switch or pulling down on the Flap Stick. On screens where a Flight Mode name appears, all the values on that page are **ONLY** for that Flight Mode.

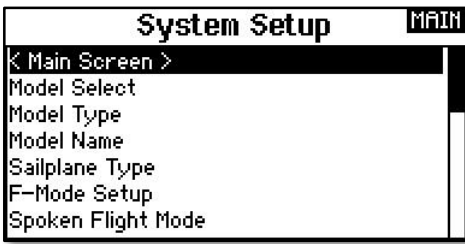
The guide covers two phases. Both phases are separate but intertwined. The first phase is setting up the mechanicals of your sailplane. Pushrods, linkages, clevis, control horns and hole placement, servo horn angle and hole placement and so on. Spend time on your mechanicals. If the mechanicals are well done, the second phase, setting up your radio is much, much easier.

These two phases are divided into five parts:

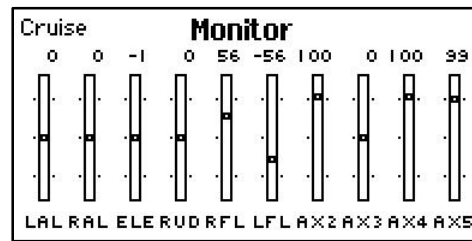
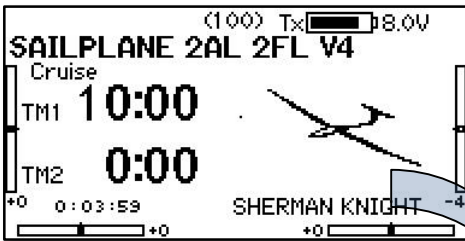
- Part 1 is downloading and renaming the template.
- Part 2 is composed primarily of the SYSTEM SETUP menu, which unless you want to change those functions, most of you will skip.
- Part 3 involves setting up your mechanicals. (**Spend time here**, you won't regret it.)
- Part 4 is composed primarily of the FUNCTION LIST menu, which modifies the values in the radio for your particular aircraft.
- Part 5 involves the final requirement before you fly for the first time.

Programming the DX18 starts with two primary menus.

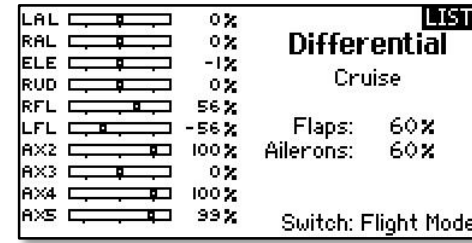
Access **System Setup** by holding down the Scroll Wheel while turning the DX on.



The second menu named **FUNCTION LIST**, is accessed by turning the radio on first and waiting for the main display to complete loading. Travel to the Monitor screen by scrolling the wheel.



Click the scroll wheel to travel to the Function List.



Navigate the menus and sub-menus with the scroll wheel. Scroll the wheel to move the cursor around the screen and once over the item, push the wheel until it clicks. Scroll and click, scroll and click and scroll and click.

Below each of these primary menus are sub-menus and sub-sub-menus. Turn-by-turn navigation instructions are represented throughout this guide as:

PRIMARY MENU > SUB MENU > **SUB SUB MENU** > Item to be Programmed.

An example would be:

FUNCTION LIST > SERVO SETUP > **SUB TRIM** > Select ELE (elevator)

The bold item in the turn-by-turn navigation is the name that appears at the top of the screen for the items that may need changing or just tweaking.

At times, there may be several screens for a particular feature. If NEXT appears in the lower right corner there are multiple screens for the feature, click on it and you will go to the next screen. From that screen, you can back up by selecting PREV in the lower left corner. Selecting MAIN or LIST in the upper right hand corner, returns you to either the System Setup or the Function List primary screens. Navigation of a function with multiple screens is demonstrated by the following example:

SYSTEM SETUP > F-MODE SETUP > Next > Next > **FLIGHT MODE TABLE**

This template assumes that all wing servo output gears 1) point towards the wing tip and 2) are closer to the spar than the trailing edge. It also assumes that all wing servo arms are bottom wing and all wing control surface control arms are top mounted. If your setup is different, you can easily modify the template, it just takes a little more work. You may have to reverse servos, change flap SubTrim from a negative value to a positive one and change some positive values to negative and some negative to positive throughout the rest of the programming.

The guide is organized in a sequence. Follow the sequence for programming your aircraft. This guide does not take you through all the available programming; it only uses those features that are necessary for a 6-servo sailplane.

What do I do if I Just Want to Play Around with the Radio, Before I Start Programming?

Some of you will want to play around with the menus until you become comfortable with them. If you do, you need to turn on all of the expanded menus discussed above or you might conclude that the DX transmitter is missing a bunch of stuff. Because the default Sailplane type is a single servo wing, standard tail and no motor, expanding menus only shows you what you need to see and in the default there isn't much. So, simply tell the radio you need to see everything. In System Setup select Sailplane as an aircraft type. In Sailplane type, select a six-servo wing (4 servo wing with the DX6), v-tail and a motor. In the Function List, select Mixing, under mix AIL > RUD and AIL > FLP insert some values and set the switch to ON.

The guide and standard template will activate some more features (such as RTrim for Flaperon trim, LTrim for Flap trim (DX9 and 18 only), but changing the default will get you nearly there. Remember, even if a feature is available, you must select a switch and insert a value or it may not work.

Have Fun

A handwritten signature in black ink, appearing to read 'SK', with a long horizontal line extending to the right.

Sherman Knight

Part 1 – The Template

STOP – BEFORE USING YOUR TRANSMITTER.

Before going any further, visit the Spektrum Community website at [community at spektrumrc.com](http://community.spektrumrc.com) to register your transmitter and download the latest AirWare firmware and voice updates.

DOWNLOAD THE TEMPLATE. The most recent Guide and Template can always be found here. <http://www.rcgroups.com/forums/showthread.php?t=1679092#post21994603> Download the Guide and the template (as Sailplane 2AL 2FL V4.0.SPM).

1. TRANSFER THE SIX-SERVO TEMPLATE TO THE RADIO.

Download and transfer the file named “Sailplane 2AL 2FL V4.0” to an SD card. Remove the SD card from the computer and Insert the card into the SD card slot on the radio. **Location varies from radio to radio.**

It is recommended that the first time you turn on the system, that the servos are not installed or the linkages are disconnected, at least for the flaps.

SYSTEM SETUP > TRANSFER SD CARD > **SD CARD MENU**

- Scroll over Select Options and click. Scroll to Import Model and click. Scroll to the file named “Sailplane 2AL 2FL V4.0” and click. On the next screen, select IMPORT.

2. SELECT THE MODEL. Now that it is imported, you still have to select it.

SYSTEM SETUP > **MODEL SELECT** > Select “Sailplane 2AL 2FL V4.0”

3. COPY THE SIX SERVO SAILPLANE TEMPLATE TO ANOTHER MODEL.

SYSTEM SETUP > MODEL UTILITIES > **COPY MODEL**>

- This feature copies the model that is currently loaded into the DX to a new model.
- Highlight the box after “To” and select the name for the new model.
- Click copy.
- Leave the File named “Sailplane 2AL 2FL V4.0” unchanged so you can use it again in the future.

4. CHANGE THE MODEL NAME. (you just copied)

SYSTEM SETUP > **MODEL NAME** > Select the Characters for the Name.

- The model name can be up to 25 characters long..
- Recommendation: Copy (Model Copy) the template to a second available model memory so you may copy this standard template for use in the future.

5. ORGANIZE THE MODELS IN MEMORY.

SYSTEM SETUP > MODEL UTILITIES > **SORT MODEL LIST**

- The models in memory can be rearranged.
- Scroll and click on the model you want to move.
- Then scroll the model to its new location and click.

6. ORGANIZE THE MODELS BY CATEGORY.

- Create a new model that will work as a category heading such as F3J, TD, Slope, HLG or Quad Copter.
- Then move the models around arranging them by category.

7. DO YOU FLY TWO AIRPLANES AT A CONTEST?

The DX Series has a feature called Direct Model Access. While the transmitter is powered on, you can go directly to Model Select by pressing the Clear and Back buttons at the same time. Then select the new model.

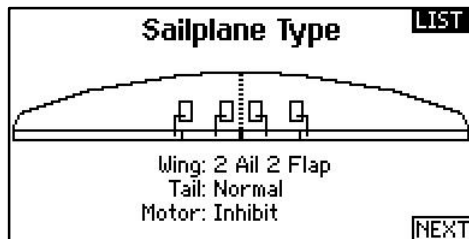
Part 2 – System Setup

The SYSTEM SETUP portion of the guide may not need any modification if you have a six-servo sailplane. If the default setting are acceptable, you may move directly to Part Three.

1. CHANGING THE NUMBER OF WING SERVOS, V OR CROSS TAIL, AND MOTOR.

SYSTEM SETUP > **SAILPLANE TYPE** > Scroll over what you want to change, click.

Default:



- If you want to program an aircraft with a different configuration, you must change it here **FIRST**, before you do any programming. Otherwise, the features you are looking for may not appear in the programming. If you change the Sailplane Type after you have done some programming, you may lose your work.
- No matter which Wing, Tail or Motor combination you choose, to determine which servo to insert in which slot on the receiver, go to System Setup > Channel Assignments > Rx Port Assignments. You can also determine which servo plugs into which servo slot on the Rx by looking on a monitor screen. From the main screen, simply scroll to the right.
- The available sailplane types include:
 - Wing: 1-Servo
 - Wing: 2 Aileron
 - Wing: 2 Ail 1 Flap
 - Wing: 2 Ail 2 Flap (This Guide covers this wing)
 - Wing: 4 Ail 2 Flap
 - Tail: Normal (This guide covers this tail)
 - Tail: V-Tail A
 - Tail: V-Tail B
 - Motor: Select from a menu of possible means to control a motor.

2. MAIN SCREEN AVATAR

SYSTEM SETUP > SAILPLANE TYPE > Next > **Sailplane Image** > Scroll and click.

- There are several avatars available and include an electric sailplane and a Hand Launch Glider.

3. FLIGHT MODES.

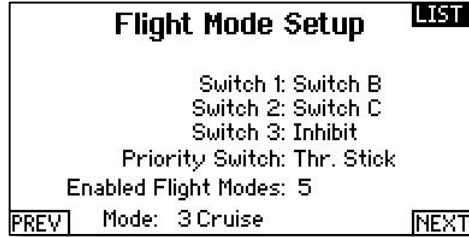
Includes numbers of modes, mode names, switch selection and switch override. Setting up Flight Modes consists of several separate screens. Those screens are:

- **F Mode Wizard** (This screen only shows up on a fresh and empty template so it will not show up in this setup guide)
- **F Mode Setup** (This screen selects the switches for selecting flight modes)
- **Analog Switch Setup**
- **Priority Switch** (This screen determines how the priority witch will override the other flight mode switches)
- **Spoken Flight Mode** (This screen assigns voices to each flight mode)
- **Flight Mode Table** (This screen allows you to select any flight mode for any switch position)

4. CHANGING THE FLIGHT MODE SWITCHES.

SYSTEM SETUP > F-MODE SETUP > FLIGHT MODE SETUP

Default:



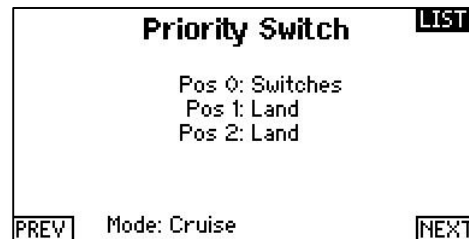
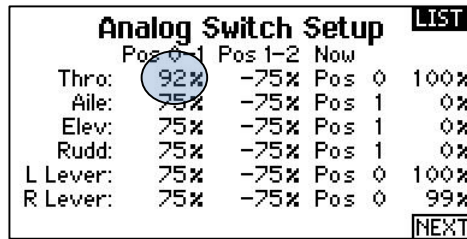
- This screen selects the switches that activate the different Flight Modes. You can change the switches by scrolling over them, click, and then scroll again to select from a list. Each switch is identified on the face of the radio.
- This screen also selects whether or not you want a switch or stick to override all other flight modes with a specific “priority switch.” This template selects “throttle stick” so that when you pull the flaps stick down it automatically selects Landing Mode. To disable the flap stick switching to the Landing Mode automatically, change Throttle Stick to Inhibit.
- Activate all 10 Flight Modes by assigning a switch to Switch 3.

5. PRIORITY SWITCH and ANALOG SWITCH SETUP **Analog switch DX18 Only.**

SYSTEM SETUP > ANALOG SWITCH SETUP

SYSTEM SETUP > F-MODE SETUP > FLIGHT MODE SETUP > Next > PRIORITY SWITCH

Default:

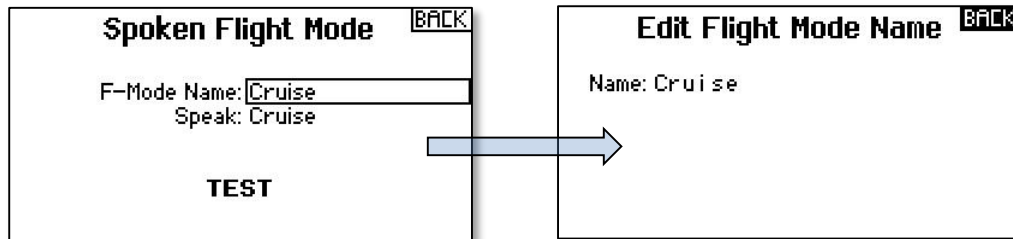


- These two screens are used to convert the flap stick into a switch. Here, the flap stick turns on Landing Flight Mode as soon as you pull down the flap stick.
- Analog Switch Setup (only found on the DX18) creates a “kick point” switch position anywhere along the arc of the Flap Stick travel. In this case the kick point is at 92% of Flap Stick Travel.
- To change the location of the kick point on the Flap Stick, move the cursor over Thro: 92%. (under the Pos 0-1 column) As you move the Flap Stick up and down, a percentage on the far right of that line changes. Move the stick to the desired percentage and click the scroll wheel which will update the value.
- The Priority Switch screen instructs the radio what occurs in each of the three switch positions. If the Flap Stick is above 92%, (position 0), this screen instructs the DX18 to use the Flight Mode Switches to determine the current flight mode. If the Flap Stick position is less than 92%, (position 1 & 2) this screen instructs the radio to change the current Flight Mode to Landing Mode, overriding the Flight Mode Switches.
- A template programmed with a DX18 will maintain this value when used in the DX9 and DX6.

6. CHANGING FLIGHT MODE NAMES.

SYSTEM SETUP > SPOKEN FLIGHT MODE > **Spoken Flight Mode**

Default:



- Five Flight Modes are setup in this template. If you wish to change the flight mode name, scroll over “F-Mode Name” and move the Flight Mode switches to a position you want to change. Edit the Flight Mode name by clicking on it and you will travel to the Flight Mode Name page. The name can be up to 15 characters long. Pay special attention to the first four letters of the new name. Only the first four letters appear in the Flight Mode Table so those first four characters should be descriptive of the Flight Mode.
- Changing the Flight Mode names will automatically change screens throughout the rest of the programming.

7. THE VOICE FOR FLIGHT MODES.

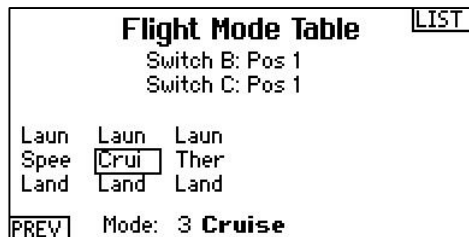
SYSTEM SETUP > SPOKEN FLIGHT MODE > **Spoken Flight Mode**

- Scroll down to Speak and click. Scroll and click on the voice you want to assign to the Flight Mode.
- Verify you selected the right voice by scrolling a click TEST.

8. FLIGHT MODE TABLE – CHANGING THE SWITCH CONFIGURATION.

SYSTEM SETUP > F-MODE SETUP > FLIGHT MODE SETUP >Next > Next > **FLIGHT MODE TABLE**

Default:

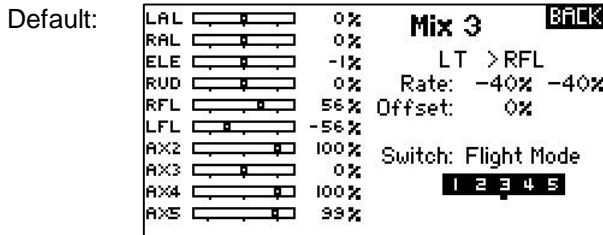


- Flight Mode Table. Scroll the box over the matrix of names. Move both of the Flight Mode switches to the neutral (Cruise) position. The Flight Mode name in the middle of the 3 by 3 matrix should have the box around it.
- Click the scroll wheel and the box will start to blink. Now scroll through the possible flight mode names you came up with earlier. Click on the one you want to assign when both switches are in the middle position. First switch position is done. (typically this is Cruise)
- Move a Flight Mode Switch to a different position and the box over the center flight mode should move to a new location. Click the scroll wheel until the box starts blinking. Scroll through all the different flight modes you have already named. Click on the one you want to use for that switch position. Second Switch position done. Continue for the remaining three.
- In this example, there are 5 flight modes but nine boxes in the Flight Mode Table. You are also using two switches, each with three positions. Some switch positions such as launch and land override all other switch positions.

- All you are doing here is choosing which Flight Mode is assigned to a particular switch position. This screen then directs the radio to use these switch positions when Flight Modes are chosen as the Switch later in features found in the Function List.

9. LTRIM TO TRIM THE FLAPS. (not available on the DX6)

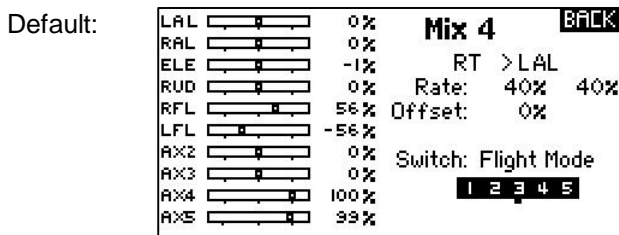
FUNCTION LIST > MIXING > P-MIX 3: LT > RFL (Left Trim to Right Flap)



- When RFL is selected as a slave, both flaps move in the same direction.
- When LFL is selected as a slave, both flaps move in the opposite direction.
- Rotate the roller to highlight the desired Flight Mode at the bottom of the screen. Press the roller to darken the box activating the mix for that Flight Mode. You can darken more than one Flight Mode position. If all the boxes are darkened, the mix function is always active. If all the boxes are light, the function is always off.
- Recommendation: Darken all boxes or only darken the Launch Mode making this mix only available in launch Mode.

10. RTRIM TO TRIM THE AILERONS. (not available on the DX6)

FUNCTION LIST > MIXING > P-MIX 4: RT > LAL (Right Trim to Left Aileron)



- When LAL is selected as a slave, both ailerons move in the same direction.
- When RAL is selected as a slave, both ailerons move in opposite directions.
- Rotate the roller to highlight the desired Flight Mode at the bottom of the screen. Press the roller to darken the box activating the mix for that Flight Mode. You can darken more than one Flight Mode position. If all the boxes are darkened, the mix function is always active. If all the boxes are light, the function is always off.
- Recommendation: Darken the same Flight Mode boxes here as the mix above.

11. SEPARATE TRIM SETTINGS FOR EACH FLIGHT MODE

SYSTEM SETUP > TRIM SETUP > Select Trims



- There are two options. Selecting “common” will make that trim the same for each Flight Mode. Selecting “F Mode” will make the trim settings for each Flight Mode separate from all other Flight Mode trims.
- Elevator Trim for each Flight Mode will most likely be different making F-Mode the default for elevator.
- Trailing edge trim (Left and Right Trimmer) for each Flight Mode will most likely be different making F-Mode the default of Left and Right Trim.
- All others are set to Common because they rarely differ from Flight Mode to Flight Mode.
- **Left and Right Trimmer unavailable on the DX6.**

12. ELEVATOR TRIM ON THE LEFT STICK

SYSTEM SETUP > TRIM SETUP > Select Trims:

Default:

- Trims: Normal.
- By changing “Trims:” from Normal to Crossed, you can move the Elevator Trim to the Flap Stick trim for making elevator trim adjustments without moving your thumb from the right stick. This also crosses Aileron Trim with Rudder Trim.

13. TRIM SENSITIVITY.

SYSTEM SETUP > TRIM SETUP >

Default:

Trim Setup		LIST
		Trim Type
Spoiler:	3	Common
Aileron:	3	Common
Elevator:	3	F Mode
Rudder:	3	Common
Left Trimmer:	2	F Mode
Right Trimmer:	2	F Mode
Trims: Normal		

- The number immediately after the trim allows you to change the sensitivity of each click of trim. A value of 1 is very fine and a value of 10 is very coarse. The radio ships with a factory default of 5 for all trims. There are few servos that can actually resolve a value less than three. A value less than 3 may require a significant number of click to make large changes in trim. This template changes the default setting to 3 for all trims.
- **Left and Right Trimmer unavailable on the DX6.**

14. WARNINGS

SYSTEM SETUP > WARNINGS.

Default:

Warnings		LIST
Alarm: Voice		
Spoiler: Under 92%		
Gear:	Flight mode:	1 2 3 4 5
Motor:		
Chan: Inhibit		
Chan: Inhibit		

WARNINGS
FLIGHT MODE
Land

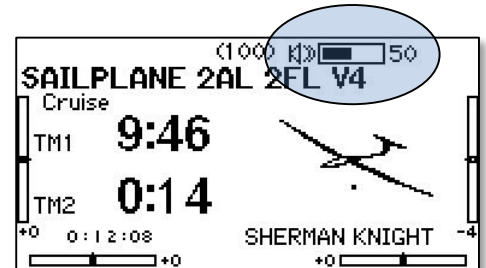
- If the radio is set to Launch Mode or Landing Mode by switch or Landing Mode by Flap Stick, the radio will not turn on and a display will be shown. You will be directed to take the radio out of

Launch or Land Mode before the radio will start. The purpose is to reduce flaps unintentionally striking the ground.

- Warnings on the left is the setup screen for warnings that occur when the Transmitter is turned on.
- If the Flap Stick is below 92% or the Flight Mode switch is in landing mode, the transmitter will not turn on but will display the WARNINGS on the right screen.
- The warnings will not go off until the Flap Stick is at the top and/or the transmitter is not in landing mode.
- To defeat these warnings, on the Warnings page on the left, highlight Flight Modes 4 and 5 and click until the box changes from dark to light.

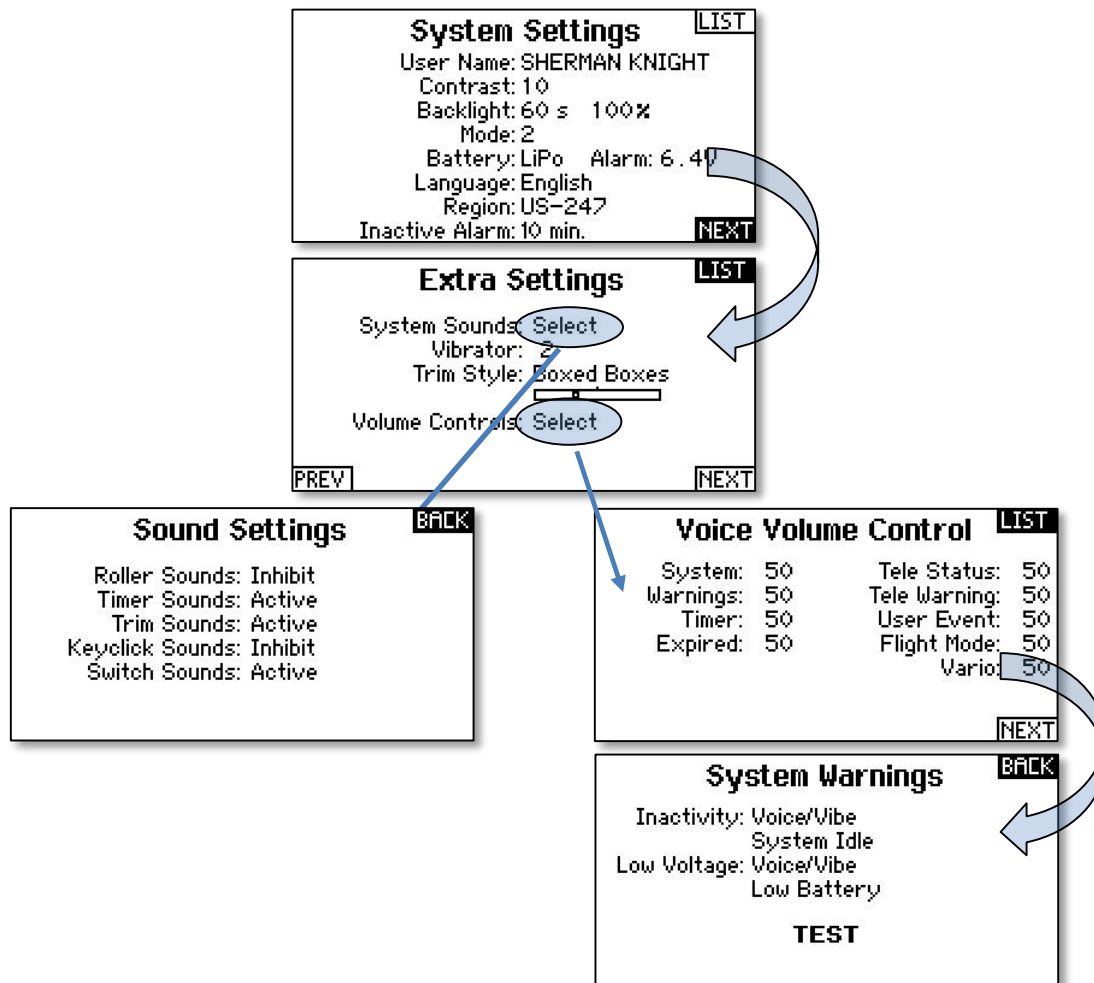
15. VOLUME

- Changing the volume on the DX series is simple. From the main screen push the back button and the battery voltage indicator will change to a volume indicator. Scroll the wheel until you obtain the volume you need and click and the volume indicator will return to the voltage indicator.



16. DEFAULT SOUNDS, ALARMS, SCREEN QUALITY AND TRANSMITTER VOLTAGE ALARM.

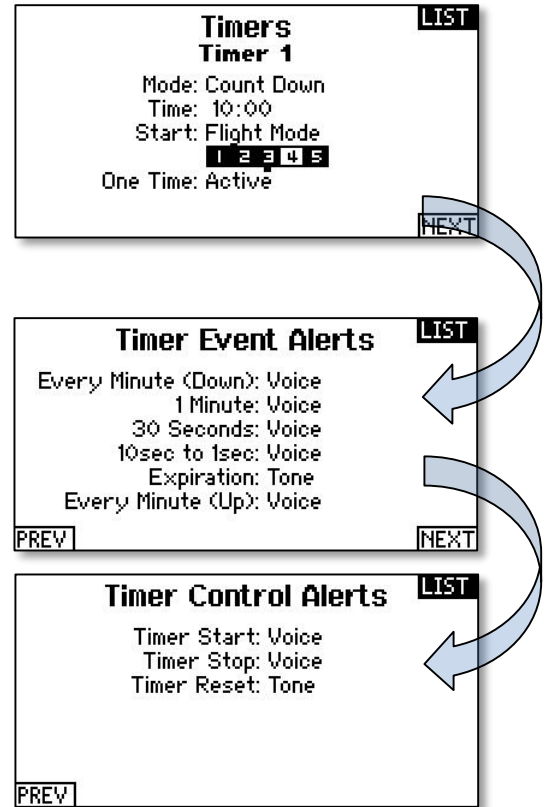
SYSTEM SETUP > SYSTEM SETTINGS



- In System Setting, you can highlight and change each item except for region.
- In Extra Settings you can highlight and change the strength of the internal vibrator and the style of the trim boxes on the main screen.
- In Extra Settings, after System Sounds scroll over and click Select.
- In Sound settings, you can make delete some sounds. The click each time you roll the scroll wheel is inhibited in this template.
- In Extra Settings, after Volume Controls scroll over and click Select.
- Voice Volume Control will automatically add and subtract features as they are added or subtracted from the feature set. le Vario only appears if telemetry is active and the sailplane has a vario installed.
- System Warnings allows you to select mechanical vibration, mechanical sound or a voice for low Transmitter battery or just a long period or inactivity.

17. TIMER

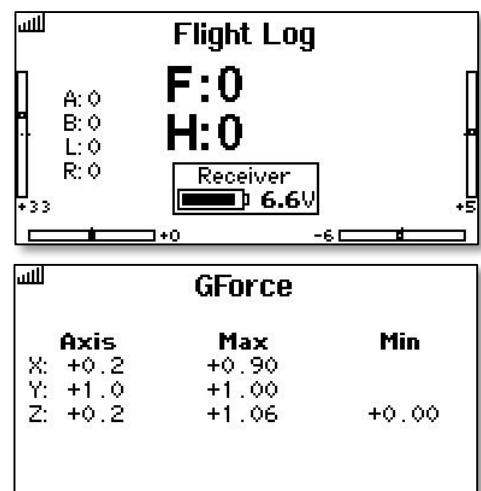
- The new timing information available by voice is pretty cool.
- There are two timers. The first is a countdown from 10 minutes and the other just counts up.
- The screens to the right set a 10 minute countdown. The timer is stopped in Launch Mode (Flight Mode 4) and as soon as you flip out of Launch Mode into any other Mode, the timer starts.
- The Timer Event Alerts are very straightforward. It is as close to a F3J count down as this version is capable.



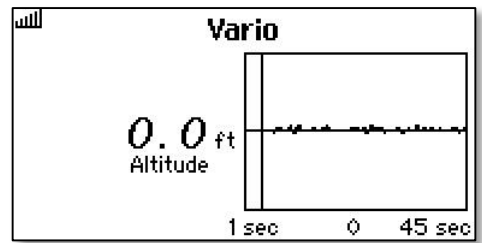
18. TELEMETRY

Function List > Telemetry > **Telemetry**

- Install the DM1000 DSMX telemetry module in the aircraft and plug it into the data port on the receiver. (If your receiver does not have a data port, telemetry is unavailable) No additional modules are necessary for battery voltage and data logger information because they are built into the DM1000 telemetry module.
- Plug the altitude (or any other) module into to the TM1000.
- Bind the receiver by pushing the bind button on the telemetry module, not the receiver.
- This template is already configured for Rx voltage, data logger and altitude.
- The telemetry module draws its power from the receiver. Turning on the receiver also turns on the Telemetry Module.

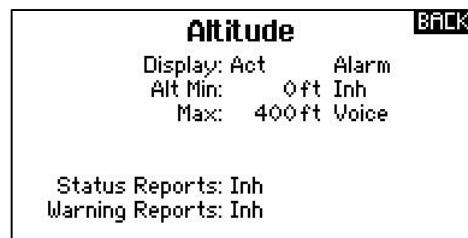
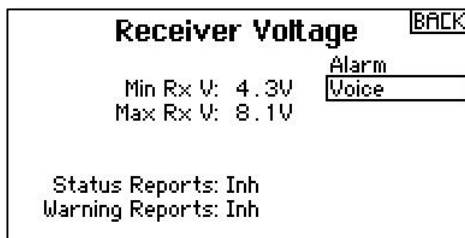


- The screens showing the telemetry information are available from the Main Screen by simply scrolling the scroll wheel. Just turn on the Tx and Rx and everything appears.
- The screens in the DX transmitters that show voltage, data logger information and altitude are only activated when the DX transmitter recognizes a telemetry signal from the aircraft. If the DX transmitter does not recognize a telemetry signal, (receiver off) the telemetry screens are not available on the DX transmitter.
- If you want to add a module, simply go to the Telemetry screen, scroll over ANY "Empty" slot and click. Scroll until you see the module you are installing. A second screen will appear allowing you to set min/max alarms for that module.
- It really is that simple.



19. TELEMETRY VOICES.

- Voices are available for all the telemetry sensors.
- The default options for all sensors is inhibit. Scroll, click and scroll through the various options of sounds, vibration and voice and click.
- It is VERY easy to turn on all the possible sounds, but you will be overwhelmed with too much information. Pick and choose just what you need.



Section 3. – Setting up the Mechanicals.

SPEND SOME TIME ON YOUR MECHANICALS – IT WILL BE WORTH IT!

Because the servos arms are often buried in the wing, changing the angle of the servo arm after it is installed is difficult, especially if you glue your servos in.

This guide assumes that the servos, servo arms and control surface horns are not installed. At a minimum, no linkages are connected.

1. PREPARE AND INSTALL CONTROL SURFACE HORNS. (Servos not installed)

- Build the two flap horns as identical as possible.
- Using the hinge line as a base, insure the clevis hole is same distance above the hinge line on both horns.
- Using the hinge line as a base, insure the clevis hole is the same distance, front to back, from the hinge line both horns.
- Repeat for the ailerons.
- It is surprising how much easier it is to program the radio if opposing linkages are matched.

2. CONNECT THE ELECTRONICS. - What servo goes where?

- With the wide array of possible wing, tail and motor configurations, see SYSTEM SETUP > CHANNEL ASSIGNMENT > **Rx Port Assignments** to determine which servo or ESC to plug into which slot on the receiver. (ignore the names on the receiver)
- As you change the configuration of your aircraft in Sailplane Type, the Rx Port Assignment screen reconfigures itself automatically.
- Servo port assignments are also shown on each Monitor.

3. BIND THE TRANSMITTER TO THE RECEIVER. - (Servos are connected to the receiver but not installed in the aircraft)

- Set LTrim and RTrim to the center points. (use the visual bars on the primary screen)
- Move flight mode switches to Cruise (Switch B and C to the center)
- Move the camber slider towards the front of the transmitter
- Move the Flap Stick to the top.

SYSTEM SETUP > BIND > Follow the instructions on the screen.

4. PREPARE AND INSTALL SERVO ARMS – If the servo arms are not easily removable from the servo, do this step before the servos are installed.

- For opposing servos, (aileron and flap) the servo arms must be the same length. Servo arms from 7 to 11 mm from center of screw to hole typically work. It is desirable, but seldom possible to have aileron and flap servo arms of the same length.
- Ailerons with a top mounted aileron control horn. Mount the servo arm pointed slightly towards the trailing edge (TE).
- Ailerons with a bottom mounted aileron control horn. Mount the servo arm pointed slightly towards the leading edge (LE).
- Flaps with a top mounted flap control horn. Mount the servo arm pointed slightly towards the leading edge (LE).
- Flaps with a bottom mounted flap control horn. Mount the servo arm pointed slightly towards the trailing edge (TE).

5. CHECK SERVO MOVEMENT. - (Turn everything on – Servos are connected to the receiver but not installed in the aircraft)

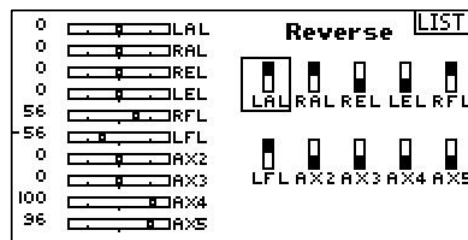
- Move flight mode switches to Cruise (Both three-position switches to the center), camber slider towards the front of the transmitter and Flap Stick to the top.
- Slowly move the right stick to confirm that the servos are moving in the correct direction. If not, enter the servo reversing function and change the servo arm as necessary.
- Repeat for the Rudder stick.
- Repeat for the Flap Stick.

6. SERVO REVERSE

MAIN > FUNCTION LIST > SERVO SETUP > **REVERSE** > Select Control Surface. (Servos are connected to the receiver but not installed in the aircraft)

Default:

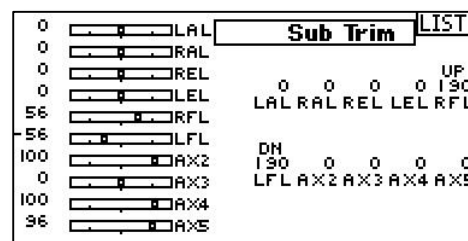
- Left Aileron, Right Aileron, Right Flap and Left Flap are UP.
- Elevator and Rudder are DOWN.
- There are several sub sub menus as part of the servo setup screen.
- When first selected SERVO SETUP you see the TRAVEL screen.
- Scroll over TRAVEL and click.
- Scrolling the wheel will run through TRAVEL, SUBTRIM, REVERSE, SPEED, ABSOLUTE TRAVEL and BALANCE.
- Select REVERSE, move the sticks slowly, and reverse if necessary.



7. MATCH OPPOSING SERVO ARM ANGLES WITH SUBTRIM. (Servos not installed)

MAIN SCREEN > FUNCTION LIST > SERVO SETUP > **SUB TRIM** > Select Control Surface

- This step should only require MINOR tweaking.
- Place the two Aileron and the two Flap servos output gear to output gear. (this can only be done if the servos are not installed) Mechanically move each servo arm to match their angles as close as possible. Typically, the servo arms will be close, but do not match exactly. To **fine tune** the arms so they match, enter the SubTrim menu. Adjust servos so the angles are matched on opposing servo arms. Split the value difference whenever possible. As an example, if it takes a -20 value to match servo arms, back that servo to -10 and adjust the other servo to +10.
- Flap SubTrim is preset to 190 to ensure full the greatest flap movement possible. If changing the flap SubTrims is necessary, split the difference in values so they average 190.



8. INSTALL SERVOS AND CENTER THE CONTROL SURFACES MECHANICALLY.

- Set LTrim and RTrim to the center points. (LTrim and RTrim are unavailable on the DX6) (use the bars on the primary screen)
- Move flight mode switches to Cruise (Switch B and C to the center)
- Move the camber slider towards the front of the transmitter.
- Move the Flap Stick to the top.
- Install Servos in the aircraft, and with the system ON, this keeps the servos centered while adjusting the linkages.

- At this time, adjust the control surfaces linkages (adjusting clevis in or out) until each control surface is in its neutral position. Neutral for the wing surfaces is a smooth continuous curve across the top with no kink or bends at the control surface hinge line. **Adjusting the mechanicals at this time is IMPORTANT.** Although this is a computer radio, doing a good job here will save a lot of time later.
- ADJUST LINKAGES TO CENTER THE CONTROL SURFACES. DO THIS BEFORE YOU TRY TO DO THE SAME WITH SUBTRIM. DO NOT SKIP THIS STEP!
- Centering a control surface is different than centering a servo.
- Again, IT IS STRONGLY RECOMMENDED THAT YOU ADJUST LINKAGES TO CENTER CONTROL SURFACES. DO THIS BEFORE YOU CENTER THE CONTROL SURFACES WITH THE RADIO. DO NOT SKIP THIS STEP!

9. RECHECK SERVO REVERSE. (Servos installed)

- Stand behind the aircraft looking forward towards the nose of the model. (DO NOT STAND IN THE FRONT OF THE MODEL LOOKING TOWARDS THE TAIL!) Move the right stick and the ailerons and elevator should move in the correct direction. Move the left stick back and forth and the rudder should also move in the correct direction. If not, repeat the Servo Reversing section above.
- If you made a mistake and a control surface moves in the wrong direction, reversing the servo may result in a control surface that does not center in the same place. If this occurs, after reversing the servo, adjust it mechanically first to bring the control surface back to neutral. Only after adjusting the mechanicals, fine tune with Sub Trim.

10. CENTERING THE CONTROL SURFACES ELECTRONICALLY.

MAIN > FUNCTION LIST > SERVO SETUP > **SUB TRIM** > Select Control Surface

- Although each control surface is close to neutral, tweaking the Sub Trim may be necessary to make final adjustments for each control surface.
- Adjust Ailerons, Elevator and Rudder to the control surface neutral setting.
- Flaps are preset to 190. When the SubTrim tweaking is done, the values should be as close to 190 as possible.

At this point, everything should work and in some cases may even be close to your desired setup. Although you want to go fly, you still have some work to do. Make adjustments in the **same sequence below**. Use this document in the future to make additional modifications.

Part 4 – Programming the Model

At this point, if the mechanicals were well done, there is a chance that the aircraft is in a flyable condition with just a few tweaks. As stated earlier, the default settings are just a ballpark value. Different styles of flying (twitchy vs. slow setups etc.) and differences in aircraft design, (this is a very long list) require the modification of the values in several areas. This section shows you how to modify those values.

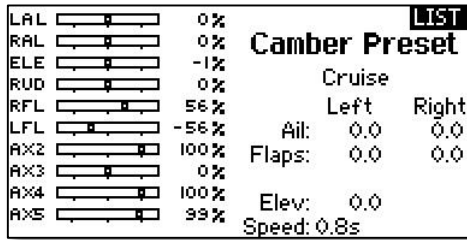
Always check the current Flight Mode before you start changing values. It is easy to modify the wrong value because you are in a different Flight Mode than you think. Especially, if you inadvertently bump the Flap Stick below 92% switching the radio into Landing Mode.

1. FINE TUNING THE TRAILING EDGE CAMBER MODE PRESETS.

MAIN > FUNCTION LIST >CAMBER PRESET > **Camber Preset** > Select Flight Mode (by a Flight Mode switch or the Flap Stick.)

Default:

Camber Presets	Ail Left	Ail Right	FLP Left	FLP Right	Speed
Speed	+7.0	+7.0	+7.0	+7.0	0.
Thermal	-7.0	-7.0	-7.0	-7.0	0.
Cruise	0	0.	0	0.0	0.
Launch	-20.0	-20.0	-20.0	-20.0	0.
Land	0	0.	0	0.0	0.



- Set LTrim and RTrim to the center points. (use the bars on the primary screen)
- Move flight mode switches to Cruise. (Switch B and C to the center)
- Move the camber slider towards the front of the transmitter.
- Move the Flap Stick to the top.
- Near the top of the screen is the current Flight Mode. Change the Flight Mode by moving the Flight Mode Switch or pulling the Flap Stick down.
- Switch through the Launch, Thermal, Speed and back to Cruise Flight Modes.
- The Trailing Edge (TE) should move to different locations.
- Trailing Edge (TE) is drooped in Launch and Thermal Mode and reflexed in Speed Mode.
- Fine-tune all of the TE control surfaces for each Flight Mode to your satisfaction.
- Setting Speed at the bottom of the screen slows the TE down when changing from one Flight Mode to another.
- If a flap or aileron jumps strangely when switching Flight Modes, you most likely have conflicting trim positions. There are several places where programming can easily conflict. This typically occurs after the first trim flight if large amounts of trim were required. The jumping may occur because you forgot to change the other four Flight Modes by a similar amount. **1)** Go to the Start Up screen and check the trims for all the Flight modes by using the Flight Mode Switches. The TE trims should be very similar. **2)** The Cruise and Landing Flight Mode should **have the same values** under Camber Preset (see above) **3)** In addition, make sure that Aileron Trim Setup is set to common (found under Trim Setup in the Systems Menu). **4)** Finally make sure the offset for Landing Mode is 92% (See the first two sections of the Flap Mode adjustments below).

2. QUICK CHANGE THE TRAILING EDGE CAMBER PRESETS USING LTRIM & RTRIM.
Not available on the DX6



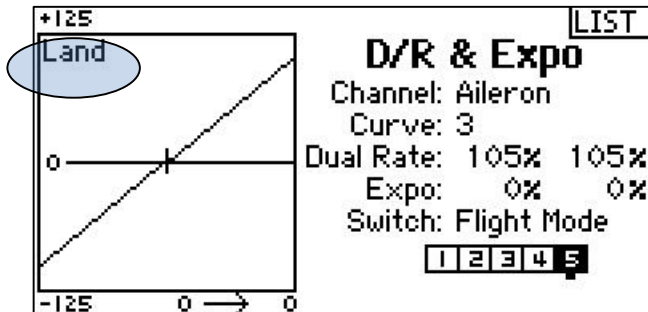
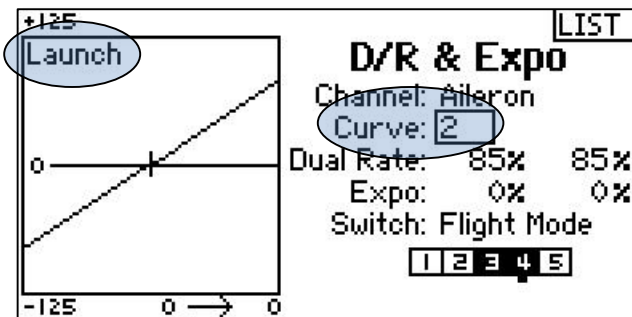
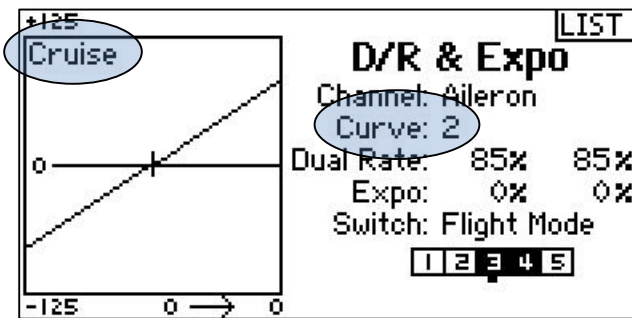
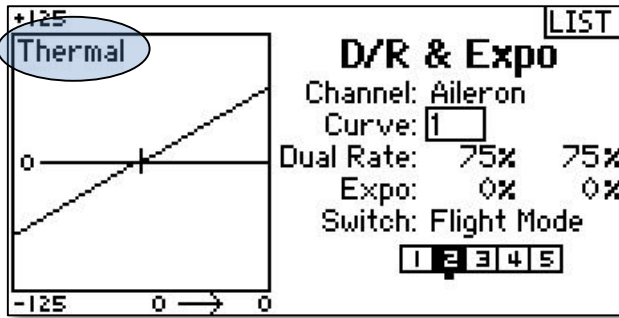
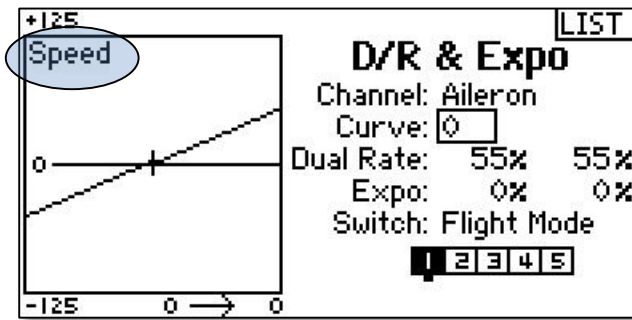
- These trims are on the face of the radio and do not require you to enter the programming to make adjustments. They are always active.
- Switch through the Launch, Thermal, Speed and back to Cruise Flight Modes.
- The Trailing Edge (TE) should move to different locations.
- To change the default settings, simply switch to the Flight Mode you want to change and use the LTrim to adjust the flaps and the RTrim to adjust the ailerons. Switch to the next flight mode and make the next change.
- If TE adjustments are made solely with the LTrim and RTrim, the speed setting found in Camber Preset may not work properly.
- Use this feature to make TE changes on the fly, like right before it is your turn to launch, in response to changing wind conditions, etc.

3. CHANGING THE RATES OF EACH CONTROL SURFACE BY FLIGHT MODE.

MAIN > FUNCTION LIST > D/R AND EXPO > D/R & EXPO > Select Control Surface Default:

Channel	F Mode	Curve	Up - DN	Switch	Select
Aileron	Speed	0	55% - 55%	F Mode	FM 1
Aileron	Thermal	1	75% - 75%	F Mode	FM 2
Aileron	Cruise	2	85% - 85%	F Mode	FM 3 - 4
Aileron	Launch	2	85% - 85%	F Mode	FM 3 - 4
Aileron	Land	3	105% - 105%	F Mode	FM 5
Elevator	Speed	0	55% - 80%	F Mode	FM 1
Elevator	Thermal	1	65% - 90%	F Mode	FM 2
Elevator	Cruise	2	75% - 100%	F Mode	FM 3 - 4
Elevator	Launch	2	75% - 100%	F Mode	FM 3 - 4
Elevator	Land	3	75% - 115%	F Mode	FM 5
Rudder	Speed	1	70% - 70%	F Mode	ON
Rudder	Thermal	1	70% - 70%	F Mode	ON
Rudder	Cruise	1	70% - 70%	F Mode	ON
Rudder	Launch	1	70% - 70%	F Mode	ON
Rudder	Land	1	70% - 70%	F Mode	ON

To see what this chart looks like in the DX18 G2 screens, see the next page.



FUNCTION LIST > D/R Expo

Dual Rate is available for Aileron, Elevator and Rudder. Each control surface has as many screens as there are Flight Modes.

Flip the Flight Mode switches to travel from screen to screen. Scroll over Aileron and click. Scroll and click the control surface you want to adjust.

These images demonstrate the one screen per Flight Mode that is typical throughout the software. When the Flight Mode appears (see upper left of the screen), the values on that screen are ONLY for that Flight Mode.

Throughout this template, Flight Modes are organized from lesser rates to greater rates. Top to bottom or from left to right. FM1 = Speed, FM2 = Thermal, FM3 = Cruise, FM4 = Launch, FM5 = Land. A darkened Flight Mode box indicates which Flight Modes are using that particular rate or curve.

By flipping a Flight Mode switch, the rates for the ailerons change. Notice the change in rate from Curve 1 to Curve 2. This represents the change from 75% to 85%. You only have four Curves to choose from but you have five Flight Modes. Somewhere, you will have to use a "Curve" more than once. In this example, Cruise and Launch share a curve.

Don't confuse the Flight Mode numbers with the Curve numbers. (Flight Modes start with 1 and Curves start with zero) Assign a Curve to a Flight Mode, not a Flight Mode to a Curve.

Notice the darkened box moving across the bottom of the screen from left to right. Each box represents a different Flight Mode.

The black dot below the five Flight Mode boxes represents the position of the Flight Mode Switches. Notice how it changes with the flipping of the Flight Mode Switches and aligns itself with the Flight Mode Name in the upper left hand corner.

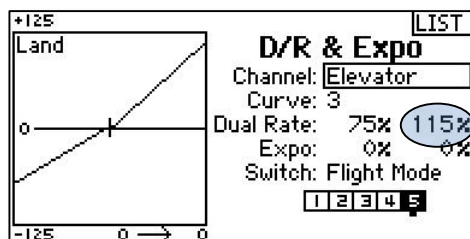
- Recommendation: Spend your first couple of flights focused on trimming while in Cruise Mode. Only after you are comfortable in Cruise mode, land and change the rates for Aileron and Elevator in the other flight modes. Start with differences similar to what is set in the table. If you reduce a rate value in Cruise by 20%, reduce all the other curves by the same amount. You now have a base from which to continue trimming your aircraft.
- Curve is a fancy way of saying “rates.” You can choose one of four different Curves consisting of a rate between 0 to 100 combined with an exponential rate between a negative 100 and a positive 100.
- Default curves are provided for each Flight Mode. Scroll to the control surface you want to modify (Aileron, Elevator or Rudder), make sure you are in the correct Flight Mode (by using the flight mode switches) and change the values as necessary.
- You can change which “curve” is assigned to each Flight Mode. Under Flight Mode, scroll the cursor over the appropriate Flight Mode and push the roller to darken the box. This curve is now active for this Flight Mode. You can darken more than one Flight Mode position. If all the boxes are darkened, the mix function is always active. If all the boxes are light, the function is always off.

4. ADJUSTING EXTRA DOWN ELEVATOR TO HELP PUSHOVER AT THE TOP OF THE ZOOM AND IN THE LANDING AREA.

MAIN > FUNCTION LIST > DR AND EXPO > **D/R & EXPO** > Select Elevator

Default:

Channel	F Mode	Curve	UP - DN	Switch	Select
Elevator	Speed	0	55% - 80%	F Mode	FM 1
Elevator	Thermal	1	65% - 90%	F Mode	FM 2
Elevator	Cruise	2	75% - 100%	F Mode	FM 3 - 4
Elevator	Launch	2	70% - 95%	F Mode	FM 3 - 4
Elevator	Land	3	75% - 115%	F Mode	FM 5



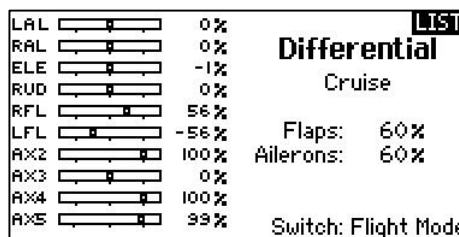
- On the above table under Flight Modes, there is a rate difference between up and down. In these flight modes, there is more down Elevator than up.
- Scroll the cursor over Dual Rate: and Click. Typically, a box will surround the up and down value and both are adjusted at the same time. To change just the up or down value, move the Elevator Stick and a single box will appear to adjust the values separate from each other.

5. CHANGING AILERON DIFFERENTIAL BY FLIGHT MODE.

MAIN > FUNCTION LIST > DIFFERENTIAL > **Differential** > Select Flight Mode

Default:

- Flight Mode 1 – Speed: 25%
- Flight Mode 2 – Thermal 75%
- Flight Mode 3 – Cruise 60%
- Flight Mode 4 – Launch 80%
- Flight Mode 5 -- Land 75%



- Differential creates more up aileron than down. The default Differential for Cruise is 60%. The default for speed is less and the default for Launch is more.
- By flipping the Flight Mode switches or moving the flap stick, the flight modes on the screen change. You can adjust the Differential for the ailerons in each of the Flight Modes.
- Recommendation: Set the Differential for Cruise first. Once you find a value you like, change the other Flight modes by the same amount. You now have a base to continue trimming your aircraft.
- Very little down aileron is necessary in Launch mode. (launch differential in excess of 90%)
- If AIL > FLP is active in Mixing, (This mix is activated in this template) a second row for Flap differential appears.

6. EQUALIZE THE AILERONS DEFLECTION USING TRAVEL ADJUSTMENTS.

MAIN > FUNCTION LIST > SERVO SETUP > Select **Travel**.

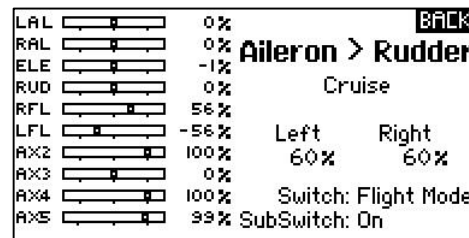
- There are **very few** situations where you will need to use Travel Adjustments.
- Select Cruise Mode.
- Move the Aileron Stick to the stop and measure the up and down throw. Move the Aileron Stick to the opposite side and measure the other aileron up and down throw.
- Using the Travel Adjustment for Left Aileron (LAL) and Right Aileron (RAL) make adjustments so that the up and down throw on each side is the same.
- Recommendation: Reduce the aileron with the greatest throw, then split the difference. (ie, if one side is reduced 20% to make the movement the same, cut back that aileron to 10% and increase the other by 10%)

7. ADJUSTING AILERON > RUDDER MIX.

MAIN > FUNCTION LIST > MIXING > "AIL > RUD" > **Aileron > Rudder**

Default:

- Flight Mode 1 – Speed: 25%
- Flight Mode 2 – Thermal 75%
- Flight Mode 3 – Cruise 60%
- Flight Mode 4 – Launch 80%
- Flight Mode 5 - Land 75%



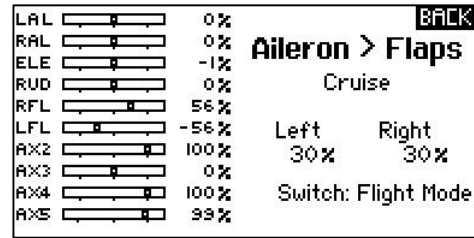
- The proper balance between 1) Differential, 2)AIL > RUD mix and 3)speed of the aircraft will provide well balanced turns.
- A different percentage of mix is available for each Flight Mode.
- The current flight mode is reflected near the top of the screen and is changed by moving the Flight Mode Switch(s).
- ALL the adjustments on the screen are only for that Flight Mode.
- To reduce yaw in Speed Mode, the mix is small.
- To increase yaw in Thermal Mode (flatter turns), the mix is medium.
- To help balance a turn at Cruising and Landing Mode, the mix is medium.
- To maximize yaw (and reduce roll) In Launch Mode, the mix is very high.

8. ADJUSTING AILERON > FLAP MIX.

MAIN > FUNCTION LIST > MIXING > "AIL > FLP" > **Aileron > Flaps**

Default:

- | | Left | Right |
|---------------------------|------|-------|
| • Flight Mode 1 – Speed: | 0% | 0% |
| • Flight Mode 2 – Thermal | 0% | 0% |
| • Flight Mode 3 – Cruise | 30% | 30% |
| • Flight Mode 4 – Launch | 0% | 0% |
| • Flight Mode 5 - Land | 0% | 0% |



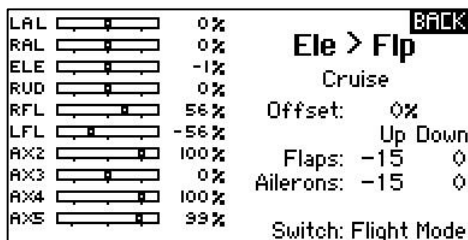
- A different percentage of mix is available for each Flight Mode.
- The current flight mode is reflected near the top of the screen and is changed by moving the Flight Mode Switch(s).
- ALL the adjustments on the screen are only for that Flight Mode.
- To reduce aileron (roll) rate in Speed Roll, the mix is off.
- To provide the greatest lift in Thermal Mode, the mix is off.
- To increase aileron (roll) rate in Cruise Mode, the mix is on.
- To maintain lift in Launch Mode, the mix is off.
- To maintain braking and to keep flaps from binding in Landing Mode, the mix should be off in Landing Mode.
- If a value is provided for AIL > FLP, Differential for the Flaps becomes available in Differential.

9. ADJUSTING ELEVATOR TO CAMBER/REFLEX MIXING (referred to as snap flaps)

MAIN > FUNCTION LIST > MIXING > "ELE > FLP" > **Ele > Flp**

Default:

ELE > FLP				
	Switch	Offset	UP Flaps	UP Aileron
Speed	Flight Mode	0	-15	-15
Thermal	Flight Mode	0	-15	-15
Cruise	Flight Mode	0	-15	-15
Launch	Flight Mode	0	0	0
Land	Flight Mode	0	0	0



- The Up and Down columns represent Up Elevator stick movement. When you pull up Elevator the Flaps and Ailerons move in a negative direction.
- This function cambers the trailing edge with up elevator.
- Camber when combined with up elevator may help some aircraft through a turn.
- Camber (or Reflex) does not "snap" to a preset position with up Elevator.
- Camber (or Reflex) is proportionally mixed to up or down Elevator. This is the third option for drooping the Trailing Edge in flight. The first uses Flight Mode switches and the second is the left Camber Slider. How you use any of the three or combination of the three is determined by each pilot. Just because this mix is available does not mean you have to use it.
- Not all aircraft will benefit from this mix.

- Offset determines where in the Elevator Stick travel the Camber or Reflex begins to occur. 0% is center stick. -100% is Elevator stick pulled or pushed all the way to the bottom or top of its travel. Move the Elevator Stick to the position you want the mix to start, view the number next to Elevator in the monitor. Insert that number in Offset:.
- To turn this feature OFF, for individual Flight Modes, set the values to -0- or set switch to INH.

10. FLAPS

Five different features are required to operate the Flap System.

- **Analog Switch Setup** turns the Flap Stick into a switch that turns on Landing Mode when you pull the Flap Stick down a little. Adjust the Kick Point here.
- **Camber System** to link the Flap Stick to the Flaps and determine the amount of flap travel.
- **Servo Setup Travel** to make sure that when flaps in the down position, they are the same.
- **P-Mix SPL > ELE** to obtain Flap Stick to Elevator compensation.
- **P-Mix SPL > LAL** to obtain Flap Stick to Flaperon mix.

A. ADJUSTING THE FLAP STICK KICK POINTS.

SYSTEM SETUP > ANALOG SWITCH SETUP > Not available on the DX6 and DX9

Default:

Analog Switch Setup				LIST
	Pos 0-1	Pos 1-2	Now	
Thro:	92%	-75%	Pos 0	100%
Aile:	75%	-75%	Pos 1	0%
Elev:	75%	-75%	Pos 1	0%
Rudd:	75%	-75%	Pos 1	0%
L Lever:	75%	-75%	Pos 0	100%
R Lever:	75%	-75%	Pos 0	99%

NEXT

- Analog Switch was already set in the System Setup above.
- This setting activates Landing when the Flap Stick is pulled below 92%.
- To change the kick point in the Flap Stick movement where Landing Flight Mode is activated, see Analog Switch Setup above under System Setup.
- If you change the kick point position here, make sure that you use the same percentage under offset in the next section.
- This feature will work on the DX6 and DX9 but the adjustments must be made using a DX18 and then downloading the DX18 .SPM file into the DX 6 or 9.

B. ADJUST THE AMOUNT OF FLAP MOVEMENT.

MAIN > FUNCTION LIST > CAMBER SYSTEM > **Camber System** (select Land Mode by Flight Mode switch or Flap Stick)

Default:

		Camber System		LIST
LAL	16%			
RAL	-16%			
ELE	11%			
RUD	0%			
RFL	46%			
LFL	-46%			
AX2	100%			
AX3	0%			
AX4	100%			
AX5	99%			
		Land		
		Input: Spoiler		
		Offset: 92%		
		Up	Down	
		Flaps: 0.0	-80.0	
		Ail: 0.0	0.0	

- The UP and Down columns represent UP and Down Flap Stick, not up and down control surface. By pulling the Flap Stick down, the Flaps are lowered (a negative value).
- Flip through the different flight modes using the switches. The Flight Mode name will change with the assigned switch position.

- In any flight mode, pull the Flap Stick down past 92% and the Flight Mode will change to Land.
- Pull the Flap Stick to the bottom slowly. Adjust Flaps (Down column) so the amount of flap movement you desire occurs when the Flap Stick is at the bottom. (don't be surprised if the flaps do not stop in the same place. It will be covered later)
- Offset should be set to the same or nearly the same as the Flap Stick Position set in Analog Switch Setup. (See section above) If you want to set a different kick point where the Flap Stick activates Land Mode (in Analog Switch Setup), you must insert the same percentage here under offset to keep the flaps from jumping when switching Flight Modes. If some jumping still occurs (while moving the Flap Stick back and forth over the kick point), adjust the offset a little in each direction to see if the jumping disappears.
- You may mix flaperons here with a proportional mix by inserting a value under Aileron.
- If you wish to mix flaperons on a curve, see SPL > LAL below. (The default does not mix flaperon here but mixes flaperons on a curve later)
- You may mix Crow (ailerons up when flaps move down) by adding a value to Up Ailerons.

C. ADJUST THE INDIVIDUAL FLAPS SO THEY MOVE THE SAME AMOUNT.

MAIN > FUNCTION LIST > SERVO SETUP > **TRAVEL** > Select RFL and LFL

- Move the Flap Stick to the bottom. Use this feature if the flaps do not stop at the same angle. Use Travel to equalize the flaps.
- Do Not use this function to increase or decrease Flap travel. To increase or decrease Flap travel use Camber System discussed above.
- Recommendation: Sometimes the Flaps do not come down at the same pace but wind up in the same spot. This is typically caused by Flap mechanicals that are not matched. To reduce this issue, reduce the Flap with the greatest throw, then split the difference. (ie, if one flap is reduced 20%, then cut back the reduction to 10% and increase the other Flap 10%)

ALTERNATIVE METHOD:

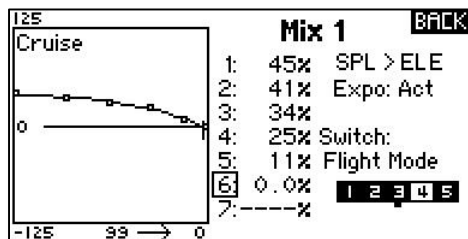
MAIN > FUNCTION LIST > SERVO SETUP > Balance If balancing is done on a DX18 or DX9, those settings will show up on a DX6.

- The Balance function was designed to match adjacent servo movement. Commonly used where you have more than one servo driving the same control surface (two servos driving the aileron on a large power aircraft) or two halves of the same control surface (separate elevator servos for each side of the elevator).
- Select R Flap or L Flap. Now scroll over the box below. The cursor moves to one of seven points. At each of these points, you can add or subtract movement of the chosen Flap.
- If the difference is great, you may have to make change to both L Flap and R Flap.
- Move the Flap Stick and a vertical line will move across the screen. Stop the vertical line at each of the dots along the line. Compare the flaps and make adjustments to equalize them at that point. Move to the next point and repeat.

D. ADJUSTING ELEVATOR COMPENSATION FOR LANDING.

MAIN > FUNCTION LIST > MIXING > **P-Mix 1: SPL > ELE**

Default:



- Do not use FLP > ELE. The dedicated mix FLP > ELE is known as a Combo Mix. It allows multiple Masters (Camber System, Flap, Camber Presets and a bunch of others) to control the elevator all

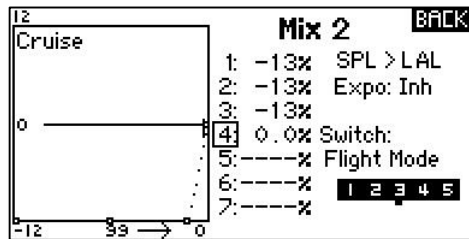
at the same time. Don't use it. (If you use the FLP > ELE mix and you have camber on a slider and Flaps on the Flap Stick, both actions move the Flaps so both will activate elevator compensation.)

- In Flight Mode Priority Switch (see Flight Mode Setup in System Setup), Throttle Stick was selected. This enables the Landing Mode to override all Flight Modes when you pull down the Flap Stick.
- You can add or remove points along the curve. Pull the flap stick down slowly until you see "Add Pt" or "Remove Pt" appearing at the bottom of the column of numbers, scroll the curser over it and click to add or delete a point.
- Recommendation: The curve is fairly generic and may need modification for your aircraft. With plenty of altitude, slowly pull down the flap stick to each point on the curve to determine if modification of the curve is necessary. Scroll over the value you need to change and click.
- Rotate the roller to highlight the desired Flight Mode at the bottom of the screen.
- Press the roller to darken the box activating the mix for that Flight Mode. You can darken more than one Flight Mode position. If all the boxes are darkened, the mix function is always active. If all the boxes are light, the function is always off.
- Although Flight Mode Priority Switch is active in all Flight Modes, this mix (SPL > ELE) is not active in Launch Mode. The down Elevator that occurs with just a slight bump of the Flap Stick combined with the very high speeds during the early part of the launch may result in a nose headed for the ground before you can respond. When the Flap Stick hits 92%, the transmitter shifts into landing mode and Elevator compensation is again active.

E. ADJUSTING FLAPERON OR CROW MIXING.

MAIN > FUNCTION LIST > MIXING > Select "P-MIX 2: SPL > LAL"

Default:



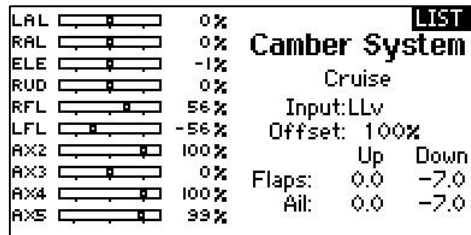
- In this situation, LAL does not stand for Left Aileron. It is a "Back" mix designed so you only have to use one mix to mover two control surfaces. LAL moves both ailerons in the same direction where RAL moves both ailerons in opposite directions.
- Move the Flap Stick to watch the cursor move across the screen.
- The curve lowers the Ailerons to a preset value quickly with Flap Sick movement .
- Turn this feature off by selecting Switch: Inhibit or change all values to -0-.
- Rotate the roller to highlight the desired Flight Mode at the bottom of the screen.
- Press the roller to darken the box activating the mix for that Flight Mode. You can darken more than one Flight Mode position. If all the boxes are darkened, the mix function is always active. If all the boxes are light, the function is always off.
- For Crow, reset the values to a positive number.

11. ADJUSTING CAMBER SLIDER

MAIN > FUNCTION LIST > CAMBER SYSTEM > **Camber System**

Default

Camber System	Input	Offset	FLP DN	AIL DN
Speed	LLv	100%	-7.0	-7.0
Thermal	LLv	100%	-7.0	-7.0
Cruise	LLv	100%	-7.0	-7.0
Launch	INH	100%	0.0	0.0
Land	Spoiler	92%	-80.0	0.0



- LLv places the camber slider on the Left Lever (slider). Camber can be moved to the Right Slider by selecting RLv. Notice that each Flight Mode can be assigned to a different slider. If you change one Flight Mode you should change all Flight Modes to the same lever or stick.
- LLv is active for all Flight Modes except for Launch and Land. To turn off the Camber Sliders, first set the appropriate Flight Mode switch and under that Flight Mode, set the Switch to INH or set the Flap and Aileron values to -0-.
- The LLv is inhibited in Launch Mode. Bumping the slider before launch will not change your launch flap causing a pop off.
- If you want to make quick TE changes, use LTrim and RTrim while in Launch Mode. LTrim and RTrim only trim the Flight Mode that is active at that time.
- Switch through the various Flight Modes and the Flight Mode name will appear just under "Camber System." All of the values under a specific Flight Mode are for that Flight Mode only. Offset of 100% moves the starting point of the lever to the top. In this position, the lever only lowers the trailing edge. If the desire is to have the lever provide both camber and reflex, set the Offset: to 0%. Move the slider up and set the Flap and Aileron "Up" values to obtain the desired amount of reflex.

Part 5 – Before You Fly.

1. **RE-BIND THE RECEIVER.** With the aircraft on the bench, receiver and transmitter on and everything working, turn the transmitter off. Your control surfaces may jump to a different location. This is the same position the control surfaces will move to if there is a loss of signal to your aircraft in flight.

Whether or not this occurs may be because of the type and nature of the failsafe in your receiver. Some receivers return to servo center. Others perform a “hold last command” function. If your aircraft is turning when connection is lost, the aircraft will keep turning. Some receivers (typically the more expensive ones) provide an option of a preset failsafe. When the connection is lost, the control surfaces will move to a preset position.

When you first bound the receiver and transmitter, the receiver remembers the position of the servos **at that time**. While adjusting your mechanicals, you may have rotated the output servo arm on the servo output splines, changed servo arm positions, reset SubTrims and changed trim settings to get the control surface to properly center. The preset failsafe receiver remembers the servo position **AT THE TIME OF BINDING AND BEFORE YOU STARTING ADJUSTING THE MECHANICALS**, not the current servo arm position or current control surface position. If you lose signal, a receiver with a preset failsafe will return the servos to the position when they were first bound. In every case, this situation is not healthy for your aircraft.

BEFORE YOU FLY, YOU MUST REBIND THE AIRCRAFT TO SET A NEW PRESET FAILSAFE.

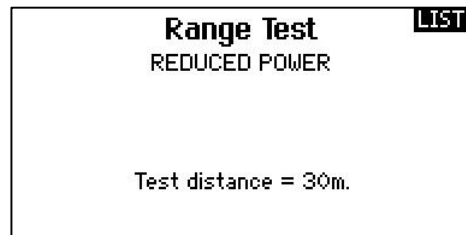
To be more precise in your selection of stick position, (Flaps slightly down with elevator compensation as an example) move the control surfaces to the desired position with the sticks, (flap stick down to move the flaps and elevator to the desired position) and without changing the stick position, turn off the receiver, then the transmitter. Insert the bind plug, turn on the receiver (lights blinking) and without changing the stick position, bind using the procedure for your radio.

Check again by turning the Transmitter off. The control surfaces should move to the position you selected.

2. **FIRST FLIGHT.** For the first trim flight, set the Elevator Trim to Common. After a new trim setting is established for the elevator, return the Elevator Trim to F Mode. In the alternative, Trim the elevator while in cruise mode and do not use any of the other flight modes during that flight. Land and then use the Monitor Screen to adjust the other Flight Mode elevator settings to match Cruise Mode. Observe the numerical value in Cruise Mode, then flip the Flight Mode switches and trim the elevator until the value in all flight modes is the same. You now have a common base to start programming the other Flight Modes
3. **ITS NEW** – Don’t be a dummy - Range check it before you fly.

FUNCTION LIST > Range Test

Push the button on the upper left of the Transmitter and the second screen with “REDUCED POWER” will appear. If you have full control at 30 meters, you are good to go.



Addendum to the Guide for a Six Servo Sailplane

1. What if I Only Want Four Flight Modes?

If you want to eliminate Launch Mode (This works for any Flight Mode, not just Launch Mode) from appearing anywhere in the radio, you must eliminate Launch Mode from the Flight Mode Table. Move to the Flight Mode Table page. Move the cursor box over all parts of the matrix where LAUN appears by moving all the Flight Mode Switches. There is no "off" position or switch for Launch Mode. In the computer world you cannot eliminate the fifth flight mode. Instead, you just don't assign LAUN to any switch position. That means that some other flight mode be assigned to more than switch position. Click the scroll wheel to make the box blink. Now roll the wheel to assign a mode other than Launch to each switch position where Launch appears. LAUN should not appear anywhere in the Flight Mode Matrix.

2. Balance Feature Addendum (Use this if the flaps move at different rates) **Not available on the DX6**

Earlier in the guide, we discussed how to make sure that the Flaps both stop at the same place in the down position. However, on the way down, one flap may fall behind the other, but catch up at the end. This can be changed with the Balance function. Function Menu > Servo Setup > **Balance**.

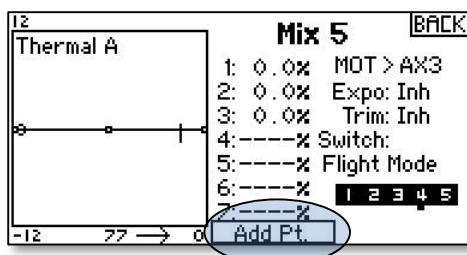
Select the control surface (right or left Flap) Continue to scroll over the box below. Now pull the flap stick down until you get to the point where the flaps are the most unequal. A short vertical line moves across the screen. Go back to the scroll wheel and scroll the box over the number over the short vertical line. Increase or decrease the number until the flaps line up at that point. Pretty cool.

3. Adding and Deleting Points on a Curved Mix

Each time you select a new mix for programming you will be asked to choose Normal or Curve. But be aware that under both you can create a curve. After you select the option, you are presented with a graph. The line across the graph represents the mix value as the master control is engaged. But under both Normal and Curve, the line can be bent. Think of it this way, if the line is not straight, then it is a curve. What the real difference between Normal and Curve has to do with points along the line. Under Normal, you are presented with three points along the line. Both ends and the middle. You can add or subtract values at each of the three points (vertically) but you cannot move the point horizontally. Under Curve, you can add or subtract points anywhere along the line and / or move those points horizontally along the line.

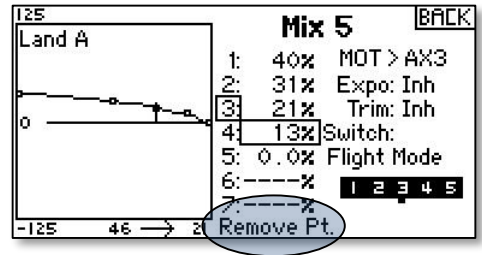
The short version is that you can bend the line in Normal (if it is not straight then it is a curve) at a single point. In curve you can bend the line at multiple points.

When you choose a Curve, the following graph only contains three points. One point on each end and one in the middle. If you do nothing more, your programming is limited to the same mixing that is available in Normal. Normal actually lets you make a curve. If the end points are in the same location, you can move the center point up or down, creating a kink in an otherwise straight line. (remember if it is not straight then it is curved)



This example mixes MOT > AX3. Adding a point is easy. Slowly pull the flap stick down and at the bottom of the column of numbers, suddenly "Add Pt." will appear. Continue to move the stick. Wherever you see "Add Pt." you can do just that. Scroll the box over "Add Pt." and click. A new point appears. In addition to adding a new point, a new cell open up for you to insert a value for the point you just added. Changing this value will move the point vertically.

Removing a point is just as easy. Move the flap stick and as soon as the short vertical moves over an existing point, "Remove Pt." appears at the bottom of the column of numbers. Scroll the box over "Remove Pt." and click. The point disappears.

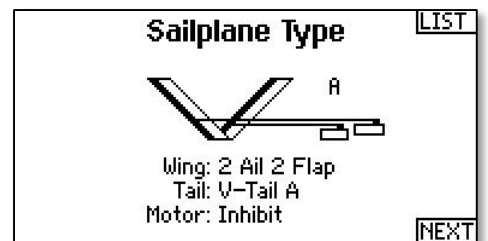


4. V-Tail Addendum.

V-tails fly great! Until now, have a bad reputation, but for the wrong reasons. If properly set up they fly great! The bad rap comes from two issues, difficulties in programming and pilots that do not know how to set them up. The DX series makes great strides in making the programming easier. (The setup is still up to you but a simple guide is provided at the end of this addendum.)

Difficulties programming arise, because of the many ways that V-tail mechanicals can be installed. These might include control surface horns above vs below the V, servos with the servo arm pointed outward vs inward, servos installed upside-down, Servos in the V-tail itself and many more.

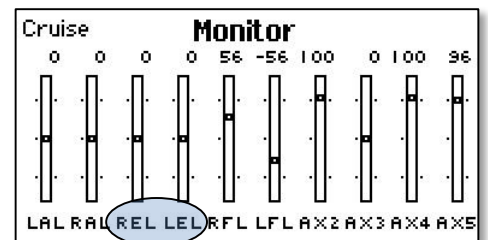
V-Tail Programming for ALL of these mechanical installations is accomplished with one of two basic templates and the DX Series has both built in. (many computer radios only provide one of the two templates) Start by selecting V-Tail in Sailplane type. Both a V-tail A and V-tail B are provided. Simply try one, and if it does not work then try the other. When you select V-tail, all references to Elevator and Rudder throughout the DX series are replaced with Left Elevator (LEL) and Right Elevator (REL).



Channel Assignment (or any monitor) will show which servo goes in which receiver slot. Plug the servos into the receiver as shown in SYSTEM SETUP > Channel Assignment or in the same sequence found in any Monitor screen in FUNCTION LIST. Now verify that LEL moves the left Elevator by using SubTrim. If left elevator subtrim moves the left elevator, you are correctly hooked up.

Use the elevator stick to check for up and down. Use the Rudder stick to check for movement left and right. Don't be surprised if the controls move the control surfaces in the wrong direction.

Use Servo Reverse to go through the four possible configurations. If you find a configuration that works, great. If not try V-tail B. One of these eight possible configurations will provide what you need.

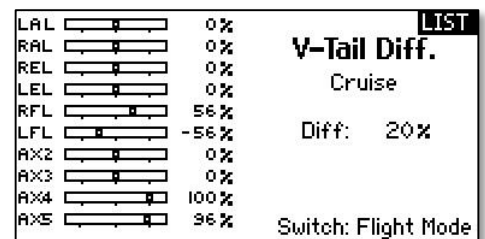


Now go ahead and mix Ail > Rud.

Trimming a V-Tail is easy. Start by setting the DX18 to cruise mode. Make sure the V-tail control surfaces move the same amount both up, down and left, right using endpoint adjustments or the balance function. **Spend time here.** This sets a foundation necessary for a good flying V-tail. Those pilots that complain about V-tails typically skip this part.

While flying the aircraft, yaw the aircraft using the rudder stick only. You want the aircraft to maintain a constant pitch while using the rudder. If instead it pitches up or down, you can correct this by using V-Tail Differential. This feature provides for both positive and negative adjustments.

If the aircraft pitches up, adjust the V-Tail Differential so the rudder stick moves the down control surfaces further downward. Measure the difference at full rudder stick. Do the opposite if the aircraft pitches down.



Of course, there are other issues where rudder movement may cause the aircraft to change pitch, but these also effect a standard tail. No matter what tail you have, poor decalage setting, CG placement and Fin and Rudder sweep will have a negative effect on your aircraft.

5. Reversing the Flap Stick Addendum.

- In Camber System in Landing Mode, change the offset from +92 to -92.
- Set flaps in the Down column to 0.
- Set flap in the up column to a negative number, it should be a rather large number, in the seventies or so. This moves the stick direction.
- To use the Flap Stick to switch on Landing Mode, you still need to go to System Setup and change Analog Switch Setup. Change the 92% value to 75% and change the -75% under Pos 1-2 to -92%.
- Finally enter Flight Modes “priority switch” screen. Change Pos 0 to land and Pos 1 & 2 to Switches.

6. Monitor Screen Addendum. (Troubleshooting)

Contrary to popular belief, troubleshooting a problem is not a black art. There is a fairly straightforward process that can help.

Let's take a common example. As you pull full flap, the nose balloons up and no matter how much elevator compensation you dial in. Something is keeping the elevator from moving far enough.

Troubleshooting is a process of elimination. Eliminate what it is not, and you will be left with what it is. The monitor screen is a fantastic troubleshooting tool but only if you understand its limitations. The Monitor does NOT show you the position of the servo arm. **The Monitor only shows you the signal sent by the transmitter to the receiver or where the transmitter wants the servo arm to move to.**

By comparing actual control surface movement to the desired movement shown on the Monitor Screen, you can determine if the problem is electronic or mechanical.

An electronic issue is diagnosed by pull the flap stick to the stop and then push full down elevator while viewing the Monitor Screen. If the FLAP cursor dot moves to the end of the box, and you still do not have enough down elevator, your system is limited by the signal sent by the transmitter.

Curing electrical issues is often a mix of electrical and mechanical. Move the dot at center stick by relocating the dot using SubTrims (creating an offset). You will then need to change the mechanicals to re-center the control surface. Try it again.

A Mechanical issue is diagnosed by pulling the flap stick to the stop and push full down elevator while viewing the Monitor Screen. If the elevator stops moving BEFORE the dot hits the end of the box, your system is limited by a mechanical issue.

Usually this is a binding issue. You may need to elongate the drive pin slot for the elevator. (fairly common). The push rod may be trying to bend around the output gear of the servo. (fairly common) The bell crank assembly in the fin may be hitting the structure and causing it to stop moving. (not common and hard to diagnose). The servo arm may be too short. (fairly common)

Before you start cutting into your aircraft, determine if it a electrical issue, a mechanical issue or a little of both.

7. Motor Addendum – Throttle on a Slider.

- Remove the Propeller From the Motor Before You Start This Section.

In the System Setup menu choose Sailplane Type. It is important to select the wing type and tail type before you select motor. Determine if you are going to use the Flap Stick to control flaps before you select a means to control the motor. As different options are chosen, the radio reorganizes the servo assignments.

Chose which stick, lever, trim or switch you want to use. Just about anything not already used can be used to control the motor.

Often, the Right Lever is used to control the motor. There isn't much else to do. It is possible that the lever is upside down. To change the movement just go to Servo Reverse and reverse the throttle servo.

Most speed controllers today set themselves up during the first cycle of the "Throttle Lever." If you don't think you are getting full throttle try increasing the Travel for the motor.

Once you select a motor control in Sailplane Type, two new features appear on the Function List. They are Throttle Cut and Motor Curve. You won't need throttle curve, but you should set throttle cut so you can always override any other settings that might involve the throttle.

If the CG is properly set and the sailplane still wants to loop over on its back during the climb, you may want to mix R Lever > Elevator. If you have the time, you can even make a multipoint curved mix so the climb out is nearly hands free at any throttle speed.

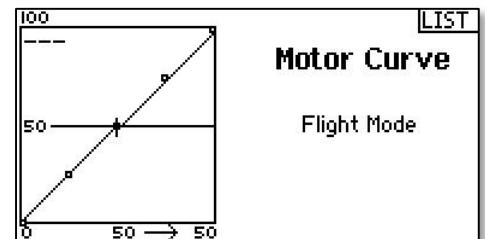
8. Motor Addendum – On/Off by Flight Mode Switch

If you are going to use a motor, put the motor on the Launch Mode Switch to further reduce pilot load. Switch to Launch Mode and motor on, switch to any other Flight Mode and motor off.

- First, remove the propeller.

In System Setup > Sailplane Type under motor select the same switch use to activate Launch Mode. In my case, switch B.

Go to Function List > Motor Curve and you will see the following: Except that inhibit will be there instead of Flight Mode. Scroll over Inhibit and click. Scroll until you see Flight Mode and click.



As you flip Switch B, a small curser will move up and down the diagonal line. Because Switch B is a three-position switch, the curser will move to three locations, 0% (lower left), 50% (middle) and 100% (upper right). If you had chosen a two position switch, the curser would move from 0% to 100%. If you had chosen Throttle Stick in in Sailplane Type, the cursor would move proportionally up and down the diagonal line as you move the stick.

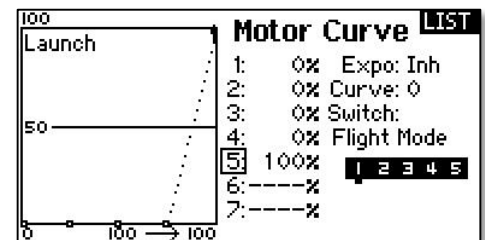
On this graph, one extreme corner (lower left) is OFF and the opposite extreme corner (upper right) is ON

But you have three position switch for each flight mode and you want one of those flight modes to activate the motor and the motor off in the other two. (like a two position switch) All we have to do is to change the Switch B from 0%, 50% and 100% to 0%, 0% and 100%.

We do that by curving the diagonal line. It looks like this.

It is really more of a kink or a sharp bend. Think of it this way, if it is not straight, then it is curved.

As you flip the Flight Mode switches, the box around the number 5 will switch to a different line. Because you want the motor off in these other switch positions, just set the values to zero.



Under switch, select Flight Mode. Boxes then appear below Flight Mode, Here five boxes for five Flight Modes. YOU MUST DARKEN ALL THE FLIGHT MODE BOXES. If you don't, when the switch position falls on a light box, the motor control in that Flight Mode will revert to Inhibit on the first screen. (0%, 50%, 100%)

To help remind you which switch position is represented by which flight mode box on the bottom of the screen, a black dot will appear below one of the boxes. As you flip the Flight Mode switches that black dot will move to the box that corresponds with the Flight Mode name in the upper left hand part of the screen.

Disclaimer:

This Guide and the accompanying template work on my personal aircraft. They have not been verified on different aircraft, with different configurations of servos, wiring harness or Y-harness (if any). Use them at your own risk.

Before you fly, verify that ALL SWITCHES AND STICKS work in their intended way, and that ALL INTENTIONALLY INACTIVE SWITCHES AND STICKS DON'T ACTUALLY DO SOMETHING. (in this guide, only **two** switches do anything!)

If moving a stick, lever, trim, knob or switch moves a control surface(s) in manner not intended,

DO NOT FLY

until the issue is resolved.

This document is copyrighted by Sherman Knight. It is currently available, along with the template for download from the Seattle Area Soaring Society, Kennedy Composites, and Soaring USA and the DX18 Sailplane Support thread at RCGroups. It is provided in a .pdf file. Send comments or feedback to duworm@aol.com

Release Notes for the Six Servo Sailplane Guide. These changes came about as questions were raised by consumers about issues and alternative means to create a function and significant changes in the X18 G2.

Version 2.0 Guide

- Because Flight Modes were already created in the Guide and Template and the Guide only discusses how to adjust them, there were requests for how to create Flight Modes From scratch. A Flight Mode Addendum was added for this purpose.
- An addendum was added demonstrating how to add and remove points in a “curved” mix.
- Version 3.0 template fixes an incorrect value. Camber preset in Thermal Mode for Right Flap was changed from 7.0 to -7.0.

Version 3.0 Guide

New addendum have been added for:

- reversing the flap stick,
 - using the monitor screen for trouble shooting and using a motor.
 - The V-tail addendum has been completely rewritten to eliminate my misunderstanding of the V-Tail feature.
 - Grammar corrections and changes to the text were made throughout the guide to increase readability.
- #### Version 3.01 Guide
- In a V tail model, if the Aileron > Rudder mix is used, the V-Tail Differential setting is now fully supported. You need to download and install Airware Version 1.03 from the Spektrum Community Website.
 - An alternative method to make the flaps move the same amount throughout the Flap movement using the Balance function was added.
 - A section was added to demonstrate how to remove a flight mode in the event you only want to use four Flight Modes.
 - An addendum was added to show you how to reverse the Flap Stick.

- Grammar corrections and changes to the text were made throughout the guide to increase readability.

Version 3.02 Guide

- A section was added to addendum for putting a motor on a switch.

Version 4.0 Guide

- A table was added to show differences between the different DX transmitters.
- Distinctions were made throughout the document to highlight differences between the DX6, DX9 and DX18.
- A section was added concerning Voice.
- A section was added to demonstrate the advanced Timer.
- Grammar corrections and additional text was added throughout to increase readability.
- An addendum was added describing how to modify the “kick points” in a DX9 using the DX18.
- Images were added showing different version of a Monitor.
- A section was added on how to sort the model table.
- Images throughout were replaced with graphic art.
- A section was added on how to change warnings.
- A section was added on how to change the start screen, settings and values.
- A section was added concerning master volume.
- Various sections were added concerning voices.
- A section was added concerning Telemetry.
- Trim section was added.
- Priority Switch and Analog Switch were combined into one section to make them more understandable.
- The Flight Mode setup sections were significantly revised to account for screen changes in Ver 1.02 and for voice alerts.

Version 4.0 Template

- Voices were added and revised so all three radios report the same voices in the same manner.
- Warnings were revised so all three radios report the same warnings in the same manner.
- Template now works on all three transmitters.
- A new standard template was built from the beginning using Ver 1.02.