INSTRUCTION MANUAL FOR SAILPLANE

XP9303

9-CHANNEL COMPUTER RADIO SYSTEM

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Section 1: Using this manual

This Manual is divided into three specific sections: Airplane, Sailplane and Helicopter. When writing this manual we employed three distinctly different individuals to write the sections that most pertained to their expertise. The Aircraft section was written by a top notch aerobatic pilot, the Sailplane section by a very experienced sailplane competitor and the Helicopter Section by a member of the 2003 USA F3C team. Each section may read and feel slightly different because of the different personal styles that each of these authors has used.

In this manual you will find the specifications for the radio and its various components and accessories. In addition, guidelines for the installation have been included. Instructions for setting all the functions and programs are presented in the three sections of the manual: Airplane, Helicopter and Sailplane. These features are discussed in the same order that they would normally be needed to set up a typical aircraft, helicopter and 6 servo winged sailplane respectively. An explanation of the use and purpose of each feature is provided, followed by a labeled illustration of its respective LCD display.

A blank data sheet has been included at the end of each section. Once all data has been input for a particular model, it is highly recommended that you record it on a copy of the sheet provided.

Section 2: Features

The computer-designed, ergonomically-styled transmitter case ensures a comfortable fit in your hands. You will also be introduced to our exclusive “Rolling Selector” on the face of the transmitter for fast and effortless movement through any programming sequence. The ultra-precision control sticks offer adjustable spring tensions and length. The throttle stick offers a ratchet in Airplane/ Sailplane configuration. 30-model memory storage allows programming of all parameters of thirty separate airplanes, helicopters or sailplanes; you can program more than one setup for a single aircraft, allowing you to instantly change the flight characteristics.

R770 Receiver

R770 (Basic Air and Sailplane Systems)

The R770 is a high-performance PCM single-conversion receiver with 10KHz super narrow band ABC&W circuitry.

A narrow band ceramic filter for high-signal selectivity assists in rejecting cross modulations from other common radio frequencies, such as RC transmitters or local paging systems.

This receiver features Direct Servo Control (DSC) for control of servos without radio frequency output.

The receiver has low current consumption.

The R770’s Slimline design allows it to fit into most model applications.

R649 Receiver

R649 (Advanced Air, Basic & Advanced Helicopter Systems)

The R649 is a high-performance PCM single-conversion receiver with 10KHz super narrow band ABC&W circuitry.

A narrow band ceramic filter for high-signal selectivity assists in rejecting cross modulations from other common radio frequencies, such as RC transmitters or local paging systems.

This receiver features Direct Servo Control (DSC) for control of servos without radio frequency output.

The receiver has low current consumption.

The R649’s credit card size design allows it to fit into most model applications.

Section 3: Component Specifications

Servo Specifications

Type	DS811	DS8311	DS368
Torque	54 Oz/In	125 Oz/In	53 Oz/In
Speed	.18	.18	.21
Weight	1.44 Oz	1.87 Oz	0.80 Oz
Size (in) (L x W x H)	1.49x0.75x1.52	1.54x0.75x1.36	1.12x0.50x1.17
Ballbearing	Yes	Yes	No
Motor	Cored	Coreless	Cored

Transmitter Specifications

Type	Airplane	Helicopter	Sailplane
Model Number	NET-N339FS	NTE-N339HS	NET-N339GS
Encoder	9-channel computer system		
RF Module	Plug-in Module	Plug-in Module	Plug-in Module
Modulation	PPM/SPCM	PPM/SPCM	PPM/SPCM
Output Power	Approximately 750mw		
Current Drain	200ma	200ma	200ma
Power Source	1.2Vx8 Ni-Cd (9.6V) 600Mah		
Output Pulse	1000-2000 (1500 neutral)		

Component Specifications

Type	Airplane	Helicopter	Sailplane
System Name	X-9303A(basic/ (advanced)	X-9303H(basic)/ (advanced)	X-9303S
Transmitter Body	NET-N339FS	NTE-N339HS	NET-N339GS
Receiver	R770(basic)/R649(advanced	R649 PCM	R770 PCM
Charger	NEC-222	NEC-222	NEC-222
Airborne Battery	1100mah	1100mah	600mah
Servos	None(basic)/ 4-DS811(advanced)	4-DS811(basic) 4-DS8311(adv)	3-DS368
Accessories	Deluxe Switch	Deluxe Switch	Deluxe Switch
	12” Ail Extension	12” Ail Extension	12” Ail Extension
	Charge Jack	Charge Jack	Charge Jack
	Servo Accessories	Servo Accessories	Servo Accessories
	Hex Wrench	Hex Wrench	Hex Wrench
	Instruction Manual	Instruction Manual	Instruction Manual

Receiver Specifications

Type	7 Channel SPCM	9 Channel SPCM
Model Number	R770	R649
Type	7-ch/SPCM-ABC&W/Micro	9-ch/SPCM-ABC&W
Frequency	72/75/50mhz	72/75/50mhz
Sensitivity(Microseconds)	5 uS Minimum	5 uS Minimum
Selectivity	8KHz/5 dB	8KHz/5 dB
Weight (oz)	.75 oz	1.5oz
Receiver Antenna	39" for all aircraft frequencies	39" for all aircraft frequencies

Charger Specifications

Type	Airplane	Helicopter	Sailplane
Model Number	NEC-222	NEC-222	NEC-222
Input Voltage	AC 100-120V	AC 100-120V	AC 100-120V
Output Current	65mAh Tx/150mAh Rx		
Charging Time	15 Hours	15 Hours	15 Hours

Airborne Battery Pack

Airborne Battery Pack Specifications

Type	Airplane	Helicopter	Sailplane
Model Number	B1100	B1100	Extra 600
Voltage	4.8V	4.8V	4.8V
Size (in) (L x W x H)	2.24 x 0.63 x 1.70	2.24 x 0.63 x 1.70	2.64 x 1.18 x .70
Weight (oz)	4.9	4.9	2.7

Battery Charging

Transmitter/Receiver

Note: It is imperative that you fully charge both the transmitter and the receiver battery packs prior to each trip to the field. To do so, leave the charger and batteries hooked up overnight (16 hours). The first charge should be approximately 20–24 hours in order to fully charge both battery packs to peak capacity.

The charger supplied with this system is designed to recharge your batteries at a rate of 65mAh for the transmitter and 150mAh for the receiver battery pack.

Transmitter Only

The center pin on all JR® Remote Control Systems is negative. Therefore, the center pin on all JR chargers is negative, not positive. This is different from many other manufacturers' chargers and radio systems. Beware of improper connections based on "color-coded" wire leads, as they do not apply in this instance. You must make sure that the center pin of your JR transmitter is always connected to the negative voltage for correct polarity hookup.

Important: Please note that the charging polarity of the transmitter and receiver are different.

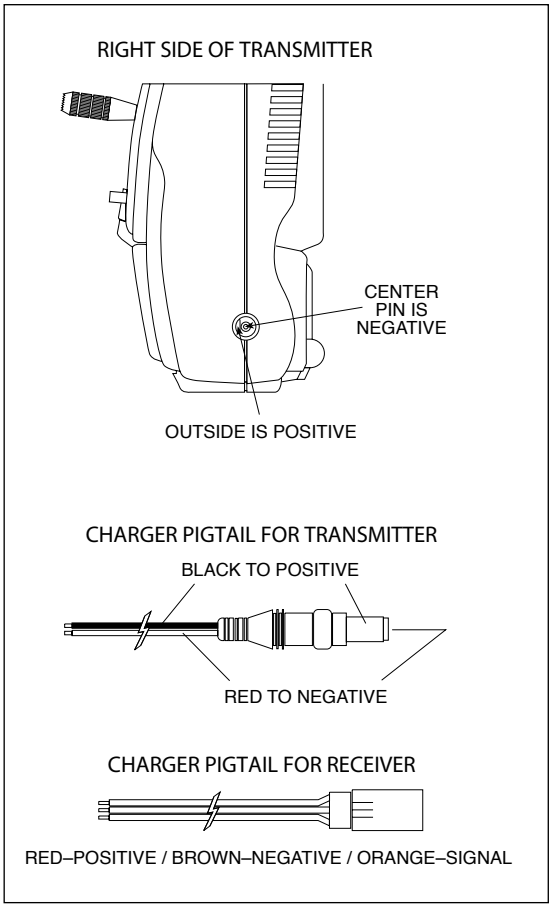
Charger

The pilot lamps should always be on during the charging operation. If not, check to make sure that both the transmitter and receiver are switched off.

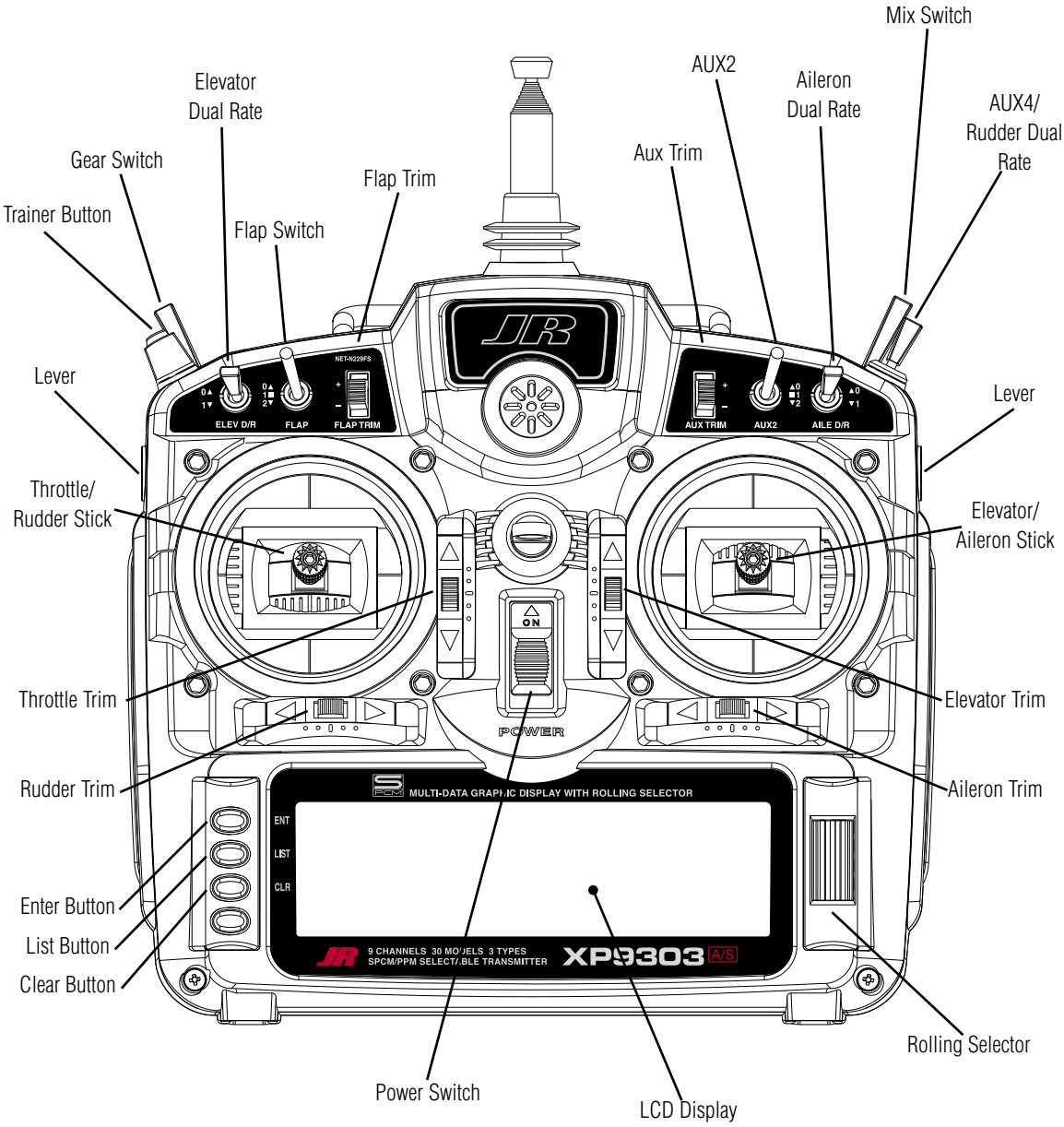
Do not use the charger for equipment other than JR. The charging plug polarity may not be the same. Equipment damage can result.

Do not use other manufacturers' after-market accessories that plug into the transmitter's charging jack if you are unsure of compatibility issues with your radio. Seek expert advice to avoid possible damage.

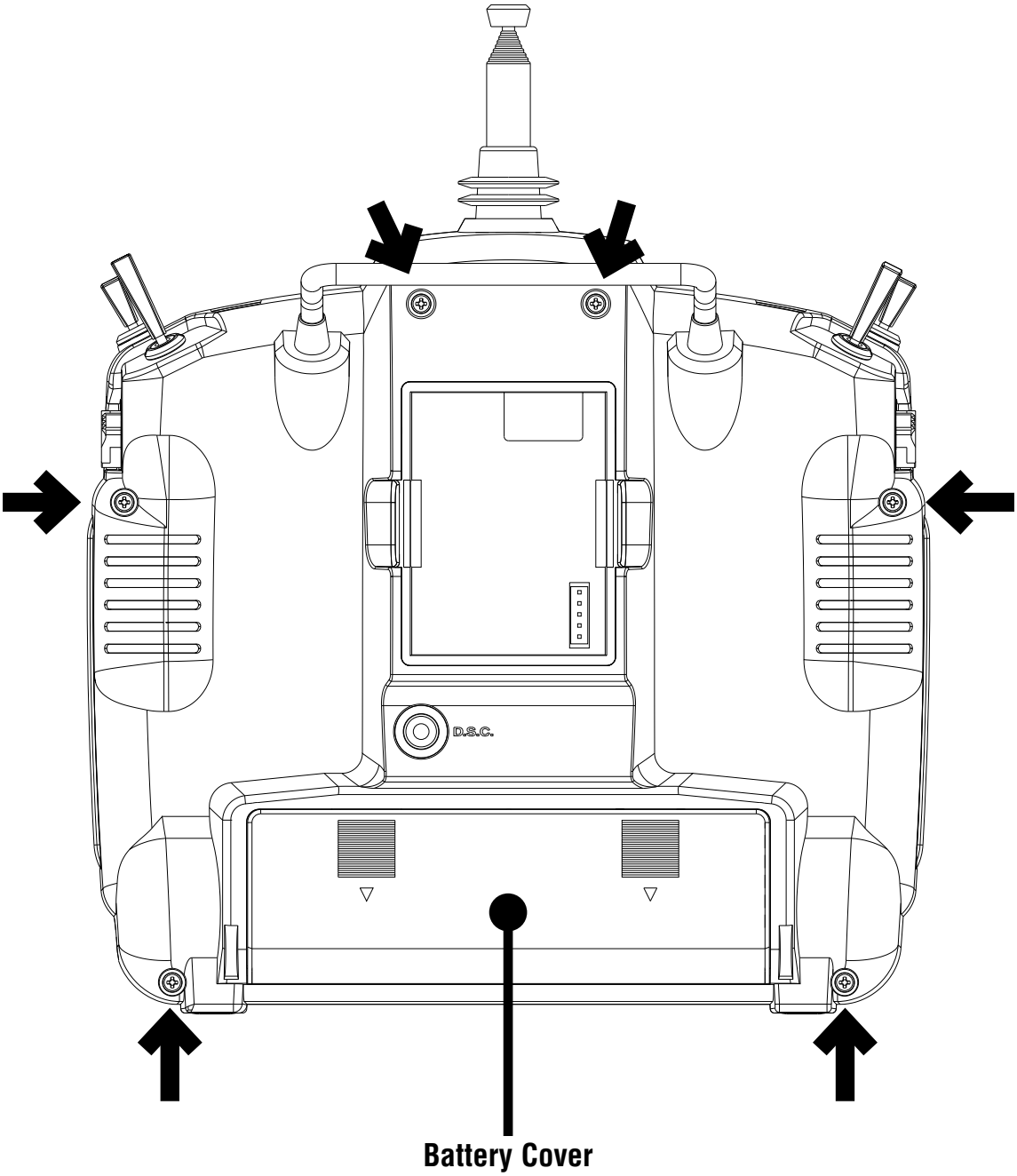
During the charging operation, the charger's temperature is slightly elevated. This is normal.



XP9303 Transmitter Features (Front)

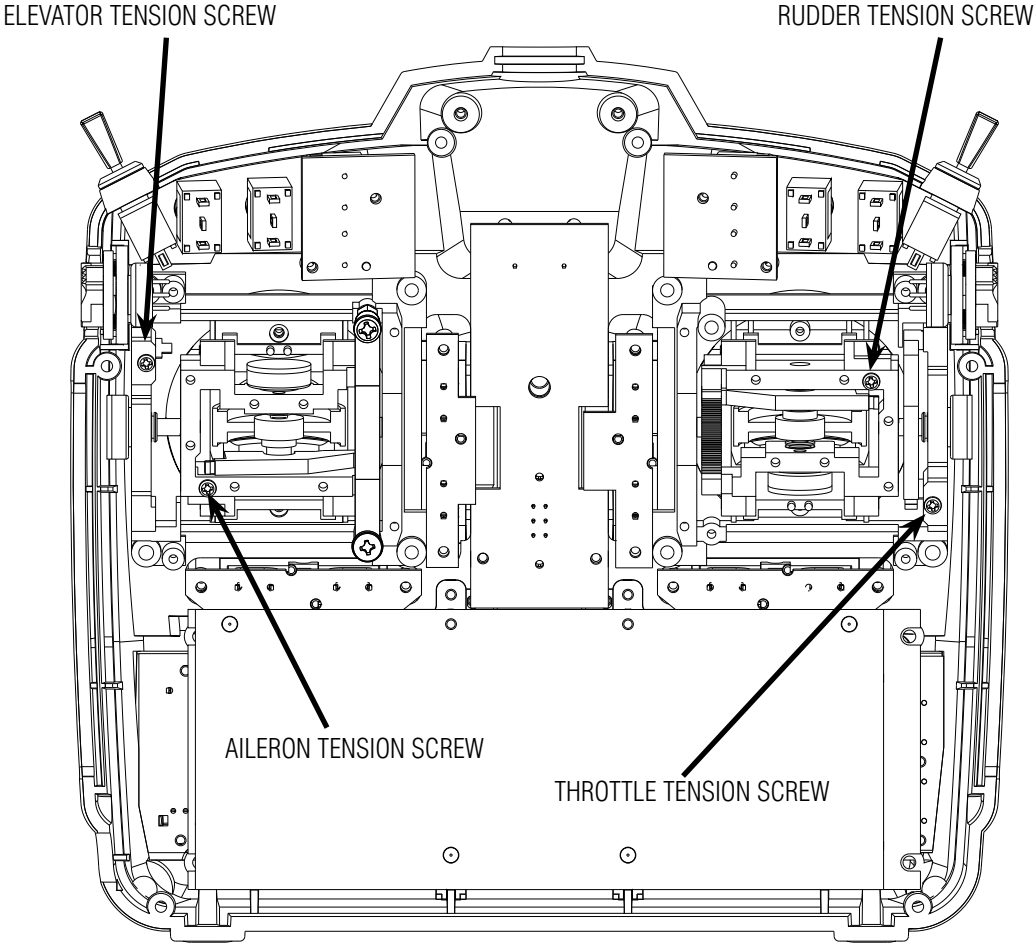


XP9303 Transmitter Features (Rear)



CAUTION: THE BATTERY CONNECTION IS KEYED SO THAT IT CAN ONLY BE PLUGGED IN ONE DIRECTION. DO NOT FORCE

XP9303 Transmitter Features (Internal)



Control Stick Tension Adjustment

Remove the six transmitter back screws as shown on the previous page. Remove the transmitter back, being careful not to cause damage to any components.

Adjust each screw for desired tension (counter-clockwise to loosen stick feel; clockwise to tighten stick feel). When adjusting the throttle ratchet tension, make sure that the adjusting screw does not touch the PC board after adjustment is complete.

Advanced Digital Trims

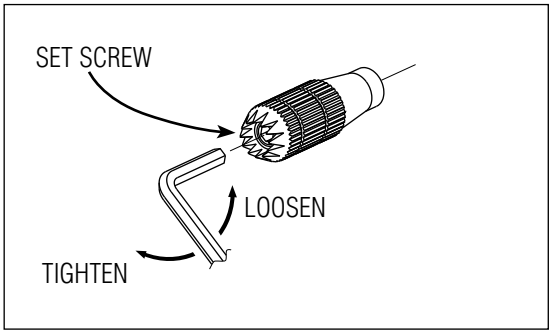
The XP9303's digital trims feature the Direct Access display function. While at the Normal display screen, if a trim lever is moved, the screen will automatically change to display the graphic position for the trim being adjusted. The XP9303's Aileron, Elevator, Throttle and Rudder trim levers feature an audible center trim beep. This is helpful in determining the trim levers center position during flight.

By using the Trim Step Function located in the System Mode, the movement of the ADT trims can be fine tuned as needed to match your specific application

Please also note that unlike conventional mechanical trim levers, when the XP9303 transmitter is in the off position, no changes can be made to the trim values during transportation.

Control Stick Length

To adjust the stick length, use the 2mm Allen wrench (supplied with your XP9303 transmitter) to unlock the set screw. Turn the wrench counterclockwise to loosen the screw. Then, turn the stick clockwise to shorten or counterclockwise to lengthen. After the control stick length has been adjusted to suit your flying style, tighten the 2mm set screw. If you desire longer sticks, JR® offers a stick (JRPA047) that is approximately one inch longer than standard. This stick, crafted from bar stock aluminum, is available at your local JR dealer.



Direct Servo Control (DSC)

For proper DSC hook-up and operation:

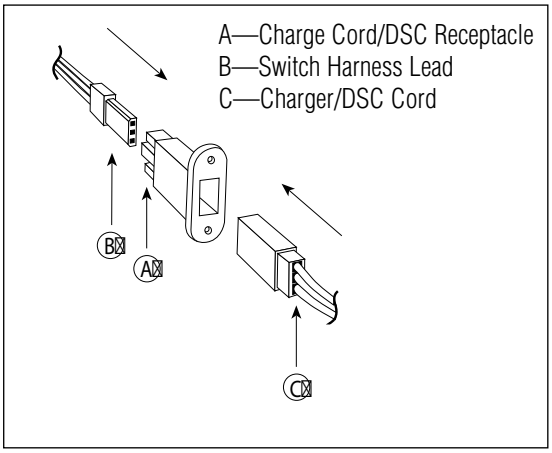
1. Leave the transmitter power switch in the Off position. The transmitter will not transmit any radio frequency (RF) in this position.
2. Plug the DSC cord (purchased separately, JRPA132) into the DSC port in the rear of the transmitter.
3. The encoder section of the transmitter will now be operational and the LCD display will be lit.
4. Plug the other end of the DSC Cord into the receiver charge receptacle. (You must use a 3-wire switch harness, such as the Deluxe Switch Harness – JRPA001, or a JR Chargeswitch – JRPA004, for the DSC function to work.) Turn the switch harness to the On position.

   Note: When you install the charging jack, be sure to hook the charging jack receptacle securely into the switch harness charge cord.

Why you should use the DSC function:

1. The DSC enables you to check the control surfaces of your aircraft without drawing the fully operational 200mAh from your transmitter battery pack. Instead, you will only draw approximately 70mAh when using the DSC function.
2. The DSC function allows you to make final adjustments to your airplane without transmitting any radio signals. Therefore, if another pilot is flying on your frequency, you can still adjust your aircraft and not interfere with the other pilot's aircraft. This is also a tremendous tool to use in the original setup of your aircraft while still in the workshop. Because of the lower current draw on your transmitter, your working time at the bench will be extended between charges.

   Note: This function is for bench-checking your aircraft only.




JRPA004 Charge Switch

Neckstrap Attachment

An eyelet is provided on the face of the XP9303 transmitter that allows you to connect a Neck Strap (JRPA023). This hook has been positioned so that your transmitter has the best possible balance when you use the neck strap.

Base Loaded Antenna

An optional base-loaded antenna is available for use with the XP9303 transmitter. It is considerably shorter than the standard antenna. However, the base loaded antenna cannot be collapsed for storage inside the transmitter. You must also use an adapter (JRPA156) to attach the antenna to your XP9303. The Base Loaded Antenna (JRPA155) is made of a flexible coil and is covered with a soft plastic material. Your range will not be affected when using the base loaded antenna.

Frequency Notes/Aircraft Only Frequencies

The XP9303 transmitter employs a plug-in module for the transmitter. Per FCC regulation, the transmitter crystal in the module should only be changed by a certified technician. Changing of the transmitter crystal by a non-authorized technician could result in a violation of FCC rules.

The XP9303 can transmit in either Pulse Code Modulation (SPCM) or Pulse Position Modulation (PPM, commonly referred to as FM).

Be certain to observe the following guidelines:

Do not operate your transmitter when another transmitter is using the same frequency, regardless of whether the second transmitter is PCM, PPM (FM) or AM. You can never operate two transmitters on the same frequency simultaneously without causing interference.

Aircraft-Only Frequencies

JR® Transmitters and receivers are available in 72MHz frequencies in the United States for use with model aircraft. Employing 72MHz frequencies does not require a special operator's license from the Federal Communications Commission (FCC).

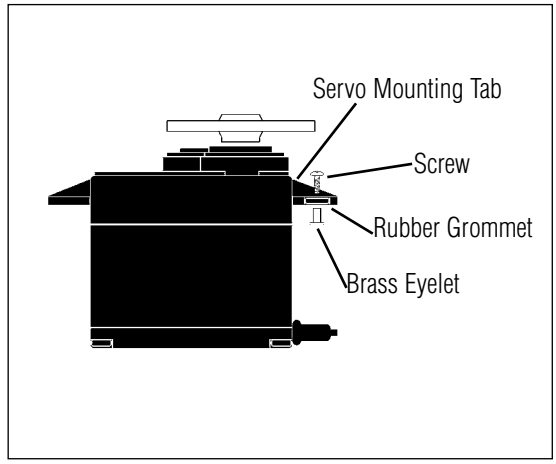
- A chart for all available frequencies is located on page I-3 of this manual.

Installation Requirements

It is extremely important that your radio system be correctly installed in your model. Here are a few suggestions for installing your JR® equipment:

1. Wrap the receiver in protective foam rubber that is no less than 3/8 inch thick. Secure the foam to the receiver with #64 rubber bands. This protects the receiver in the event of a crash or a very hard landing.
2. The servos should be mounted using rubber grommets and brass eyelets to isolate them from vibration. Do not over-tighten the mounting screws; this will negate the vibration absorption effect of the rubber grommets. The following diagram will assist you in properly mounting your servo.

   The brass eyelets are pushed from the bottom up in the rubber grommets. When the servo screw is tightened securely, it provides the proper security as well as the proper vibration isolation for your servo.
3. The servos must be able to move freely over their entire range of travel. Make sure that the control linkages do not bind or impede the movement of any of the servos.
4. Mount all switches away from the engine exhaust and away from any high vibration areas. Make sure the switch operates freely and is able to operate over its full travel.
5. Mount the receiver antenna firmly to the airplane to ensure that it will not become entangled in the propeller or control surfaces.



Flash Memory

All preprogrammed data is protected by a flash memory that guards against main transmitter battery failure.

Connections:

Note Separate drawings for Acro, Sailplane and Helicopter with typical plug order, switch location, and battery pack connections.

Battery Alarm and Display

When the transmitter voltage drops below 9.0 volts DC, the display flashes “BATT LOW” and an alarm sounds. If you are flying when this occurs, land immediately.

Sailplane- GLID Mode

The GLID mode is intended for multi-function sailplanes. The program software was developed by some of the world's leading sailplane pilots and offers a level of sophistication not found in any other sailplane system. Up to 5 flight modes are available, each allowing virtually every parameter to be individually adjusted. Active flight mode digital trims allow in-flight adjustments of camber, elevator, rudder and aileron. Trim settings are automatically stored and recalled in each individual flight mode. Following is a list of sailplane specific programming menus and their primary functions:

SYSTEM MODE GLID FEATURES

- Trim Step–Allows the trim authority to be adjusted or even turned off.
- Device Select–Flight modes, switch and lever locations and functions are programmed in this menu.
- Wing Type–Allows the selection of V-tail and dual or single flap servos.

FUNCTION MODE GLID FEATURES

- Elevator-to-Flap–Allows two values of elevator-to-flap mixing with independent up and down adjustments. Offset allows snap flaps to be programmed and the mix can be automatically selected in any desired flight mode or via several switch options.
- Aileron-to-Flap–Allows two values of aileron-to-flap mixing with independent right and left adjustment. This mix can be automatically selected in any desired flight mode or via several switch options.
- Aileron and Flap Differential–Separate differential values (5) are available in each flight mode including reverse differential (for landing). Aileron and flap differentials are independently adjustable.
- Camber Adjust Delay–A delay of up to 2 seconds can be programmed for each individual flight mode such that when switching flight modes, the camber and elevator presets transition smoothly. A break-off delay allows an elevator stick position to be used to override the delay, useful during launch when switching from launch to cruise mode for a zoom launch.
- Camber Mix–Allows individual up and down flaperon and elevator values for each of the 5 flight modes to be adjusted via the side lever.
- Aileron-to-Rudder Mix–Features separate right and left mix values for each of the 5 available flight modes.
- The Butterfly Menu–Provides 2 settings for flaps, flaperons and elevator values operated using the spoiler stick. Each value can be selected via flight modes or several available switches.
- Flap Rate–Allows the flap camber up and down to be adjusted independently in each of the 5 flight modes via the side lever(s).
- Programmable Mix 1–Spoiler-to-elevator curve mix allows non- linear elevator compensation when landing flap (butterfly/ crow) is deployed. A 6-point adjustable curve allows precise elevator input throughout flap travel avoiding unwanted pitching during landings.
- 2 Timers–Are available and can be programmed as count up or down, and are assignable to various switches and buttons.
- Active Digital Flight Trims–Allow presets of elevator, camber, rudder and aileron to be adjusted in flight and are automatically stored and recalled in each of the 5 flight modes.

Note: The following section contains in-depth details regarding each of the available programming functions. If you're just getting started, you'll likely find it easier (and we recommend) using the programming guide for 6 servo sailplanes on page S40. This step-by-step guide leads you through a typical 6-servo sailplane and even gives the key-strokes necessary to set up a sailplane, including flight modes, butterfly and side lever camber adjustment. We recommend referring to the section below when a more in-depth understanding of a specific programming feature is desired.

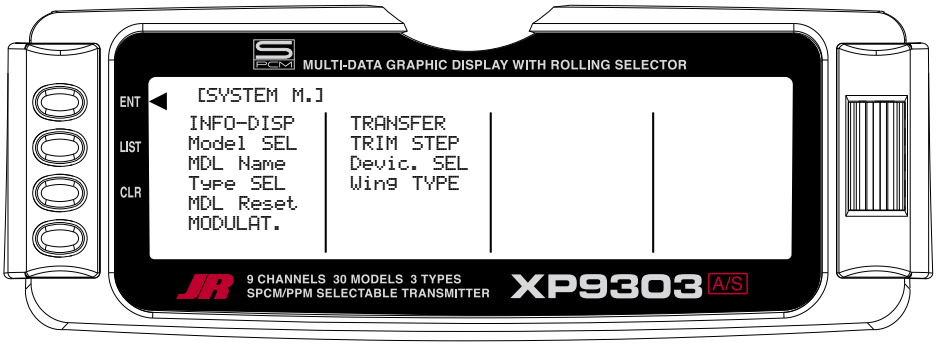
System Mode

System mode contains the foundational programming. System mode screens include model name, model reset, modulation, data transfer, etc.—functions that are typically set once and then are seldom changed or adjusted.

To enter System Mode–

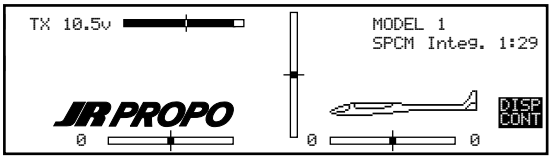
Press *ENT* and hold while turning on the transmitter.

The screen should appear as follows.

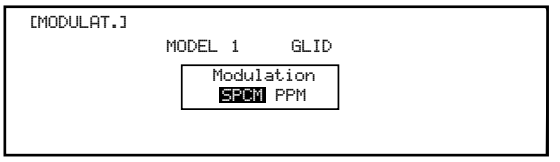


System Mode

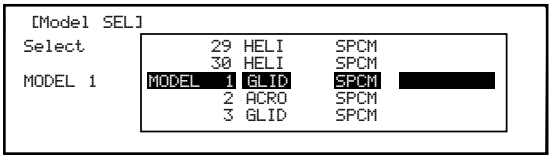
System mode contains the follow screens:



Info Display

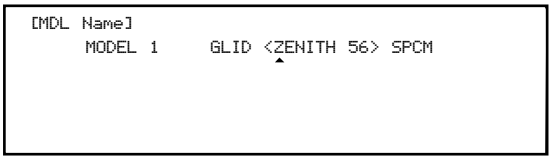


Modulation Pg. S5

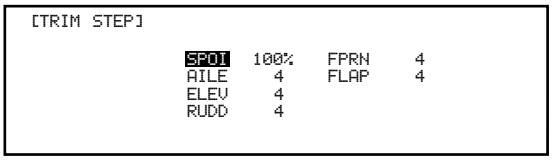


Model Select Pg. S3

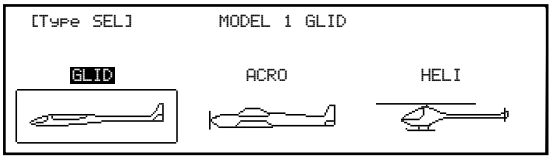
Transfer Pg. S6



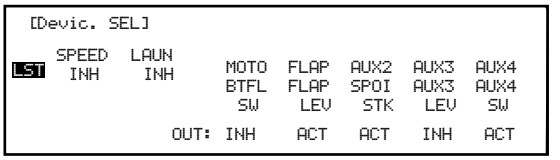
Model Name Pg. S3



Trim Step Pg. S8

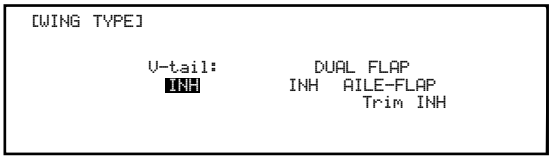


Type Select Pg. S4



Device Select Pg. S9

Model Reset Pg. S4



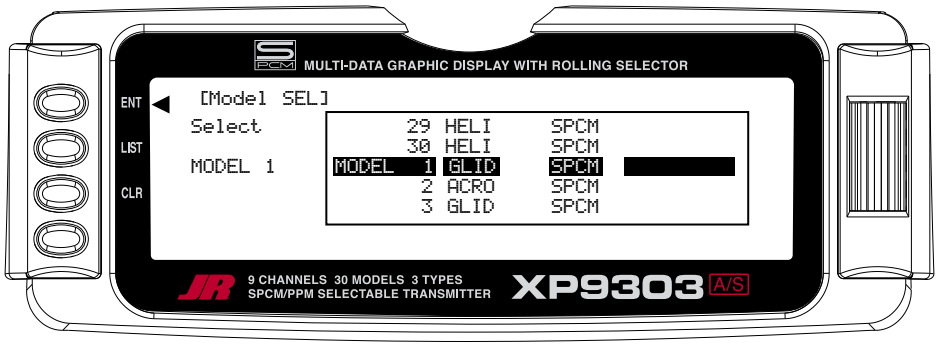
Wing Type Pg. S14

Model Select

Model select allows up to 30 different models to be stored and selected.

> **Note**: When setting up a new model it is recommended that an unused model memory is selected. If a current model memory is selected it's recommended that the model be reset to factory default setting before programming the new model. See model reset page S4.

1. In the ***SYSTEM Menu***, highlight and select ***Model SEL*** using the *Selector*.
2. Use the *Selector* to highlight and select the desired model number to be used.

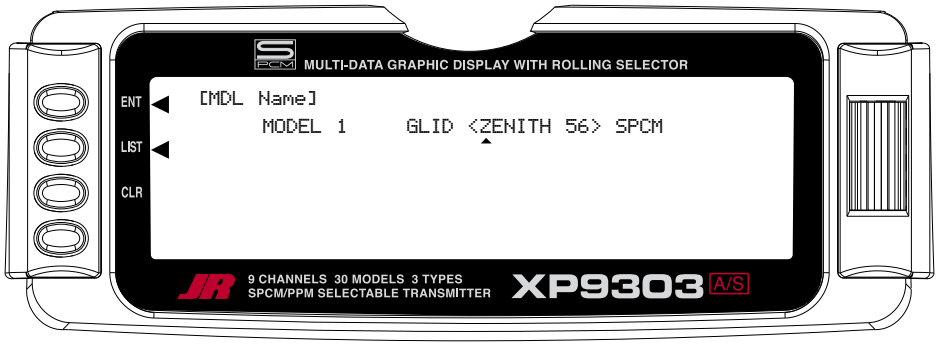


3. Return to the SYSTEM Menu by pressing the *LIST* button.

Model Name

The model name screen allows each model to be given an eight digit name or number. This is convenient for identifying a model or the channel number the model is on. The model's name will appear in the upper right corner of the main info screen.

1. In the ***SYSTEM Menu***, highlight and select ***MDL Name*** using the *Selector*.
2. The cursor (indicates where the next character will be placed) is positioned at the beginning of the model name. Press the *Selector* to obtain a list of available characters.
3. Highlight and select the desired character to form the model name. After the character is selected, rotate the *Selector* to position the cursor where the next character is to be placed and press the *Selector* to obtain the character list again. Repeat until the model name is completed.

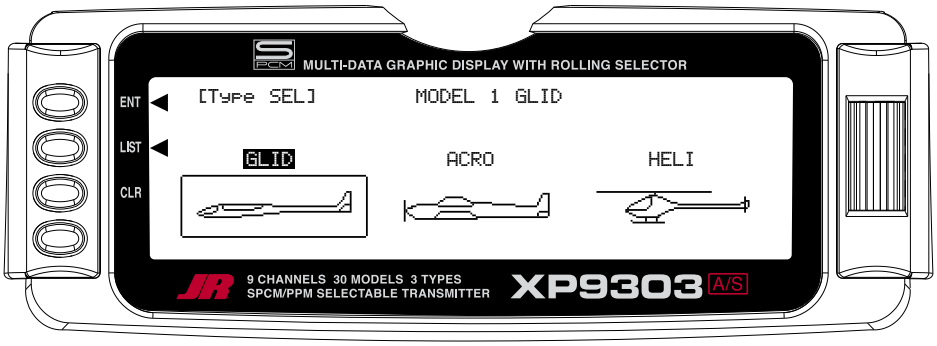


4. Return to the SYSTEM Menu by pressing the *LIST* button.

Type Select

Type select allows the model type to be selected. Model types include glider, acro or heli. **Note**: When changing model types the programming information will be reset to the factory default setting loosing the previous settings.

1. In the ***SYSTEM Menu***, highlight and select ***Type SEL*** using the *Selector*.
2. Highlight and select ***GLID*** using the *Selector* .

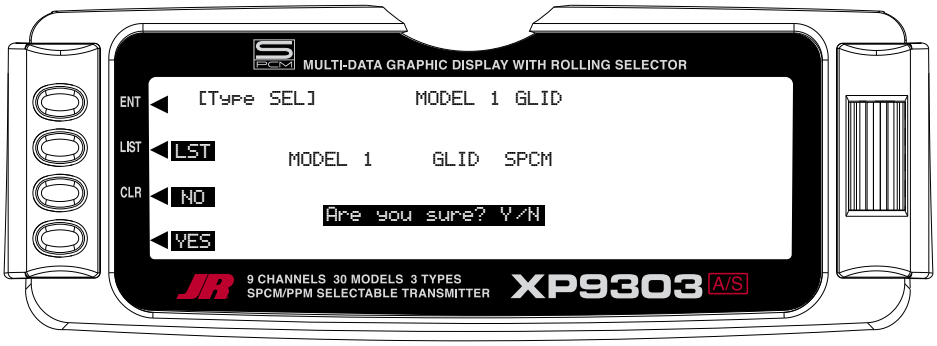


3. Return to the SYSTEM Menu by pressing the *LIST* button.

Model Reset

Model Reset is used to return the program to the factory default settings.

1. In the ***SYSTEM Menu***, highlight and select ***MDL Reset*** using the *Selector*.
2. Press the *CLR* button that is next to ***RES*** on the display.



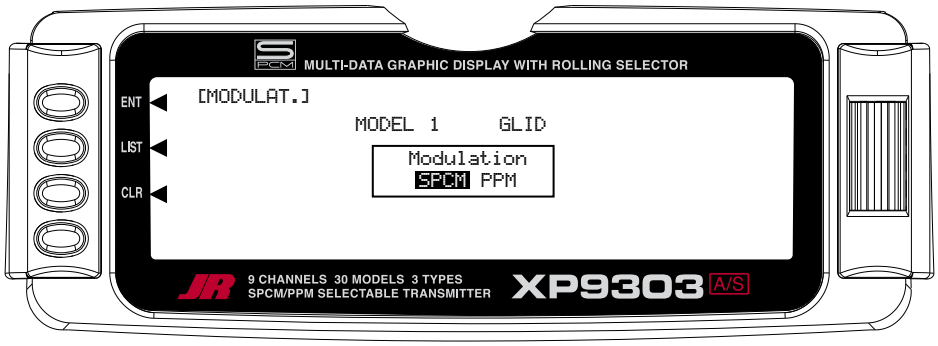
3. Press the lowermost button next to ***YES*** on the display to reset all data for this model.
4. Return to the SYSTEM Menu by pressing the *LIST* button.

Modulation

The XP9303 system supports two types of modulation – SPCM and PPM (FM). The correct modulation type must be selected to match the receiver in the aircraft or the system will not function.

Note: The XP9303 system is not designed for use with "Z" PCM receivers.

1. In the ***SYSTEM Menu***, highlight and select ***MODULAT.*** using the *Selector*.
2. Highlight and select either SPCM or PPM to match the receiver in the aircraft.



3. Return to the SYSTEM Menu by pressing the *LIST* button.

TRANSFER – Transfer the model to another transmitter or to DataSafe

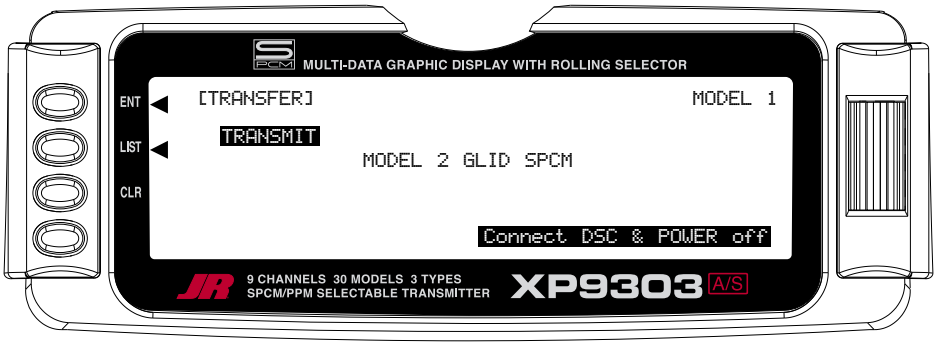
The TRANSFER function can be found in the SYSTEM Menu and is used to copy the contents of a model memory to another XP9303 transmitter or to a DataSafe device on a Personal Computer (PC). It is also used to receive data for a model, either from another XP9303 transmitter or from a DataSafe unit.

TRANSFER a model from the XP9303 – (Transfer function)

1. Hold the *ENT* button while plugging the trainer cord into the back of the transmitter to obtain the SYSTEM Menu.

Plug the other end of the trainer cord into another XP9303 transmitter while holding the *ENT* button down and prepare that transmitter for Receive as described below. Or, plug the other end of the trainer cord into a DataSafe unit and prepare the DataSafe to receive.

2. Highlight and select ***TRANSFER*** in the ***SYSTEM Menu*** to obtain the Transfer display.



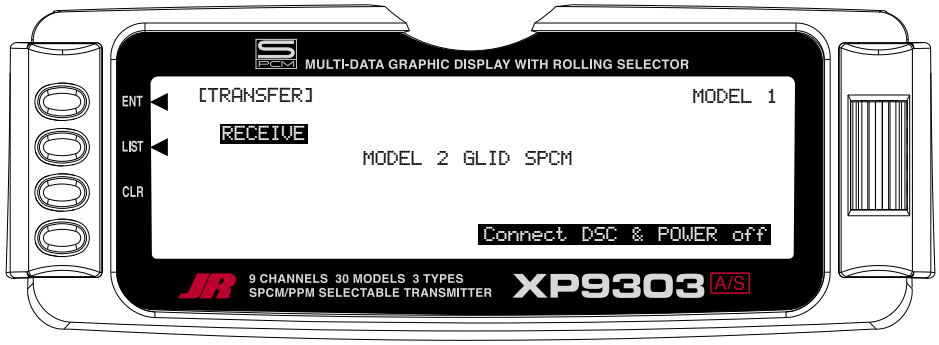
3. The model to be transferred must be the currently selected model. If the model to be transferred is not currently selected, see ***Model SEL*** in the ***SYSTEM Menu*** to select the model to be transferred to another XP9303 or DataSafe unit.

4. When the receiving device is ready, press the *CLR* button next to ***START*** on the left side of the display. The data for the currently selected model is transferred to the receiving device.

TRANSFER a model to the XP9303 – (Transfer function)

1. Hold the *ENT* button while plugging the trainer cord into the back of the transmitter to obtain the ***SYSTEM Menu***.
   Plug the other end of the trainer cord into another XP9303 transmitter while holding the *ENT* button and prepare that transmitter for Transmit as described above. Or, plug the other end of the trainer cord into a DataSafe unit and prepare the DataSafe to transmit.

2. Highlight and select ***TRANSFER*** in the ***SYSTEM Menu*** to obtain the Transfer display.



3. If ***RECEIVE*** is already displayed, continue with the next step. If ***TRANSMIT*** is displayed, highlight and select ***TRANSMIT***, changing it to ***RECEIVE***.

4. Select the model memory to receive the data by highlighting and selecting the model name/memory number and then scrolling to and selecting the model memory that is to receive the data. Be careful to select an unused model memory or a memory that contains data for a model no longer needed because the data in this model memory is going to be replaced by what is transmitted and will be permanently lost.

5. Press the *CLR* button next to ***START*** on the left side of the display. Stand-by appears at the bottom of the display indicating that the XP9303 is ready to receive data. Press start on the transmitting XP9303 or DataSafe unit to begin the data transfer to the XP9303.

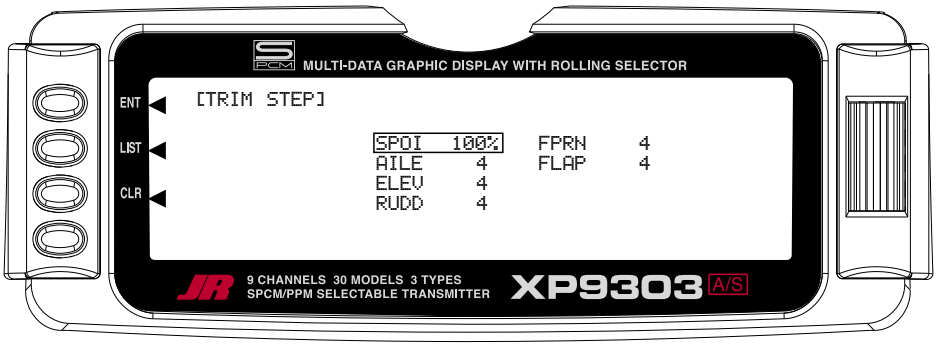
Trim Step

The Trim Step function provides for adjusting the sensitivity of the trim levers. It is useful during and after initial trimming of the aircraft, in order to trim the aircraft quickly at first and then to make very precise adjustments to aircraft trim. When adjusting the digital trims (AILE, ELEV, RUDD, FPRN, FLAP), the total trim travel does not change—only the number of increments (beeps) changes, which makes for finer or coarser trim movements. The digital trims may have a setting of 0–10 with 10 being the coarsest adjustment. When the value is set to 10, there are only 10 trim increments from center to each end. When set to 5, there are 20 trim increments from center to each end. When set to 4 there are 25 increments. When set to 3 there are 34 increments and when set to 1 there are 100 trim increments. When set to 0 the trim levers cease to function and can no longer be used to change the trim of the aircraft.

When adjusting the analog spoiler trim, however, the total trim travel is actually reduced when set to less than 100%.

Use a fairly coarse setting such as 4–6 when test flying an aircraft in order to be able to trim the aircraft quickly, and then use a finer setting such as 3–1 for final precision trimming.

1. Highlight and select ***TRIM STEP*** in the ***Devic. SEL*** display of the ***SYSTEM Menu*** to acquire the ***TRIM STEP*** display.

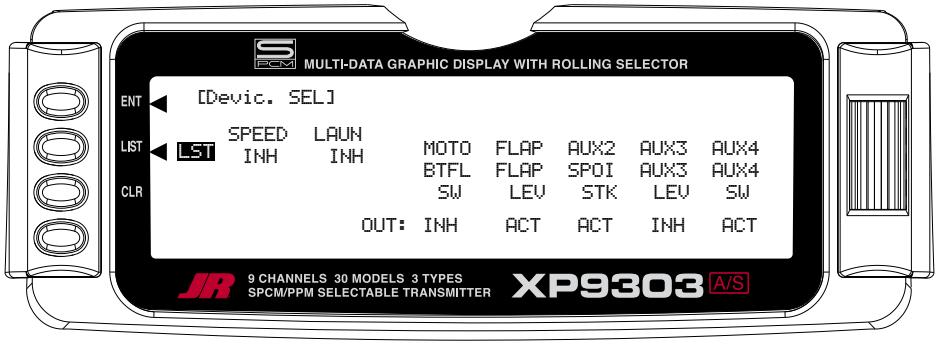


2. Highlight and select the trim that is to be changed and use the *Selector* to set a value of 1–10 (1 = finest, 10 = coarsest).
3. Repeat for other trims as desired.

Device Select

The device select screen is used to select the following:

- To assign/activate flight modes to a variety of switches
- To assign the motor function to spoiler the stick, levers or switches
- To program the digital aileron and rudder trims so that they are common or separate in each flight mode
- To assign the flap (camber) adjustment to one of the two available side levers
- To assign aux 2 channel to various levers, switches or sticks
- To assign aux 3 channel to various levers, switches, buttons or sticks
- To assign aux 4 channel to various levers, switches, buttons or sticks
- To activate or inhibit the motor, flap, aux 2, aux 3 and/or aux 4 channels



Flight Modes

Flight modes allow nearly all of the parameters (i.e. Dual rates, camber adjust values, preset trims, all types of mixing, etc.) to be programmed and then selected in flight via a switch (es). The XP9303 offers up to 5 flight modes that include Launch, Land, Cruise, Speed and Thermal. Flight modes allow a sailplane's programming to be optimized for up to five tasks.

As an example, typically in launch mode:

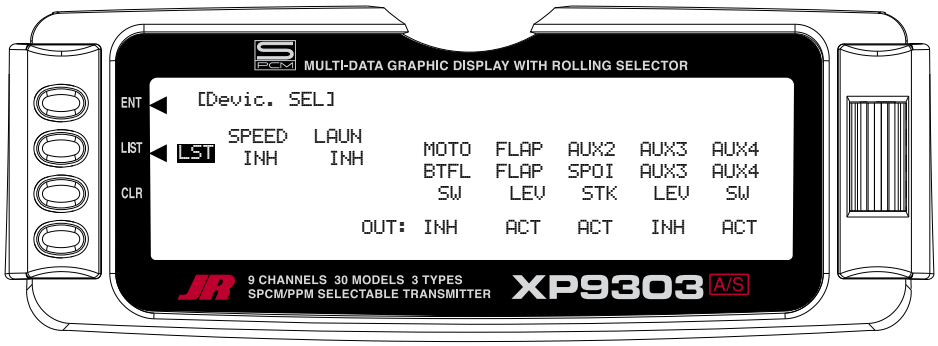
- The flaps and flaperons are preset with positive camber to give more lift.
- An elevator preset trim position that gives the best climb is programmed.
- A high rudder rate with reduced exponential to give authoritative steering control on launch is desired, while the elevator and aileron rates are set to give a medium response.
- Aileron-to-rudder mix is turned off, as are landing flaps and elevator-to-flap mix while camber adjustment of the side lever is programmed to give proportional camber changes to allow for last minute adjustments based on wind and winch conditions.
- Aileron differential is set at 50%.

All these (and many more) programming parameters can be selected by simply moving one switch. At the top of the launch you prepare to zoom by switching to the cruise mode. A single flip of the switch neutralizes the trailing edge while giving the correct elevator trim for cruise. Rudder-to-elevator and elevator-to-flap mixes automatically turn on the programmed values and the aileron differential is now at a much higher 75% for more coordinated thermal turns. At the flip of a single switch you're ready for a zoom launch and for hunting thermals! And remember there are 3 more flight modes available. Once you start using flight modes, you'll wonder how you ever flew without them.

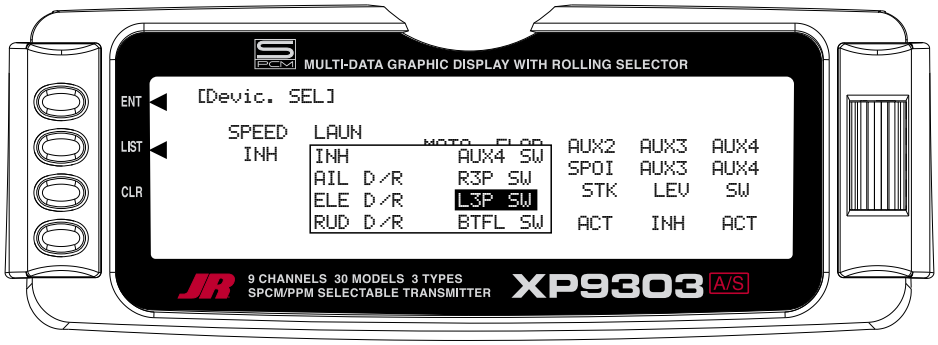
Activating and Assigning Flight Modes

In the factory default setting, all flight modes are inhibited. Flight modes are activated and assigned to the desired switch position using the SPEED and LAUN functions in the Device SEL screen.

In system mode list rotate the *Selector* until ***Device SEL*** is highlighted. Press the *Selector* to access the Device Select screen.

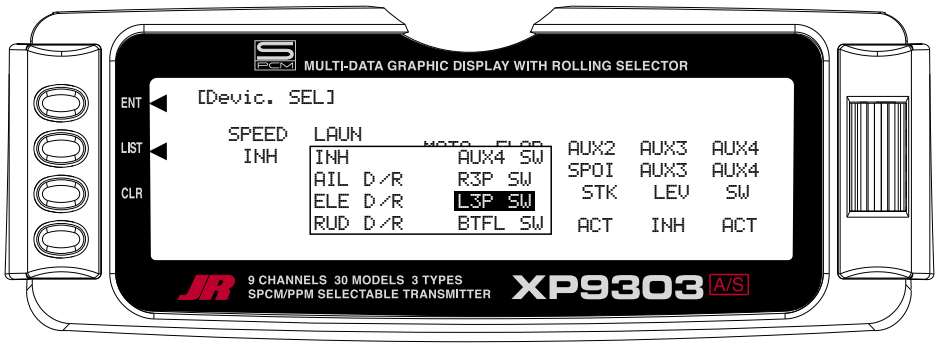


To activate the launch, cruise, and land mode, rotate the *Selector* until ***LAUN*** is highlighted and then press the *Selector*. The following screen will appear:



At this point, you must decide which 2- or 3-position switch you prefer to assign the flight mode to. If a 2-position switch is selected, launch and cruise will be active. If a 3-position switch is selected, the launch, cruise and land will be activated. We recommend starting with the L3P (left 3 position) switch, as this is a convenient place. Rotate the *Selector* until the desired switch is highlighted and press to select.

AIL D/R =	Aileron dual rate switch
ELE D/R =	Elevator dual rate switch
RUD D/R =	Rudder dual rate switch
AUX4 =	Auxiliary 4 switch
R3P =	Right 3-position switch
L3P =	Left 3-position switch
BTFL =	Butterfly switch

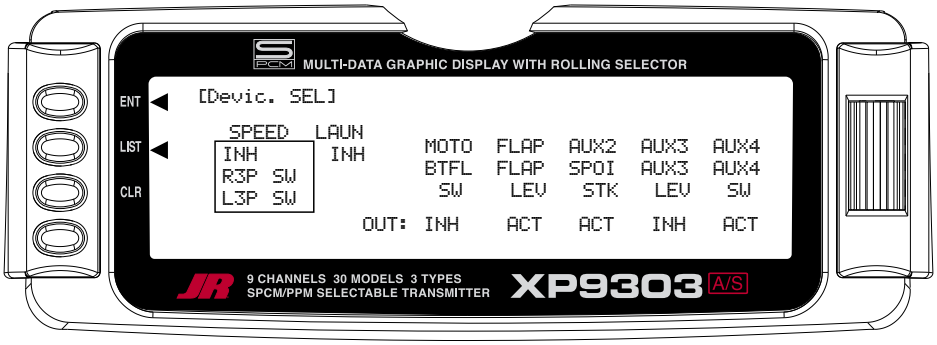


Activating and Assigning Flight Modes (continued)

To activate the speed thermal flight modes, highlight ***SPEED*** and press the *Selector* to select the desired switch position.

Important: When the speed and thermal flight modes are activated, launch and land always have priority. Any time launch or land is selected they will override speed, thermal or cruise. To access speed or thermal, the launch switch must be in the cruise position. Try selecting the various flight modes several times while looking at the main info screen and you'll quickly become familiar with the switch priority.

Note: On the main info screen, the flight mode that is activated will be displayed on the top center of the screen.



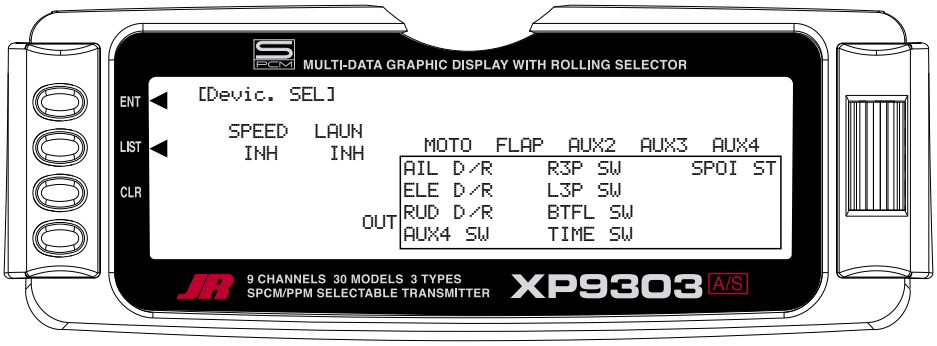
Motor Function

The motor function can be assigned to operate from several different switches, buttons or the throttle stick. In device select, highlight ***MOTO*** and press the *Selector* to access the available switches that can be programmed to operate the motor.

Select the desired switch by highlighting it and press the *Selector*.

AIL D/R =	Aileron dual rate switch
ELE D/R =	Elevator dual rate switch
RUD D/R =	Rudder dual rate switch
AUX4 SW =	Auxiliary 4 switch
R3P SW =	Right 3-position switch
L3P SW =	Left 3-position switch
BTFL SW =	Butterfly switch= Auxiliary 4 switch
TIME SW =	Timer button
SPOI ST =	Spoiler stick

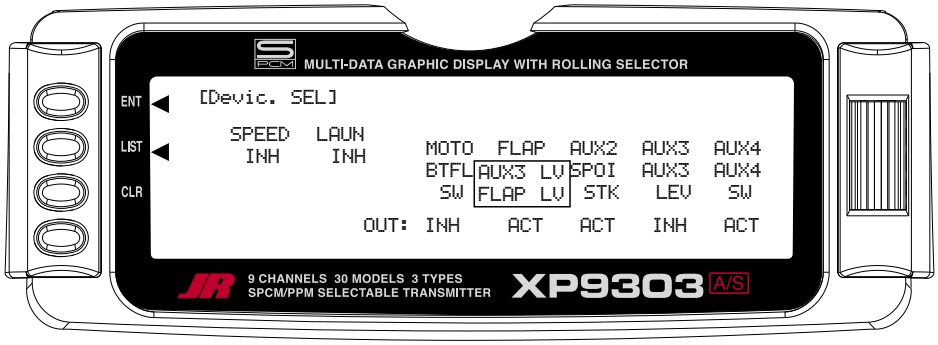
Note: If dual flaps are activated, the motor function is not assigned to a channel. It will be necessary to use a programmable mix to mix MOTO to any open auxiliary channel in order to operate the throttle when dual flaps are activated. Also see Motor Hold on page S29 for more details.



Flap and AUX Functions

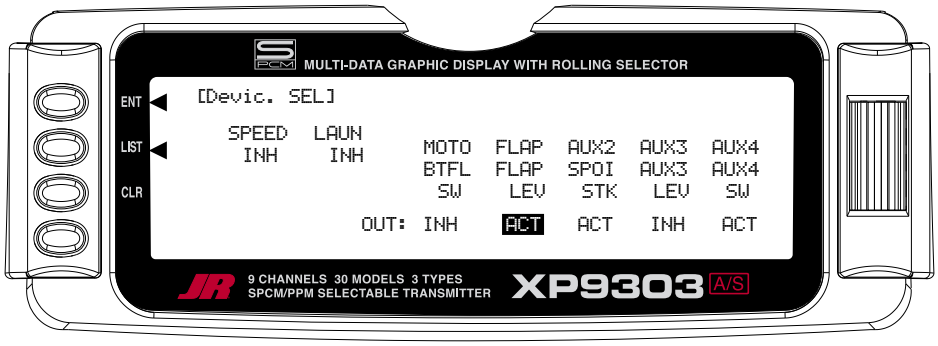
The Flap and Auxiliary functions can be assigned to operate from several different switches, buttons or the throttle stick. In device select, highlight the desired flap or aux function and press the *Selector* to access the available switches that can be programmed to operate each function.

Select the desired switch by highlighting it and press the *Selector*.



Activating / Inhibiting Channels

Channels 6–9 can be inhibited, allowing them to be used as slave channels, in programmable mix. Highlight the desired ***ACT/INH*** below the appropriate channel. Press the *Selector* to inhibit or activate the channel.



Wing Type

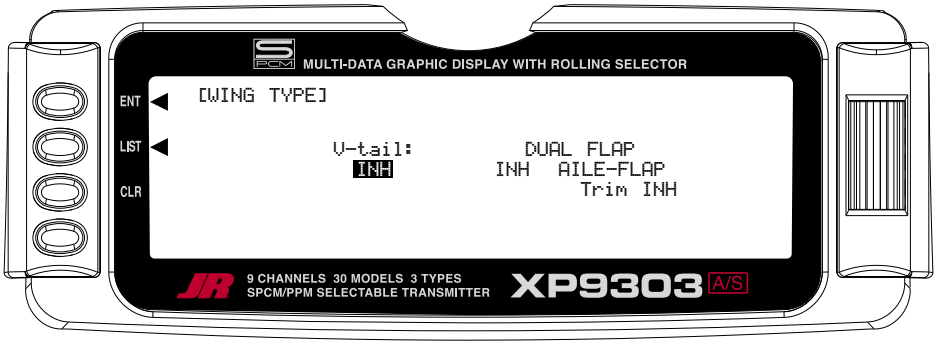
This screen allows the selection of V-tail, dual flap and, when dual flaps are activated, aileron-to-flap trim.

To access Wing type in ***System mode*** list, rotate the *Selector* to highlight ***Wing TYPE***. Press the *Selector* to access the wing type screen.

If your sailplane has a V-tail, activate the V-tail function by highlighting ***INH*** and pressing the *Selector*.

If your sailplane has dual flaps, activate the dual flap function by highlighting ***INH*** and pressing the *Selector*.

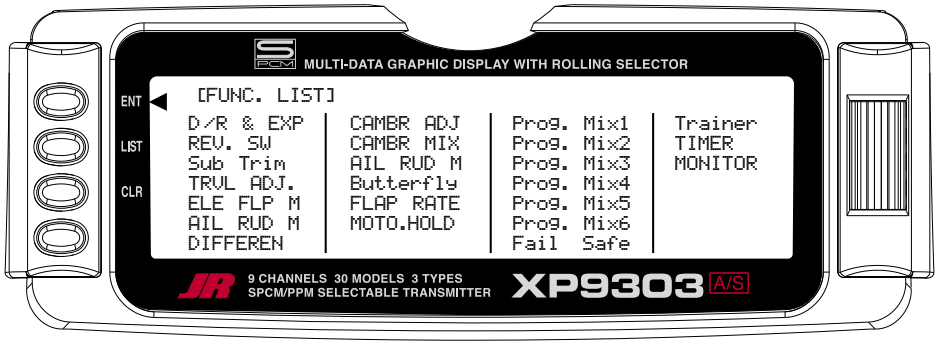
If you choose to have aileron trim to also affect the flaps, activate the ***AILE-FLAP*** trim function.



Function Mode

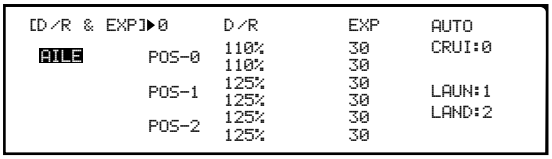
Programs found in the function mode are more frequently used. Not only are these functions used during initial setup, but many of these are commonly adjusted at the field to change/optimize the flight characteristics and response of an aircraft.

To enter function modes, turn on the transmitter then press the *ENT* button. To enter the function list mode, press the list mode after the function mode has been selected.

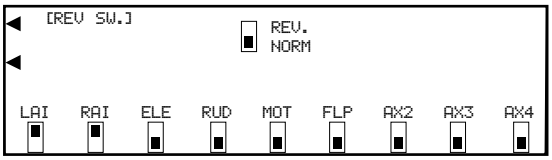


Function Mode (continued)

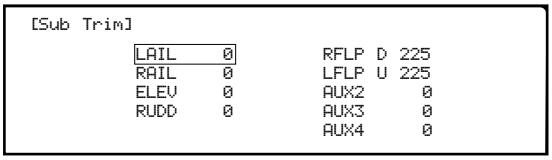
Function mode contains the following screens:



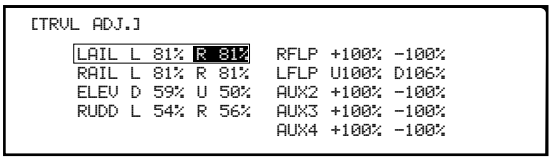
Dual Rate and Exponential Pg. S18



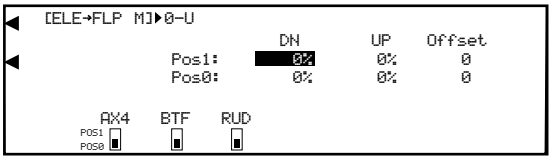
Reversing Switch Pg. S19



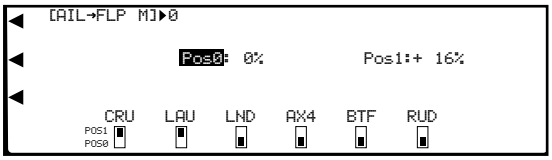
Sub Trim Pg. S20



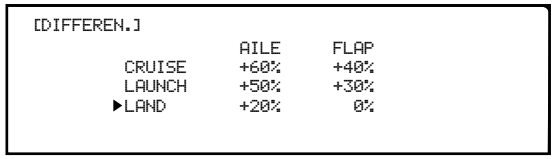
Travel Adjust Pg. S21



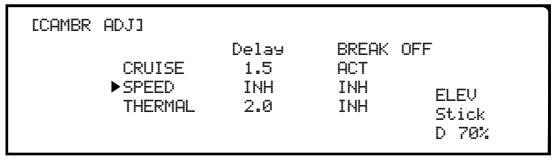
Elevator-to-Flap Mix Pg. S22



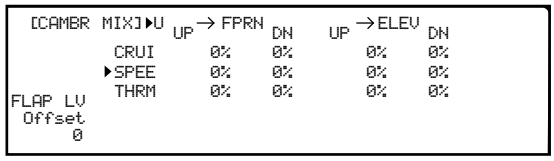
Aileron-to-Flap Mix Pg. S23



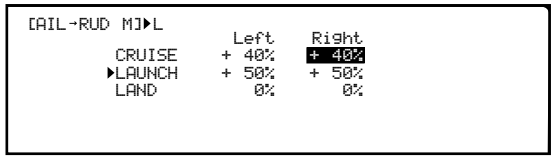
Differential Pg. S23



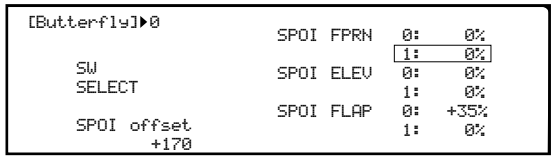
Camber Adjust Pg. S24



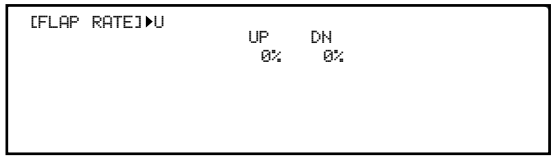
Camber Mix Pg. S25



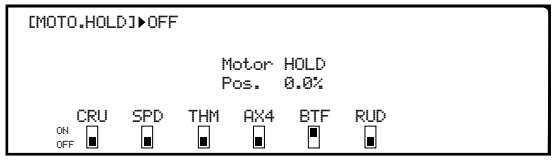
Aileron-to-Rudder Mix Pg. ****



Butterfly Mix Pg. S27

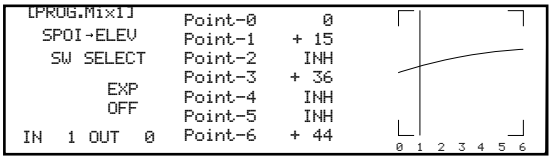


Flap Rate Pg. S28

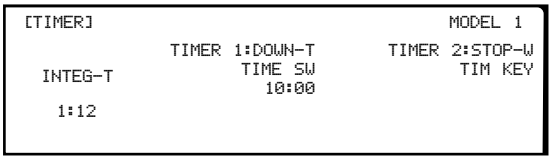


Motor Hold Pg. S29

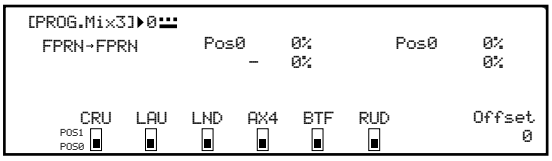
Function Mode (continued)



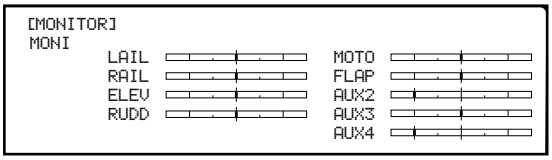
Programmable Curve Mix Pg. S30



Timer Pg. S31



Programmable Mix Pg. S32

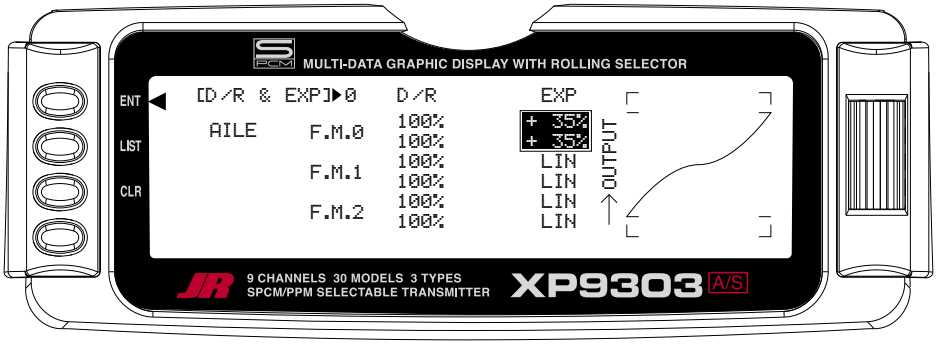


Monitor Pg. S39

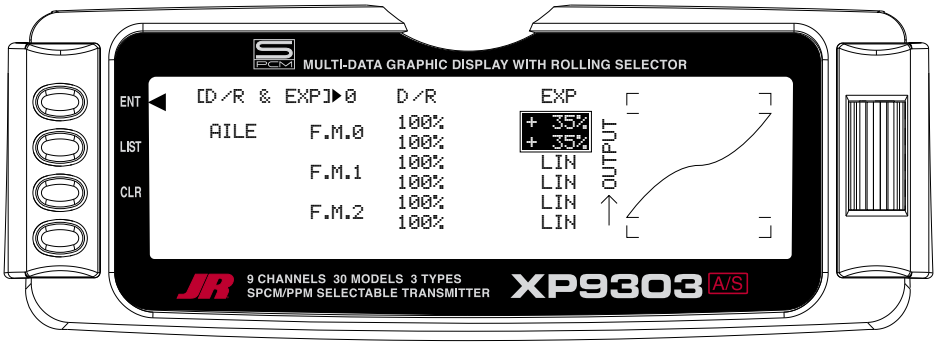
D/R & EXP – DUAL RATE AND EXPONENTIAL

Three dual and exponential rates are available and are selectable via flight modes or selected switches. Dual and Expo rates are independently adjustable in each direction by moving the appropriate stick in the desired direction.

1. Highlight and select ***D/R & EXP*** in the ***FUNC.LIST*** to obtain the D/R & EXP display. If Flight Modes were activated earlier in the ***Devic.SEL*** function and ***D/R*** was set to ***FM*** in the same function, there will be 3 sets of values displayed for each channel – Aileron, Elevator and Rudder.



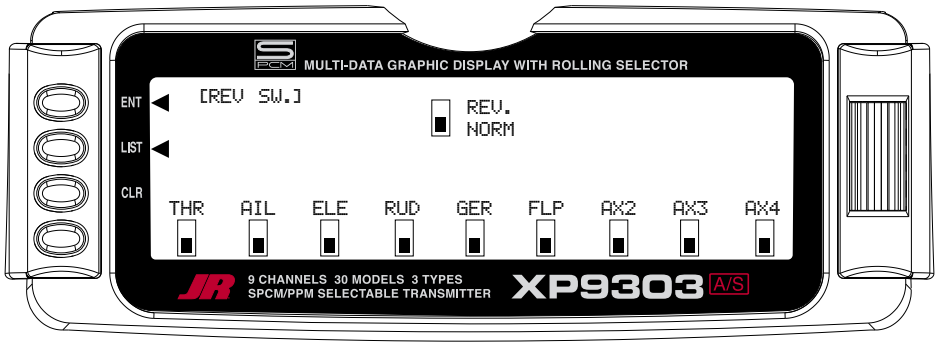
2. Use the *Selector* to change between Aileron, Elevator and Rudder. Then use it to set dual rate and exponential values.



REV.SW – SERVO REVERSING

The servo reverse screen allow the direction of each servo to be selected.

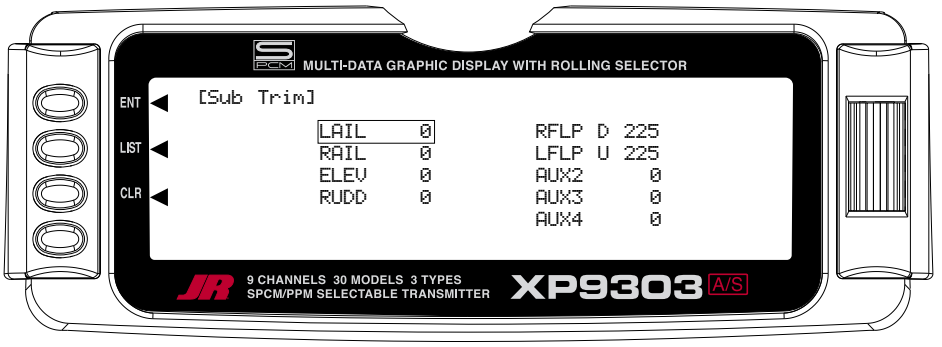
1. Highlight and select ***REV.SW*** in the ***FUNC.LIST*** to obtain the servo reversing display.
2. Use the *Selector* to highlight and select those channels that need to be reversed. Pressing the *Selector* toggles the channel between Normal and Reverse.



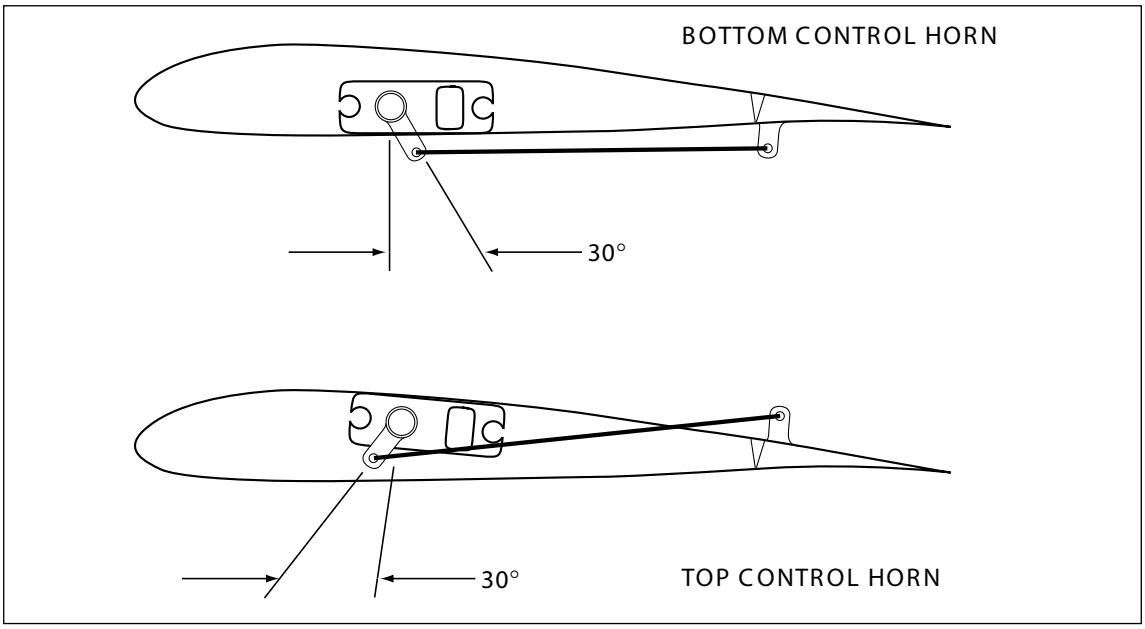
SUB TRIM

Use Sub Trims to fine-tune the alignment of servo arms.

1. Highlight and select ***Sub Trim*** in the ***FUNC.LIST*** to obtain the Sub Trim Display.
2. Highlight and select the channels where the sub trims must be adjusted. Once a channel is selected, rotate the *Selector* until the servo arm is in the desired position.



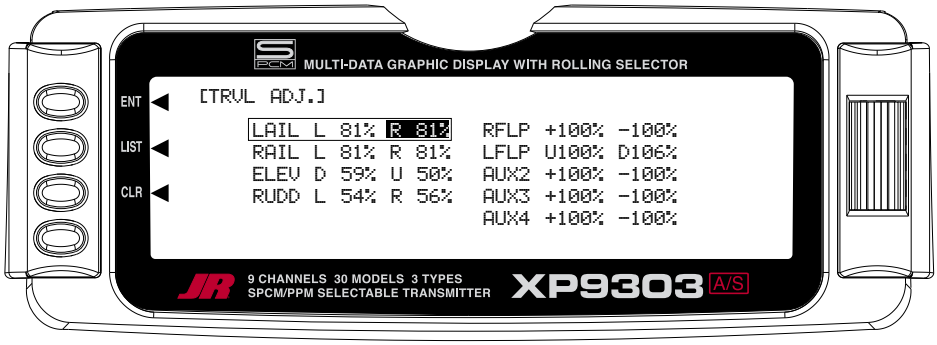
Note: Typical flap geometry requires that the sub trim be significantly offset to provide adequate down flap throw. This issue exists because flaps typically have a large travel down (80 to 90 degrees) but very little travel up (less than 15 degrees). To achieve proper flap travel, it is necessary that the right flap sub trim be set at 225 down and the left flap sub trim be set at 225 up as a starting point. Then when attaching the flap servo arms be sure the spoiler stick is in the up position and camber lever is in the middle position. Install the flap servo horns such that they are angled approximately 30˚ toward the trailing edge, then adjust the flap linkage such that the flaps are level.



TRVL. ADJ - TRAVEL ADJUST

Travel Adjust allows the independant adjustment of servo travel for each direction of servo travel.

1. Highlight and select ***TRVL ADJ.*** in the ***FUNC.LIST*** to obtain the Travel Adjust display.
2. Use the *Selector* to highlight and select each channel and adjust the travel in each direction by rotating the *Selector*. The direction of travel is changed by moving the stick/switch/lever back and forth.

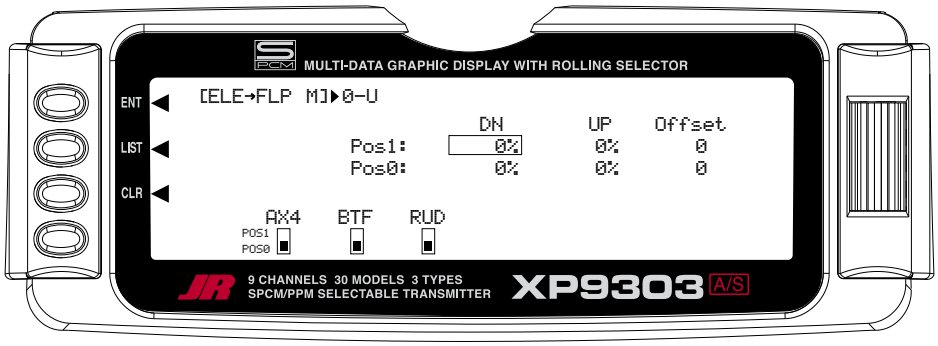


Elevator-to-Flap Mix

Elevator-to-flap mix is normally used to give several degrees of down flap when up elevator is applied. This gives more pitch authority than would elevator alone, and is commonly used for slope racers to improve high-speed turns and in thermal sailplanes to allow increased maneuverability for tight thermal turns. An offset is available that allows the programming of snap-flaps. With snap-flaps, no flap mixing occurs during small to medium up elevator inputs, but at about 80% up elevator, the flaps are mixed to give down flaps, causing greater up pitch authority. For more detail on setting up snap-flaps, see the setup guide on page S58.

To access Elevator-to-flap mix, in Function Mode list, rotate the *Selector* until ***ELE→FLP M*** is highlighted. Press the *Selector* to access the Elevator-to-Flap mix menu. Note that two elevator-to-flap mix values are available, ***Pos0*** and ***Pos1*** and the elevator-to-flap values can be independently adjusted up and down. Also the offset (the stick position where the mixing changes from up to down) can be adjusted. This offset allows the programming of snap-flaps, a common sailplane function that gives greater full up elevator pitch authority for tighter turns. If you choose to program snap-flaps, the offset adjustment range is -200 to +200. Negative values move the offset in the up elevator direction. Switches are available at the bottom of the screen that allow the selection of Pos0 or Pos1.

Note: Position 1 always has priority over position 0. Press the *LIST* button to return to the Function Mode screen.



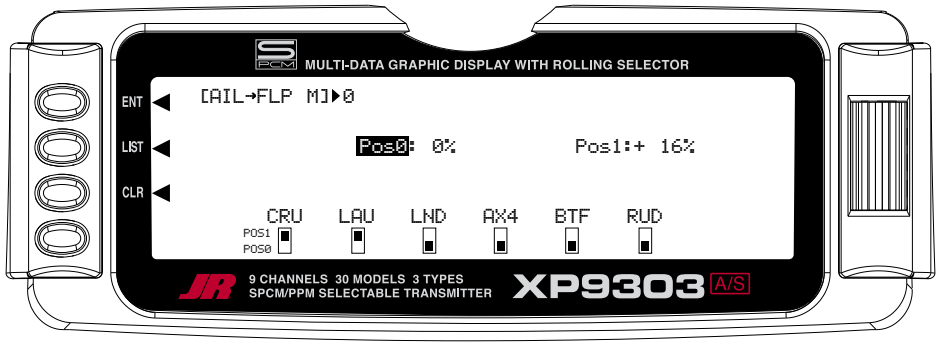
Aileron-to-Flap Mix

Aileron-to-flap mix causes the flaps to move in unison with the ailerons. This function gives added roll response by mixing ailerons to flaps such that the entire trailing edge functions as an aileron.

To access aileron-to-flap mix, in ***FUNC.LIST*** rotate the *Selector* until ***AIL□FLP M*** is highlighted. Press the *Selector* to access the Aileron-to-Flap mix.

Note: Two aileron-to-flap mix values are available—Pos0 and Pos1. Switches are available at the bottom of the screen that allow the selection of Pos0 or Pos1.

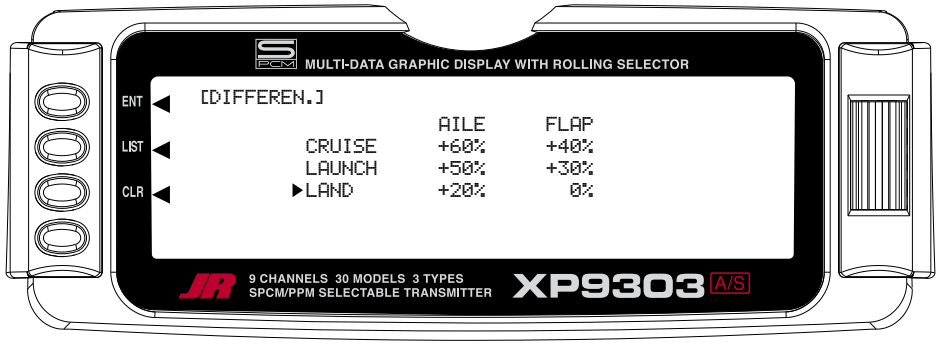
Note that position 1 always has priority over position 0. Press the *LIST* button to return to the Function Mode screen.



Differential

Differential (typically more up aileron travel than down) is utilized to reduce adverse yaw and to improve the turning/handling characteristics. Aileron and flap differentials can be adjusted for each of the 5 flight modes.

To access Differential, in ***FUNC.LIST*** rotate the *Selector* until ***DIFFEREN.*** is highlighted. Press the *Selector* to access the Aileron differential menu. Rotate the *Selector* to highlight the desired flight mode and aileron or flap value, and then press the *Selector* to access that value. With the flight mode switch in the corresponding mode, give a full right aileron command and rotate the *Selector* to achieve the desired aileron or flap differential. Pressing the *Selector* will store the value. Press the *LIST* button to return to the Function Mode screen.

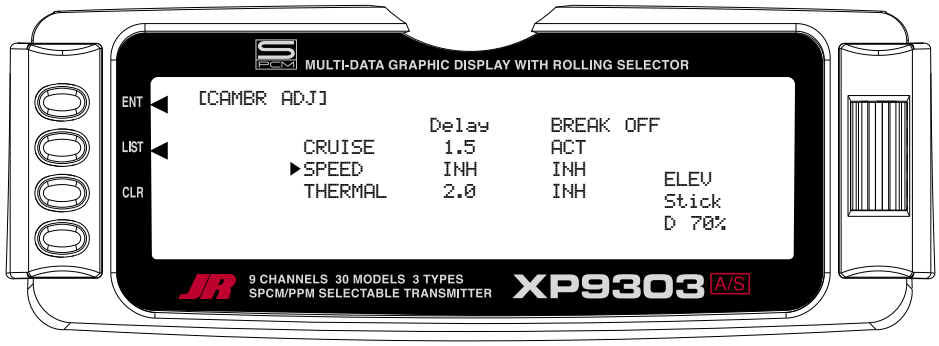


Camber Adjust

The camber adjust screen allows a delay of up to 2 seconds to be programmed to each of the 5 flight modes. This delay affects the flap, flaperon and elevator (and rudder and aileron if activated) presets such that when switching from one flight mode to another the servos don't rapidly change to their intended preset position. A break-off function is available for each flight mode that bypasses the delay at a given programmed elevator stick position. This is useful during launch when you my wish to switch from the launch flight mode to cruise for zoom and need the delay to be overridden. In this case, the break-off can be set for slight down elevator in the cruise mode.

> **Note**: In order for the camber adjustment to operate, flight modes must be programmed in device select and each must have different trim presets. See Device Select Pg. S9 and Servo Monitor pg. S39 for more details.

To access camber adjust, in ***FUNC.LIST*** rotate the *Selector* until ***CAMBR ADJ*** is highlighted. Press the *Selector* to access the Camber Adjust menu. Rotate the *Selector* to highlight the launch delay value, and then press the *Selector* to access this value. Rotate the *Selector* to adjust the value. Values from inhibit to 2 seconds are available. To access the break-off value, rotate the *Selector* to highlight the desired break-off flight mode then press the *Selector* to access this value. To access the elevator stick position, rotate the *Selector* to highlight ELEV Stick then press the *Selector* to access this value. Press the *Selector* to store the value. Press the *LIST* button to return to the Function Mode screen.



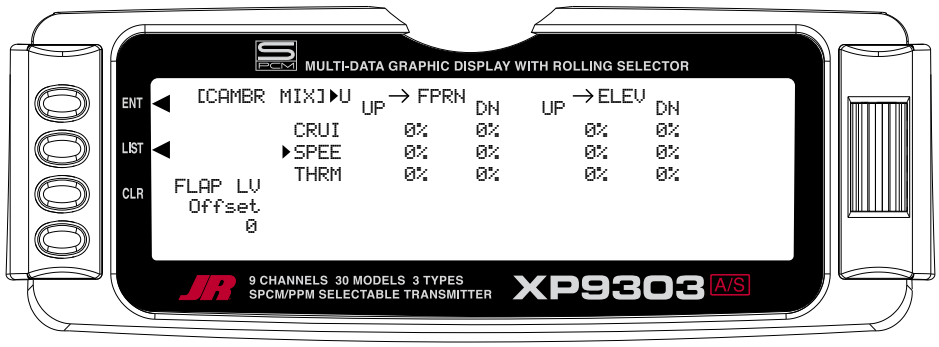
Camber Mix

Important: Camber mix values are based on a percentage of the value programmed in Flap Rate (see page S28). If no values are programmed in flap rate (default setting) then camber mix values will have no effect. It's recommended that the flap rate values be programmed first before programming camber mix values. Also be aware that whenever changing flap rate values, the travel of these camber mix settings will also be affected.

Camber mix allows the independent adjustment of flaperon (ailerons up and down) and elevator with the lever that camber mix is assigned to (flap lever or Aux 3 lever) in Device Select (pg. S9) for each of the flight modes. An offset is provided that allows pilots to choose the neutral position for the side lever. Some pilots prefer the lever's neutral position be in the center (detent) position when the trailing edge is at neutral (offset at 0). This offers the advantages of being able to add camber (trailing edge down) or reflex (trailing edge up) in each flight mode using the side lever. Some pilots prefer the neutral position to be in the lever up position. (Offset +170)

To access camber mix, in ***FUNC.LIST*** rotate the *Selector* until ***CAMBR MIX*** is highlighted. Press the *Selector* to access the Camber Mix menu. Rotate the *Selector* to highlight the desired value then press the *Selector* to access this value. With the flight mode switch in the corresponding mode, move the programmed side lever to the appropriate position and adjust the value to the desired position. Press the *Selector* to store the value. Repeat the process for all flight modes. Press the *LIST* button to return to the Function Mode screen.

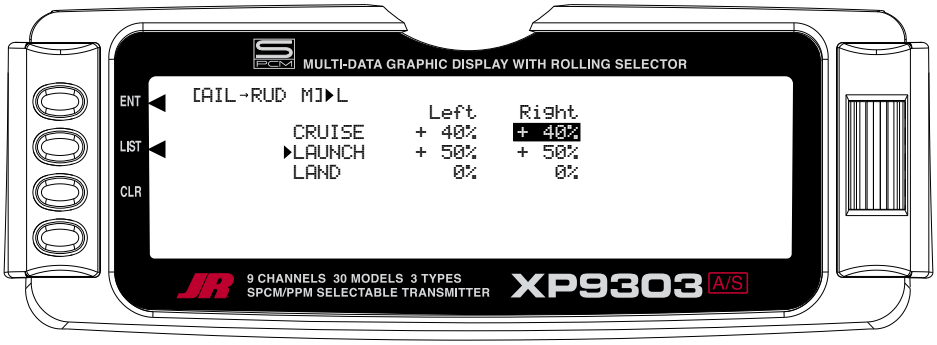
Note: The Offset value determines the point at which the side lever changes from the up value to the down value. If the desired lever neutral position is in the middle a 0 value is needed. This will allow up and down FPRN and ELEV values to the programmed. If an up lever position is desired then the offset value of +170 is used. This will allow only the down values to be operational.



Aileron-to-Rudder Mix

Aileron-to-rudder mix causes the rudder to move in unison with ailerons. It is utilized to reduce adverse yaw and to improve the turning/ handling characteristics. Aileron-to-rudder mix values can be independently adjusted right and left for each of the 5 flight modes.

To access Aileron-to-Rudder mix, in ***FUNC.LIST*** rotate the *Selector* until ***AIL□RUD M*** is highlighted. Press the *Selector* to access the aileron-to-rudder mix menu. Rotate the *Selector* to highlight the desired value corresponding to the flight mode and desired direction and then press the *Selector* to access that value. With the flight mode switch in the corresponding mode, give an aileron command and rotate the *Selector* to achieve the desired rudder value. Pressing the *Selector* will store the value. Press the *LIST* button to return to the Function Mode screen.



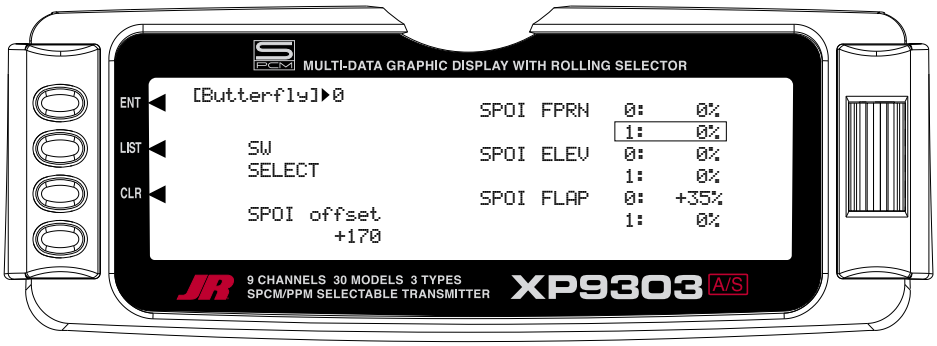
Butterfly Mix (Landing Flaps)

The Butterfly Mix is the landing program that mixes the flaps, flaperons (ailerons as flaps) and elevator to the spoiler (throttle) stick. Two values are available, ***Pos0*** and ***Pos1***, and each can be assigned to several different switches or flight modes. An offset is provided to allow the user's preference for the neutral position (normally stick up).

To access the Butterfly menu, in ***FUNC.LIST*** rotate the *Selector* until ***Butterfly*** is highlighted. Press the *Selector* to access the Butterfly menu.

Note: The default setting for offset is at +170%.

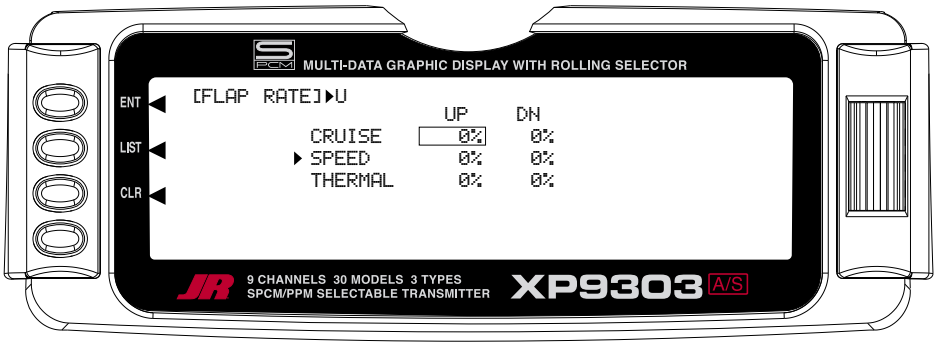
With this setting, the flap's neutral position (trailing edge level) occurs when the spoiler stick is in the full up position. If you choose to locate the neutral position in the down position, the value would be –170%. Rotate the *Selector* to highlight SW select and press the *Selector* to access the available switches. The default setting is the ***BTF*** or butterfly switch. To access the various values, rotate the *Selector* to highlight them then depress the *Selector* to access the value. Move the spoiler stick to the full down position and adjust the value by rotating the *Selector* until the desired position is achieved. Press the *Selector* to store the value. You may wish to adjust the ***SPOI→ELEV***, however, there is a curve mix in P-mix 1 that will allow several points on a curve to be adjusted for flap-to-elevator mixing that we will be covering in programmable mix 1. Press the *LIST* button to return to the Function Mode screen.



Flap Rate

Flap Rate allows the independent up and down adjustment of flaps with the lever that camber mix is assigned to (flap lever or Aux. 3 lever) in Device Select (pg. S9) for each of the flight modes. The lever-offset position is established in camber mix above, allowing pilots to choose the neutral position for the side lever and this offset is in effect in the flap rate menu (see Camber Mix for more details). It's important to first program these values before proceeding to the camber mix menu, as the camber mix values are based on a percentage of the flap values.

To access Flap Rate in ***FUNC.LIST*** rotate the *Selector* until ***FLAP RATE*** is highlighted. Press the *Selector* to access the Flap Rate menu. Rotate the *Selector* to highlight the desired value then press the *Selector* to access this value. With the flight mode switch in the corresponding launch mode, move the left side lever to the appropriate position and adjust the value to the desired flap position. Repeat this for all desired flight modes and flap positions. Press the *LIST* button to return to the Function Mode screen.



Motor Hold

Note: This function is only available when the motor is programmed to the spoiler stick in the device select menu. See Device Select Pg. S9.

The Motor Hold feature allows the spoiler stick to be used for multiple functions. In one mode (launch mode, for example) it can be used as a proportional throttle for an electric motor and switching to another mode (landing) the spoiler can be used as landing flaps. The motor hold function is used in conjunction with a programmable mix by mixing motor to an AUX channel. When the motor hold mix is on, the throttle hold program holds the throttle in the desired position (usually motor off).

To access Motor Hold in ***FUNC.LIST*** rotate the *Selector* until ***MOTO. HOLD*** is highlighted. Press the *Selector* to access the Motor Hold menu. Rotate the *Selector* to highlight desired flight mode or switch, and then press the *Selector* to access on or off. Adjust the motor value to achieve the desired throttle position for that flight mode or switch. Press the LIST button to return to the Function Mode screen.