

# BomBot Operations Manual

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IT SHOULD BE NOTED THAT THIS OPERATIONS MANUAL IS IN ADDITION TO THE ATTACHED SPECTRUM DX7 MANUAL AS WELL AS THE LITERATURE FOR THE SPEED CONTROLLER. THE FOLLOWING INFORMATION IS SOLELY USED FOR THE INSTALLATION AND OPERATION OF THE BOMBOT AS PROVIDED BY TEAM 10 OF THE FAMU / FSU COLLEGE OF ENGINEERING SENIOR DESIGN PROJECT 2009. THE CONTENTS HEREIN SHALL BE USED ONLY AS SUPPLEMENTAL INFORMATION RELATED DIRECTLY TO THE INSTALLATION AND USE OF SUCH HARDWARE AND ANY INFORMATION WITHHELD FROM THIS GUIDE SHALL BE DEEMED AS AVAILABLE IN THE ATTACHED LITERATURE ELSE WISE IT IS IRRELEVANT AND THEREFORE NOT NEEDED.

# Installation

## Speed Controller

The speed controller installed on the BomBot is the Novak EVX Electronic Speed Control. The EVX must be removed and replaced with the Novak XR Super Duty Speed Control. The XR is to be mounted in the same receptacle as the EVX and mounted utilizing the hardware that the EVX used. This can be seen in figure 1.



**Figure 1: Novak XR Super Duty Installed**

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The XR is to be set to “Program 1” as instructed by the attached literature. The Positive leads coming from the XR are to be connected to the positive leads from the motor, and the negative leads from the XR to the negative leads from the motor.

## **Receiver Location**

The AR-7000 receiver is to be mounted in the front portion of the BomBot undercarriage utilizing Velcro tape as shown in figure 2.

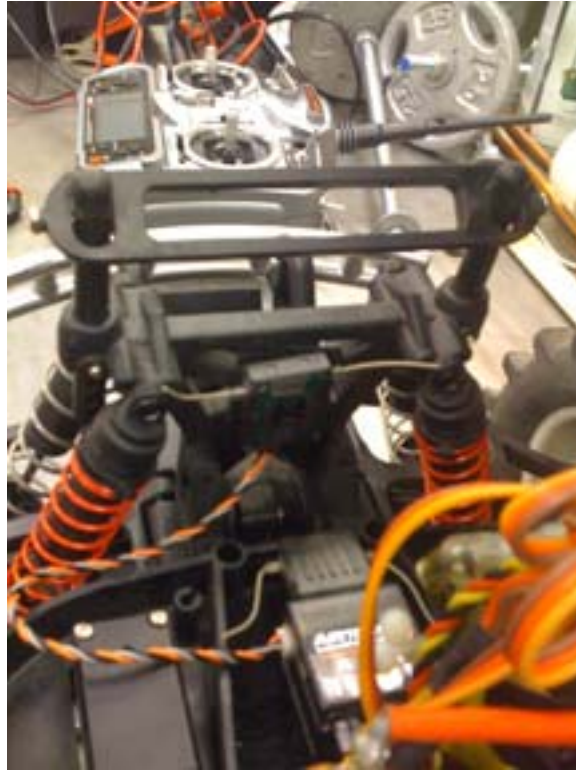


**Figure 2: AR-7000 Receiver Installed**

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The additional antenna is to attach to part #4917R of the BomBot with Velcro tape as shown in figure 3.



**Figure 3: AR-7000 Antenna Installed**

It should be noted that the antenna wires from the main receiver are set perpendicular to those of the supplemental antennal and should be installed as such.

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## Receiver Wiring

Being that the receiver is intended for use on an RC airplane or helicopter the labels for the inputs of the servos are quite different from their intended use. Below in table 1 is an overview of which servos are to be installed into which inputs of the AR-7000 receiver. What is vital to the understanding of table 1 is that each channel has a set operation on the DX-7 controller and the servos are installed based on ease of operation for the BomBot operator.

Channel	Servo	Input Location
1	Camera Tilt	Throttle
2	Throttle (XR Super Duty)	Aileron
3	Steering	Elevator
4	Camera Pan	Rudder
5	Left Locking Servo	Gear
6	Swinging Platform <sup>1</sup>	Flap
7	Right Locking Servo	Aux 2

**Table 1: Servo Input Locations / Channels**

Below in figure 4 is an overview of the controls of the DX-7 controller that has been inserted to allow for a better understanding of table 1.

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<sup>1</sup> The swinging platform utilizes a servo on each side of the swinging platform that are wired together using a Y-cable therefore both servos are controlled by the use of the single channel.

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**Figure 4: DX-7 Controller (Use with Table 1)**

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# Programming

## Speed Controller

As aforementioned the XR Super Duty should be set to program 1 as described in the attached literature regarding the XR Super Duty. It is vitally important that the user understands that when programming the DX-7 controller that the gain on the Aileron (Channel 2) be set to a linear curve and not an exponential curve. More information regarding the programming of the DX-7 follows below.

## Receiver

The receiver and attached antenna do not require any additional programming if the servos are attached to the inputs on the receiver as defined in table 1. What must be done is that the receiver must be bound to the DX-7 controller to prevent the DX-7 from controlling the wrong BomBot. The procedures to bind the DX-7 to the AR-7000 are included in the attached literature.

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## **DX-7 Controller**

The Controller is to be programmed so that all of the servos will operate correctly. All instructions for programming the DX-7 are included in the attached literature. What will be explained are the individual adjustments to the programming that were used in order to complete the programming of the BomBot.

All of the travel adjustments for the DX-7 were set initially to 150% to ensure full range of motion of the servos. Once that was complete the individual channels were adjusted down to allow for easy operation of the BomBot.

The servo-reversing page of the DX-7 allows each of the servos to operate in the opposite direction. It was necessary to reverse the steering of the BomBot so that an input of right would actually turn the wheels to the right. The same principle applies for an input of left to the steering stick. With the steering servo reversed an input of left to the steering stick would then turn the wheels to the left.

The Sub-Trim adjustment page allows for the overall adjustment of the servo location. This is useful if the servo horn (arm) is not attached where the user wishes. This allows for a general adjustment of the servo location. This feature is useful for the locking servos to ensure that when they are in the locked position they are not continually pushing on the grooves cut for them.

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The Dual Rate page allows the user to set input to the servos based upon the switches on the DX-7. This was used to allow for a slow and fast speed selection of the BomBot. In doing such the BomBot could be set to full throttle in one position and when the switch is moved only provide 10-15% power for forward throttle. This is useful for making precise turns or aligning the BomBot with the funnels attached to the RMAX.

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**SPEKTRUM**®

# DX7

**7-Channel, 20-Model Memory  
Full Range DSM2™ System**



# Welcome to the World of Spektrum DSM2 Full Range Technology

Spektrum's DX7 is the first-ever full range 2.4Ghz Spread Spectrum Radio system for R/C aircraft. With Spektrum's DSM2™ technology, now even large gas- and glow-powered aircraft can take advantage of Spektrum® technology. No longer will you have to wait for a frequency pin or be concerned that someone may inadvertently turn on to your same frequency. With Spektrum DSM2 technology, when you're ready to fly any aircraft—from parkflyer to giant-scale—simply turn on the system, and go flying!





## DSM2 DualLink Technology

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Your DX7 transmits on the 2.4GHz band and utilizes DSM2™ second-generation Digital Spread Spectrum Modulation giving visual range in all types and sizes of aircraft. Unlike conventional narrow band systems, Spektrum's 2.4GHz digital DualLink™ technology is virtually immune to internal and external radio interference.

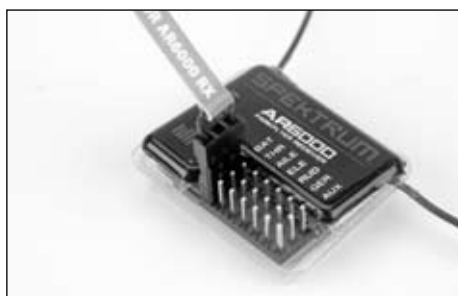
Included with your DX7 is an AR7000 7-channel receiver. The AR7000 combines an internal and external receiver, offering superior path diversity. The system simultaneously transmits on two frequencies, creating dual RF paths. This dual path redundancy, plus the fact that each of the two receivers is located in a slightly different location exposes each to a different RF environment and creates a bulletproof RF link in all conditions.



## AR6000 Parkflyer Compatible

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You'll be glad to know that the DX7 is compatible with the AR6000 mini park flyer receiver, however, when using the AR6000 receiver, aircraft type is limited to parkflyers and mini and micro helicopters only. Simply bind the DX7 transmitter to the AR6000 and you are ready to fly.



## Model Match

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With patented Model Match™ technology, you'll never mistakenly try to fly your model using the wrong memory again. The DX7 features Model Match technology that prevents the operation of a model if the wrong model memory is selected. During binding, the receiver actually learns and remembers the specific model memory (1 of 20) that the transmitter is currently programmed to. Later, if the incorrect model is selected in the transmitter and the receiver is turned on, the model simply won't operate preventing a possible crash. Change programming to the matching model memory and you are set to fly.

## Using This Manual

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For your convenience, this manual is arranged with separate sections for airplane and helicopter software functions. Airplane Programming is located on Pages 27 through 61; Helicopter Programming is located on Pages 63 through 97. Programming functions are discussed in the same order that they appear on the radio. An explanation of the use and purpose of each feature is provided, followed by an illustration of its 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 also record it on a copy of the data sheet provided.

## Alternate Languages

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ITALIAN: Per la versione italiana di questo manuale vi preghiamo di visitare il sito [www.spektrumrc.com](http://www.spektrumrc.com)

FRENCH: Pour consulter ce manuel en français, visiter le site [www.spektrumrc.com](http://www.spektrumrc.com)

GERMAN: Zur Ansicht der Bedienungsanleitung in den Deutsch besuchen Sie bitte [www.spektrumrc.com](http://www.spektrumrc.com)

SPANISH: Para ver este manual en Español entra en [www.spektrumrc.com](http://www.spektrumrc.com)

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# Battery Charging

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## Transmitter/Receiver

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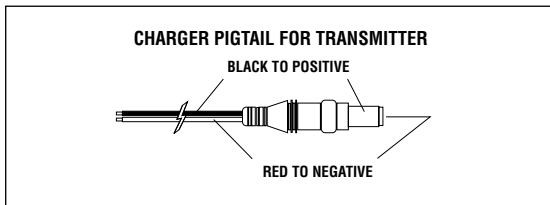
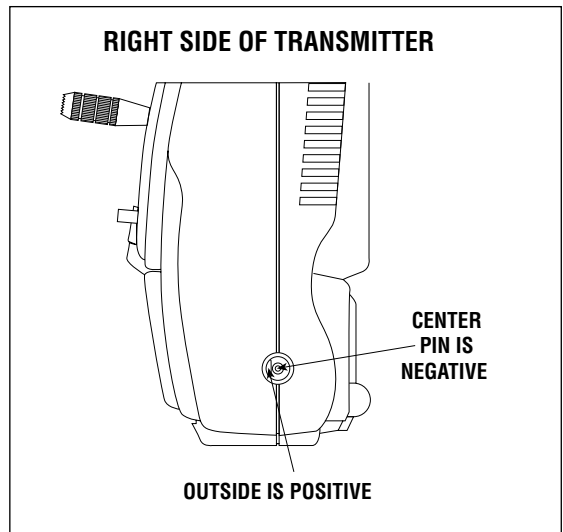
It is imperative that you fully charge both the transmitter and the receiver battery packs prior to each flying session. To do so, using the included wall charger, leave the charger and batteries connected overnight (16 hours).

The charger supplied with this system is designed to recharge your batteries at a rate of 110mA for the transmitter and 110mA for the receiver battery pack.

## Transmitter Polarity

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The center pin on all Spektrum® transmitters is negative. Therefore, the center pin on all Spektrum 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 may not apply in this instance. You must make sure that the center pin of your Spektrum transmitter is always connected to the negative voltage of your charger for correct polarity hookup.



## Charger

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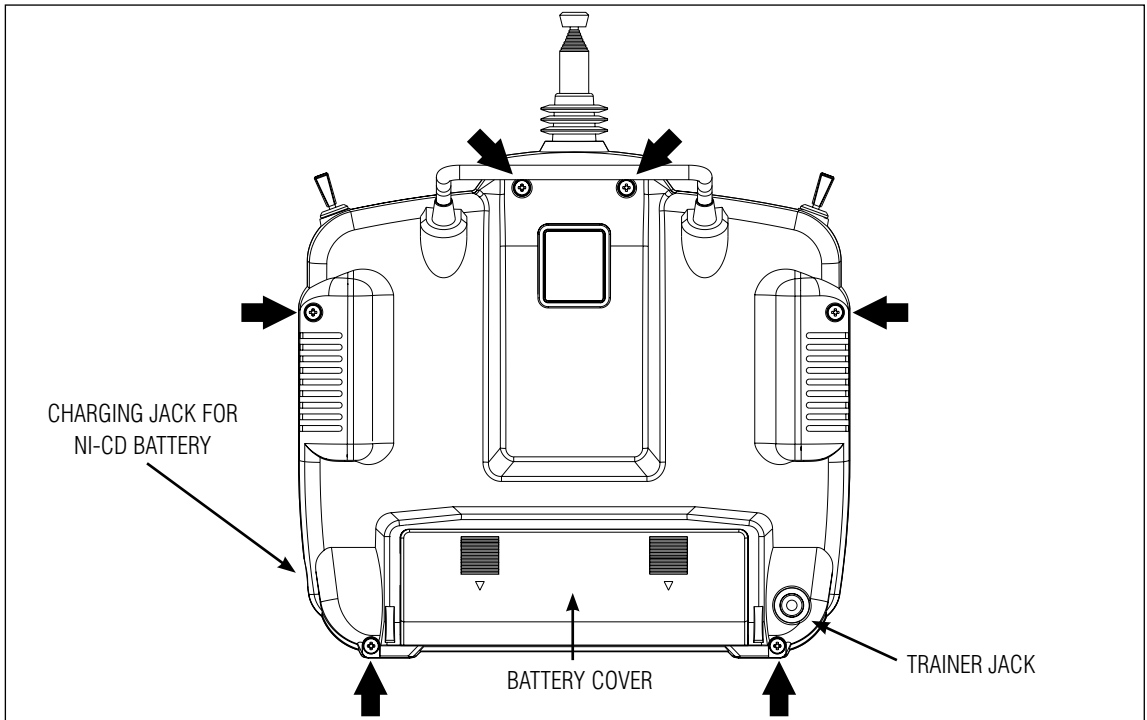
The pilot lamps should always be ON during the charging operation. If they're not, check to make sure that both the transmitter and receiver are switched OFF. Do not use this charger for equipment other than Spektrum. The charging plug polarity may not be the same and equipment damage can result. During the charging operation, the charger's temperature is slightly elevated. This is normal.



# Control Stick Tension Adjustment

## Removing the Back of the Transmitter

Remove the battery cover by pressing down on the ridged areas of the cover and sliding the cover towards the bottom of the transmitter. Unplug the battery and set it aside. Carefully remove the screws from the back of the transmitter using a small Phillips screwdriver.



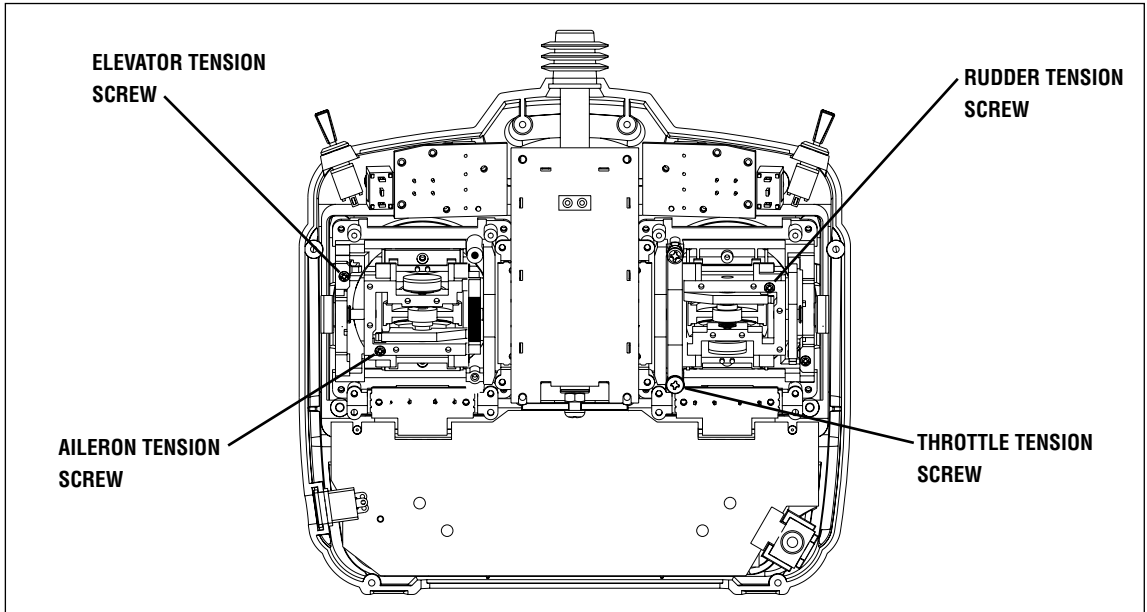
CAUTION: THE BATTERY CONNECTOR IS KEYSO THAT IT CAN ONLY BE PLUGGED IN ONE DIRECTION. DO NOT FORCE.

**Note:** Use care when installing the screws securing the back of the transmitter. They are threading into plastic and can be stripped if over-tightened.

## Adjusting the Control Stick Tension

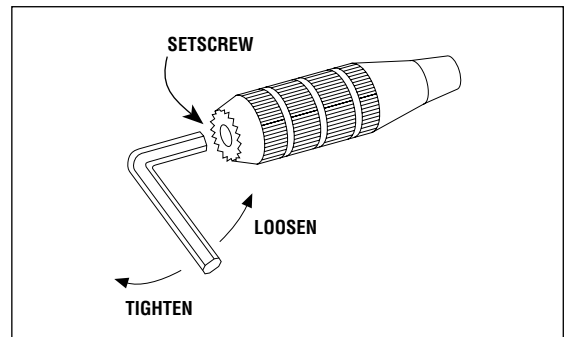
**Note:** Remove the six (6) transmitter back cover screws. Remove the transmitter back, being careful not to cause damage to any components.

Adjust each stick tension screw for the desired tension (counterclockwise to loosen stick tension, clockwise to tighten stick tension).



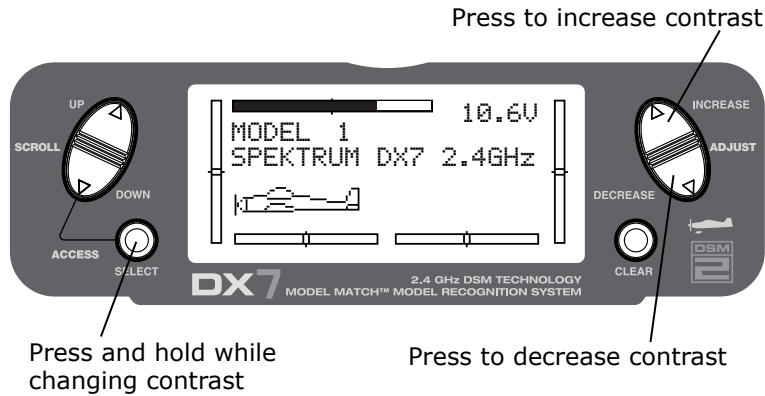
## Control Stick Length Adjustment

The DX7 allows you to adjust the control stick's length. Use the 2mm Allen wrench (supplied with your DX7 transmitter) to unlock the setscrew. 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 setscrew.



# Screen Contrast

The screen contrast is adjustable, allowing the user to vary the contrast for improved clarity in all conditions. To adjust contrast: With the transmitter on and in the main menu, press and hold the select key. Then pressing the **INCREASE** or **DECREASE** key will lighten or darken the contrast.

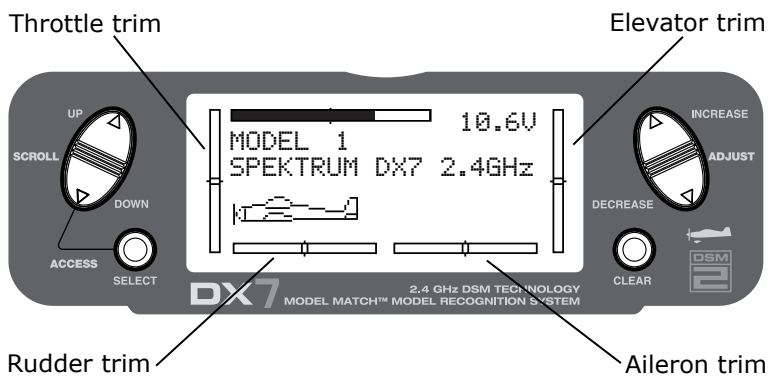


# Advanced Digital Trims

The DX7 employs digital trim levers on aileron, elevator, throttle, and rudder. (Hover pitch and hover throttle for helicopters). The ADT (Advanced Digital Trim) feature is designed to automatically store the selected trim values for each model. When a different model is selected, the previously stored trim positions for that model are automatically recalled.

When using the helicopter program, each flight mode has its own trim that is automatically recalled each time that flight mode is entered.

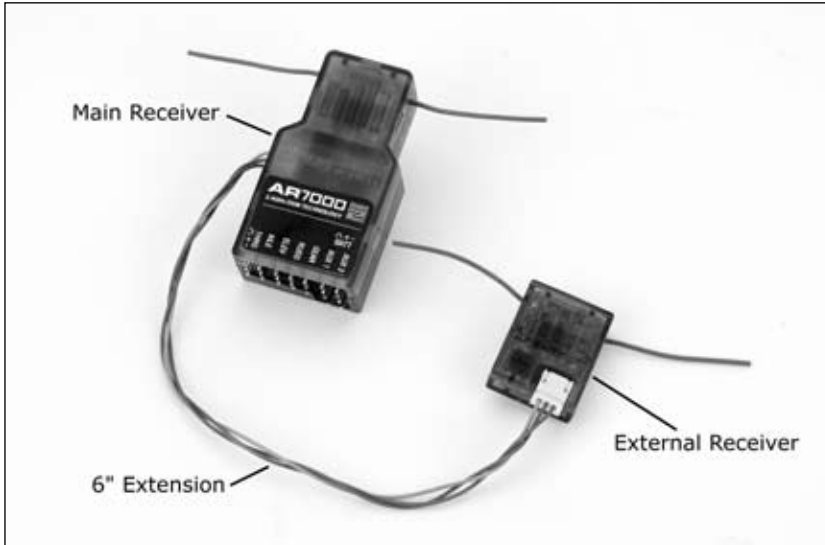
Visual trim positions are displayed on the main screen. The trims feature dual speed scrolling. Holding the trim lever for an extended time will cause the trim rate of change to increase.



# Receiver and Servo Installation

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The AR7000 incorporates dual receivers, offering the security of dual path RF redundancy. An internal receiver is located on the main PC board, while a second external receiver is attached to the main board with a 6" extension. By locating these receivers in slightly different locations in the aircraft, each receiver is exposed to its own RF environment, greatly improving path diversity (the ability for the receiver to see the signal in all conditions).



## Receiver Installation

---

Install the main receiver using the same method you would use to install a conventional receiver in your aircraft. Typically, wrap the main receiver in protective foam and fasten it in place using rubber bands or Velcro straps. Alternately, in electric models or helicopters, it's acceptable to use thick double-sided foam tape to fasten the main receiver in place.

Mounting the remote receiver in a slightly different location, even just inches away from the primary receiver, gives tremendous improvements in path diversity. Essentially, each receiver sees a different RF environment and this is key to maintaining a solid RF link, even in aircraft that have substantial conductive materials (i.e. larger gas engines, carbon fiber, pipes, etc.), which can attenuate the signal.

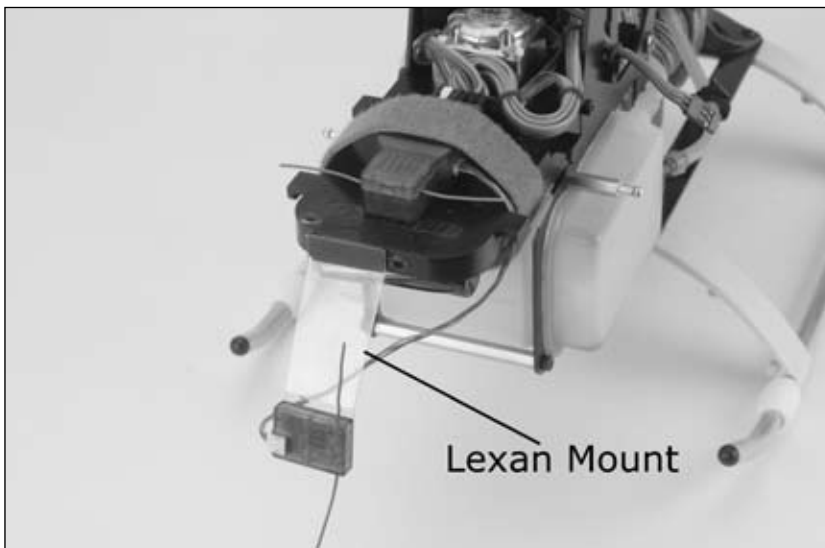
Using servo tape, mount the remote receiver keeping the remote antennas at least 2" away from the primary antenna. Ideally, the antennas will be oriented perpendicularly to each other, however, we've found this to not be critical. In airplanes, we've found it best to mount the primary receiver in the center of the fuselage on the servo tray and to mount the remote receiver to the side of the fuselage or in the turtle deck.



## Receiver Installation (continued)

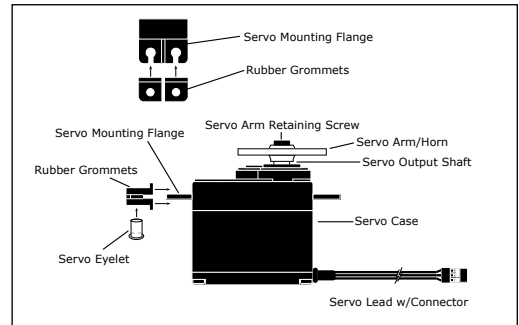
---

In helicopters, there is generally enough room on the servo tray to achieve the necessary separation. If necessary a mount can be fashioned using clear plastic to mount the external receiver.



## Servo Installation

In gas- and glow-powered aircraft where vibration is present, the servos should be mounted using the supplied rubber grommets and bushings. Do not over-tighten the mounting screws. The diagram will assist you in properly mounting the grommets and bushings. In electric and non-powered aircraft, there are many acceptable methods for mounting the servo, including servo tape and even glue. See the information included with your aircraft for the recommendation for installing servo(s) in your aircraft.



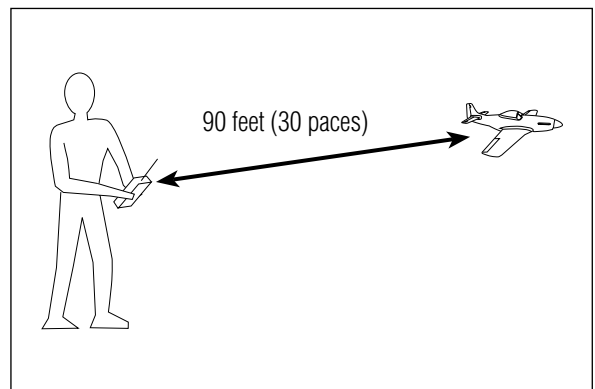
## How to Range Test the DX7

Before each flying session, and especially with a new model, it is important to perform a range check. The DX7 incorporates a range testing system which, when the bind button on the back of the transmitter is pressed and held, reduces the output power, allowing a range check.



## Range Testing the DX7

1. With the model resting on the ground, stand 30 paces (approx. 90 feet) away from the model.
2. Face the model with the transmitter in your normal flying position and depress and hold the bind button on the back of the transmitter. This causes reduced power output from the transmitter.
3. You should have total control of the model with the button depressed at 30 paces (90 feet).
4. If control issues exist, call the Spektrum Service Center at 1-877-504-0233 for further assistance.



# Binding

---

The AR7000 receiver must be bound to the transmitter before it will operate. Binding is the process of teaching the receiver the specific code of the transmitter so it will connect to that specific transmitter. Once bound, the receiver will only connect to the transmitter when the previously bound model memory is selected. If another model memory is selected, the receiver will not connect. This feature is called Model Match and prevents flying a model using the wrong model memory.

## SmartSafe Fail Safe

---

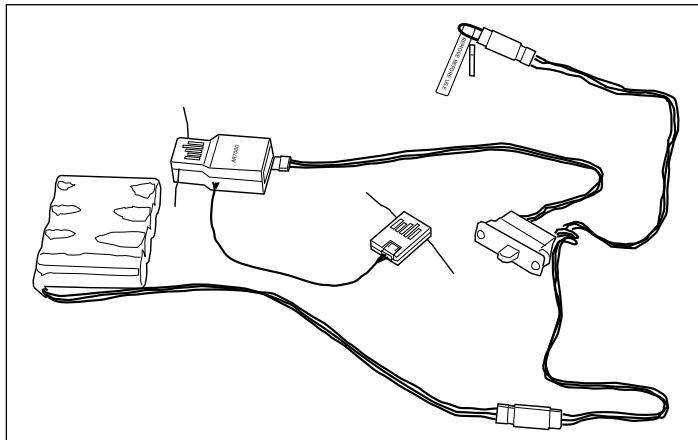
The AR7000 features the SmartSafe™ fail-safe system.

SmartSafe:

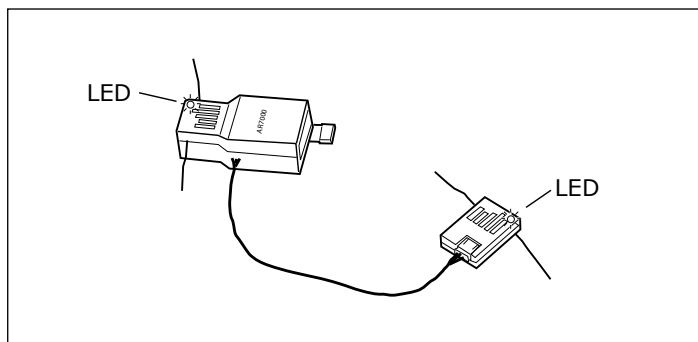
- Prevents unintentional electric motor response on start-up.
- Eliminates the possibility of overdriving servos on start-up.
- Establishes low-throttle failsafe if the RF signal is lost.
- Maintains last-commanded control surface position in the event of RF link interruption.

**Note:** Fail-safe positions are stored via the stick and switch positions on the transmitter during binding.

1. With the system hooked up as shown, insert the bind in the charge plug receptacle.

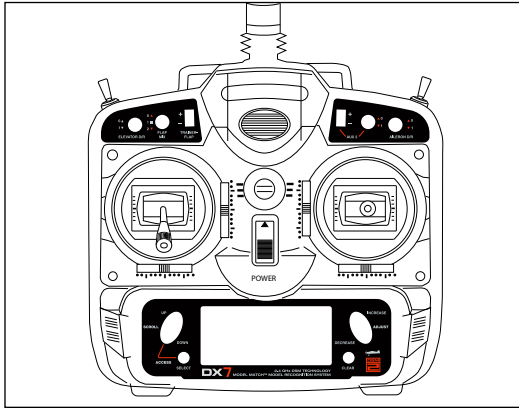


2. Turn on the receiver switch. Note that the LED's on both receivers should be flashing, indicating that the receiver is ready to bind.

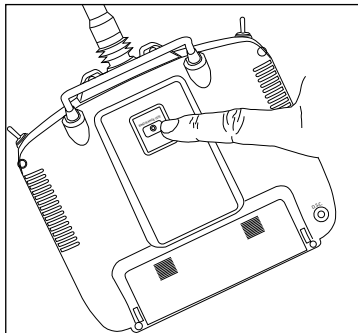




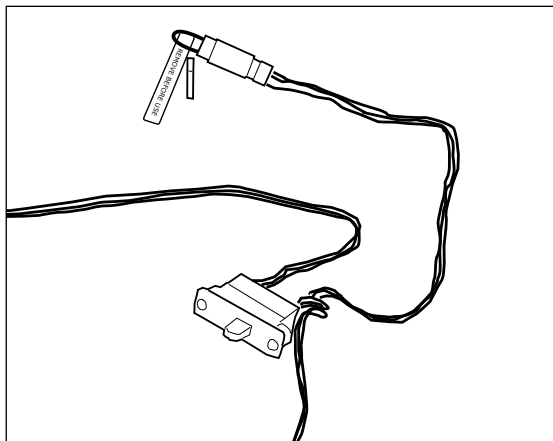
3. Establish the desired fail-safe stick positions: normally low throttle and flight controls neutral.



4. Press and hold the bind button on the back of the transmitter while turning on the power switch. The bind button should flash and within a few seconds the system should connect. The LED's on the receivers should go solid indicating the system has connected.



5. Remove the bind button and store it in a convenient place.



6. After you've programmed your model, it's important to rebind the system so the true low throttle and neutral control surface positions are programmed.

**Note:** The AR7000 features DSM2™ technology and is only compatible with DSM2 transmitters. The AR7000 will not operate with the DX6 or Spektrum® surface systems.

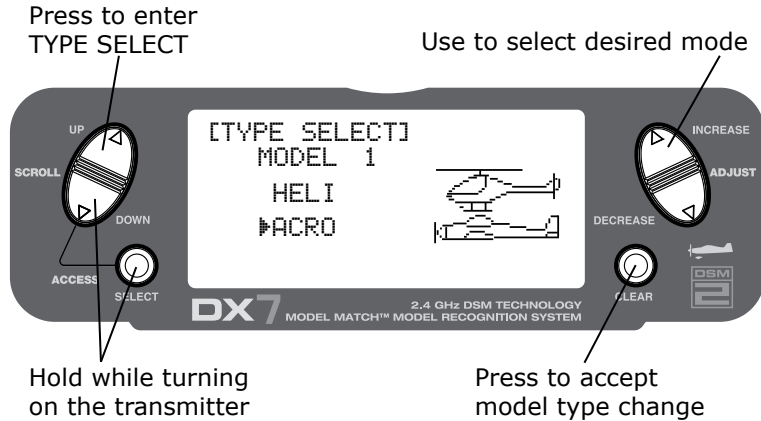
# Airplane Quick Start

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The following covers a basic 4-channel airplane with a single rate. For more details on programming for the aircraft mode, see the Aircraft section of this manual.

## Model Type Selection

---



## Selecting Airplane Mode

---

Press the **DOWN** and **SELECT** keys simultaneously and hold while turning on the transmitter to enter System Setup mode.

Press the **UP** or **DOWN** button until **TYPE SELECT** appears on screen.

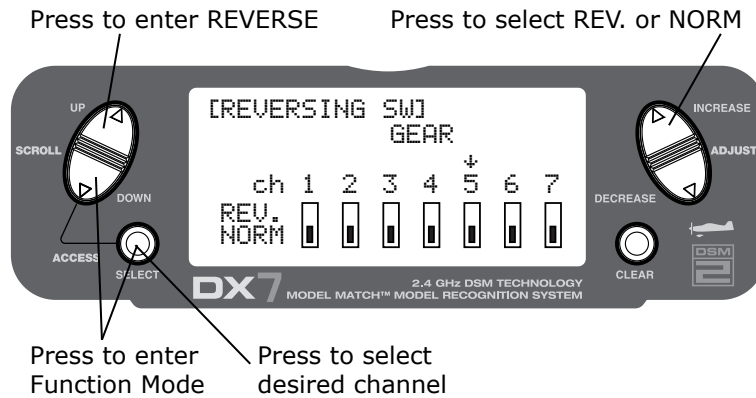
If **ACRO** is highlighted on screen, proceed to **SERVO REVERSING**. (Page 21)

If **HELI** is highlighted, press the **INCREASE** or **DECREASE** key once and **ACRO** should be highlighted.

Press the **CLEAR** key to accept the model type change.

# Servo Reversing

---



## To Access Servo Reversing

---

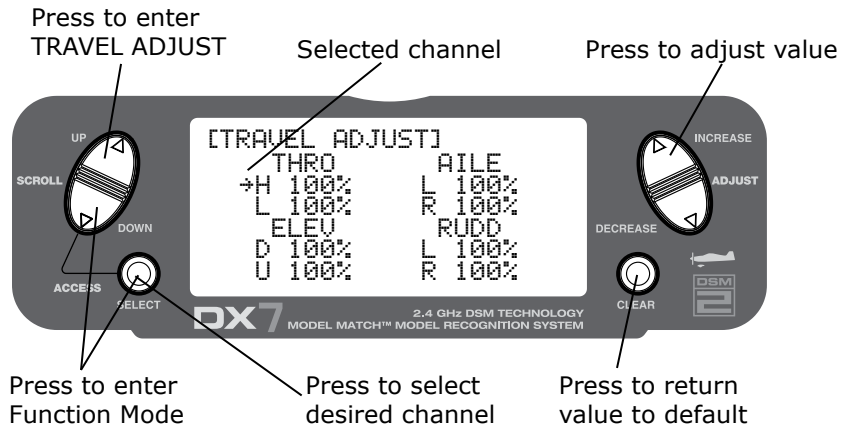
Turn the power on, press the **DOWN** and **SELECT** keys simultaneously to enter the function mode.

Press the **UP** or **DOWN** key until **REVERSING SW** appears on screen.

Press the **SELECT** key to select the desired channel, then press the **INCREASE** or **DECREASE** key to select reverse or normal servo direction.

## Travel Adjust

---



### To Access Travel Adjust

---

Turn the power on and press the **DOWN** and **SELECT** keys simultaneously to enter the function mode.

Press the **UP** or **DOWN** key until **TRAVEL ADJUST** appears on screen. Press the select key to move the cursor arrow to the desired channel.

Use the **SELECT** key to choose the appropriate channel that you wish to adjust.

While holding the channel or switch in the desired direction, press the **INCREASE** or **DECREASE** key to adjust the travel adjust in that direction.

This completes the basic Quick Start setup for your airplane. For additional features like Dual and Expo rates, Mixing, etc, see the appropriate pages listed in the table of contents.

**Note:** If your airplane's ailerons are controlled independently by two servos, see "Wing Type Selection" on Page 39 for specifics on programming flaperons.

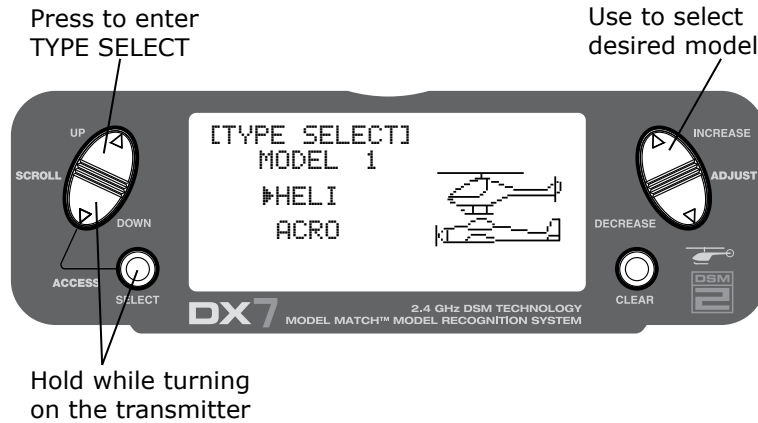
# Helicopter Quick Start

---

The following covers a basic 5-channel mechanical mix helicopter with single rate. For more details on programming for the helicopter mode, see the Helicopter section of this manual.

## Model Type Selection

---



### Selecting Helicopter Mode

---

Press the **DOWN** and **SELECT** keys simultaneously and hold while turning on the transmitter to enter system set up mode.

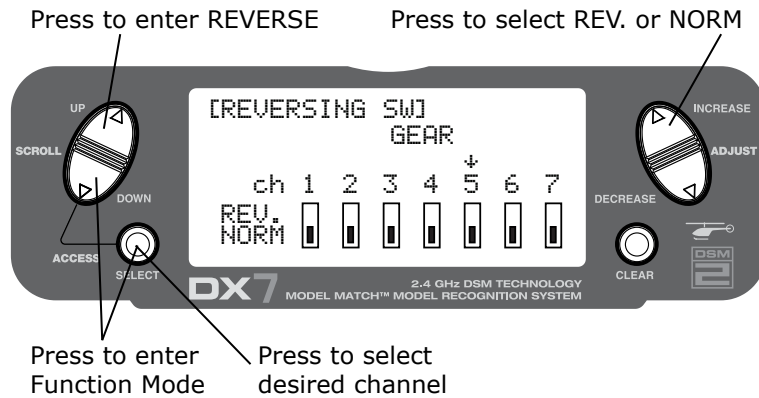
Press the **UP** or **DOWN** button until **TYPE SELECT** appears on screen.

If **HELI** is highlighted on screen, proceed to **SERVO REVERSING**. (Page 24)

If **ACRO** is highlighted, press the **INCREASE** or **DECREASE** key once and heli should be highlighted.

Press the **CLEAR** key to accept the model type change.

## Servo Reversing



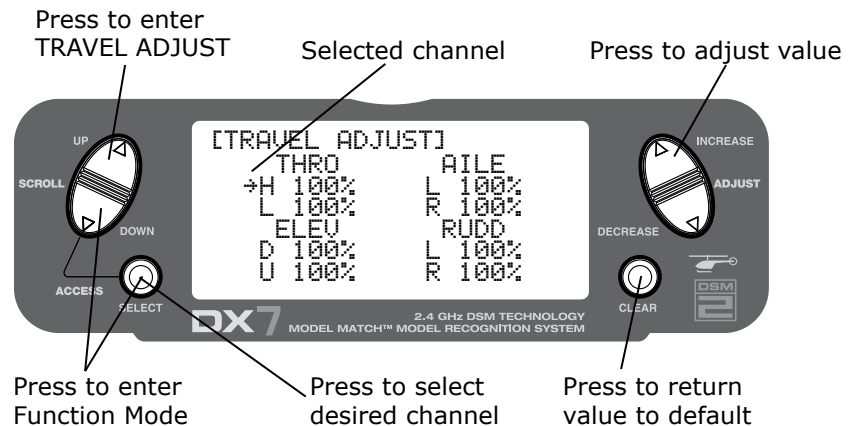
### To Access Servo Reversing

Turn the power on and press the **DOWN** and **SELECT** keys simultaneously to enter the function mode.

Press the **UP** or **DOWN** key until **REVERSING SW** appears on screen.

Press the **SELECT** key to select the desired channel then press the **INCREASE** or **DECREASE** key to select **REVERSE** or **NORMAL** servo direction.

## Travel Adjust



### To Access Travel Adjust

Turn the power on and press the **DOWN** and **SELECT** keys simultaneously to enter the function mode.

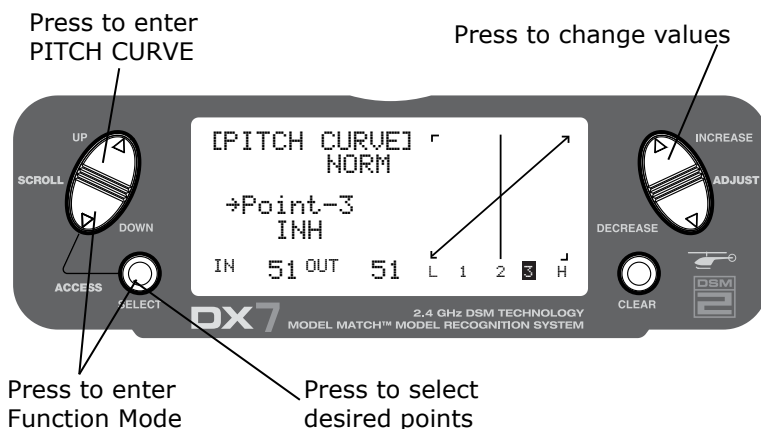
Press the **UP** or **DOWN** key until **TRAVEL ADJUST** appears on screen.

Press the **SELECT** key to select the desired channel, then press the **INCREASE** or **DECREASE** key while holding the stick or switch in the desired direction that you wish to adjust the servo travel.

# Pitch Curve

## Adjusting the Normal Pitch Curve

The DX7 offers four independent pitch curves, each with up to five adjustable points. This function allocates a separate pitch curve setting during normal, stunt 1, stunt 2 and hold modes. Once the pitch curves are adjusted, each can be activated in flight using the three-position flight mode and throttle hold switches. Each of the five points of the pitch curve are independently adjustable from 0–100%. These five points correspond to low, 25%, mid, 75% and high stick positions. See Page 89 for more details on setting up pitch curves.



## To Access the Pitch Curve Function

Turn the power on and press the **DOWN** and **SELECT** keys simultaneously to enter the function mode.

Press the **UP** or **DOWN** key until **PITCH CURVE NORM** appears on screen.

Press the **SELECT** key to select the stick position that you wish to adjust the pitch.

- L= Low
- 1= 25%
- 2= 50%
- 3= 75%
- H= High

Press the **INCREASE** or **DECREASE** keys to adjust the pitch value of the selected pitch position.

### Recommended Initial Pitch Settings

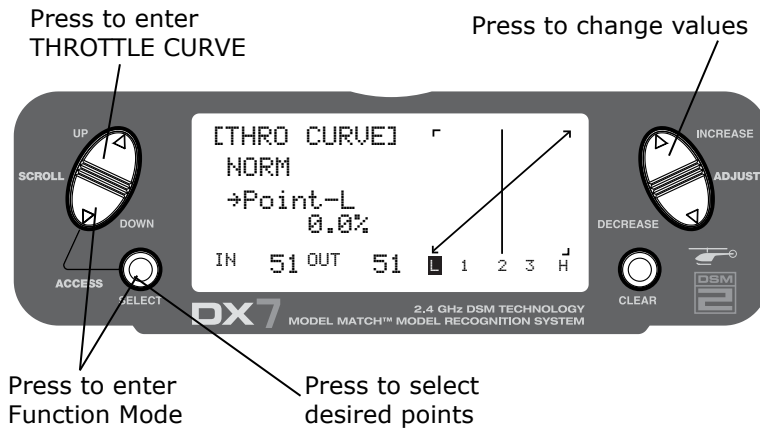
- L=  $-4^\circ$
- 2=  $5^\circ$
- H=  $9^\circ$

**Note:** For more information about setting up pitch curves, see Page 89.

# Throttle Curve

## Adjusting the Normal Throttle Curve

Adjustment of the throttle curves is similar to the pitch curve adjustment described on the preceding page. Three throttle curves are available: normal, stunt 1 and stunt 2. All throttle curves have five adjustable points—low, 25%, 50%, 75% and high. Flight modes are located on the 3-position flight mode switch. The throttle curve is in the normal mode when the Flight Mode switch is in the rear position and the Throttle Hold switch is rearward.



## To Access the Throttle Curve Function

Turn the power on and press the **DOWN** and **SELECT** keys simultaneously to enter the function mode.

Press the **UP** or **DOWN** key until **THROTTLE CURVE NORM** appears on screen.

Press the **SELECT** key to select the stick position that you wish to adjust the throttle.

- L= Low
- 1= 25%
- 2= 50%
- 3= 75%
- H= High

Press the **INCREASE** or **DECREASE** keys to adjust the throttle value of the selected throttle position.

**Note:** For more information about setting up Throttle Curves see Page 87.

This completes the basic Quick Start setup for your helicopter. For additional features like Dual and Expo Rates, Mixing, etc, see the appropriate pages listed in the table of contents.

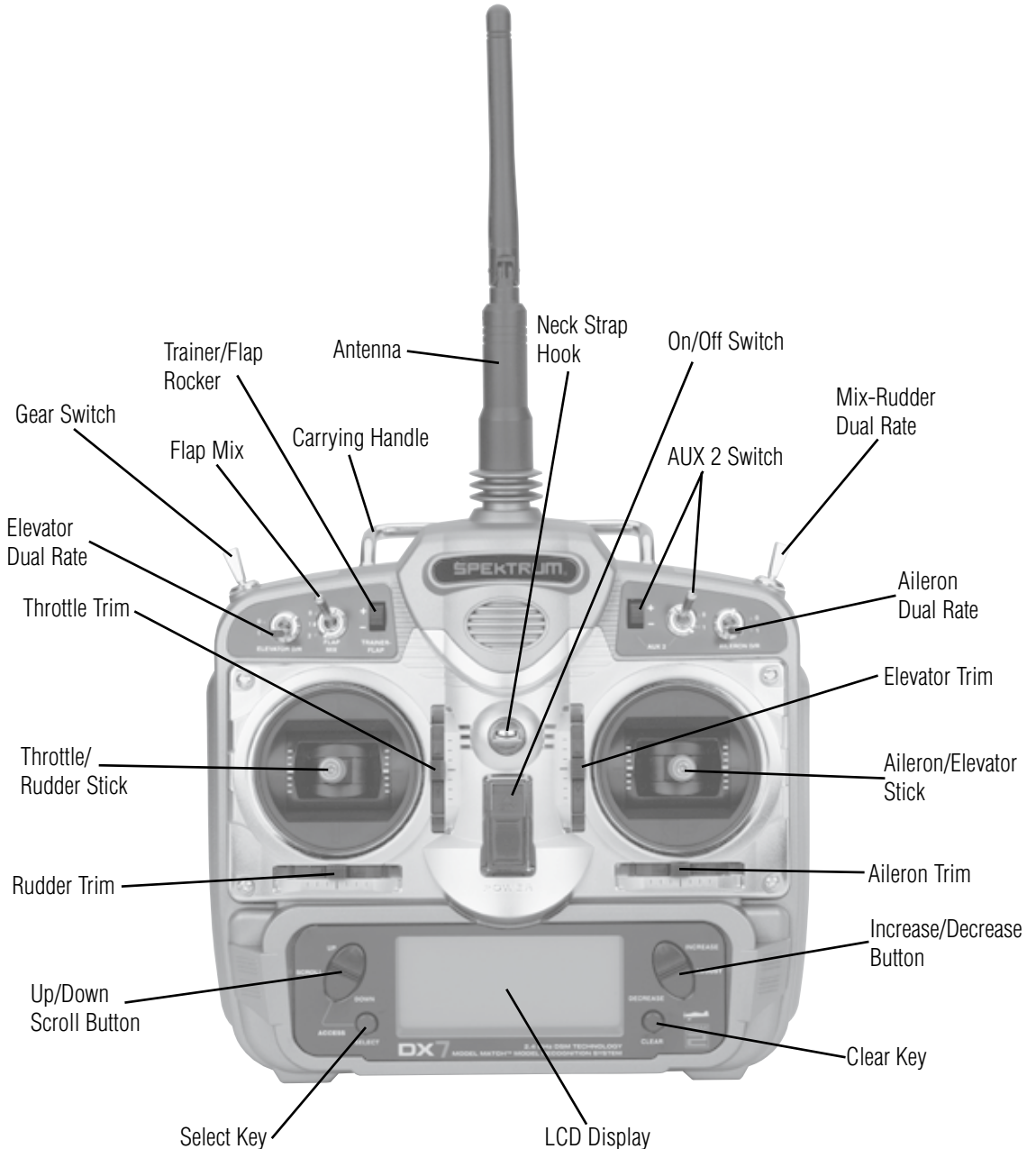


# Aircraft Programming Guide

## Control Identification and Location - Airplane Mode 2

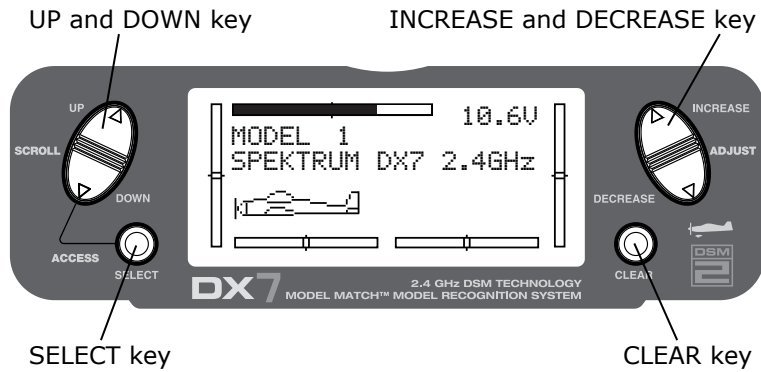
### Throttle ALT

The Throttle ALT function makes the throttle stick trim active only when the throttle stick is at less than half throttle. This allows accurate idle adjustments without affecting the mid to high throttle position.



## General Information

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## Key Input and Display Functions

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- The **UP** and **DOWN** keys are used to select the programming function.
- The **SELECT** key is used to select the channel or feature that you wish to program.
- The **INCREASE** or **DECREASE** keys are used to change the values of the selected programming feature.

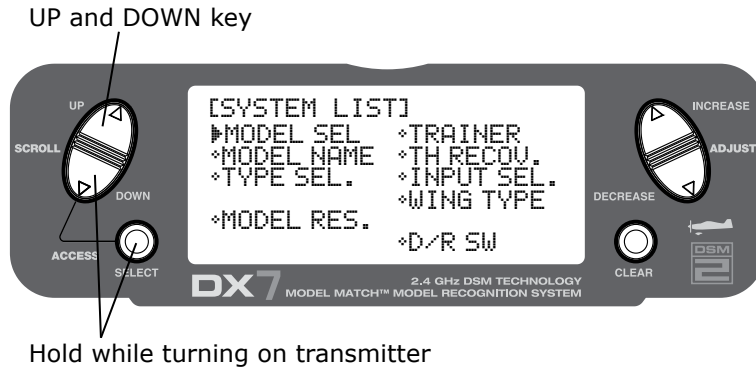
The DX7 features two programming modes: System Mode and Function Mode.

# System Mode Functions

---

## System Mode

---



### To Enter the System List Mode

---

With the transmitter off, press and hold the **DOWN** and **SELECT** keys simultaneously while turning the power switch on to enter the System Mode.

While in the System Mode, press the **UP** and **SELECT** keys simultaneously to access the “List” mode.

Use the **UP** and **DOWN** keys to Scroll through the available function.

Press **DOWN** and **SELECT** to enter a selected function.

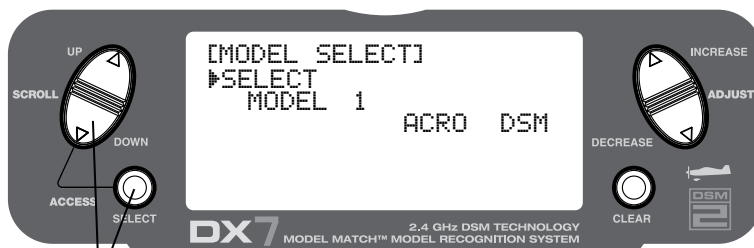
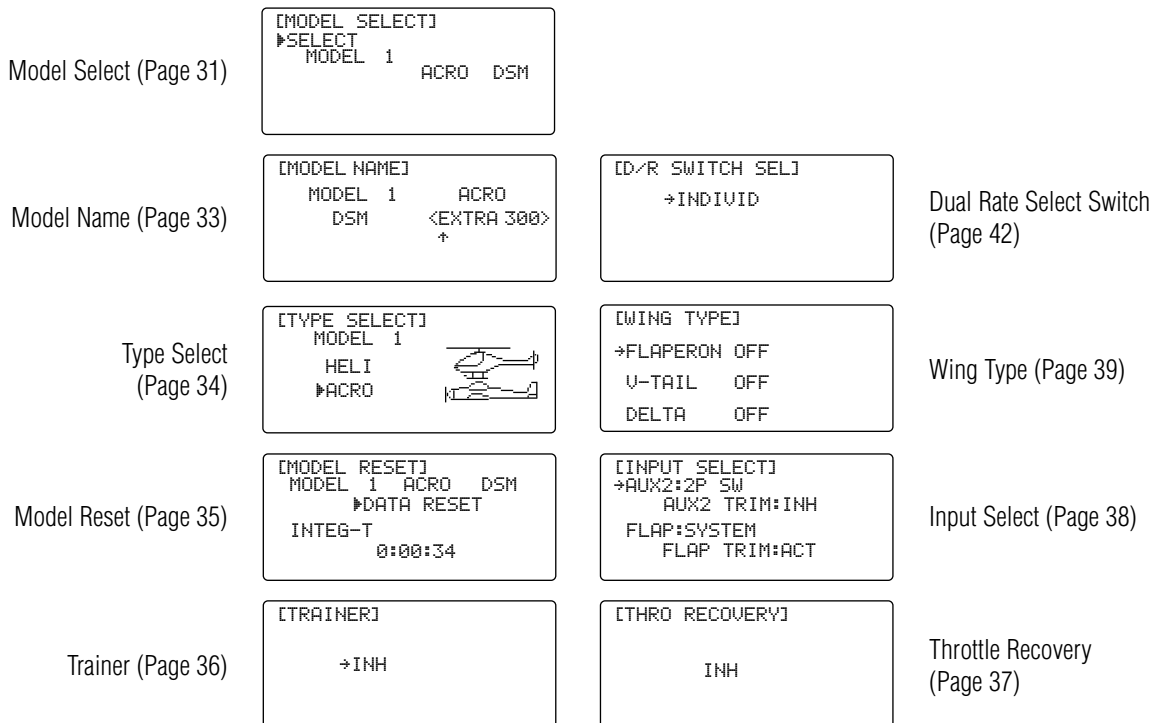
In this mode, servos are not activated.

By pressing the **DOWN** and **SELECT** keys twice simultaneously, you can return to the main screen.

# System Setup Mode Flowchart

The list mode screens display all the functions onscreen allowing the access of any function without having to scroll through each screen. Note that there are two list modes: a System Setup List Mode that displays all the system setup functions, and a Function List Mode that displays all the system setup functions.

System Mode includes programming functions that are normally used during set up. System programming functions for airplanes include:



Hold while turning on transmitter to enter System Mode

## To Enter the System Setup Mode

- With the power switch off, press and hold the **DOWN** and **SELECT** keys simultaneously.
- Turn on the power switch.
- The system will display the last screen that was used in system set up mode. You are now in System Mode.

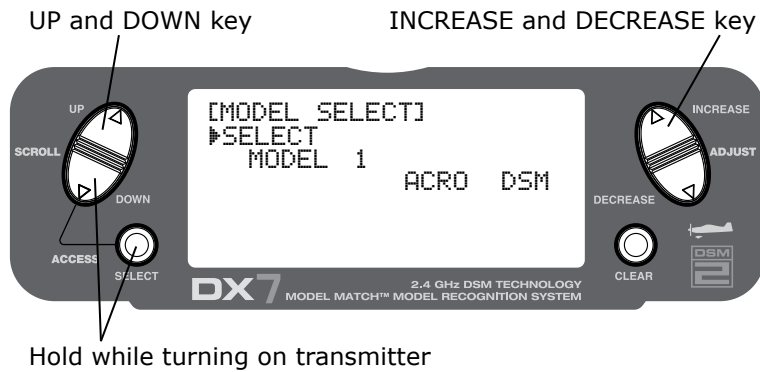
## To Exit the System Setup Mode

- Press the **DOWN** and **SELECT** keys simultaneously. The main screen will be displayed.
- Turn the transmitter off.

## Model Select/Copy Function

---

The DX7 features a memory function that stores the programmed data for up to 20 models. Any combination of up to 20 airplanes and/or helicopters can be stored in memory. A model name feature with up to eight characters allows each model to be easily identified. (See Page 33)



### To Enter the Model Select Function

---

Press the **DOWN** and **SELECT** keys simultaneously and turn the power switch ON to access the System Setup Mode. Press the **INCREASE** or **DECREASE** key until the **MODEL SELECT** screen appears.

Press the **INCREASE** or **DECREASE** key to select the desired model memory.

## Model Match

---

The DX7 features patented Model Match™ technology that prevents operating a model using the wrong memory. This feature can prevent stripped servo gears, broken linkages and even a crash due to trying to operate/ fly a model using the wrong memory.

### How Model Match Works

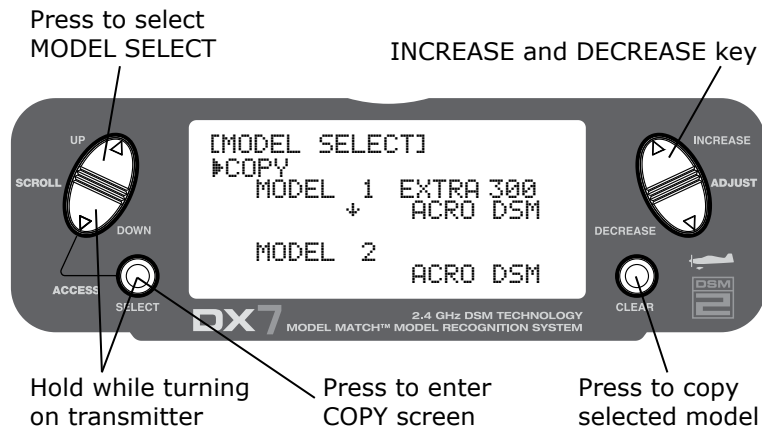
---

Each individual model memory has its own embedded code that is transferred to the receiver during binding. The receiver actually learns the code for the specific model memory that has been selected during binding and, when bound, will only operate when that model memory is selected. If a different (non-matching) model memory is selected, the receiver simply won't connect. This feature prevents trying to operate/ fly a model using the wrong model memory. The receiver can be re-programmed to operate with any other model memory by simply re-binding with the transmitter programmed to the desired model memory.

**Note:** If the receiver is turned on and the matching model memory is not selected, the system will not connect. Either select the matching model memory or rebind the receiver in the current model memory to resume operation.

## Model Select/Copy Function (continued)

---



### To Enter the Copy Function

---

Press the **DOWN** and **SELECT** keys simultaneously and turn the power switch ON to access the System Setup Mode.

Press the **UP** or **DOWN** key until Model Select appears on screen.

Press the **SELECT** button to enter the **COPY SCREEN**.

Press the **INCREASE** or **DECREASE** keys to select the model that you wish to copy the model to.

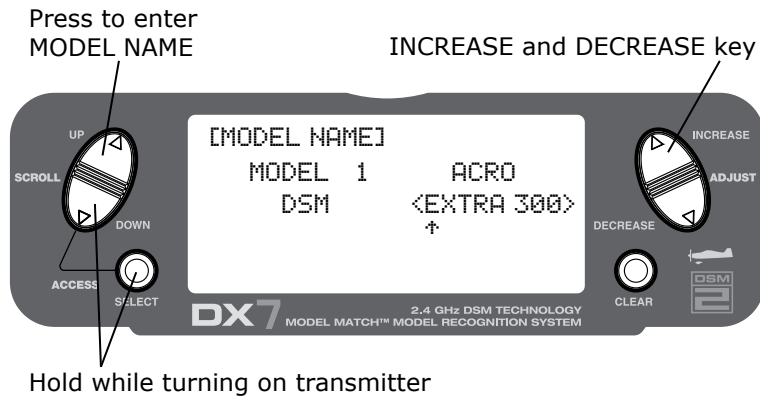
Press the **CLEAR** key to copy the model to the selected model memory.

**Note:** Be aware that the model you copy to will have its memory replaced with the new model's memory, and the programming information for the model to be copied to will be erased.

## Model Name

---

The Model Name function is used to input and assign the model's name to a specific memory, allowing easy identification of each model's program. Each model's name is displayed on the main screen when that model is selected. Up to eight characters that include numbers and letters are available.



### To Enter the Model Name Function

---

Press the **DOWN** and **SELECT** keys simultaneously, then turn on the transmitter.

Press the **INCREASE** or **DECREASE** key until the **MODEL NAME** screen appears.

Press the **SELECT** key to move the cursor to the desired character's position.

Press the **INCREASE** or **DECREASE** key to select the desired character.

## Model Match

---

The DX7 features patented Model Match™ technology that prevents operating a model using the wrong memory. This feature can prevent stripped servo gears, broken linkages and even a crash due to trying to operate/ fly a model using the wrong memory.

### How Model Match Works

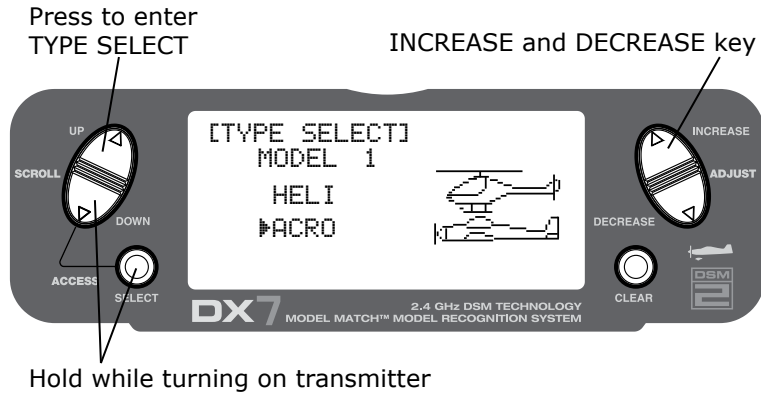
---

Each individual model memory has its own embedded code that is transferred to the receiver during binding. The receiver actually learns the code for the specific model memory that has been selected during binding and, when bound, will only operate when that model memory is selected. If a different (non-matching) model memory is selected, the receiver simply won't connect. This feature prevents trying to operate/ fly a model using the wrong model memory. The receiver can be re-programmed to operate with any other model memory by simply re-binding with the transmitter programmed to the desired model memory.

**Note:** If the receiver is turned on and the matching model memory is not selected the system will not connect. Either select the matching model memory or rebind the receiver in the current model memory to resume operation.

## Type Select Function

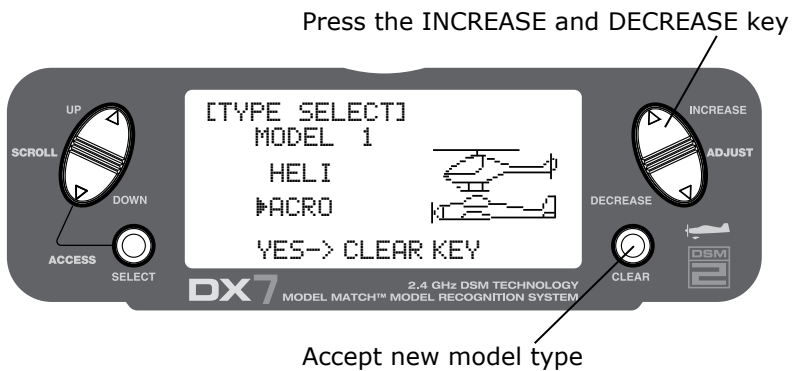
The DX7 features two programming types: Airplane and Helicopter. The DX7 can memorize data for up to 20 models individually and the model type will automatically be stored with each model memory.



### To Enter the Type Select Mode

Press the **DOWN** and **SELECT** keys simultaneously, then turn on the transmitter.

Press the **UP** key until the **TYPE SELECT** function appears on screen.



### To Select a Model Type

Press the **INCREASE** or **DECREASE** key to toggle between the heli or acro model types.

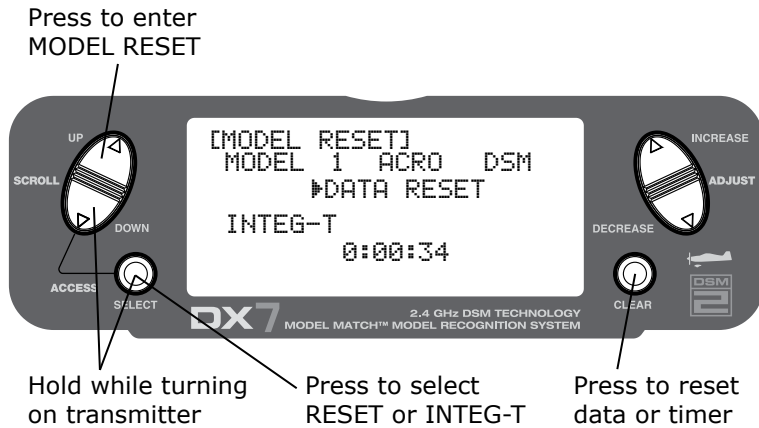
To accept the new model type press the **CLEAR** key. All settings will be set to the factory defaults.



## Model Reset and Integrated Timer Reset

---

The Model Reset function allows the model memory of the current model to be reset to the factory default setting. This screen also allows the integrated timer to be reset.



### To Perform a DATA RESET or Reset the Integrated Timer:

---

Press the **DOWN** and **SELECT** keys simultaneously then turn on the transmitter.

Press the **UP** or **DOWN** key until **MODEL RESET** appears on the screen.

Use the **SELECT** key to select **DATA RESET** or **INTEG-T**.

When **DATA RESET** is selected, pressing the **CLEAR** key will reset the date to the factory default setting for that model, or if **INTEG-T** is selected, the integrated timer will be reset to 0:00:00.

## Trainer

---

The DX7 offers a programmable Trainer function that allows the transmitter to operate in three different Trainer modes. Either the left or right rocker can be programmed as the trainer switch.

### **NORMAL:**

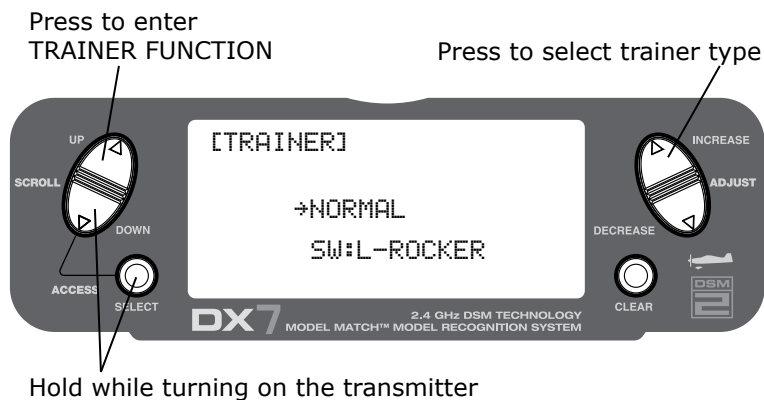
The transmitter can be used as a master or slave but the slave transmitter must have the same programming (i.e. reverse, travel adjust, dual rates, mixes, sub trims, etc.) as the master.

### **P-LINK:**

In Pilot Link the master transmitter maintains control of all secondary functions (i.e. dual rate, expo, gear, flaps, etc.) and only the primary stick controls (aileron, elevator, rudder and throttle) are transferred to the slave transmitter when the trainer switch is pressed.

### **SLAVE/P-LINK:**

In the Slave mode, the DX7 is used as a slave radio in conjunction with a Spektrum® radio that is used as the master that is in P-LINK mode; there is no need to match the slave's programming to the master transmitter's programming in this mode.



## To Enter the Trainer Mode

---

Press the **DOWN** and **SELECT** keys simultaneously then turn on the transmitter.

Press the **UP** key until **TRAINER** function appears on screen.

Press the **INCREASE** or **DECREASE** key to select the desired Trainer type: **INH**, **NORMAL**, **P-LINK** or **SLAVE/P-LINK**.

Also note that the trainer switch can be located on the right or left rocker switch. Use the **SELECT** key to highlight **SW:R** then press the **INCREASE** or **DECREASE** key to select the **RIGHT (R)** or **LEFT (L)** rocker.

## Throttle Recovery

---

The DX7 has a unique throttle trim recovery feature. Throttle Recovery stores the last known throttle trim position before the trim is moved to the full down (closed) position. That stored position is then recalled by moving the throttle trim up (open) one notch. This makes shutting off the engine and restarting it with the correct trim position easy. Throttle Recovery must be activated for each model.



### To Activate Throttle Recovery

---

Press the **DOWN** and **SELECT** keys simultaneously, then turn on the transmitter.

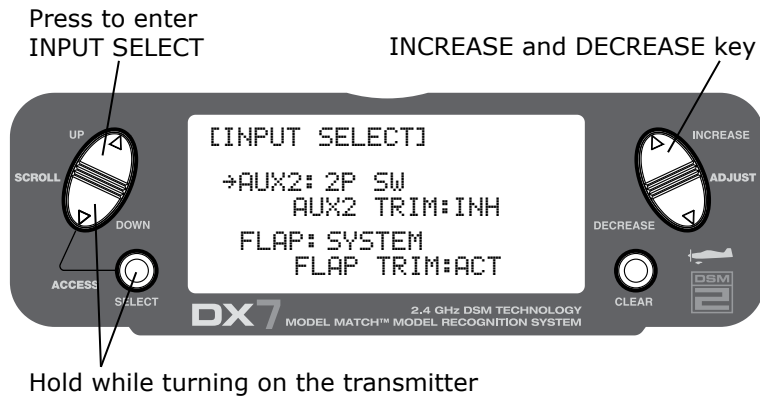
Press the **UP** key until the **THRO RECOVERY** function appears on screen.

Press the **INCREASE** or **DECREASE** key to turn on/off the throttle recovery function.

## Input Select

---

The purpose of the Input Selection Function is to assign the activation device for the AUX2 channel and the Flap Channel.



## To Access Input Select

---

Press the **DOWN** and **SELECT** keys simultaneously, then turn on the transmitter.

Press the **UP** key until the **INPUT SELECT** function appears on screen.

Here you have 4 choices that can be used to operate the AUX2 channel:

- 2-position switch
- INH
- Rocker
- 3-position switch

(The rocker provides proportional control, while the switch allows 2 or 3 positions of the AUX2 channel. You can also use the rocker for an AUX2 trim switch when using the 2P switch to activate the AUX2 function. Or you can inhibit the AUX2 rocker as well to prevent inadvertent changes.)

In addition, you have 3 choices to activate/inhibit **FLAP SYSTEM**:

- System (3-position switch)
- INH
- Rocker

(The rocker provides proportional control, while the system allows 3-position function of the FLAP channel. You can also use the rocker for a FLAP trim switch when using the 3P switch to activate the FLAP function. Finally, you can inhibit the FLAP Rocker as well to prevent inadvertent changes.)

**Note:** When operating the transmitter in a trainer mode (Normal or P-Link Master) the Trainer-Flap Rocker is not available to control the flaps.

**Note:** The individual AUX2/spoiler operation is inhibited when AUX2/spoiler is coupled for automatic landing attitude.

## Wing Type

---

The DX7 offers three different wing types to choose from: Normal, Flaperon and Delta (also called elevon mixing). In addition, V-Tail mixing is available from the Wing Type screen.

### Normal

---

When the Flaperon and Delta wing function are off, Normal wing type is selected. Use this wing type with common aircraft that utilize only one servo for both ailerons. Normal is the default setting.

### Flaperon Wing Type Selection

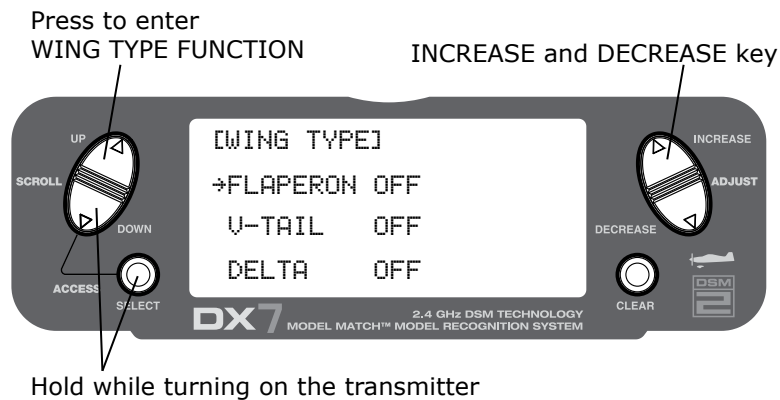
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Flaperons require the use of one servo for each aileron and allow the use of ailerons as flaps or spoilers. This function also allows the precise independent adjust of up and down travel, and independent sub-trim and differential of each aileron.

### Delta Wing Type Selection

---

Delta wing arrangements combine the function of ailerons with the function of the elevator to allow precise control of both roll and pitch.



### To Enter the Wing Type Function

---

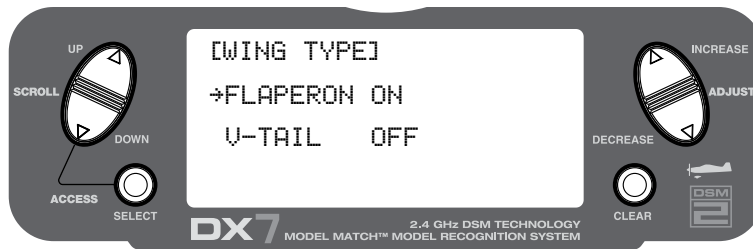
Press the **DOWN** and **SELECT** keys simultaneously, then turn on the transmitter.

Press the **UP** key until **WING TYPE** function appears on screen.

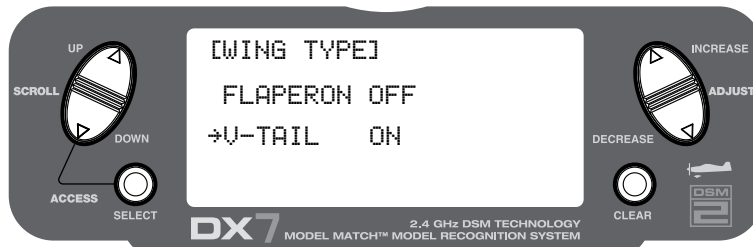
## Wing Type (continued)

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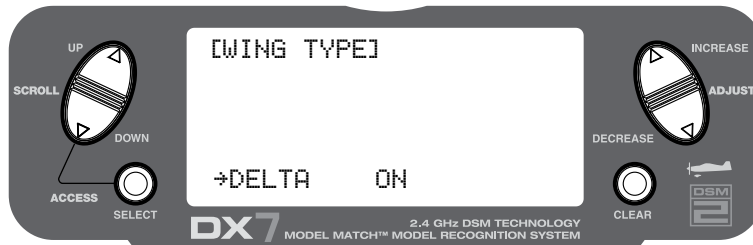
Flaperon Active:



V-Tail Active:



Delta Active:



### To Select a Wing Type

---

Press the **INCREASE** or **DECREASE** key until the desired wing type is highlighted on screen: **NORMAL**, **FLAPERON**, **DELTA WING**.

**Note:** When Flaperon or Delta Wing type is selected, the travel adjustment is used to adjust the individual servo throw, while the combined aileron travel is adjusted with the aileron dual rate. It is also possible to set aileron differential. Reverse switches are applicable for each servo. Neutral adjustments of each servo are made by the Sub Trim Function.

## Wing Type (continued)

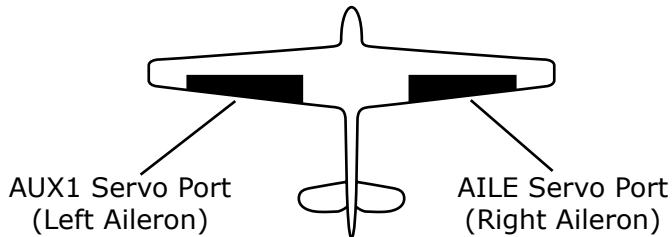
---

### Flaperon Wing Type Servo Connections

---

- AILE servo port (right aileron)
- AUX1 servo port (left aileron)

#### Flaperon Wing Type Connection

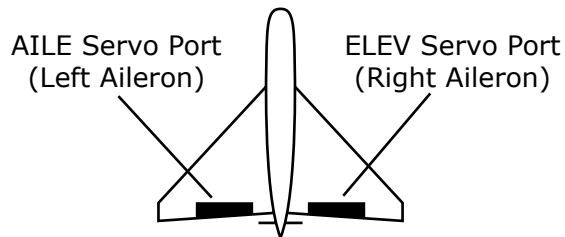


### Delta Wing Type Servo Connections

---

- ELEV servo port (right aileron)
- AILE servo port (left aileron)

#### Delta Wing Type Connection

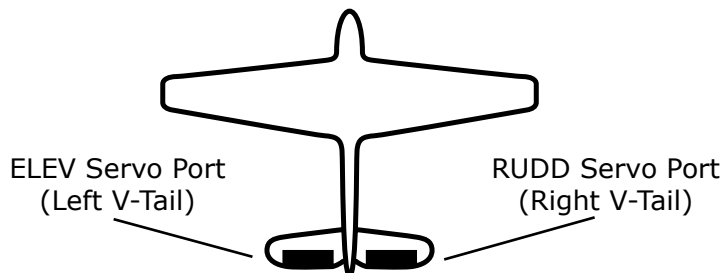


### V-Tail Type Servo Connections

---

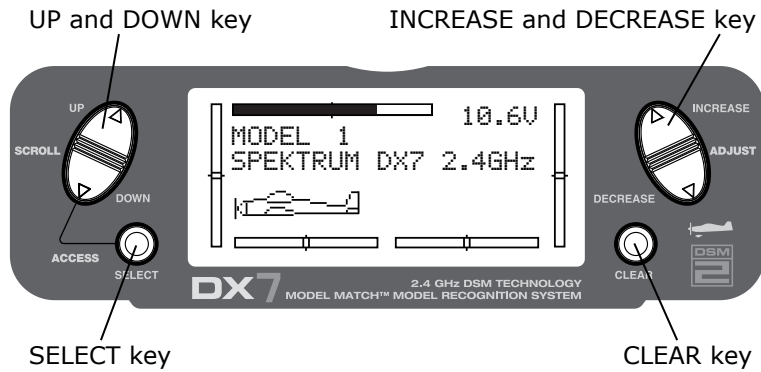
- RUDD servo port (right V-tail)
- ELEV servo port (left V-tail)

#### V-Tail Type Connection



## Function Mode

---



### To Enter Function Mode

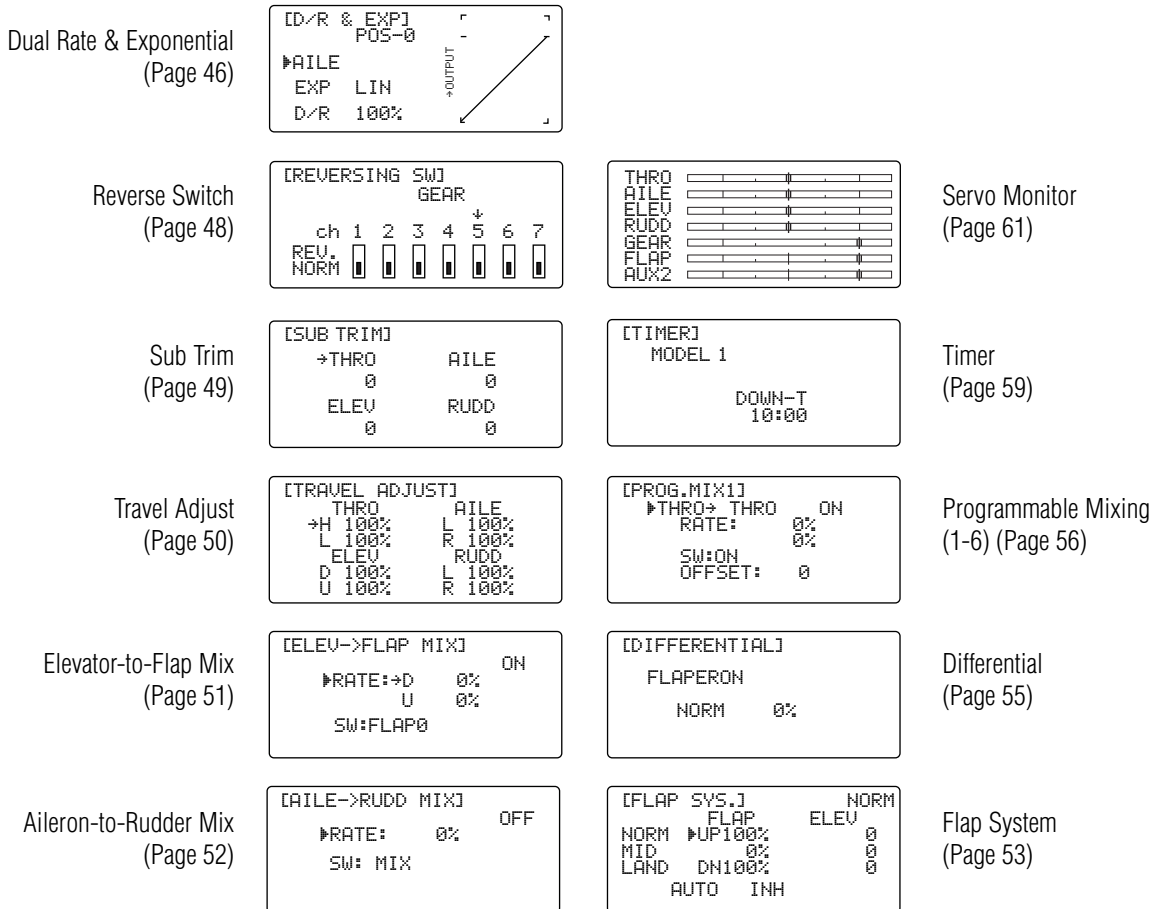
---

- From Main Screen Display press the **DOWN** and **SELECT** keys simultaneously to enter the Function Mode.
- Use the **UP** or **DOWN** keys to select the desired function.
- Use the **SELECT** key to scroll to the desired channel.
- Use the **INCREASE** and **DECREASE** keys to change the values or positions of the selected channel.
- Use the **CLEAR** key is used to return the selected value to the factory default settings.



# Function Mode Flowchart

Information pertaining to each function is explained on the following pages. Functions will appear on the screen in the same order they are shown on the flow chart below:



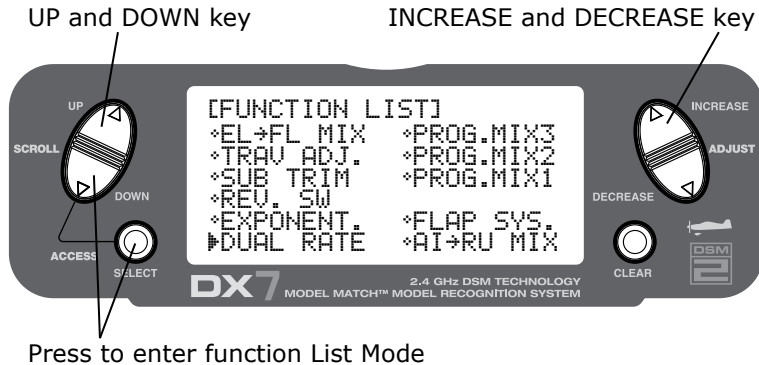
## Function List Modes

---

The list mode screens display all the functions onscreen allowing the access of any function without having to scroll through each screen. Note that there are two list modes: a System Setup List Mode that displays all the system setup functions, and a Function List Mode that displays all the system setup functions.

To enter the Function List Mode, with the system on and in any function mode screen, press the **UP** and **SELECT** keys simultaneously.

In list mode, pressing the **UP** and **DOWN** keys will move the cursor to the desired function. Then pressing the **DOWN** and **SELECT** keys simultaneously will access the selected function.



### To Enter the Function List Mode

---

- Turn the transmitter on.
- From the main screen, press the **UP** and **SELECT** keys simultaneously.
- The system is now in Function List Mode and will display a list of all the functions available.
- Use the **UP** and **DOWN** keys to Scroll through the available function.
- Press **DOWN** and **SELECT** to enter a selected function.

### To Exit the Function List Mode

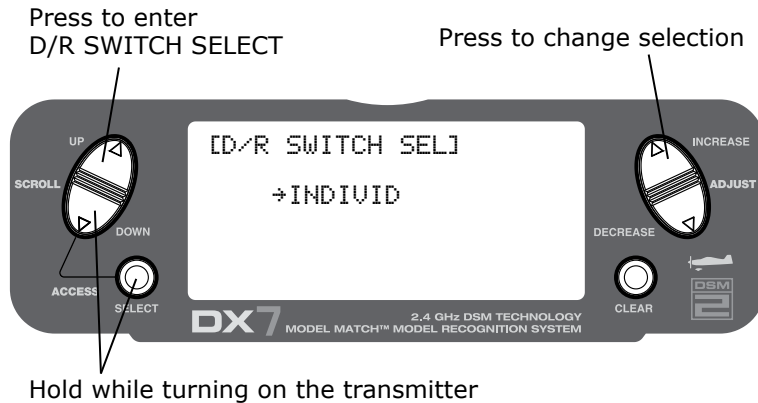
---

- Press the **DOWN** and **SELECT** keys simultaneously twice. The system will return to the main screen or turn off the transmitter.

## Dual Rate and Switch Select

The D/R switch select function allows the dual and expo rates to be selected via individual switches (aileron, elevator and rudder D/R switches) or to be conveniently combined on a single switch. When combined to a single switch the following switch options are available:

- COM AILE: Aileron D/R switch
- COM ELEV: Elevator D/R switch
- COM RUDD: Rudder D/R switch
- FLAP 2: Flap switch in the lower position
- FLAP 0: Flap switch in the upper position
- INDIVID: D/R activated by it's individual aileron, elevator and rudder switches



### To Activate Dual Rate and Switch Select

Press and hold the **DOWN** and **SELECT** keys simultaneously to enter system mode.

Press the **UP** or **DOWN** key until **D/R SWITCH SEL** appears on the screen.

Press the **INCREASE** or **DECREASE** keys to select the desired switch(es) you wish to operate the D/R and Expo function.

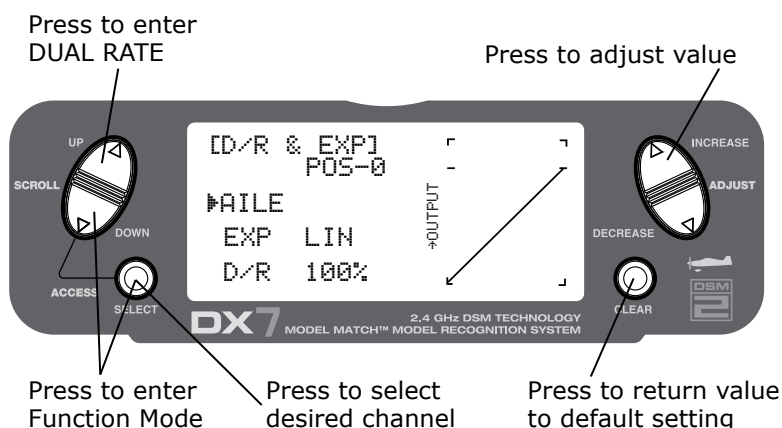
# Function Mode Functions

## Dual Rate and Exponential

The Dual Rate and Exponential function allows two control rates to be programmed and selected with a switch. Dual rates and expos are available on the aileron, elevator and rudder channels. Changing the dual rate value not only affects the maximum control authority but also affects the overall sensitivity of control. A higher rate yields a higher overall sensitivity. The sensitivity around center can be tailored using the Exponential function to precisely adjust control feel.

Dual and Expo rates can be controlled by their respective dual rate switches (aileron, elevator and rudder) or by 1 common switch (COM AILE, COM ELEV, COM RUDD, FLAP0 or FLAP2). The choices for this are found on the D/R SWITCH SEL screen in the System Setup Mode for Airplanes.

Dual rate values are adjustable from 0–125%. The factory default settings for both the 0 and 1 switch positions are 100%. Exponential values are adjustable from -100% to +100%. Either switch position may be selected as the low or high rate by placing the switch in the desired position and adjusting the value accordingly.



## To Adjust the Dual and Expo Rates

Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** keys to select the **D/R & EXP** screen.

Press the **INCREASE** or **DECREASE** key to select the desired channel (**AILE**, **ELEV** or **RUDD**).

Press the **SELECT** key to highlight the **D/R** or **EXPO** function.

Adjust the dual rate values for the selected switch position using the **INCREASE** or **DECREASE** keys.

The Dual Rate and Expo functions for aileron, elevator and rudder can be combined on a single switch conveniently allowing high or low rates to be selected via one switch (COM AILE, COM ELEV, COM RUDD, FLAP0 or FLAP2). The choices for this are found on the **D/R SWITCH SEL** screen in the System Setup Mode for Airplanes. (See Page 45)

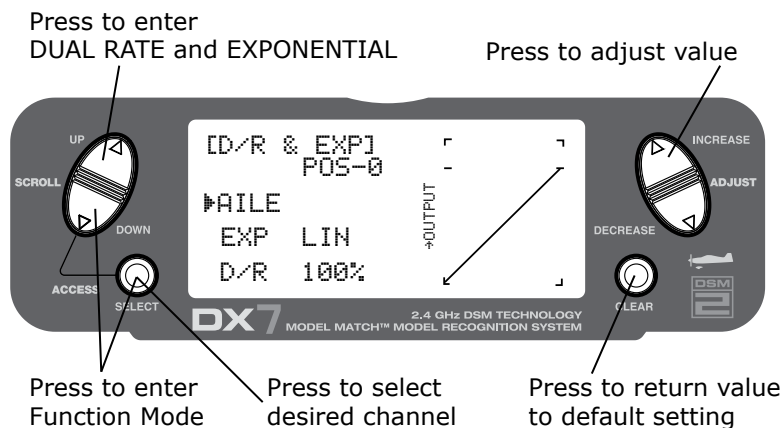
## Dual Rate and Exponential (continued)

The Exponential function allows two exponential rates to be programmed and selected with a switch. Exponential is available on the aileron, elevator and rudder channels. Changing the exponential value does not affect the maximum control authority but only affects control sensitivity. Exponential is normally used to reduce control sensitivity around neutral while still allowing high control authority at the extremes of throw. The sensitivity around center can be tailored using the Exponential function to precisely adjust control feel.

Exponential rates can be controlled by their respective rate switches (aileron, elevator and rudder), or combined on a single switch (COM AILE, COM ELEV, COM RUDD, FLAPO or FLAP2). The choices for this are found on the D/R SWITCH SEL screen in the System Setup Mode for Airplanes.

Exponential is available for the aileron, elevator and rudder channels. Expo values are adjustable from -100% (full negative expo), LIN (linear), and +100% (full positive expo). The factory default settings for both the 0 and 1 switch positions are LIN or 0%. Either switch position may be selected to give any desirable EXPO rate by placing the switch in the desired position and adjusting the value accordingly.

**Note:** A negative (-) Expo value will increase sensitivity around neutral, and a positive (+) Expo value will decrease sensitivity around neutral. Normally a positive value is used to desensitize control response around neutral.



### To Adjust the Exponential

Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** keys to select the **DUAL RATE & EXPONENTIAL** screen.

Press the **INCREASE** or **DECREASE** key to select the desired channel (**AILE**, **ELEV** or **RUDD**).

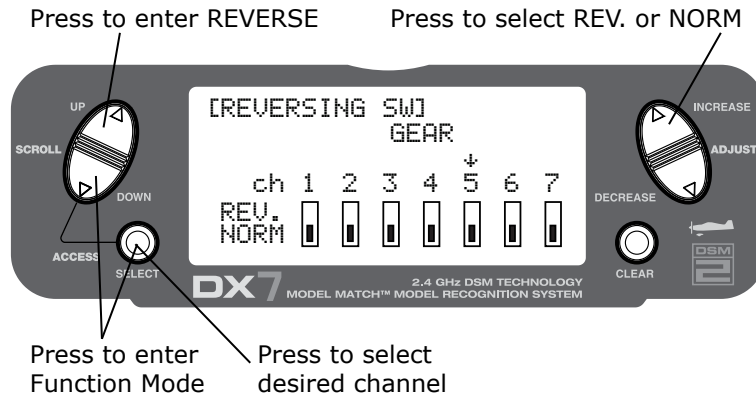
Move the selected channel's dual rate switch to the desired position, 0 or 1.

Press the **SELECT** key until **EXP** is highlighted.

Adjust the Expo rate values for the selected switch position using the **INCREASE** or **DECREASE** keys.

## Reverse Switch

The Reverse Switch function allows electronic means of reversing the servo's throw. Servo reversing is available for all seven channels.



### To Access the Reverse Switch Mode

Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** key to select the Reverse screen.

Press the **SELECT** key to access the desired channel.

Press the **INCREASE** or **DECREASE** keys to reverse the servo direction for that selected channel. The channels available are:

- THRO: Throttle
- AILE: Aileron
- ELEV: Elevator
- RUDD: Rudder
- GEAR: Retractable Landing Gear
- FLAP: Flap
- AUX2: Auxiliary 2

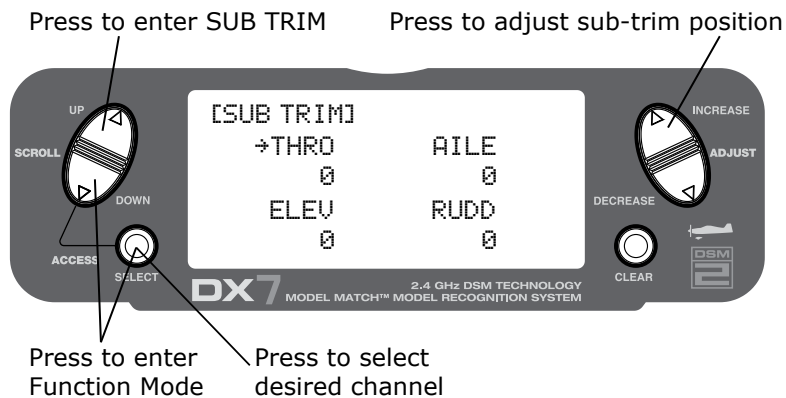
## Sub-Trim

The Sub-Trim function allows you to electronically adjust the centering of each servo. Sub trim is individually adjustable for all seven channels, with a range of + or - 125% (+ or - 30 degrees servo travel).

**Caution:** Do not use excessive sub-trim values as it is possible to overdrive the servo's maximum travel.

The channels available are:

- THRO: Throttle
- AILE: Aileron
- ELEV: Elevator
- RUDD: Rudder
- GEAR: Retractable Landing Gear
- FLAP: Flap
- AUX2: Auxiliary 2



### To Access the Sub-Trim Function

Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** key to select the **SUB TRIM** screen.

Press the **SELECT** key to access the desired channel.

Press the **INCREASE** or **DECREASE** keys to adjust the sub-trim position for that selected channel.

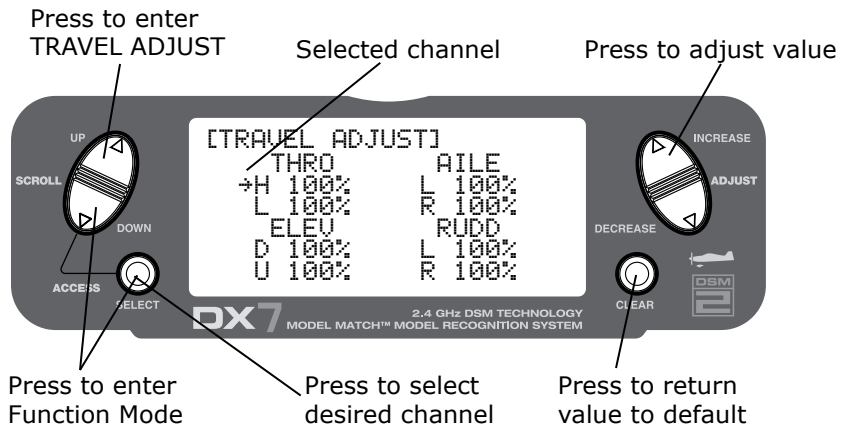
## Travel Adjust

---

The Travel Adjust function allows the precise end-point adjustments of all seven channels in each direction independently. The travel adjust range is from 0–150%.

Channel available for programming are:

- THRO: Throttle
- AILE: Aileron
- ELEV: Elevator
- RUDD: Rudder
- GEAR: Retractable Landing Gear
- FLAP: Flap
- AUX2: Auxiliary 2



### To Access the Travel Adjust Function

---

Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** key to select the **TRAVEL ADJUST** screen.

Press the **SELECT** key to access the desired channel.

Move the selected channel's stick or switch in the desired direction that you wish to adjust.

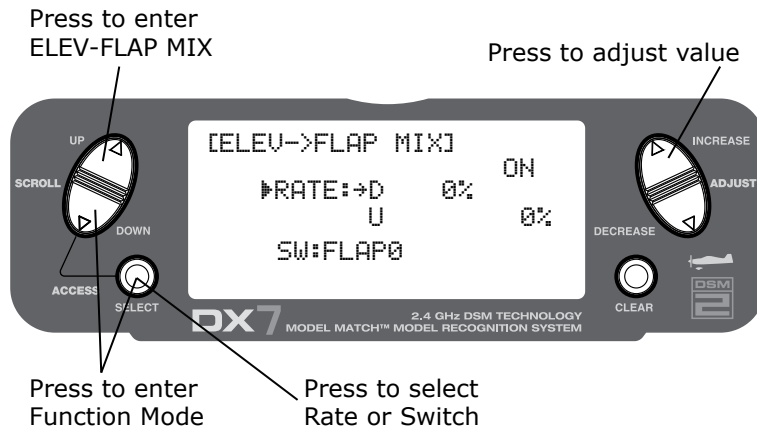
Press the **INCREASE** or **DECREASE** keys to adjust the end-point position for that selected channel's direction.



## Elevator-to-Flap Mix Function

---

When the Elevator-to-Flap Mixing System is active, and a value of flaps is input, the flaps will be deflected each time the elevator stick is used. The actual flap movement is independently adjustable for both up and down elevator. A commonly used application is up elevator/down flaps and down elevator/up flaps. When used in this manner, the aircraft pitches much more quickly than normal. The uppermost position of the Flap Mixing Switch or the Mix Switch can be used to activate the Elevator-to-Flap Mixing function. When you want to reverse the mixing directions, press the - key and change the mixing value from + to - (or - to +).



### To Access the Elevator-to-Flap Mixing

---

In the Function Mode, use the **UP** or **DOWN** key to select the **ELEVATOR TO FLAP MIXING** function and access by pressing the **UP** and **DOWN** keys simultaneously.

**Note:** The flap mix switch, or the Mix switch, depending on which is selected, must be in the "ON" position to adjust values.

To adjust the rate value, with the switch on, move the elevator stick in the desired position up or down and press the **INCREASE** or **DECREASE** button to adjust the desired mix value.

### To Select the Switch to Operate the Flap Mix

---

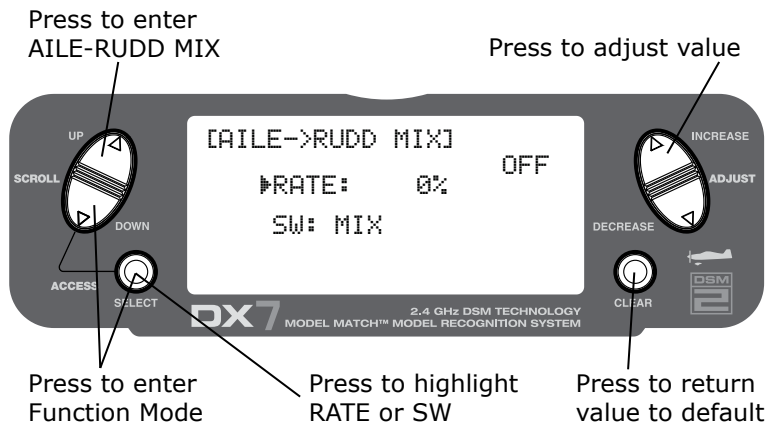
Press the **SELECT** key to highlight **SW**.

Press the **INCREASE** or **DECREASE** key to select the **MIX** or **FLAP0** switch position.

## Aileron-to-Rudder Mixing

The Aileron-to-Rudder Mixing function is designed so that when input to the aileron stick is given, the rudder servo will also move, eliminating the need to coordinate these controls manually. This mixing program can be turned ON/OFF by a switch. The switches that can be selected are shown below, with their abbreviations as they appear on the screen and the corresponding switch positions. Mix values are adjustable from 0 to 125%. When adjusting the mix value, if an opposite mixing direction of the rudder servo is required, simply press the **INCREASE** or **DECREASE** key and change the mixing value from + to - or - to +. This will reverse the mixing direction of the rudder from its original direction.

- ON: Mixing Always ON
- MIX Switch ON/OFF Using Mixing Switch
- Flap 0 Switch ON/OFF Using Flap Mix Position 0
- Flap 2 Switch ON/OFF Using Flap Mix Position 2



### To Access the Aileron-to-Rudder Mix Function

Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** key to select the **AILE-RUDD MIX** screen.

Press the **SELECT** key to highlight **RATE** or **SW** (switch).

### To Adjust the Mix Value

With **RATE** highlighted, press the **INCREASE** or **DECREASE** keys to adjust the mix value.

**Note:** To reverse mix directions, a negative mix value is accessible.

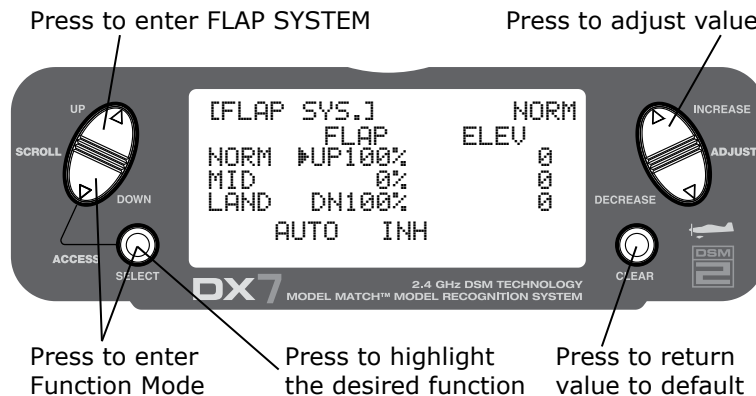
### To Assign a Switch

With **SW** highlighted, press the **INCREASE** or **DECREASE** keys to select the desired switch used to turn on/off the mix (Flap 0 or Mix).

## Flap System

The purpose of the Flap System is to set the flap and elevator positions for landing and takeoff. This is accomplished by selecting values for the elevator and flaps to be activated when the Land Switch is engaged. Three flap and elevator positions are available. The landing system can also be activated by a preset position of the throttle stick. Refer to the Automatic Landing Attitude section for more information on how to select the preset throttle position.

**Note:** The Flap System is only operational when **SYSTEM** is selected under Flap in the Input Select screen. See page 41 for more detail.



### Accessing and Utilizing the Flap System

Press the **UP** and **SELECT** keys simultaneously to enter the Function Mode.

Press either the **UP** or **DOWN** keys until **FLAP SYS** appears in the upper left portion of the LCD.

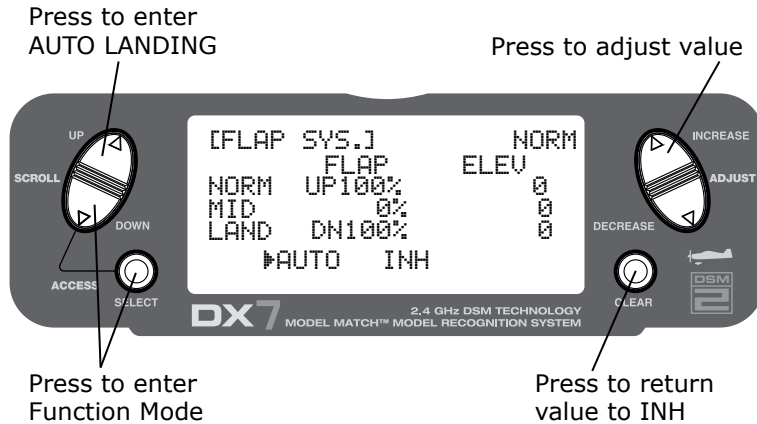
Press the **SELECT** key to position the cursor at the desired function (i.e., **ELEV**, **FLAP**, **SPOI**, **AUTO**).

**Note:** The flap system can only be accessed when **SYSTEM** is selected in the Input Select screen under flaps. See page 41 for more details.

Press the **UP** or **DOWN** keys to set the value for flap and elevator travel. The **UP** key adds up flap/elevator and the **DOWN** key adds down flap/elevator. The input is adjustable from 125% for flap and -200% for elevator.

## Automatic Landing

When the Automatic Landing Function is active, the throttle stick will activate the landing system you have just set up. Any point of throttle stick travel can be set as the “auto-land” point. Once the throttle stick passes through this point and the LAND switch is in the MID, or land position, the landing system will be activated. Thus, the elevator and flaps would be activated. If the flap mixing switch is not in the LAND position, the throttle stick operation would have no effect on the landing system.



### To Activate the Automatic Landing Feature

In the flap screen, press the **SELECT** key until **AUTO** is highlighted.

Press either the **INCREASE** or **DECREASE** key to activate the **AUTOMATIC LANDING SYSTEM**.

To change this value, press the **INCREASE** or **DECREASE** key to adjust the value (0% = low stick while 100% = full stick).

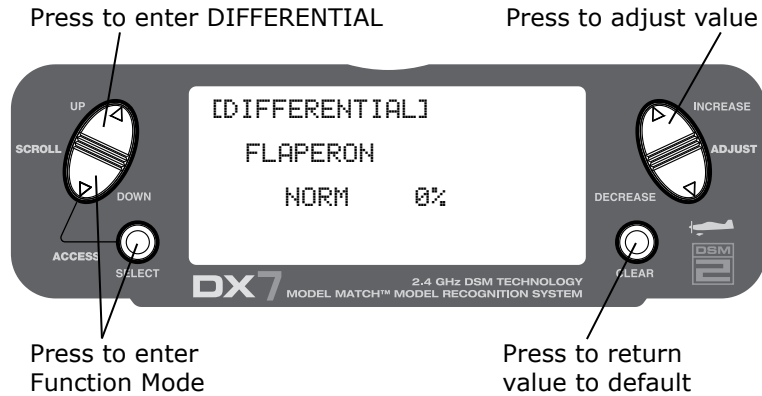
To clear the auto land point, press **CLEAR** and the display will return to **INH**.

## Differential Aileron Mixing

---

**Note:** Only available when Flaperon or Elevon is activated (see Wing Type Page 39).

The Differential Aileron function allows precise electronic adjustments of the up vs. down aileron travel of both ailerons. Aileron differential is used to reduce unwanted yaw characteristics during roll inputs. In order to access the Differential Function, flaperon or elevon wing mixing must be selected and two servos must be used to operate the ailerons.



### To Access the Differential Aileron Mixing Function

---

Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** key to select the **DIFFERENTIAL** screen.

Press the **INCREASE** or **DECREASE** keys to adjust the Differential value.

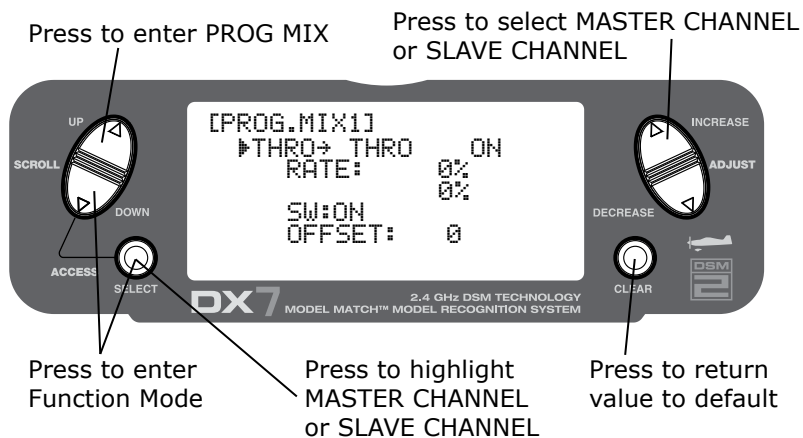
**Note:** Increasing the value will reduce the amount of down travel in each aileron.

If differential is working in reverse, the aileron servos are plugged into the wrong (opposite) channels. The right aileron should be plugged into the aileron channel, while the left aileron should be plugged into the flap channel.

## Programmable Mixing 1–6

The DX7 offers six (6) programmable mixes that allow stick or switch inputs to control the output of two or more servos. This function allows mixing any one channel to any other channel, or the ability to mix a channel to itself. The mix can remain ON at all times, or it can be switched OFF in flight, using a number of different switches. Mix values are adjustable from 0 to 125%. Each channel is identified by a four-character name (i.e., Aileron - AILE, Elevator - ELEV, etc.). The channel appearing first is the master channel. The second channel is the slave channel. For example, AILE - RUDD would indicate aileron-to-rudder mixing. Each time the aileron stick is moved, the aileron will deflect, and the rudder will automatically move in the direction and to the position based on the value input in the programmable mix screen. Mixing is proportional, so small inputs of the master channel will produce small outputs of the slave channel. Each programmable mix has a mixing offset. The purpose of the mixing offset is to redefine the neutral position of the slave channel.

**Note:** Programmable mix 5 and 6 have a built-in trim include function. If programmable mix 5 or 6 is selected, and a master channel is selected that has a trim lever (ie. aileron, elevator rudder or throttle), the trim will operate both the master and the slave channel.



## Programmable Mixing 1–6 (continued)

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### Assigning Channels

---

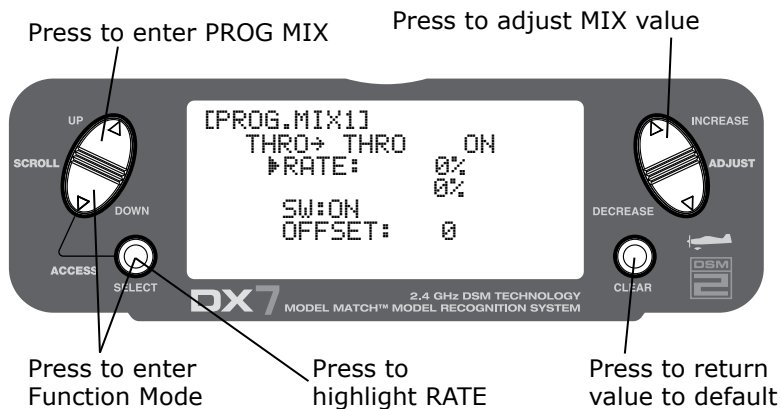
Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** keys to select the desired **PROG. MIX** screen (1–6).

Press the **INCREASE** or **DECREASE** keys to select the desired master channel.

Press the **SELECT** key to highlight the slave channel.

Press the **INCREASE** or **DECREASE** keys to select the desired slave channel.



### Assigning Mixing Values

---

Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** keys to select the desired **PROG. MIX** screen (1–6).

Press the **SELECT** key to highlight **RATE**.

Using the stick or switch that is assigned to the master channel, move that stick or switch in the desired direction that you wish to adjust the mix value.

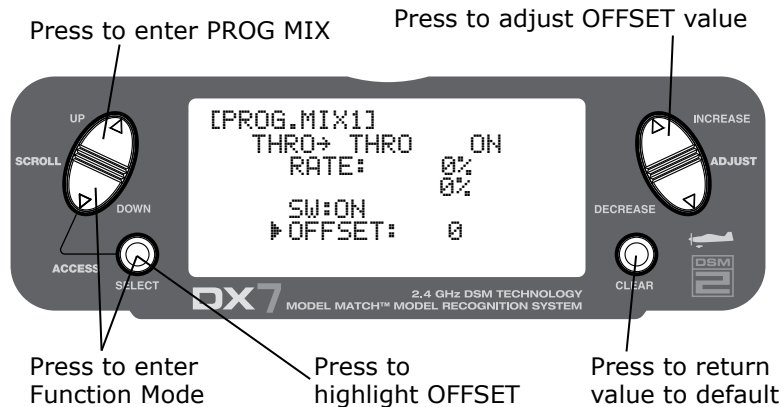
Press the **INCREASE** or **DECREASE** keys to adjust the mix value. values are adjustable from -125% to +125%.

**Note:** If a switch is assigned to the mix, that switch must be turned on to allow mixing values to be changed.

Moving the stick or switch in the opposite direction will allow the mix value to be adjusted in the opposite direction.

## Programmable Mixing 1–6 (continued)

---



### Assigning an Offset

---

Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** keys to select the desired **PROG. MIX** screen (1–6).

Press the **SELECT** key to highlight **OFFSET**.

To establish the offset position, use the **INCREASE** or **DECREASE** keys to change the value to the desired point. The stored offset value will appear onscreen.

To change the offset value, simply use the **INCREASE** or **DECREASE** keys to change the value. Pressing the **CLEAR** button will reset the offset to 0.

### Assigning a Switch

---

Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** keys to select the desired **PROG. MIX** screen (1–6).

Press the **SELECT** key to highlight **SW**.

Use the **INCREASE** or **DECREASE** keys to select the desired switch to turn on/off the mix.

- ON: Mixing Always On
- MIX: Mixing Switch Toward Self
- Flap 0: Flap Switch in Flap 0 Position
- Flap 2: Flap Switch in Flap 2 Position
- Gear: Gear Switch



# Timer

The DX7 features an onscreen timer with three programming options:

## **INH:**

Inhibit- In this mode the timer is turned off.

## **Down-T:**

Down Timer- The countdown timer allows a preset time in ten-second intervals up to 59 minutes and 50 seconds to be programmed, and when that time expires, a beeper will sound for 10 seconds.

## **STOP-W:**

Stopwatch- The stopwatch function is a simple count-up timer that that displays minutes and seconds up to 59 minutes and 59 seconds.

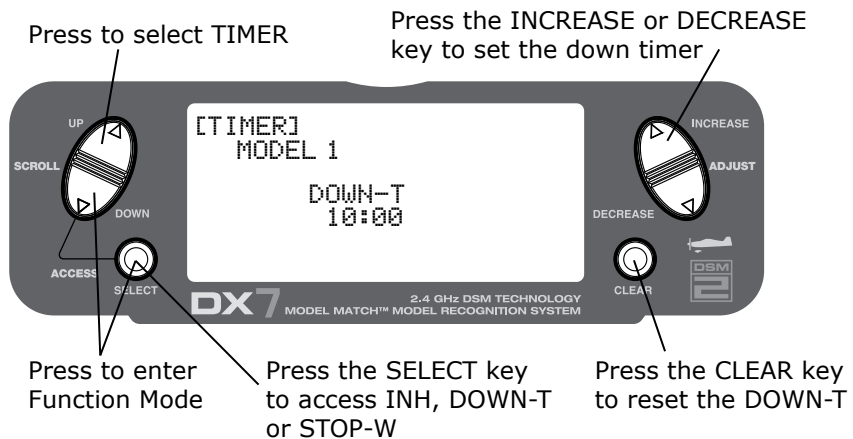
When the **DOWN-T** or **STOP-W** function is selected, the timer will be displayed on the main screen. The following buttons are used in conjunction to operate the timer function:

### **INCREASE** or **DECREASE** keys:

Used to start, stop and restart the timer.

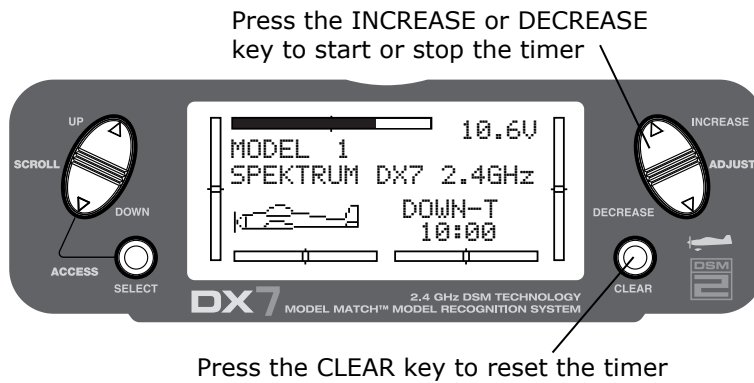
### **CLEAR** key:

Used to reset the timer to the preset time (Down-T) or to reset the stopwatch timer to 0:00.



## Timer (continued)

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Press the **DOWN** and **SELECT** keys simultaneously to access the system mode.

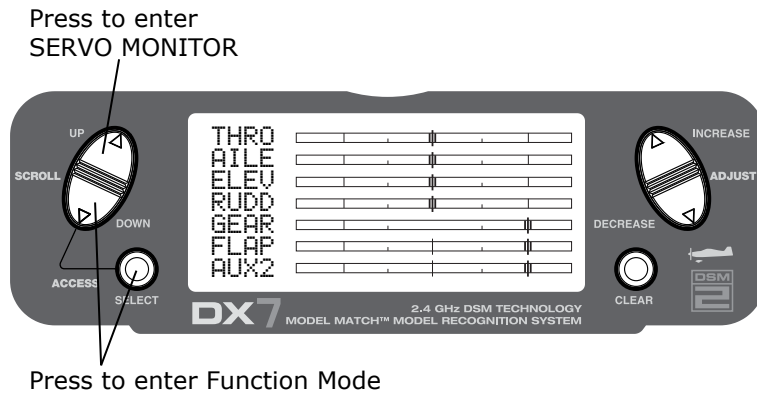
In System Mode use the **UP** or **DOWN** key to select the **TIMER** screen.

Press the **SELECT** key to select **STOP-W**, **DOWN-T** or **INH**.

With **DOWN-T** selected press the **INCREASE** or **DECREASE** key to change the preprogrammed time.

## Servo Monitor

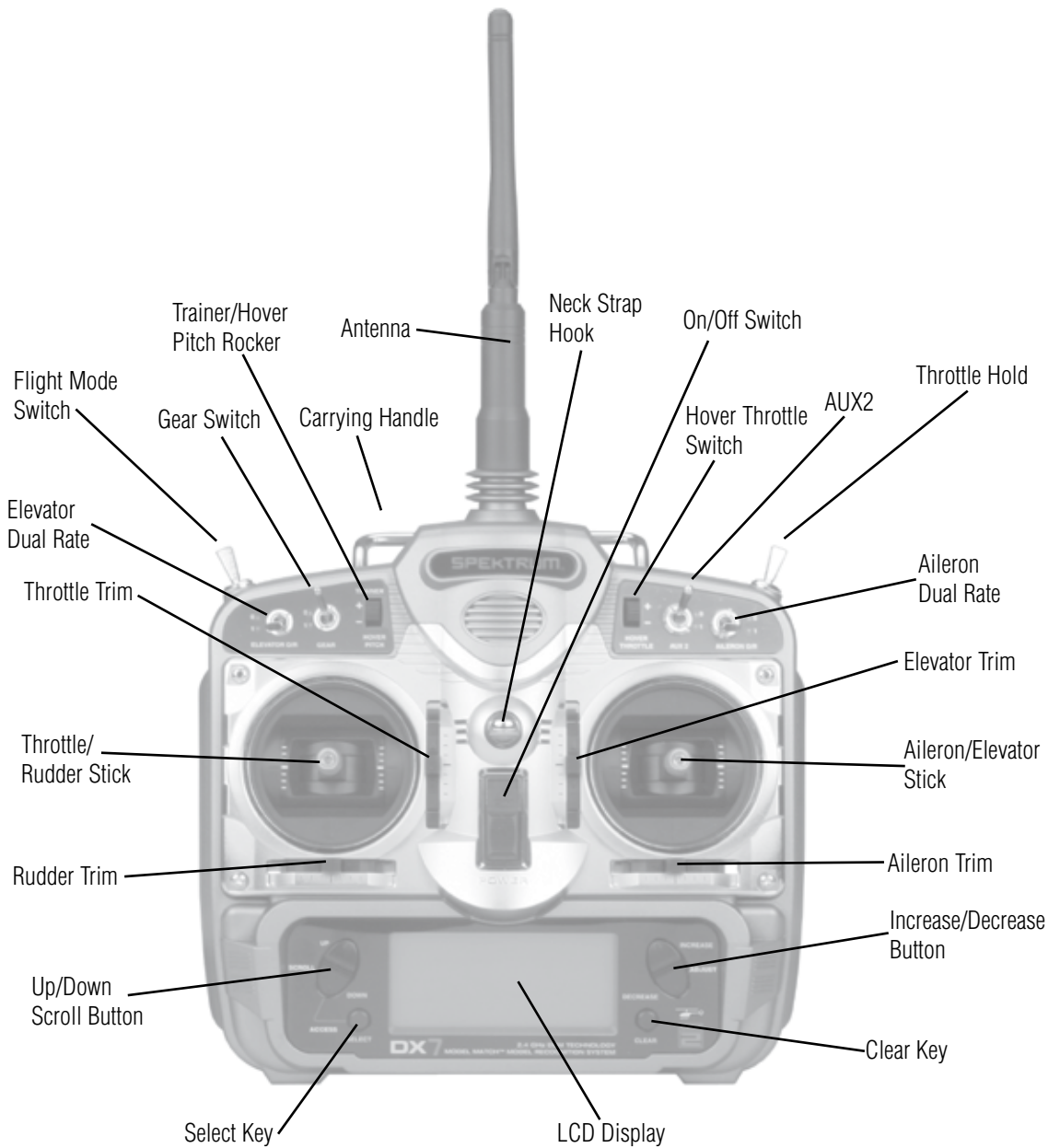
The servo monitor screen serves as a useful tool when programming your radio. It displays servo positions and is useful in checking different programming functions.





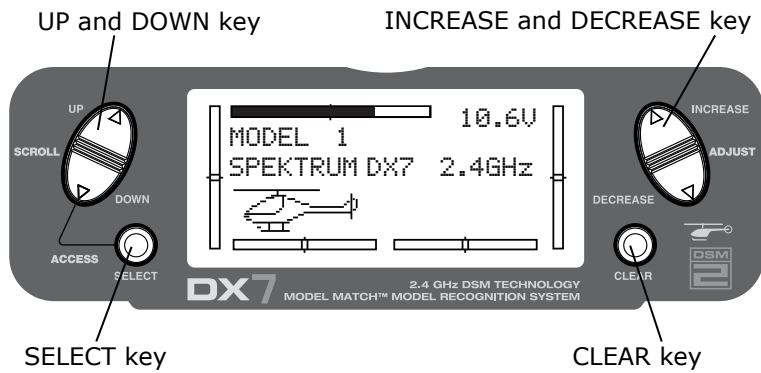
# Helicopter Programming Guide

## Transmitter Control Identification and Location



## General Information

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### Key Input and Display Functions

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- The **UP** and **DOWN** keys are used to select the programming function.
- The **SELECT** key is used to select the channel or feature that you wish to program.
- The **INCREASE** or **DECREASE** keys are used to change the values of the selected programming feature.

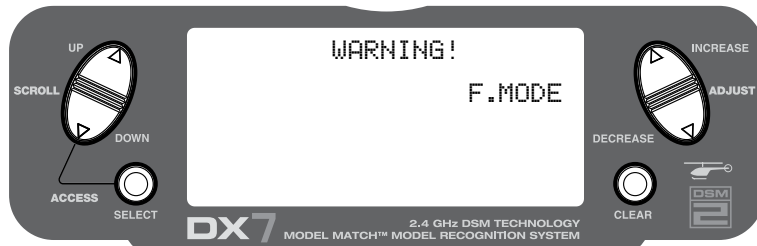
The DX7 features two programming modes: System Setup Mode and Function Mode, which are described in the next sections.

## Warning Screen for Throttle Hold/Stunt Mode

---

When the DX7 is operated in the helicopter mode, there is a warning system that is employed to avoid hot starts (accidental high throttle startups) when the power switch is initially turned ON. If the flight mode switch or throttle hold is on, an alarm will sound and a warning message will be displayed on the LCD. When all switches are returned to the normal condition, the display will return to normal.

**Note:** If the Throttle Hold function is not activated prior the power switch being turned ON, no alarm will sound. Below is the display example of WARNING CONDITION when the power switch is ON.



## Gyro Connections

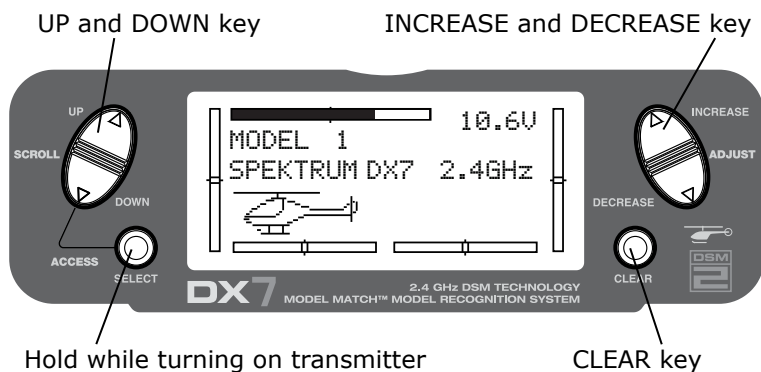
---

**Note:** The Gyro Gain channel can be selected to operate on Channel 5 (Gear) or Channel 7 (AUX2). See input Select on Page 73 for detail on selecting the gain channel.

# System Setup Mode

Includes programming functions that are normally used during setup. System Setup programming functions include:

Model Select (Page 67)	<pre>[MODEL SELECT] ▶SELECT MODEL 1  T-REX           HELI  DSM</pre>	[SWASH TYPE] 1 SERVO NORM	Swash Type (Page 75)
Model Name (Page 68)	<pre>[MODEL NAME] MODEL 1  HELI DSM      &lt;T-REX450&gt;           ↑</pre>	[INPUT SELECT] →AUX2     GEAR           GYRO     INH	Input Select (Page 73)
Type Select (Page 69)	<pre>[TYPE SELECT] MODEL 1 ▶HELI     [Helicopter Icon] ACRO     [Acroplane Icon]</pre>	[THRO RECOVERY] INH	Throttle Recovery (Page 72)
Model Reset (Page 70)	<pre>[MODEL RESET] MODEL 1  HELI  DSM ▶DATA RESET INTEG-T       0:00:34</pre>	[TRAINER] →NORMAL       SW=L-ROCKER	Trainer (Page 71)



## To Enter the System Setup Mode

- With the power switch off, press and hold the **DOWN** and **SELECT** keys simultaneously.
- Turn on the power switch.
- The system will display the last system setup screen that was used.

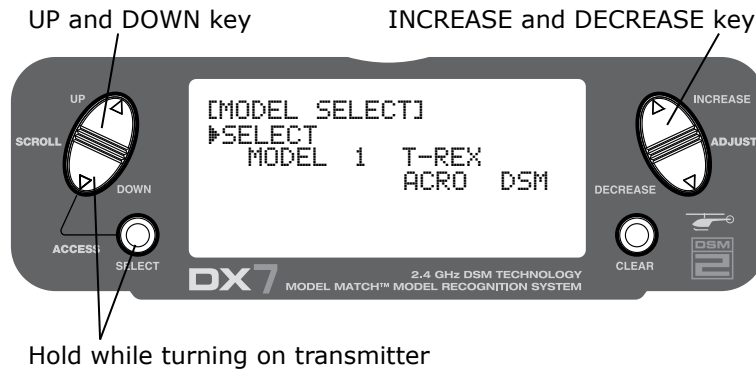
## To Exit the System Setup Mode

- Press the **DOWN** and **SELECT** keys simultaneously.
- The main menu will be displayed
- Or turn the transmitter off to exit the System Setup Mode.



## Model Select/Copy

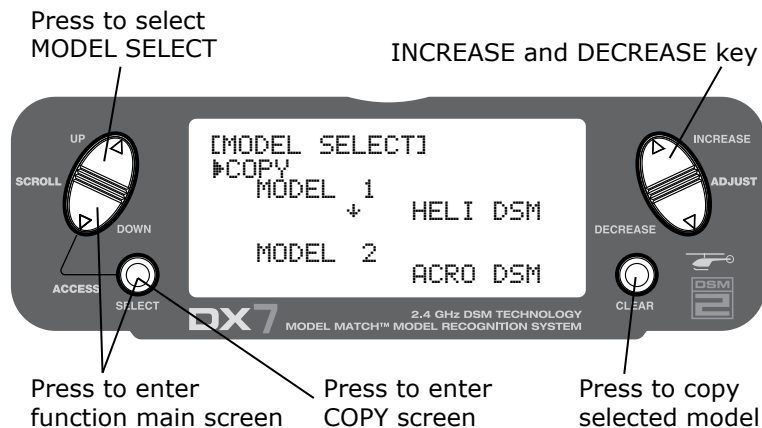
The DX7 features a memory function that stores the programmed data for up to 20 models. Any combination of up to 20 airplanes and/or helicopters can be stored in memory. A model name feature with up to eight characters allows each model to be easily identified.



### To Enter the Model Select Function

Press the **DOWN** and **SELECT** keys simultaneously and turn the power switch ON to access the System Setup Mode. Press the **INCREASE** or **DECREASE** key until the **MODEL SELECT** screen appears.

Press the **INCREASE** or **DECREASE** key to select the desired model memory.



### To Enter the Copy Function

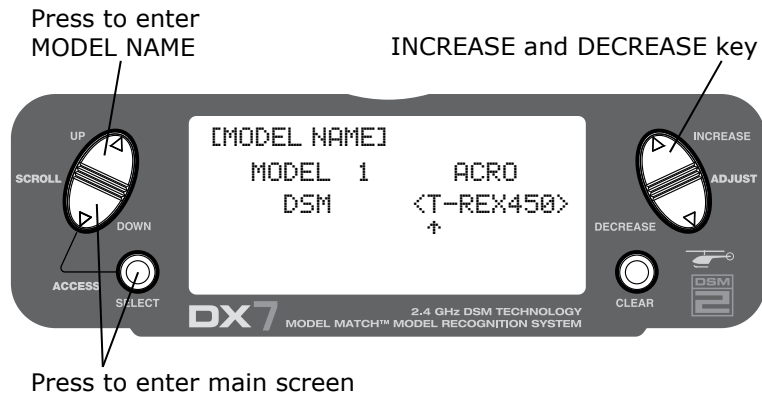
- Press the **DOWN** and **SELECT** keys simultaneously and turn the power switch ON to access the System Setup Mode.
- Press the **UP** or **DOWN** key until **MODEL SELECT** appears on screen.
- Press the **SELECT** button to enter the **COPY** screen.
- Press the **INCREASE** or **DECREASE** keys to select to model that you wish to copy the model to.
- Press the **CLEAR** key to copy the model to the selected model memory.

**Note:** Be aware that the model that you copy to will have its memory replaced with the new model and the programming information for that model will be erased.

## Model Name

---

The Model Name function is used to input and assign the model's name to a specific memory, allowing easy identification of each model's program. Each model's name is displayed on the main screen when that model is selected. Up to eight characters that include numbers and letters are available.



### To Enter the Model Name Function

---

Press the **DOWN** and **SELECT** keys simultaneously, then turn on the transmitter.

Press the **INCREASE** or **DECREASE** key until the **MODEL NAME** screen appears.

Press the **SELECT** Key to move the cursor to the desired character's position.

Press the **INCREASE** or **DECREASE** key to select the desired character.

## Model Match

---

The DX7 features patented Model Match™ technology that prevents operating a model using the wrong memory. This feature can prevent stripped servo gears, broken linkages and even a crash due to trying to operate/ fly a model using the wrong memory.

### How Model Match Works

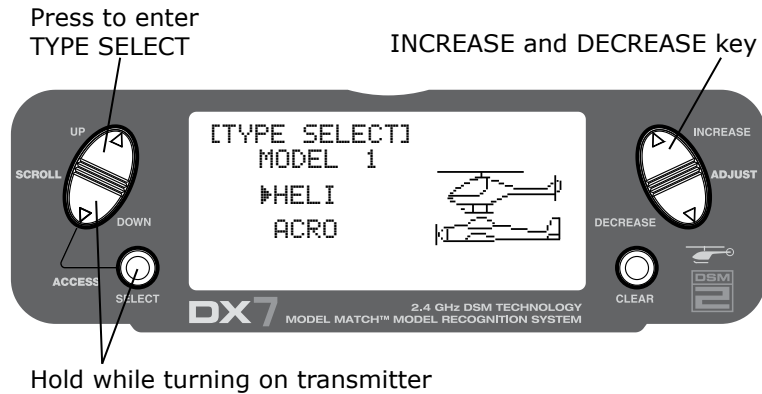
---

Each individual model memory has its own embedded code that is transferred to the receiver during binding. The receiver actually learns the code for the specific model memory that has been selected during binding and, when bound, will only operate when that model memory is selected. If a different (non-matching) model memory is selected, the receiver simply won't connect. This feature prevents trying to operate/ fly a model using the wrong model memory. The receiver can be re-programmed to operate with any other model memory by simply re-binding with the transmitter programmed to the desired model memory.

**Note:** If the receiver is turned on and the matching model memory is not selected the system will not connect. Either select the matching model memory or rebind the receiver in the current model memory to resume operation.

## Type Select Function

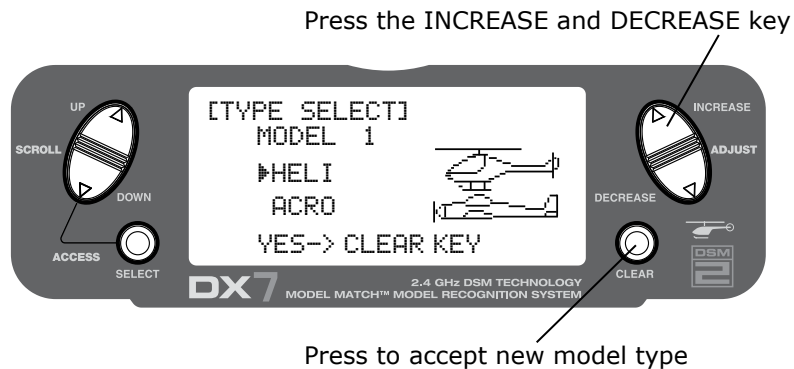
The DX7 features two programming types: Airplane and Helicopter. The DX7 can memorize data for up to 20 models individually.



### To Enter the Type Select Mode

Press the **DOWN** and **SELECT** keys simultaneously, then turn on the transmitter.

Press the **UP** key until the **TYPE SELECT** function appears on screen.



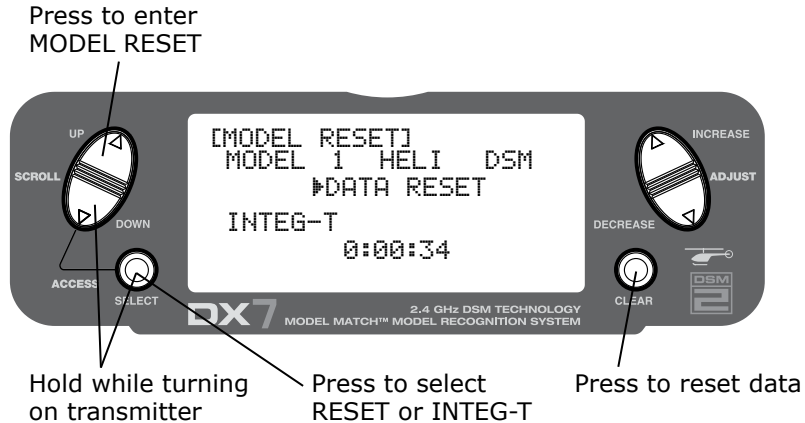
### To Select a Model Type

Press the **INCREASE** or **DECREASE** key to toggle between the heli or acro model types.

To accept the new model type press the **CLEAR** key. All settings will be set to the factory defaults.

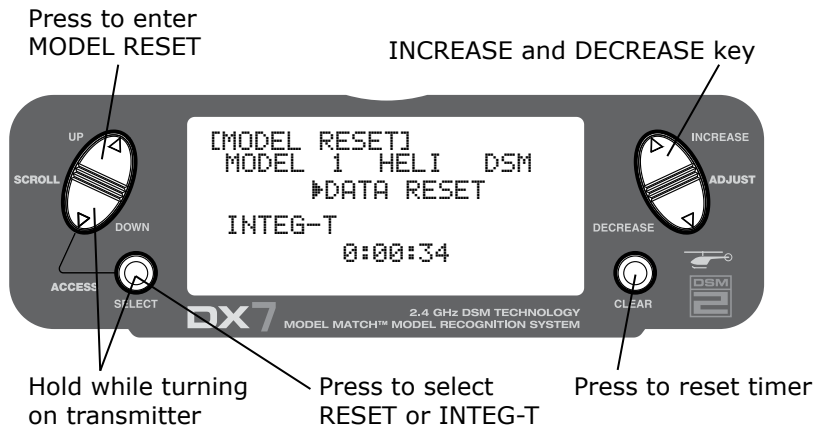
## Model Reset/Integrated Timer

The Model Reset function resets all programming functions to their default settings. This screen also allows you to reset the integrated timer function to zero.



### To Reset a Model

- Press the **DOWN** and **SELECT** keys simultaneously, then turn on the transmitter.
- Press the **UP** key until **MODEL RESET** appears on screen.
- Press the **SELECT** key until **DATA RESET** is highlighted.
- Pressing the **CLEAR** key will reset the model memory to factory default settings.



### To Reset the Integrated Timer

- Press the **DOWN** and **SELECT** keys simultaneously, then turn on the transmitter.
- Press the **UP** key until the **MODEL RESET** function appears on screen.
- Press the **SELECT** key until **INTEG-T** is highlighted.
- Pressing the **CLEAR** key will reset the **INTEG-T** to factory zero.

# Trainer

The DX7 offers a programmable Trainer function that allows the transmitter to operate in three different Trainer modes. The left or right rocker can be programmed as the trainer switch.

## **NORMAL:**

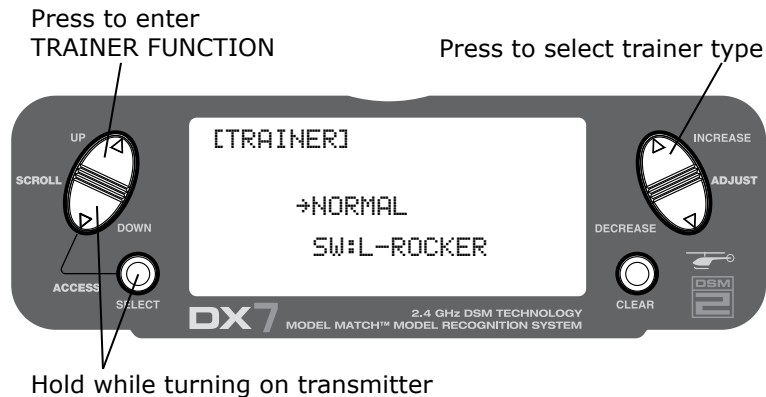
The transmitter can be used as a master or slave, but the slave transmitter must have the same programming (i.e. reverse, travel adjust, dual rates, mixes sub trims, etc.) as the master.

## **P-LINK:**

In Pilot Link the master transmitter maintains control of all secondary functions (i.e. dual rate, expo, gear, flaps, etc.) and only the primary stick controls (aileron, elevator, rudder and throttle) are transferred to the slave transmitter when the trainer switch is pressed.

## **SLAVE/P-LINK:**

In the Slave mode, the DX7 is used as a slave radio in conjunction with a Spektrum® radio that is used as the master that is in P-LINK mode; there is no need to match the slave's programming to the master transmitter's programming in this mode.



## To Enter the Trainer Mode

Press the **DOWN** and **SELECT** keys simultaneously, then turn on the transmitter.

Press the **UP** key until **TRAINER** function appears on screen.

Press the **INCREASE** or **DECREASE** key to select the desired Trainer type: INH, Normal, P-Link or Slave/P-Link. Also note that the trainer switch can be located on the right or left rocker switch. Use the select key to highlight SW:R then press the increase or decrease key to select the right (R) or left (L) rocker.

## Throttle Recovery

---

The DX7 has a unique throttle trim recovery feature. Throttle Recovery stores the last known throttle trim position before the trim is moved to the full down (closed) position. That stored position is then recalled by moving the throttle trim up (open) one notch. This makes shutting off the engine and restarting it with the correct trim position easy. Throttle Recovery must be activated for each model.



### To Activate the Throttle Recovery Function

---

Press the **DOWN** and **SELECT** keys simultaneously, then turn on the transmitter.

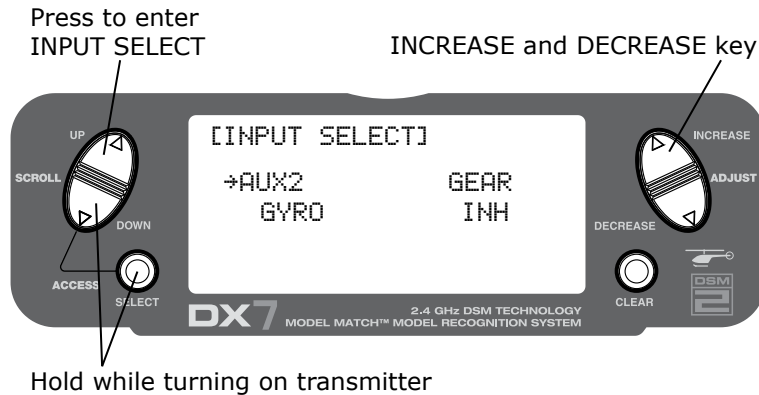
Press the **UP** key until **THRO RECOVERY** appears on screen.

Press the **INCREASE** or **DECREASE** key to turn on/off the Throttle Recovery function.

## Input Select

---

The Input Select function is used to select the switch input for the gyro gain and the channel that will operate the gyro gain.



### To Select the Function for the AUX2 Channel

---

Press the **DOWN** and **SELECT** keys simultaneously, then turn on the transmitter.

Press the **UP** or **DOWN** key until the **INPUT SELECT** function appears on screen.

Press the **SELECT** key until **AUX2** is highlighted.

Press the **INCREASE** or **DECREASE** key to select the desired function.

The Auxiliary 2 channel options are:

#### **INH:**

Inhibit is selected if the gyro function will not be used on the Aux 2 channel.

#### **F.MODE:**

In this mode, the AUX2 channel is controlled by the flight mode switch and three positions are available. Sub trim and travel adjust is used to set the center and end points for each switch position.

#### **AUX2:**

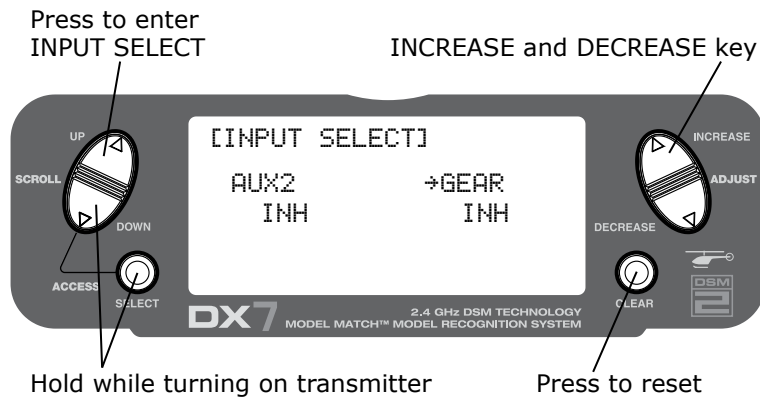
The Auxiliary 2 switch controls the AUX2 Channel.

#### **GYRO:**

The gyro mode is selected if you want to use the Gyro Sensing (see page 91) for more detail. Selecting GYRO under AUX2 assigns the gyro sensing program to operate use the AUX2 channel. In this case the gyro gain must be plugged into the AUX2 (Channel 7) channel.

## Input Select (continued)

---



### To Select the Function for the Gear Channel

---

Press the **DOWN** and **SELECT** keys simultaneously, then turn on the transmitter.

Press the **UP** or **DOWN** key until **INPUT SELECT** appears on screen.

Press the **SELECT** key until **GEAR** is highlighted.

Press the **INCREASE** or **DECREASE** key to select the desired function.

The gear channel options are:

#### **INH:**

Inhibit is selected if the gyro function will not be used on the gear channel. Selecting inhibit turns off the gear channel, allowing it to be used as a slave channel for mixing.

#### **GEAR:**

Gear is selected if the gyro gain or retractable gear position is to be selected using the gear switch.

#### **GYRO:**

Gyro is selected under gear if you wish to have the Gyro Sensing (Page 91) operate using the gear channel.

#### **AUX2:**

The Auxiliary 2 switch is used to activate the gear channel.

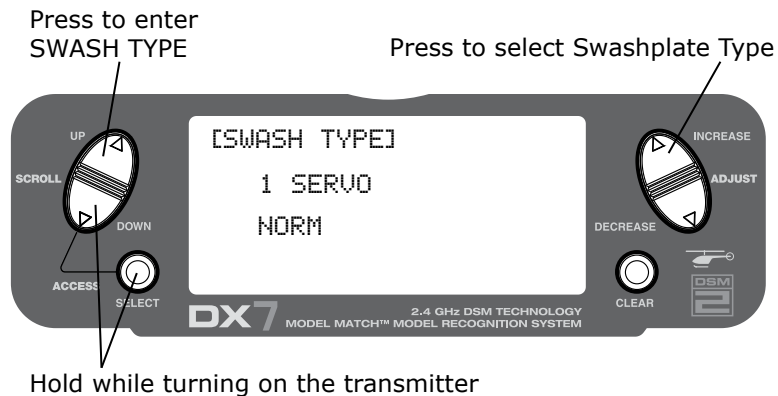
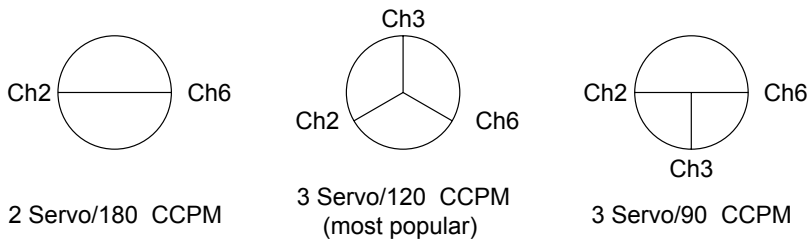


# Swash Type

The Swashplate Mixing function enables the DX7 system to operate the following swashplate types:

The Swashplates are:

- 1 Servo: Non-CCPM, standard mixing type helicopter
- 2 Servo/180° CCPM
- 3 Servo/120° CCPM (most popular)
- 3 Servo/90° CCPM



## Accessing the Swashplate Types

While pressing the **DOWN** and **SELECT** keys, turn the transmitter on to enter the System Mode.

Press either the **UP** or **DOWN** key until **SWASH TYPE** is displayed in the LCD.

Press the **INCREASE** or **DECREASE** keys to change the swashplate type.

Pressing the **CLEAR** key will reset the swashplate type to the **NORMAL** position.

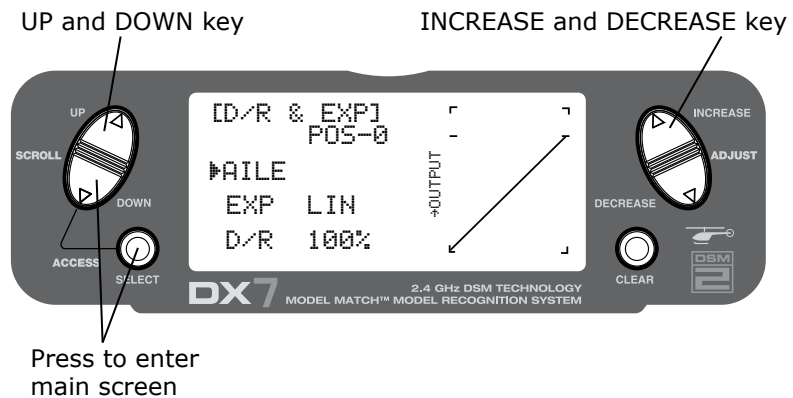
# Function Mode Flowchart

Includes programming functions that are more frequently used. Function Mode programming functions include:

Dual Rate & Exponential (Page 79)	<pre> [D/R &amp; EXP]   POS-0   ▶AILE   EXP LIN   D/R 100%           </pre>		
Auto Dual Rate Expo (Page 81)	<pre> [AUTO D/R EXP]   ▶NORM INH   ST-1 INH   ST-2 INH           </pre>	<pre> THRO AILE ELEV RUDD GEAR FLAP AUX2           </pre>	Servo Monitor (Page 97)
Reverse (Page 82)	<pre> [REVERSING SWJ]   GEAR   ch 1 2 3 4 5 6 7   REV.   NORM           </pre>	<pre> [TIMER]   MODEL 1   DOWN-T   10:00           </pre>	Timer (Page 95)
Sub Trim (Page 83)	<pre> [SUB TRIM]   ▶THRO AILE   0 0   ELEV RUDD   0 0           </pre>	<pre> [PROG.MIX1]   ▶THRO→ THRO ON   RATE: 0%   SW:ON 0%   OFFSET: 0           </pre>	Programmable Mix (1 though 3) (Page 92)
Travel Adjust (Page 84)	<pre> [TRAVEL ADJUST]   THRO AILE   ▶H 100% L 100%   L 100% R 100%   ELEV RUDD   D 100% L 100%   U 100% R 100%           </pre>	<pre> [GYRO SENS]   ▶RUDD   RATE:   0: 50%   1: 50%           </pre>	Gyro Sensing (Only available when AUX2 or GEAR is assigned as Gyro Function) (Page 91)
Swashplate Mix (Only available when CCPM Mix is active) (Page 85)	<pre> [SWASH MIX]   3 SERVO ▶AILE +60%   120° ELEV +60%   EXP INH PIT. +60%           </pre>	<pre> [REVO MIX]   NORM STNT   ▶UP 0% UP 0%   DN 0% DN 0%           </pre>	Revo Mix (Page 90)
Throttle Hold (Page 86)	<pre> [THRO HOLD]   ACT OFF   HOLD POS.   - 5.0%           </pre>	<pre> [PITCH CURVE]   HOLD   ▶Point-L   0.0%   IN 49 OUT 49           </pre>	Pitch Curve Hold (only available when HOLD is activated) (Page 89)
Throttle Curve Normal (Page 87)	<pre> [THRO CURVE]   NORM   ▶Point-L   0.0%   IN 51 OUT 51           </pre>	<pre> [PITCH CURVE]   ST-2   ▶Point-3   INH   IN 51 OUT 51           </pre>	Pitch ST-2 (Page 89)
Throttle Curve ST-1 (Page 87)	<pre> [THRO CURVE]   ST-1   ▶Point-3   INH   IN 51 OUT 51           </pre>	<pre> [PITCH CURVE]   ST-1   ▶Point-3   INH   IN 51 OUT 51           </pre>	Pitch Curve ST-1 (Page 89)
Throttle Curve ST-2 (Page 87)	<pre> [THRO CURVE]   ST-2   ▶Point-3   INH   IN 51 OUT 51           </pre>	<pre> [PITCH CURVE]   NORM   ▶Point-3   INH   IN 51 OUT 51           </pre>	Pitch Curve Normal (Page 89)

## Function Mode (continued)

---



### To Enter the Function Mode

---

- Turn the transmitter on.
- From the main screen press the **DOWN** and **SELECT** keys simultaneously.
- The system is now in Function Mode and will display the last screen that was used in Function Mode.

### To Exit the Function Mode

---

- Press the **DOWN** and **SELECT** keys simultaneously. The system will return to the main screen.

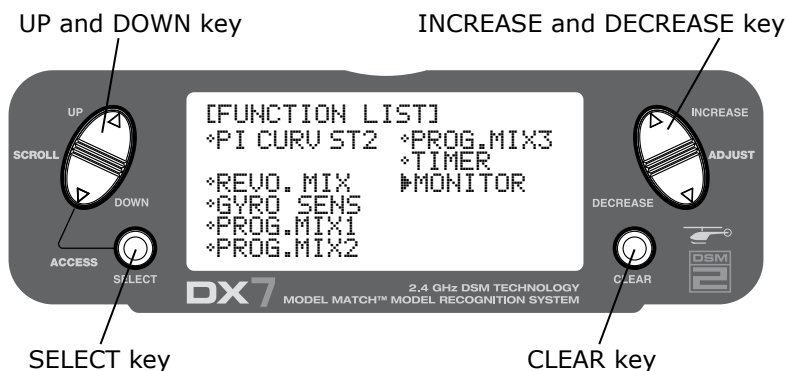
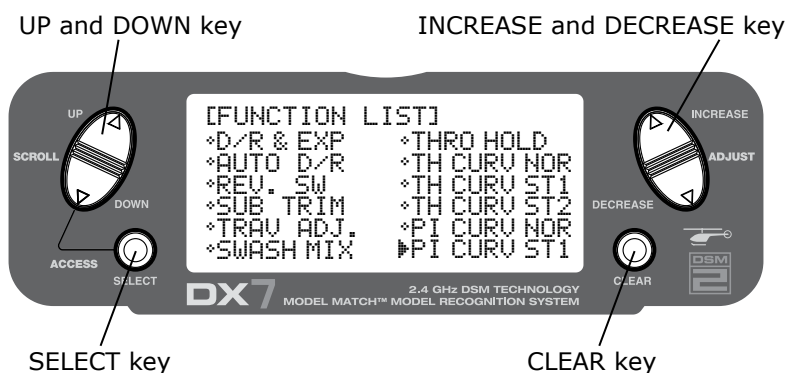
# List Modes

The list mode screens display all the functions onscreen, allowing the access of any function without having to scroll through each screen. Note that there are two list modes: a System Setup list mode that displays all the system setup functions and a Function list mode that displays all the system programming functions.

To enter the System Setup List Mode, with the system on and in any System Setup function, press the **UP** and **SELECT** keys simultaneously.

To enter the Function List mode, with the system on and in any function mode screen, press the **UP** and **SELECT** keys simultaneously.

In either List Mode, pressing the **UP** and **DOWN** keys will move the cursor to the desired function. Then pressing the **DOWN** and **SELECT** key simultaneously will access the selected function.



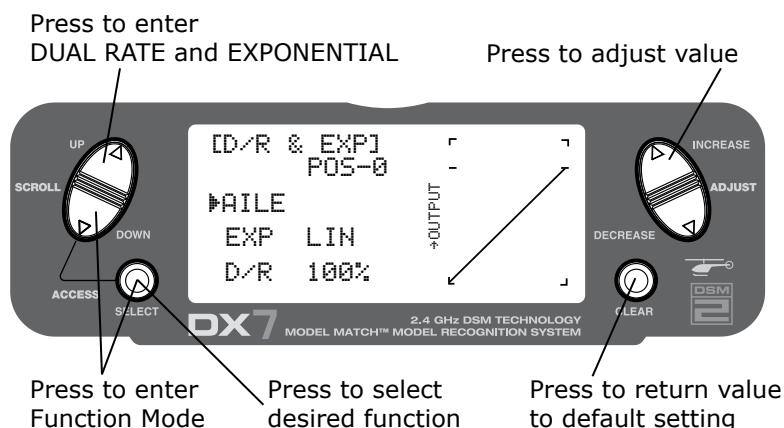
# Function Mode Functions

## Dual Rate and Exponential

The Dual Rate and Exponential function allows two control rates to be programmed and selected with a switch. Dual rates and exponentials are available on the aileron, elevator and rudder channels. Changing the dual rate value not only affects the maximum control authority but also affects the overall sensitivity of control. A higher rate yields a higher overall sensitivity. The sensitivity around center can be tailored using the Exponential function to precisely adjust control feel.

Dual rates can be controlled by their respective dual rate switches (aileron, elevator and rudder). An auto dual rate function is available that allows to automatic selection of the desired rates via the three-position flight-mode switch.

Exponential values are adjustable from -100% to +100%. The factory default settings for both the 0 and 1 switch positions are 100%. Either switch position may be selected as the low or high rate by placing the switch in the desired position and adjusting the value accordingly.



### To Adjust the Dual Rate

Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** keys to select the **D/R & EXP** screen.

Press the **INCREASE** or **DECREASE** key to select the desired channel (**AILE**, **ELEV** or **RUDD**).

Press the **SELECT** key to highlight the **D/R** or **EXPO** function.

Adjust the dual rate values for the selected switch position using the **INCREASE** or **DECREASE** keys.

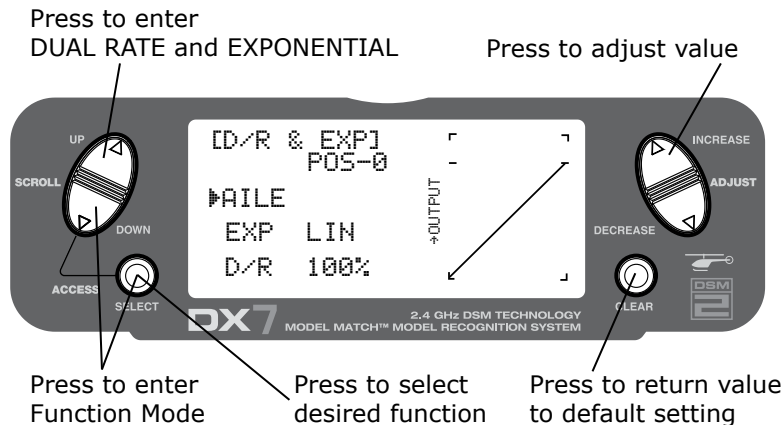
The Dual Rate and Expo functions for aileron, elevator and rudder can be combined on the flight mode auto dual rate/expo conveniently allowing high or low rates to be selected via the flight mode switch. See Page 81 for more details.

## Dual Rate and Exponential (continued)

The Exponential function allows two exponential rates to be programmed and selected with a switch. Exponential is available on the aileron, elevator and rudder channels. Changing the exponential value does not affect the maximum control authority but only affects control sensitivity. Exponential is normally used to reduce control sensitivity around neutral while still allowing high control authority at the extremes of throw. The sensitivity around center can be tailored using the Exponential function to precisely adjust control feel.

Exponential rates can be controlled by their respective rate switches (aileron, elevator and rudder), or combined on a flight mode switch. Exponential is available for the aileron, elevator and rudder channels. Expo values are adjustable from -100% (full negative expo), LIN (linear), and +100% (full positive expo). The factory default settings for both the 0 and 1 switch positions are LIN or 0%. Either switch position may be selected to give any desirable EXPO rate by placing the switch in the desired position and adjusting the value accordingly.

**Note:** A negative (-) Expo value will increase sensitivity around neutral, and a positive (+) Expo value will decrease sensitivity around neutral. Normally a positive value is used to desensitize control response around neutral.



### To Adjust the Exponential

Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** keys to select the **DUAL RATE AND EXPONENTIAL** screen.

Press the **INCREASE** or **DECREASE** key to select the desired channel (**AILE**, **ELEV** or **RUDD**).

Move the selected channel's dual rate switch to the desired position, 0 or 1.

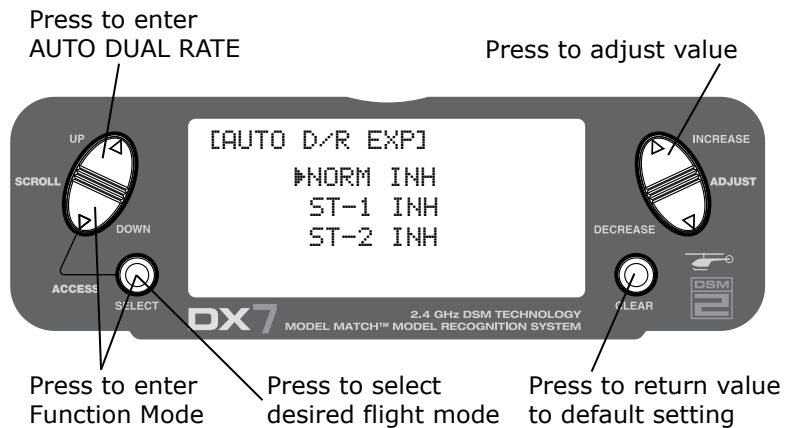
Press the **SELECT** key until **EXP** is highlighted.

Adjust the Expo rate values for the selected switch position using the **INCREASE** or **DECREASE** keys.

## Auto Dual Rate EXP

---

The Auto Dual Rate and Expo function allows Expo and Dual Rate values (aileron, elevator and rudder) to be automatically selected in each flight mode (Normal, ST1, ST2, and Hold.) When an auto dual rate flight mode is inhibited, the dual rate is defaulted to the correlating switch and dual rate switch positions.



### To Adjust the Auto Dual Rate

---

Press the **DOWN** and **SELECT** key simultaneously to access the Function Mode.

Press the **UP** or **DOWN** key until the **AUTO D/R EXP** screen appears on screen.

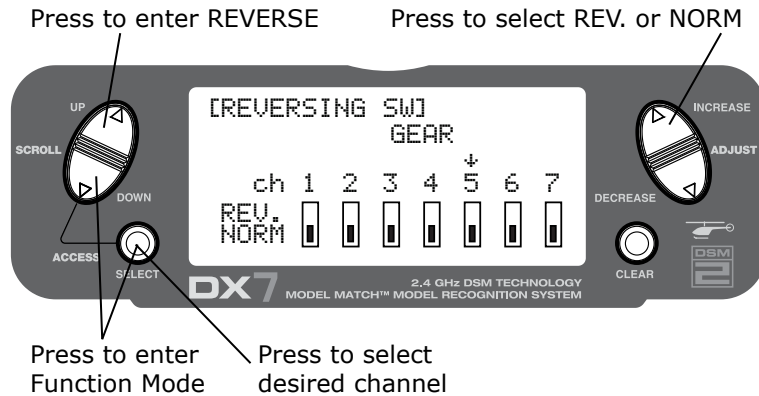
Use the select key to select **NORMAL**, **ST1** **ST2** or **HOLD FLIGHT** mode.

When selected, press the **INCREASE** or **DECREASE** key to select **DUAL RATE**, **P-1**, **P-2** or **INHIBIT**.

**Note:** The actual dual rate values are set in the Dual Rate and Expo screen. See Page 79.

## Reverse Switch

The Reverse Switch function allows electronic means of reversing the servo's throw. Servo reversing is available for all seven channels.



## Accessing the Reverse Switch Function

Press the **SELECT** key to access the desired channel.

Press the **INCREASE** or **DECREASE** keys to reverse the servo direction for that selected channel.

- THRO: Throttle
- AILE: Aileron
- ELEV: Elevator
- RUDD: Rudder
- GEAR: Gyro Gain
- PIT: Pitch (AUX1) Gyro Gain



## Sub Trim

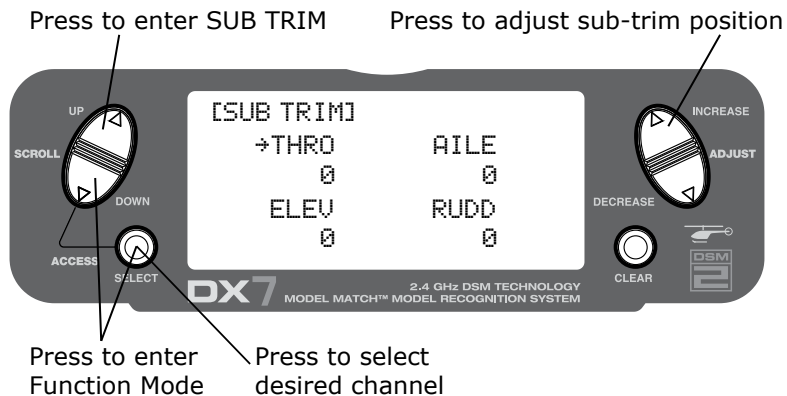
The Sub-Trim function allows you to electronically adjust the centering of each servo. Sub trim is individually adjustable for all seven channels, with a range of + or - 125% (+ or - 30 degrees servo travel).

**Caution:** Do not use excessive sub-trim values as it is possible to overdrive the servo's maximum travel.

Sub-trim value (max  $\pm 125$ ).

The channels available are:

- THRO: Throttle
- AILE: Aileron
- ELEV: Elevator
- RUDD: Rudder
- GEAR: Retractable Landing Gear
- PIT.: Pitch
- AUX2: Auxiliary 2



### To Access the Sub-Trim Function

Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** key to select the **SUB TRIM** screen.

Press the **SELECT** key to access the desired channel.

Press the **INCREASE** or **DECREASE** keys to adjust the sub-trim position for that selected channel.

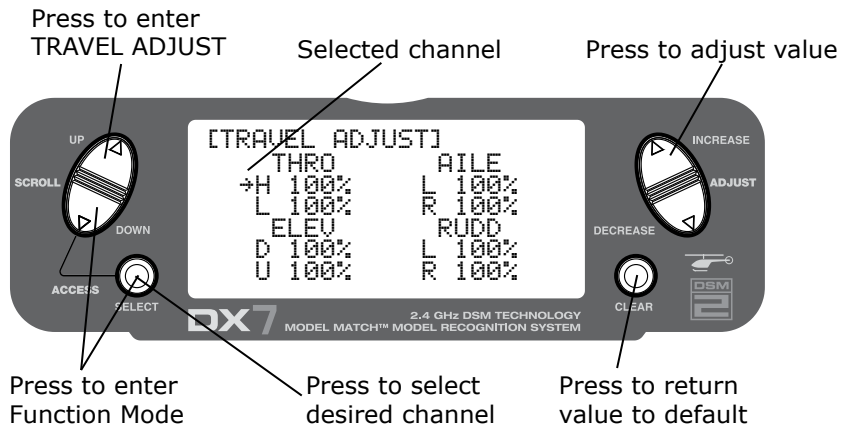
## Travel Adjust

---

The Travel Adjust function allows the precise end point adjustments of all seven channels in each direction independently. The travel adjust range is from 0–150%.

Channel available for programming are:

- THRO: Throttle
- AILE: Aileron
- ELEV: Elevator
- RUDD: Rudder
- GEAR: Retractable Landing Gear
- PIT.: Pitch
- AUX2: Auxiliary 2



## To Access the Travel Adjust Function

---

Press the **SELECT** key to access the desired channel.

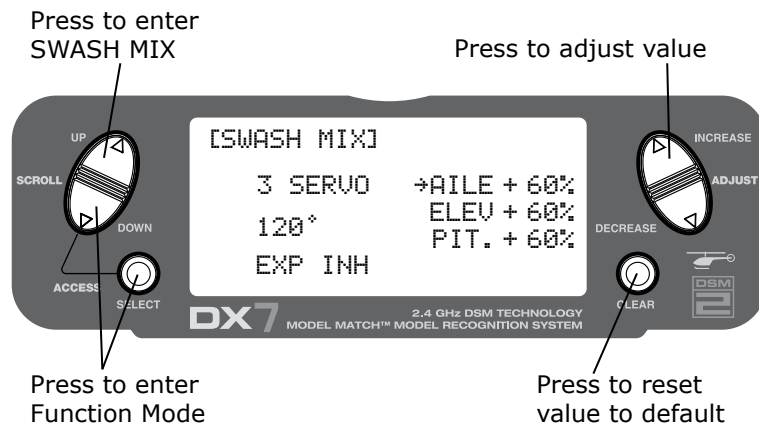
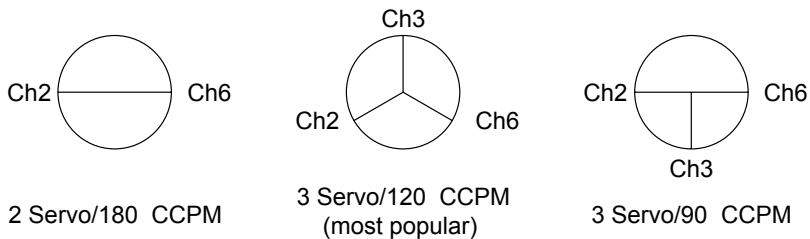
Move the selected channel's Stick or switch in the desired direction that you wish to adjust.

Press the **INCREASE** or **DECREASE** keys to adjust the sub-trim position for that selected channel's direction.

## Swashplate Mixing

The Swashplate Mix screen is only displayed when a CCPM swashplate mix is activated. (See Page 75 for Swashplate Type to enable Swashplate Mix.) Swashplate Mix adjusts the amount, and direction of travel, for the aileron, elevator and pitch functions. For example, if more aileron travel is desired, increasing the aileron swashplate mix value will increase the overall travel of the servos necessary to achieve greater aileron throw.

**Note:** Negative values are available which will reverse the direction of that function.



## Accessing the Swashplate Mix Function

Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In function mode, press the **UP** or **DOWN** key to select the **SWASH MIX** screen.

Press the **SELECT** key to access the desired function (**AILERON**, **ELEVATOR**, **PITCH** or **EXPO**).

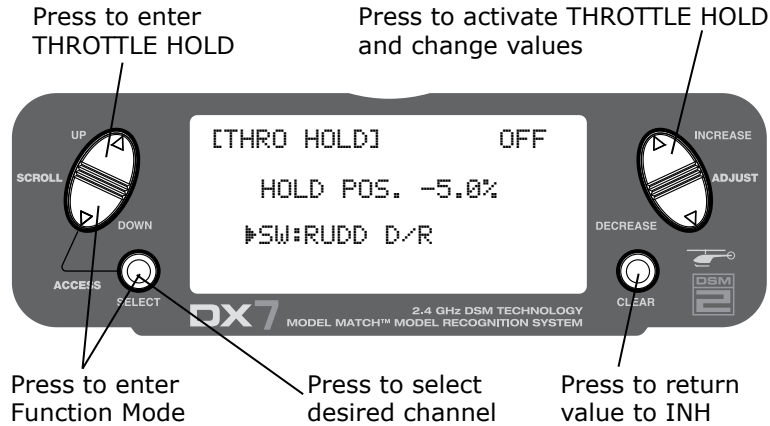
Press the **INCREASE** or **DECREASE** key to change the selected swashplate mix value.

**Note:** Selecting a negative value will reverse the direction of the function.

## Throttle Hold

---

The Throttle Hold function is used to practice autorotation and is often used as a safety switch for electric helicopters, holding the throttle in the off position. When the throttle hold switch is activated, the throttle hold function holds the throttle servo/ ESC in a specific position (normally low or off throttle) while all other servos function normally. The throttle hold switch is also selectable. Switch selection options include rudd D/R, gear, AUX2, aileron D/R or elevator D/R.



### To Access the Throttle Hold Function

---

Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** key to select the **THRO HOLD** screen.

Press the **INCREASE** or **DECREASE** key to activate the throttle hold function.

When activated, press the **INCREASE** or **DECREASE** key to change the throttle hold value.

### To Access the Throttle Hold Switch Function

---

Press the **SELECT** key to highlight switch.

Press the **INCREASE** or **DECREASE** key to select the desired switch.

## Throttle Curve

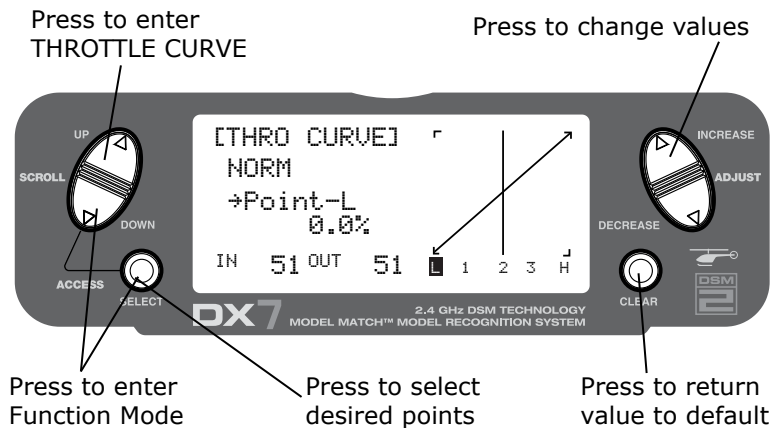
The DX7 offers three (3) separate throttle curves with five (5) adjustable points per curve. This function allows you to adjust the throttle curve to optimize engine rpm at a particular pitch setting. Once the throttle curves are established, each can be activated in flight using the 3-position flight mode switch. The flight mode switch offers three (3) selectable curves: N=Normal, 1=Stunt 1, 2=Stunt 2.

The N, or Normal, position should be used for starting the engine and hovering. Positions 1 and 2, or Stunt 1 and Stunt 2, should be used for aerobatic maneuvers and forward flight.

**Note:** The throttle trim and hovering throttle lever are only operable when the flight mode switch is in the Normal position. Thus, in the 1 or 2 positions, these two functions have no effect.

Each of the five (5) positions of the throttle curve are independently adjustable from 0–100%. These five (5) positions correspond to the position of the throttle stick.

The transmitter is factory preset to the throttle curve as indicated by the solid line in the figure below. Individual points can be activated and increased/decreased to suit your specific needs.



### To Access the Throttle Curve Function

Press the **DOWN** and **SELECT** keys simultaneously to access the System Mode.

In System Mode, use the **UP** or **DOWN** keys to select the **THRO CURVE NORM** screen.

Press the **SELECT** button to access pitch points L (Low), **1**, **2**, **3**, or **H** (High) or **EXPO**.

Press the **INCREASE** or **DECREASE** keys to change the selected pitch value or expo on/off.

## Throttle Curve (continued)

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### Throttle Trim Setting

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The throttle trim lever is only active when the flight mode switch is in the normal position. The throttle trim is used to increase or decrease the engine rpm to achieve a reliable idle when in the Normal Mode. The throttle trim lever has no effect in flight modes 1 or 2 (Stunt 1 or Stunt 2), or throttle hold.

### Hovering Throttle Rocker Setting

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The hovering throttle rocker increases or decreases the engine throttle position for the center point only (point #2) of the throttle curve. Use of the hovering throttle rocker shifts the middle curve upward or downward. Therefore, operation of the hovering throttle rocker does not cause any change to the high point and low point of the throttle curve but only affects the hovering rpm. The hovering throttle rocker only affects the throttle curve in normal mode and has no effect on the curve in Stunt 1 or Stunt 2.

### Exponential Throttle Curve Function

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With the DX7 system, individual throttle curves are selectable to be either straight (linear) or curved (exponential). To select an exponential curve, press the select key until EXP OFF appears on the throttle curve screen. Next press either the increase or decrease key to activate the exponential feature (an “on” will replace the “off” on the screen). With the exponential function ON, you will notice that any “sharp” angles of the throttle curve will become more “rounded” or “smooth,” creating a smooth throttle servo movement during the entire throttle curve range.

### Idle Up

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Normally, flight mode 1 and 2 are used to increase engine rpm below half stick for forward flight and aerobatic maneuvers (idle up), and at this time any other trims are not active as the throttle will only operate/follow the current throttle curve values.

### Stunt 1 and Stunt 2

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**Note:** Throttle curves are adjusted independent of the normal throttle curve. Simply select the desired throttle curve by using the up or down keys.

## Pitch Curve

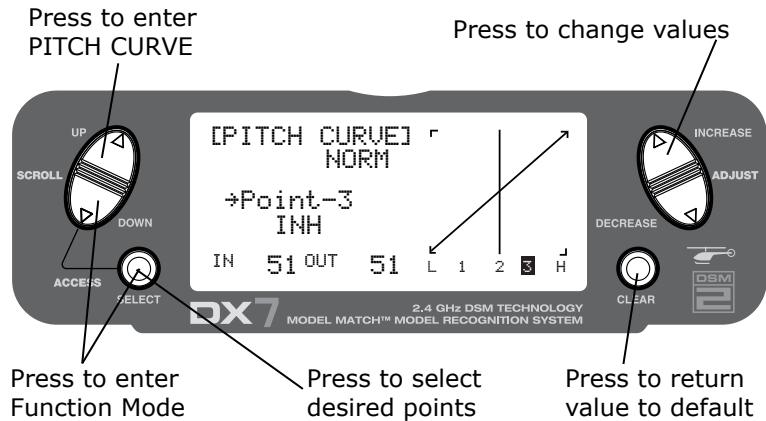
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Adjustment of the pitch curve is very similar to the throttle curve adjustment described in the preceding section. A thorough understanding of the throttle curve section will make pitch curve adjustment easier to understand.

The DX7 offers four (4) independent pitch curves: Normal, Stunt 1, Stunt 2 and Hold. Each pitch curve contains five (5) adjustable points — L, 1, 2, 3, and H.

**Note:** When setting pitch curve for throttle hold, it is necessary for the throttle hold to be active — if this function is inhibited, the throttle hold pitch curve will not be visible on the screen.

In the Function Mode, use the **UP** and **DOWN** keys to select **PITCH CURVE**.



## To Access the Pitch Curve Function

---

Press the **DOWN** and **SELECT** keys simultaneously to access the System Mode.

In System Mode, use the **UP** or **DOWN** keys to select the **PITCH CURVE NORM** screen.

Press the **SELECT** button to access pitch points L (Low), **1**, **2**, **3**, or **H** (High) or **EXPO**.

Press the **INCREASE** or **DECREASE** keys to change the selected pitch value or expo on/off.

## Hovering Pitch Rocker

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The hovering pitch rocker operates in the same manner as the hovering throttle rocker. It is operable while the flight mode is in the N, or Normal, position, and its function is to shift the center point (#2) of the curve either upward or downward to adjust pitch at the hover position.

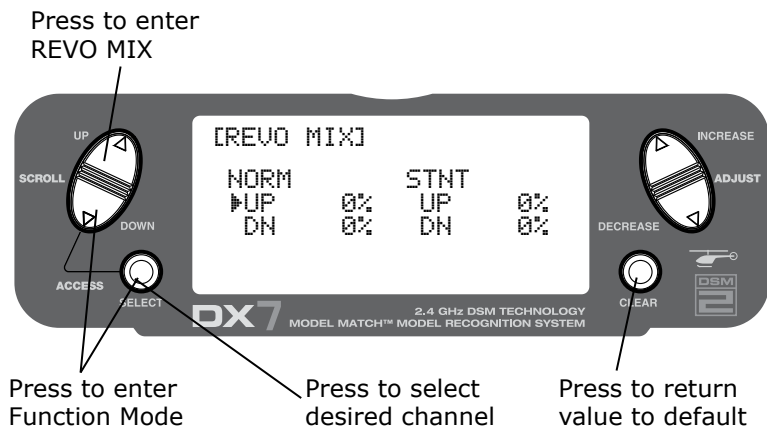
## Revolution Mixing (only used with non-heading hold gyros)

The Revolution Mixing Function mixes tail rotor input with the Throttle/Collective function to counteract torque from the main rotor blades. When set up correctly, the helicopter should climb and descend without a tendency to yaw in either direction. Because torque reaction varies with different power settings, it is necessary to vary the tail rotor pitch at the same time. The DX7 offers two (2) separate revolution mixing programs with independent up and down mixing for each—one for flight mode position N, and the other for Stunt 1 and Stunt 2 positions. The U, or Up, mixing adjusts the tail rotor compensation for the mid to high throttle/stick setting, and the D, or Down, mixing adjusts the tail rotor compensation for the mid to low throttle/stick setting.

In the Function Mode, use the **UP** or **DOWN** keys to select Revolution Mixing screen.

### Setting Up Revolution Mixing

First, adjust the helicopter so that it will hover in a neutral position with the tail rotor trim at center. Next, establish the helicopter into a stable hover; then steadily increase the throttle to initiate a stable climb. The body of the helicopter will move in the opposite direction to the main rotor rotation. Increase the U, or Up, setting until the helicopter will climb with no tendency to turn or rotate. At a safe altitude, close the throttle and the helicopter will descend with the body turning in the same direction as the main rotor. Increase the D, or Down, mix until the helicopter descends with no tendency to turn or rotate. When attempting this procedure, throttle stick movements should be slow, and the initial acceleration and deceleration swings should be overlooked.



### To Access Revolution Mixing

Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

Press the **SELECT** key to select the desired function.

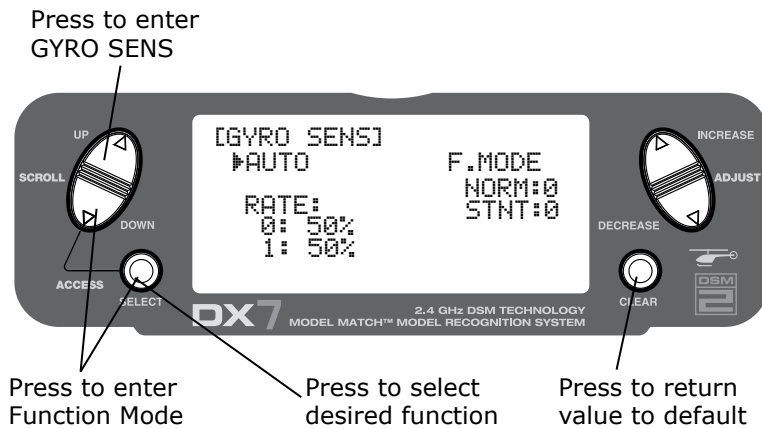
Press the **INCREASE** or **DECREASE** key to change the value or function.



## Gyro Sensing

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The DX7 offers two different types of Gyro Sensitivity Adjustments — manual or automatic. This feature gives the user the choice of selecting gyro sensitivity manually through the rudder dual rate switch or automatically through the flight mode switch.



### To Access the Gyro Sensing Function

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In function mode, press the **UP** or **DOWN** key until **GYRO SENS** screen appears on the screen.

Use the **SELECT** key to highlight the desired **RATE** or **FLIGHT MODE**.

Press the **INCREASE** or **DECREASE** key to change the rate value or the select position 0 or 1 for each flight mode.

**Note:** In order to access the Gyro Sensing function, it is necessary to select Gyro in the Input Select screen and assign it to AUX2 or the gear channel. See Page 73 for more details.

### Manual Gyro Sensitivity Adjustment

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Manual Gyro Sensitivity Adjustment allows the pilot to select from two different gyro sensitivities during all flight conditions. This function is activated in conjunction with the rudder dual rate switch.

### Automatic Gyro Sensitivity Adjustment

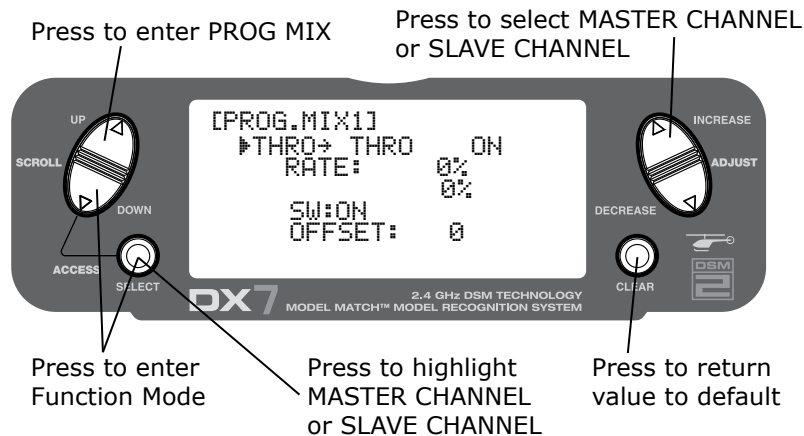
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The Automatic Gyro Sensitivity Adjustment feature allows the pilot to automatically alter the sensitivity of the gyro from either of two pre-determined settings through the use of the flight mode switch. As different flight modes are selected (Normal, 1, 2, Hold), the Gyro's sensitivity rate will switch to the pre-determined compensation rate for each particular flight mode in use.

## Programmable Mixing 1–3

In helicopter mode the DX7 offers three (3) programmable mixes that allow stick or switch inputs to control the output of two or more servos. This function allows mixing any one channel to any other channel or the ability to mix a channel to itself. The mix can remain ON at all times, or be switched OFF in flight using a number of different switches. (Refer to chart below.) Mix values are adjustable from 0 to 125%. Each channel is identified by a four-character name (i.e., Aileron - AILE, Elevator - ELEV, etc.). The channel appearing first is the master channel. The second channel is the slave channel. For example, AILE - ELEV would indicate aileron-to-elevator mixing. Each time the aileron stick is moved, the elevator will deflect, and the elevator will automatically move in the direction and to the position based on the value input in the programmable mix screen. Mixing is proportional, so small inputs of the master channel will produce small outputs of the slave channel. Each programmable mix has a mixing offset. The purpose of the mixing offset is to redefine the neutral position of the slave channel.

- ON: Mixing always on
- F-NR: Flight mode normal
- F-S12: Stunt modes 1 and 2
- F-S2: Stunt mode 2
- HOLD: Throttle hole toward self
- GEAR: Gear channel toward self



## Assigning Channels

Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** keys to select the desired **PROG. MIX** screen (1–3). Press the **INCREASE** or **DECREASE** button to access the Programmable Mix function.

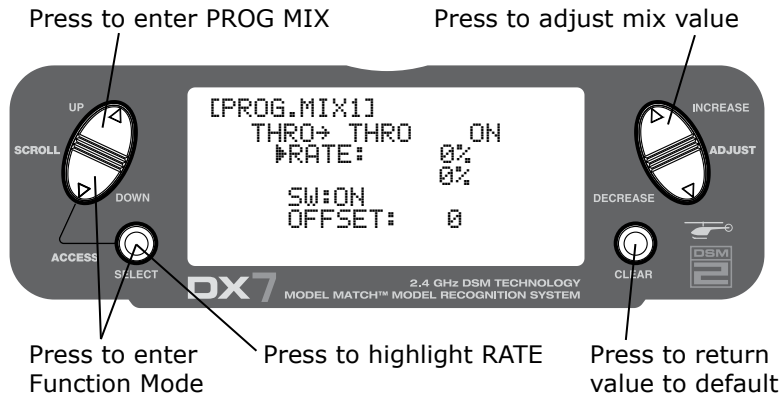
Press the **INCREASE** or **DECREASE** keys to select the desired master channel.

Press the **SELECT** key to highlight the slave channel.

Press the **INCREASE** or **DECREASE** keys to select the desired slave channel.

## Programmable Mixing 1–3 (continued)

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### Assigning Mixing Values

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Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** keys to select the desired **PROG. MIX** screen (1–3).

Press the **SELECT** key to highlight **RATE**.

Using the stick or switch that is assigned to the master channel, move that stick or switch in the desired direction that you wish to adjust the mix value.

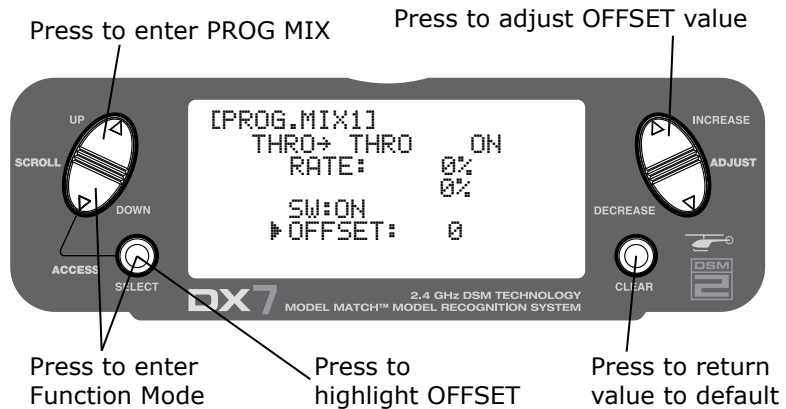
Press the **INCREASE** or **DECREASE** keys to adjust the mix value.

**Note:** If a switch is assigned to the mix, that switch must be turned on to allow mixing values to be changed.

Moving the stick or switch in the opposite direction will allow the mix value to be adjusted in the opposite direction.

## Programmable Mixing 1–3 (continued)

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### Assigning an Offset

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Press the **DOWN** and **SELECT** keys simultaneously to access the Function Mode.

In Function Mode, use the **UP** or **DOWN** keys to select the desired **PROG. MIX** screen (1–3).

Press the **SELECT** key to highlight **OFFSET**.

Move the master channel's stick to the desired offset position and press the **CLEAR** key to store that offset value. The stored offset value will appear onscreen.

To change the offset value, simply move the master channel's stick to the desired position and press the **CLEAR** button.

# Timer

The DX7 features an onscreen timer with three programming options:

## **INH:**

Inhibit- In this mode the timer is turned off.

## **DOWN-T:**

Down Timer- The countdown timer allows a preset time in ten-second intervals up to 59 minutes and 50 seconds to be programmed and when that time expires a beeper will sound for 10 seconds.

## **STOP-W:**

Stopwatch- The stopwatch function is a simple count-up timer that that displays minutes and seconds up to 59 minutes and 59 seconds.

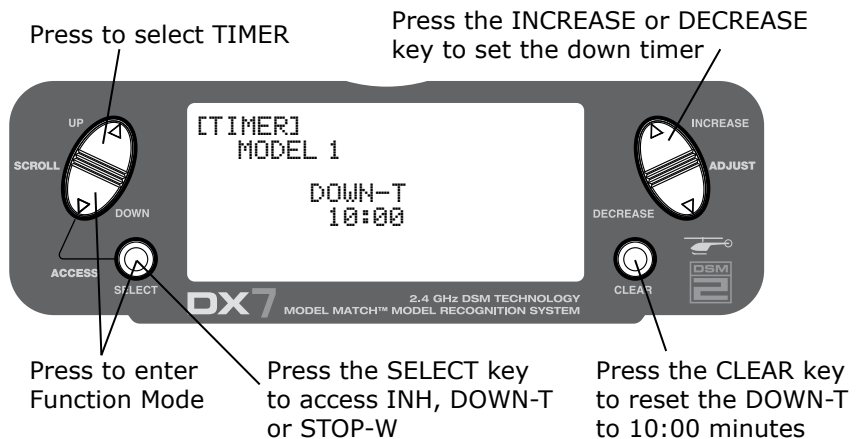
When the **DOWN-T** or **STOP-W** function is selected, the timer will be displayed on the main screen. The following buttons are used in conjunction to operate the timer function:

### **INCREASE** or **DECREASE** keys:

Used to start, stop and restart the timer.

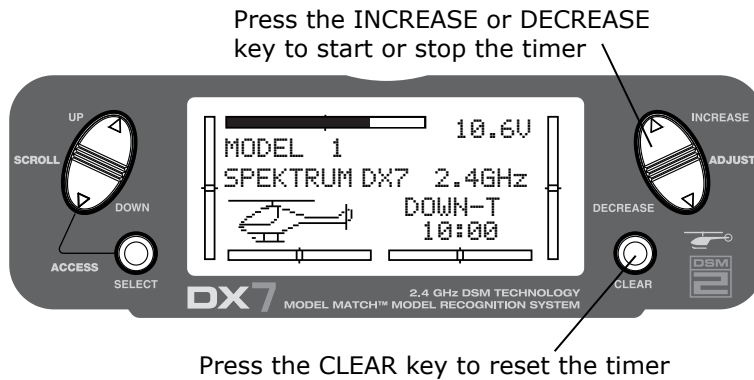
### **CLEAR** key:

Used to reset the timer to the preset time (Down-T) or to reset the stopwatch timer to 0:00.



## Timer (continued)

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### To Access the Timer Function

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Press the **DOWN** and **SELECT** keys simultaneously to access the system mode.

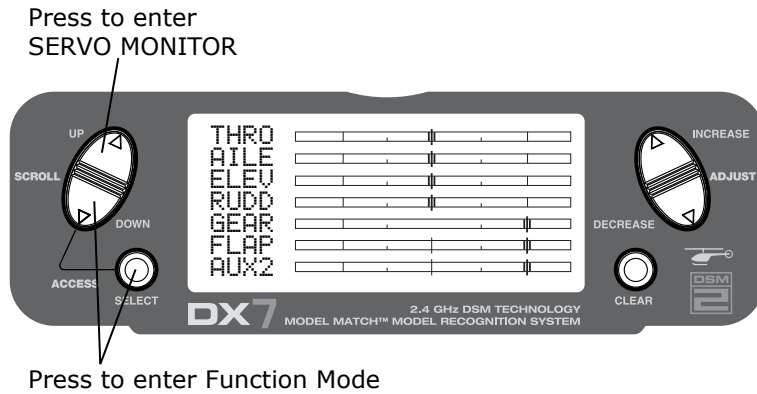
In System Mode use the **UP** or **DOWN** key to select the **TIMER** screen.

Press the **SELECT** key to select **STOP-W**, **DOWN-T** or **INH**.

With **DOWN-T** selected press the **INCREASE** or **DECREASE** key to change the preprogrammed time.

## Servo Monitor

The servo monitor screen serves as a useful tool when programming your radio. It displays servo movement and direction when different programming functions, sticks and/or switches are moved.







# General Information

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## FCC Information

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This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**Caution:** Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This product contains a radio transmitter with wireless technology which has been tested and found to be compliant with the applicable regulations governing a radio transmitter in the 2.400GHz to 2.4835GHz frequency range.

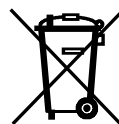
The associated regulatory agencies of the following countries recognize the noted certifications for this product as authorized for sale and use:

## Instructions for Disposal of WEEE by Users in the European Union

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This product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.

USA	Canada	Belgium
Denmark	France	Finland
Germany	Italy	Netherlands
Spain	Sweden	UK



## Servo Precautions

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- Do not lubricate servo gears or motors.
- Do not overload retract servos during retracted or extended conditions. Make sure they are able to travel their full deflection. Overloading or stalling a servo can cause excessive current drain.
- Make sure all servos move freely through their rotations and no linkages hang up or bind. A binding control linkage can cause a servo to draw excessive current. A stalled servo can drain a battery pack in a matter of minutes.
- Correct any control surface “buzz” or “flutter” as soon as it is noticed in flight, as this condition can destroy the feedback potentiometer in the servo. It may be extremely dangerous to ignore such “buzz” or “flutter.”
- Use the supplied rubber grommets and brass servo eyelets when mounting your servos. Do not over-tighten the servo mounting screws, as this negates the dampening effect of the rubber grommets.
- Ensure the servo horn is securely fastened to the servo. Use only the servo arm screws provided; the size is different from other manufacturers.
- Discontinue to use servo arms when they become “yellowed” or discolored. Such servo arms may be brittle and can snap at any time, possibly causing the aircraft to crash.
- Check all related mounting screws and linkages frequently. Aircraft often vibrate, causing linkages and screws to loosen.

## General Notes

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Radio controlled models are a great source of pleasure. Unfortunately, they can also pose a potential hazard if not operated and maintained properly.

It is imperative to install your radio control system correctly. Additionally, your level of piloting competency must be high enough to ensure that you are able to control your aircraft under all conditions. If you are a newcomer to radio controlled flying, please seek help from an experienced pilot or your local hobby store.

## Safety Do's and Don'ts for Pilots

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- Ensure that your batteries have been properly charged prior to your initial flight.
- Keep track of the time the system is turned on so you will know how long you can safely operate your system.
- Perform a ground range check prior to the initial flight of the day. See the “Daily Flight Checks Section” for information.
- Check all control surfaces prior to each takeoff.
- Use frequency flags.
- Do not fly your model near spectators, parking areas or any other area that could result in injury to people or damage of property.
- Do not fly during adverse weather conditions. Poor visibility can cause disorientation and loss of control of your aircraft. Strong winds can cause similar problems.
- Do not fly unless your frequency is clear.

**Warning:** Only one transmitter at a time can operate on a given frequency. If you turn on your transmitter while someone else is operating a model on your frequency, both pilots will lose control of their models. Only one person can use a given frequency at a time. It does not matter if it is AM, FM or PCM—only one frequency at a time.

- Do not point the transmitter antenna directly toward the model. The radiation pattern from the tip of the antenna is inherently low.
- Do not take chances. If at any time during flight you observe any erratic or abnormal operation, land immediately and do not resume flight until the cause of the problem has been ascertained and corrected. Safety can never be taken lightly.

# Federal Aviation Administration

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## Purpose

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This advisory outlines safety standards for operations of model aircraft. We encourage voluntary compliance with these standards.

## Background

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Attention has been drawn to the increase in model aircraft operation. There is a need for added caution when operating free flight and radio controlled craft in order to avoid creating a noise nuisance or a potential hazard to full-scale aircraft and persons and/or property on the surface.

## Operating Standards

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Modelers generally are concerned with safety and exercise good judgment when flying model aircraft. However, in the interest of safer skies, we encourage operators of radio controlled and free flight models to comply with the following standards:

- a. Exercise vigilance in locating full-scale aircraft (get help if possible) so as not to create a collision hazard.
- b. Select an operating site at sufficient distance from populated areas so you do not create a noise problem or a potential hazard.
- c. Do not fly higher than 400 feet above the surface.
- d. Always operate more than three miles from the boundary of an airport unless you are given permission to be closer by the appropriate air traffic control facility in the case of an airport for which a control zone has been designated or by the airport manager in the case of other airports.
- e. Do not hesitate to ask for assistance in complying with these guidelines at the airport traffic control tower or air route traffic control center nearest the site of your proposed operation.

## Information Provided By

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Director, Air Traffic Service Federal Aviation Administration, Washington, D.C.

## Daily Flight Checks

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1. Check the battery voltage on both the transmitter and the receiver battery packs. Do not fly below 9.0V on the transmitter or below 4.7V on the receiver. To do so can crash your aircraft.

**Note:** When you check these batteries, ensure that you have the polarities correct on your expanded scale voltmeter.

2. Check all hardware (linkages, screws, nuts, and bolts) prior to each day's flight. Be sure that binding does not occur and that all parts are properly secured.
3. Ensure that all surfaces are moving in the proper manner.
4. Perform a ground range check before each day's flying session. The range check should be as follows:
  - Do not extend the transmitter antenna at this time. Turn the transmitter "on."
  - Turn the model "on."
  - Slowly walk away from the model while moving the control surfaces. The aircraft should function properly at a distance of 60–75 feet.
  - For PCM Only: With the throttle fail-safe preset to idle, bring the throttle slightly above idle. Walk away until the throttle drops to idle. This will be the distance of the range check.
5. Prior to starting your aircraft, turn off your transmitter, then turn it back on. Do this each time you start your aircraft. If any critical switches are on without your knowledge, the transmitter alarm will warn you at this time.
6. Check that all trim levers are in the proper location.
7. All servo pigtails and switch harness plugs should be secured in the receiver. Make sure that the switch harness moves freely in both directions.

## Three Year Warranty Period

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Exclusive Warranty- Horizon Hobby, Inc., (Horizon) warranties that the Products purchased (the "Product") will be free from defects in materials and workmanship for a period of 3 years from the date of purchase by the Purchaser.

## Limited Warranty

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(a) This warranty is limited to the original Purchaser ("Purchaser") and is not transferable. REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE PURCHASER. This warranty covers only those Products purchased from an authorized Horizon dealer. Third party transactions are not covered by this warranty. Proof of purchase is required for warranty claims. Further, Horizon reserves the right to change or modify this warranty without notice and disclaims all other warranties, express or implied.

(b) Limitations- HORIZON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCT. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.

(c) Purchaser Remedy- Horizon's sole obligation hereunder shall be that Horizon will, at its option, (i) repair or (ii) replace, any Product determined by Horizon to be defective. In the event of a defect, these are the Purchaser's exclusive remedies. Horizon reserves the right to inspect any and all equipment involved in a warranty claim. Repair or replacement decisions are at the sole discretion of Horizon. This warranty does not cover cosmetic damage or damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or modification of or to any part of the Product. This warranty does not cover damage due to improper installation, operation, maintenance, or attempted repair by anyone other than Horizon. Return of any goods by Purchaser must be approved in writing by Horizon before shipment.

## Damage Limits

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HORIZON SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCT, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY. Further, in no event shall the liability of Horizon exceed the individual price of the Product on which liability is asserted. As Horizon has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability.

If you as the Purchaser or user are not prepared to accept the liability associated with the use of this Product, you are advised to return this Product immediately in new and unused condition to the place of purchase.

Law: These Terms are governed by Illinois law (without regard to conflict of law principals).

## Safety Precautions

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This is a sophisticated hobby Product and not a toy. It must be operated with caution and common sense and requires some basic mechanical ability. Failure to operate this Product in a safe and responsible manner could result in injury or damage to the Product or other property. This Product is not intended for use by children without direct adult supervision. The Product manual contains instructions for safety, operation and maintenance. It is essential to read and follow all the instructions and warnings in the manual, prior to assembly, setup or use, in order to operate correctly and avoid damage or injury.

## Questions, Assistance, and Repairs

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Your local hobby store and/or place of purchase cannot provide warranty support or repair. Once assembly, setup or use of the Product has been started, you must contact Horizon directly. This will enable Horizon to better answer your questions and service you in the event that you may need any assistance. For questions or assistance, please direct your email to [productsupport@horizonhobby.com](mailto:productsupport@horizonhobby.com), or call 877.504.0233 toll free to speak to a service technician.

## Inspection or Repairs

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If this Product needs to be inspected or repaired, please call for a Return Merchandise Authorization (RMA). Pack the Product securely using a shipping carton. Please note that original boxes may be included, but are not designed to withstand the rigors of shipping without additional protection. Ship via a carrier that provides tracking and insurance for lost or damaged parcels, as **Horizon is not responsible for merchandise until it arrives and is accepted at our facility**. A Service Repair Request is available at [www.horizonhobby.com](http://www.horizonhobby.com) on the "Support" tab. If you do not have internet access, please include a letter with your complete name, street address, email address and phone number where you can be reached during business days, your RMA number, a list of the included items, method of payment for any non-warranty expenses and a brief summary of the problem. Your original sales receipt must also be included for warranty consideration. Be sure your name, address, and RMA number are clearly written on the outside of the shipping carton.

## Warranty Inspection and Repairs

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**To receive warranty service, you must include your original sales receipt** verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be repaired or replaced free of charge. Repair or replacement decisions are at the sole discretion of Horizon Hobby.

## Non-Warranty Repairs

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**Should your repair not be covered by warranty the repair will be completed and payment will be required without notification or estimate of the expense unless the expense exceeds 50% of the retail purchase cost.** By submitting the item for repair you are agreeing to payment of the repair without notification. Repair estimates are available upon request. You must include this request with your repair. Non-warranty repair estimates will be billed a minimum of ½ hour of labor. In addition you will be billed for return freight. Please advise us of your preferred method of payment. Horizon accepts money orders and cashiers checks, as well as Visa, MasterCard, American Express, and Discover cards. If you choose to pay by credit card, please include your credit card number and expiration date. Any repair left unpaid or unclaimed after 90 days will be considered abandoned and will be disposed of accordingly. **Please note: non-warranty repair is only available on electronics and model engines.**

Electronics and engines requiring inspection or repair should be shipped to the following address:

Horizon Service Center  
4105 Fieldstone Road  
Champaign, Illinois 61822

All other Products requiring warranty inspection or repair should be shipped to the following address:

Horizon Product Support  
4105 Fieldstone Road  
Champaign, Illinois 61822

**Please call 877-504-0233 with any questions or concerns regarding this product or warranty.**



# Aircraft Programming Guide

MODEL NAME \_\_\_\_\_

MODEL NUMBER \_\_\_\_\_

	THRO NORM • REV	AILE NORM • REV	ELEV NORM • REV	RUDD NORM • REV	GEAR NORM • REV	FLAP NORM • REV	AUX2 NORM • REV
REVERSE SW							
SUB TRIM							
TRAVEL ADJUST	H %	L %	U %	L %	+ %	U %	U %
	L %	R %	D %	R %	- %	D %	D %

DUAL RATE • EXPO	0	D/R	AILE %	ELEV %	RUDD %
		EXP	%	%	%
	1	D/R	%	%	%
		EXP	%	%	%

ELEV – FLAP MIX	UP	%
	DOWN	%

AILE – RUDD MIX	RATE	%
	SW	

PROGRAM MIX		CHANNEL	SW	+POS	-POS	OFFSET
	MIX 1	–		%	%	
	MIX 2	–		%	%	
	MIX 3	–		%	%	
	MIX 4	–		%	%	
	MIX 5	–		%	%	
	MIX 6	–		%	%	

WING TYPE	FLAPERON	
	ELEVON	
	V-TAIL	

D/R SWITCH SELECT	AILERON	
	ELEVATOR	
	RUDDER	
	FLAP 2	
	FLAP 0	

FLAP SYSTEM	ELEV	%
	FLAP	



# Helicopter Programming Guide

MODEL NAME \_\_\_\_\_

MODEL NUMBER \_\_\_\_\_

	THRO	AILE	ELEV	RUDD	GEAR	PITCH	AUX2
REVERSE SW	R • N	R • N	R • N	R • N	R • N	R • N	R • N
SUB TRIM							
TRAVEL ADJUST	H %	L %	U %	L %	+ %	H %	H %
	L %	R %	D %	R %	- %	L %	L %

THROTTLE CURVE		P-LOW	P-1	P-MID	P-3	P-HIGH
	NORMAL					
	STUNT 1					
	STUNT 2					

THROTTLE HOLD	ON •	POSITION
	OFF	

PITCH CURVE		P-LOW	P-1	P-MID	P-3	P-HIGH
	NORMAL					
	STUNT 1					
	STUNT 2					

SWASH TYPE	NORMAL	90 CCPM	120 CCPM	180 CCPM
------------	--------	---------	----------	----------

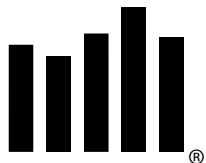
SWASH MIX	AILE	ELEV	PITCH
	%	%	%
	REV R•N	REV R•N	REV R•N

SWITCH SELECT	D/R	
	GEAR	
	FL-M	

PROGRAM MIX		CHANNEL	SW	+POS	-POS	OFFSET
	MIX 1	-		%	%	
	MIX 2	-		%	%	
	MIX 3	-		%	%	

DUAL RATE • EXPO	0		AILE	ELEV	RUDD
		D/R	%	%	%
		EXP	%	%	%
	1	D/R	%	%	%
		EXP	%	%	%

REVO MIX	NORMAL	UP	%
		DOWN	%
	STUNT	UP	%
		DOWN	%



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# SET-UP GUIDE -- SUPER DUTY XR

## Super Duty

High-Power Reversible ESC



# NOVAK

#IM-1685-1  
10-2004

## SPECIFICATIONS

Input Voltage .....	6-14 cells (1.2 volts DC/cell)
Case Size .....	1.75"x2.17"x0.85" [44.5x55.1x21.6mm]
Weight (w/o wires) .....	4.03 ounce [114 grams]
On-Resistance @ Transistors/25°C .....	0.0011 Ω
Rated Current (forward/braking & reverse) .....	400/180 amps
B.E.C. Voltage/Current .....	6.0 volts DC/3.0 amps
Power Wire .....	14G Super-Flex Silicone
Single Motor Limit @ 6 cells .....	None
Single Motor Limit @ 10, 12, & 14 cells .....	None (550 size only)
Dual Motor Limit @ 6 cells .....	10 Turns (550 size only)
Dual Motor Limit @ 10 cells .....	None (550 size only)
Dual Motor Limit @ 12 & 14 cells .....	12 Turns (550 size only)
Throttle Program #1 .....	Forward, Brakes, & 100% Reverse
Throttle Program #2 .....	Forward & Brakes only (no reverse)
Throttle Program #3 .....	Forward, Brakes, & 25% Reverse

### BIG...BAD...POWERFUL...RELIABLE.....the SUPER DUTY XR is here!

The Super Duty XR is the toughest high-power reversible electronic speed control that you can get for your big trucks, hot boats, or any other high-power R/C application using brush-type motors!

With 3 factory throttle programs to choose from & Novak's Smart Braking II (you don't go into reverse until you shift into reverse by returning the trigger to neutral and then back to reverse), the Super Duty XR is ready for anything. The Super Duty XR has **Thermal Overload Protection** for peace of mind, **high-power B.E.C.** for strong/fast servo response, **Polar Drive & Digital Anti-Glitch circuitries** for cool & smooth operation, and **Radio Priority circuitry** for the ultimate in control, right down to the end of the battery power. Add to this the ease & convenience of user-replaceable battery wires, power capacitor, ON/OFF switch, & input harness, and the Super Duty XR is super user-friendly!

To benefit from all of the Super Duty XR's technical features, PLEASE READ ALL INSTRUCTIONS

## PRECAUTIONS

### WATER & ELECTRONICS DON'T MIX!

Never allow water, moisture, or other foreign materials to get inside ESC or on the PC Board. **Water damage will void the warranty!**

### DISCONNECT BATTERIES WHEN NOT IN USE

Always disconnect the battery pack from the speed control when not in use to avoid short circuits and possible fire hazard.

### 6 TO 14 CELLS ONLY

Never use fewer than 6 or more than 14 cells (7.2-16.8VDC, 1.2VDC/cell) in the vehicle's main battery pack(s).

### NO REVERSE VOLTAGE!

Reverse battery polarity can damage ESC & void warranty. Disconnect battery immediately if a reverse connection occurs.

### NO SCHOTTKY DIODES!

External Schottky diodes MUST NOT be used with reversible speed controls—usage will damage ESC & void warranty.

### ALWAYS USE HEAT SINKS

Heat sinks are factory-installed on your Super Duty XR and MUST be used for maximum cooling and performance—**Never allow the separate heat sinks to touch each other or any exposed metal or conductive surface, as this will cause a short circuit & damage ESC.**

### POWER CAPACITOR REQUIRED

An external power capacitor is installed and **MUST** be used with your Super Duty XR. **Failure to use Power Capacitor will result in higher ESC operating temperatures & possible thermal shut-down!**

### TRANSMITTER ON FIRST

Always turn on the power of the transmitter first so that you will have control of the vehicle when you turn it on.

### INSULATE WIRES

Always insulate exposed wiring with heat shrink tubing or electrical tape to prevent short circuits, which can damage ESC.

### NO CA GLUE

Exposure to CA glue or its fumes can cause damage to internal components of the speed control and result in premature failure.

## OPTIONAL ACCESSORIES

### POWER-BOOST ESC COOLING FAN KIT [Novak kit #5646]

The Power-Boost ESC cooling fan kit has everything needed to get more power from your Super Duty XR for hot motors—custom fit fan brackets (short & tall included), mounting screws, & high-volume cooling fan that plugs into Super Duty XR's fan power output jack.

### POWER CAPACITORS [Novak kit #5675]

An external power capacitor is installed, and **MUST BE USED** to maintain cool and smooth operation. Refer to Fig.5 Set-Up Photo

### MOTOR CAPACITORS [Novak kit #5620]

Additional motor capacitors are available in Novak kit #5620.

### SUPER-FLEX SILICONE POWER WIRE [Novak kits #5500 & 5530]

Novak Super-Flex wire for motor & power wiring. 14 gauge silicone wire in kit #5500 (36"red & 36"black), and 12G silicone in kit #5530 (36"red & 36"black).

### INPUT SIGNAL HARNESS [Novak kits #5315 & 5320]

User-replaceable input signal harnesses are available for the Super Duty XR in both short (#5315) and long lengths (#5320).

### REPLACEMENT SWITCH HARNESS [Novak kit #5600]

The replacement switch harness has ON/OFF switch with pre-tinned wires ready to solder to the Super Duty XR's Direct-Solder Wire Tabs.

## PRODUCT WARRANTY

The Super Duty XR speed control is guaranteed to be free from defects in materials or workmanship for a period of 120 days from the original date of purchase (verified by dated, itemized sales receipt). Warranty does not cover incorrect installation, components worn by use, damage to case, damage from using fewer than 6 or more than 14 cells (1.2 volts DC/cell) input voltage, cross-connection of battery/motor, overheating solder tabs, reverse voltage application, damage from incorrect installation of FET/servo or receiver battery pack, not installing three 0.1µF (50V) capacitors on each motor, incorrect installation of a Power Capacitor on the ESC or from using a damaged Power Capacitor, using a Schottky diode or non-Novak Power Capacitor, splices to input harness, damage from excessive force when using the One-Touch/SET button or from disassembling case, tampering with internal electronics, allowing water, moisture, or any other foreign material to enter ESC or get onto the PC board, incorrect installation/wiring of input plug plastic, allowing exposed wiring or solder tabs to short-circuit, or any damage caused by a crash, flooding, or act of God.

Because Novak Electronics, Inc. has no control over the connection & use of the speed control or other related electronics, no liability may be assumed nor will be accepted for any damage resulting from the use of this product. Every Novak speed control is thoroughly tested & cycled before leaving our facility and is, therefore, considered operational. By the act of connecting/operating speed control, user accepts all resulting liability. In no case shall our liability exceed the product's original cost. We reserve the right to modify warranty provisions without notice.

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Friday: 8:00am-4:00pm (closed every other Friday)

[www.teammovak.com](http://www.teammovak.com)

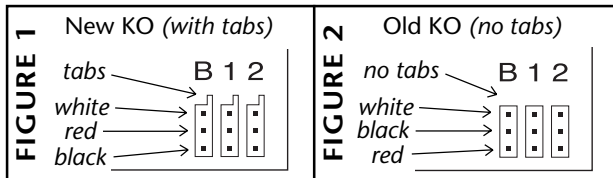
## STEP 1-CONNECT INPUT HARNESS

The Super Duty XR is equipped with the industry standard receiver input connector on a user-replaceable input harness that **works with all the major radio brand's new receivers**. However, some very old receivers must have the wiring sequence inside the plastic 3-pin connector housing changed. **This is an important step, because the receiver electronics may be damaged if the sequence is not correct.**

### CHANGING WIRING SEQUENCE @ RECEIVER END

JR • Hitec • Futaba • New KO • Airtronics Z  
**JR, Hitec, Futaba, new KO, & Airtronics Z receivers do not need input harness re-wiring.** Airtronics Z receivers have blue plastic cases & new KO cases have tabs on the input harness openings as in **Figure 1**.

- Plug the connector on one end of the input harness into the receiver with the **BLACK wire toward the outside edge** of receiver case.
- Plug the other end of the input harness into 3-pin header inside rectangular opening on top of the Super Duty XR's case with the **WHITE wire toward the 'S' (signal) marking** on the ESC's label.

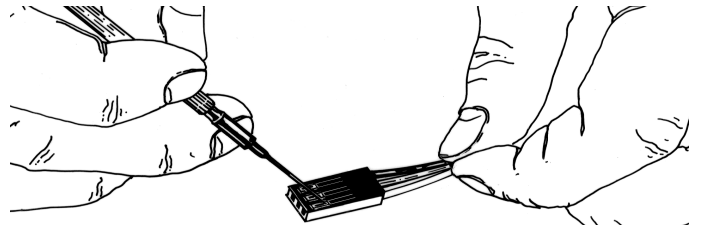


### Old-style KO • Old-style Sanwa/Airtronics

If you have an older KO or Sanwa/Airtronics, you must change the sequence of the ESC's input harness wires--Old Sanwa/Airtronics cases are black color & Old KO cases do not have tab openings, as in **Figure 2** above.

- Using a small standard/flat blade screwdriver, **remove the red and black wires** from the plastic connector housing at the receiver end of the input harness as in **Figure 3** below.
- **Interchange the red and black wires** in the plastic 3-pin connector housing at the receiver end of the input harness.
- Insert modified end of the harness into the receiver with the **RED wire toward the outside edge** of receiver case.

**FIGURE 3** With a small standard screwdriver, gently lift plastic prong until wire and metal socket easily slide out of plastic housing.



## STEP 2-MOUNTING ESC

Mount ESC where its power wires will be away from other electronics and won't interfere with moving parts. If possible, select a location that allows airflow through the heat sinks--**If the ESC gets some air flow, it will run cooler, and that means it will be more efficient, and you'll go faster!**

**For single battery pack use, proceed to STEP 3 & 4 before completing STEP 2**

- Mount Super Duty XR in the vehicle with the included double-sided tape (**in the Traxxas E-Maxx, use the stock mounting screws**).
- Mount Power Capacitor to chassis with double-sided tape or tie-wrap. **If Power Cap. becomes dented/damaged, ESC failure can occur--replace immediately. Longer Power Capacitor wires decrease performance.**
- Install the ON/OFF switch using a screw or double-sided tape where it will be easy to access.
- Be sure receiver & antenna are mounted as far from ESC, power wires, battery, and servo as possible--these components all emit RF noise when throttle is being applied. On graphite or aluminum chassis vehicles, it may help to place receiver on edge with crystal & antenna as far above chassis as possible.

*Note: Mount antenna as close to receiver as possible--trail any excess wire off top of antenna mast (cutting or coiling excess antenna wire will reduce radio range).*

## STEP 3-MOTOR PREP

### 1. MOTOR CAPACITORS

Electric motors generate RF noise that causes interference. The included 0.1µF (50V) non-polarized, ceramic capacitors must be used on all motors to reduce motor noise & prevent ESC damage.

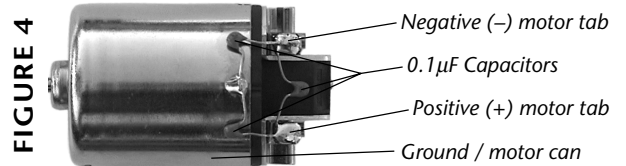
*Note: Some motors come with capacitors built-in. If your motor only has two capacitors, you need to install a capacitor between the positive & negative motor tabs.*

*If you experience radio interference when using only the built-in capacitors, install external ones.*

#### Solder 0.1µF (50V) capacitors between:

- POSITIVE (+) motor tab & NEGATIVE (-) motor tab.
- POSITIVE (+) motor tab & GROUND tab\*.
- NEGATIVE (-) motor tab & GROUND tab\*.

\*If motor has no ground tab (below), solder the capacitors to motor can.



Extra 0.1µF capacitors are available in Novak kit #5620.

### 2. DO NOT USE SCHOTTKY DIODES

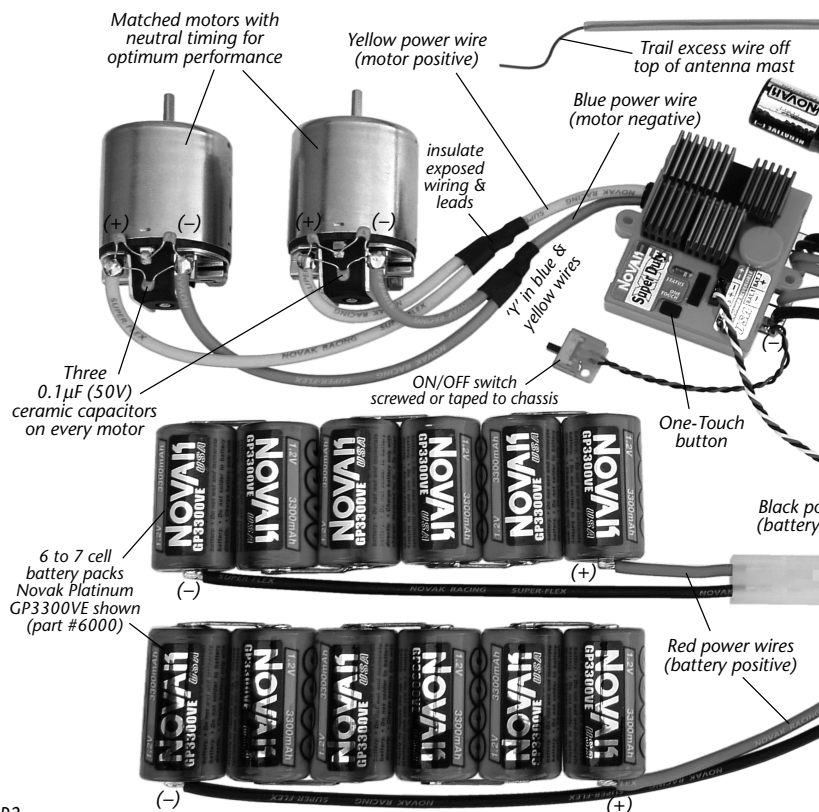
**Schottky diodes must NOT be used with reversible speed controls. Using a Schottky diode will damage the speed control and void the product's warranty.**

### 3. USE NEUTRALLY TIMED MOTORS

Using motors with other than 0° timing will draw excessive current in reverse, and result in speed control overheating and premature motor wear.

Modified motors (with adjustable end bells) are recommended, and should be timed to 0° for optimum performance.

You should not use stock motors that are used for racing (with fixed end bells) as these motors usually have very high timing and run very poorly in reverse. **Johnson or Mabuchi motors that come with car kits are not timed as aggressively and also work well--these motors usually last longer also.**





# STEP 4—WIRING SPEED CONTROL, MOTOR, & BATTERY

The Super duty XR is very powerful, and capable of very efficient delivery of battery power to the vehicle's motor. Therefore, good connections must be made between the battery, speed control, and motor. A common cause of performance problems & ESC failures is poor connections--If you have any doubts about your soldering skill, we suggest seeking assistance at your hobby shop or track.

## GENERAL INSTALLATION NOTES:

- Keep the ESC and its power wires away from other electronics in the vehicle, especially the receiver & antenna.
- Do not bundle receiver/signal wires with other wires--messy installations account for nearly all radio interference (*glitching*) problems. A clean looking install almost always works better.
- Route ESC wires to clear any moving parts in the vehicle.

Once you've mounted the Super Duty XR, it's time for some wiring. The Super Duty XR is wired for two battery packs, and is equipped with high-power versions of JST/Tamiya-style battery connectors so you can use standard sport battery packs.

Using different style connectors will be discussed at the end of this section.

## 1. BATTERY PACK CONNECTIONS

The Super Duty XR is designed to be used with two battery packs. However, it can also be used with one standard R/C battery pack (6 or 7 cells @ 1.2VDC/cell) or with one 12 volt DC battery. Using the Super Duty with a single battery requires special wiring and is discussed in this step.

### USING DUAL BATTERY PACKS:

- Connect one battery pack (6-7 cells @ 1.2VDC/cell) to the JST/Tamiya connector at the end of the red & black wires coming from the ESC's **BAT.1** solder tabs as marked on the Super Duty's case labels.
- Connect a second battery pack to the JST/Tamiya connector coming from the ESC's **BAT.2** solder tabs.

### USING SINGLE BATTERY PACK:

To use the Super Duty XR with a single 6 or 7 cell (1.2VDC/cell) pack or a 12VDC battery, the battery must be connected to the **BAT.2** input, and the wires from the **BAT.1** input must be shorted together.

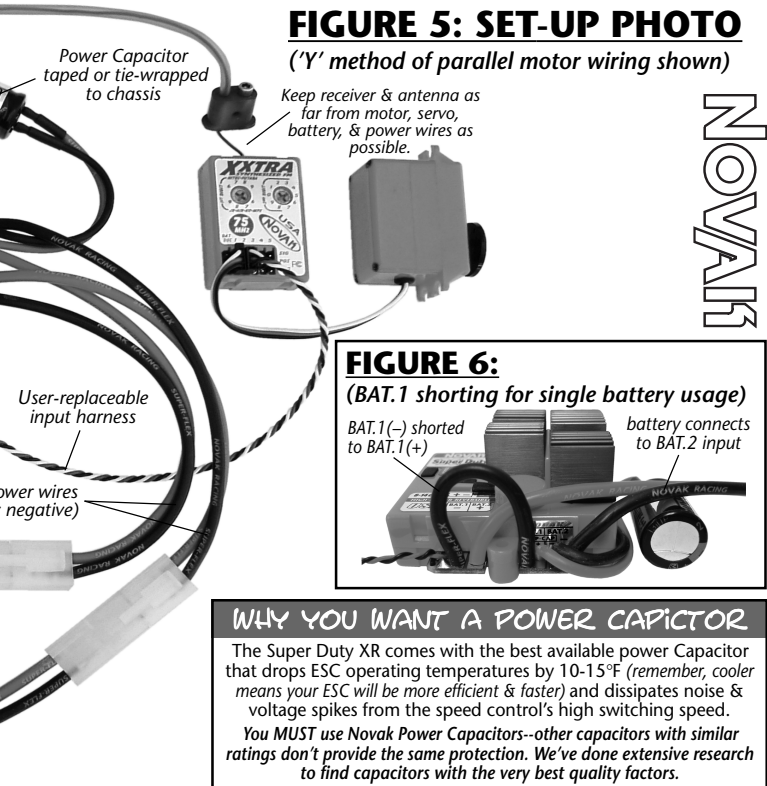
(Refer to FIGURE 6 below)

- Cut the black wire coming from the **BAT.1 (-)** solder tab (battery wire closest to the front of ESC) about 2-3" above the solder tab.
- Strip a 1/8-1/4" of insulation off the end of the **BAT.1 (-)** black wire. Tightly twist the strands of wire & lightly tin with solder.

continued ↑

## FIGURE 5: SET-UP PHOTO

('Y' method of parallel motor wiring shown)



Using Single Battery Pack: continued →

**CAUTION:** When making battery wire solder connections at the Super Duty XR's Direct-Solder Wiring Tabs, it is important to not overheat & damage PCB (printed circuit board) with the soldering iron by applying prolonged or excessive heating (PCB damage voids warranty).

- Remove the red wire from the **BAT.1 (+)** solder tab. Use a soldering iron to apply heat to the wire's solder joint while gently pulling on the wire to remove it from the PC Board's hole.
- Solder the stripped & tinned end of the black wire coming from the ESC's **BAT.1 (-)** solder tab into the **BAT.1 (+)** solder tab. Insert the wire end into the **BAT.1 (+)** solder tab hole (if there is still solder in the hole you can melt it with the iron while pushing the wire through the hole). Apply heat to the section of wire that is sticking through the tab's hole, and add solder to the tip of the soldering iron and to the wire. Add just enough solder to form a clean & continuous joint from the plated area of the solder tab up onto the wire. Use side cutters to trim excess wire above tab (about 1/16").
- Connect the battery pack (6-7 cells @ 1.2VDC/cell) to the JST/Tamiya connector at the end of the red & black wires coming from the ESC's **BAT.2** solder tabs as marked on the Super Duty's case labels.
- USING A SINGLE BATTERY WITH VOLTAGE ABOVE 8.4VDC**  
When using a single 12VDC battery (like lead acid or a gell cell), there is limited output from the B.E.C. circuit. A separate receiver battery pack can be used for improved servo/receiver performance.

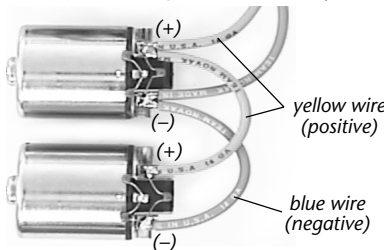
## 2. MOTOR CONNECTIONS

### USING A SINGLE MOTOR:

- Cut the ends of the Super Duty XR's blue & yellow wires to the proper length so they will reach the tabs of the motor and strip 1/8-1/4" of insulation off the ends. Twist & tin the end of the wires.
- Solder the end of the ESC's blue wire to motor negative (-).
- Solder the end of the ESC's yellow wire to motor positive (+).

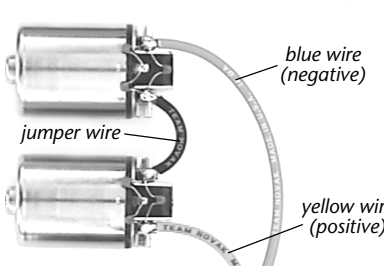
**TIP:** Twisting the BLUE & YELLOW wires as they go to the motor helps reduce RF noise emitted from power wires.

### USING DUAL-MOTORS IN PARALLEL:



To use the ESC with 2 motors in parallel (most common way to wire two motors for getting higher speed), the Super Duty XR's blue motor wire goes to the negative (-) tab of both motors, and the yellow motor wire goes to the positive (+) tab of both motors as shown in the main set-up photo (Figure 5).

### USING DUAL-MOTORS IN SERIES:



To use the ESC with 2 motors in series (low speed wiring method for long run time), the Super Duty XR's blue motor wire goes to the negative (-) tab of the 1st motor, the yellow motor wire goes to the positive (+) tab of the 2nd motor, and a jumper wire connects the positive (+) tab of the 1st motor to the negative (-) tab of the 2nd motor as shown here.

## BATTERY & MOTOR CONNECTORS

If you are going to use connectors for your motor, or change the factory installed battery connectors, we suggest the Dean's Ultra Connectors.

**When installing battery & motor connectors, please note the following:**

- If you have any doubts about your soldering skills, seek assistance from your hobby shop or track, or see our website for tips.
- Use connectors that cannot be plugged in backwards--reverse voltage will damage the Super Duty XR and void the warranty.
- Use a female connector on battery packs to avoid shorting.
- If using connectors for both battery & motor leads, use a male connector on the battery leads and a female on the motor lead to prevent cross connection (also voids warranty).

For additional information on connector usage, visit our website.

## STEP 5—TRANSMITTER ADJUSTMENTS

For proper ESC operation, adjust transmitter as follows:

- A. Set **HIGH ATV** or **EPA** to **maximum** setting.  
*[amount of throw at full throttle]*
- B. Set **LOW ATV**, **EPA**, or **ATL** to **maximum** setting.  
*[amount of throw at full brakes]*
- C. Set **EXPONENTIAL** to **zero** setting. *[throttle channel linearity]*
- D. Set **THROTTLE CHANNEL REV. SWITCH** to **either** position.
- E. Set **THROTTLE CHANNEL TRIM** to **middle** setting.  
*[adjusts neutral position/increases or decreases coast brakes]*
- F. Set **ELECTRONIC TRIGGER THROW ADJUSTMENT** to **50% throttle** and **50% brake throw** (or 5:5).  
*[adjusts trigger throw electronic/digital pistol-grip transmitters]*
- G. Set **MECHANICAL TRIGGER THROW ADJUSTMENT** to position with **1/2 throttle** and **1/2 brake throw**.  
*[adjusts trigger throw on mechanical/analog pistol-grip transmitters]*

•NOT ALL TRANSMITTERS HAVE THESE ADJUSTMENTS•

## STEP 6—ONE-TOUCH PROGRAMMING

With ESC connected to (at least) a receiver & a charged battery pack:

1. **TURN ON THE TRANSMITTER'S POWER**
2. **PRESS & HOLD ESC'S ONE-TOUCH/SET BUTTON**
3. **TURN ON THE SPEED CONTROL'S POWER**  
With transmitter throttle at neutral, and still pressing the SET button, slide the ESC's ON/OFF switch to **ON position**.
4. **CONTINUE HOLDING SET BUTTON UNTIL RED LED COMES ON**
5. **RELEASE SET BUTTON AS SOON AS LED TURNS RED**
6. **PULL TRANSMITTER THROTTLE TO FULL-ON POSITION**  
Hold it there until the **green status LED turns solid green**.  
*Note: Motor will not run during programming even if connected.*
7. **PUSH TRANSMITTER THROTTLE TO FULL-BRAKES**  
Hold it there until the **green status LED blinks green**.
8. **RETURN TRANSMITTER THROTTLE TO NEUTRAL**  
Red status LED will **turn solid red**, indicating that throttle is at neutral, and proper programming has been completed--you're done.

*NOTE: If transmitter setting are changed, programming must be repeated. If you experience any problems, turn off ESC and repeat programming.*

## THROTTLE PROGRAM SELECTION

The Super Duty XR has **3 user-selectable Throttle Programs** to choose from:

- PROGRAM #1:** Forward, brakes, and full power reverse.  
**PROGRAM #2:** Forward & brakes only--reverse disabled.  
**PROGRAM #3:** Forward, brakes, and 25% power reverse.

### SELECTING THROTTLE PROGRAM:

With ESC connected to a charged battery (transmitter ON or OFF):

1. **IF TRANSMITTER IS OFF, DISCONNECT ESC FROM RECEIVER**  
To avoid possible radio interference from other transmitters, remove the Super Duty XR's input signal harness from the receiver.
2. **TURN ON THE SPEED CONTROL'S POWER**
3. **PRESS & HOLD THE ONE-TOUCH SET BUTTON**  
Continue to hold SET button on ESC *until both LEDs turns on*.
4. **RELEASE SET BUTTON AS SOON AS BOTH LEDs COMES ON**  
*Once released, the status LEDs will flash to indicate what Throttle Program is currently selected.* The number of times the LEDs flash indicates the Throttle Program selection (1 of 3).
5. **QUICK PRESS (& release) SET BUTTON TO CHANGE SELECTION**  
Each press will change to the next consecutive Throttle Program.  
*(After Program 3, the sequence begins again at Program 1)*  
*Note: there is a time constraint during this selection process.*  
*If SET button is not pressed for about 3 seconds, ESC will exit to neutral.*
6. **ESC STORES SELECTION & EXITS TO NEUTRAL**  
When SET button is not pressed for about 3 seconds, the **selected Program is stored** into memory & the red LED will come on solid. The speed control is at neutral & ready to go.

*NOTE: Whenever the One-Touch set-up is performed, the Super Duty XR will automatically revert to the factory default setting of Throttle Program #1.*

## USING A RECEIVER BATTERY PACK

If using an external receiver battery pack with the Super Duty XR:

1. Plug an external 5 cell (1.2VDC/cell) receiver battery pack into the battery slot of the receiver.
2. Leave the Super Duty XR's ON/OFF switch in the **OFF** position, and use receiver battery pack's ON/OFF switch to turn the **system power on and off**—Do not use the ESC's switch.

**12VDC BATTERY NOTE:** An external receiver battery pack should be used when using the Super Duty XR's with a single 12 volt battery, like a lead acid or gel cell. The ESC's built-in B.E.C. will provide limited output due to the high voltage directed through the single battery input, resulting in degraded servo and receiver performance.

## TROUBLE-SHOOTING GUIDE

### Steering Channel Works But Motor Will Not Run

- Check motor connections. Check motor and brushes.
- Make sure input signal harness is plugged into throttle channel of receiver and the ESC. Check throttle channel operation with a servo. Check wiring color sequence of receiver signal harness.
- Possible thermal shut-down—Check motor, brushes, & drive train. ESC is being severely over-loaded.
- Possible internal damage—Refer to Service Procedures.

### Receiver Glitches/Throttle Stutters During Acceleration

- Receiver or antenna too close to ESC, power wires, battery, or motor.
- Bad connections—Check wiring and connectors.
- Motor brushes worn—Replace brushes.
- Motor capacitors broken or missing—Refer to Step 3.
- Excessive motor current—Use milder motor or smaller pinion gear.
- External Power Capacitor damaged/not installed—Replace Power Capacitor.

### Motor and Steering Servo Do Not Work

- Check wires, receiver signal harness wiring & color sequence, radio system, crystals, battery & motor connectors, and battery pack.
- Possible internal damage—Refer to Service Procedures.

### Model Runs Slowly/Slow Acceleration

- Check motor and battery connectors—Replace if needed.
- Bad battery or motor—Check operation with another.
- Incorrect transmitter/ESC adjustment—Refer to Steps 5 & 6.
- External Power Capacitor damaged/not installed—Replace Power Capacitor.

### Motor Runs Backwards

- Motor wired backwards—Check wiring and reverse.
- Backwards motor timing—Reverse motor end bell.

### ESC Is Melted Or Burnt/ESC Runs With Switch Off

- Internal damage—Refer to Service Procedures.

*\*For more assistance call our Customer Service Department.*

## SERVICE PROCEDURES

Before sending your ESC in for service, review Trouble-Shooting guide & instructions. ESC may appear to have failed when other problems exist.

After reviewing instructions, if you feel your ESC requires service, please obtain the most current product service options & pricing by the following:

**WEBSITE:** Print a copy of the **PRODUCT SERVICE FORM** from the CUSTOMER SERVICE section of the website. Fill out the needed information on this form and return it with the Novak product that requires servicing.

**PHONE/E-MAIL:** If you do not have access to the internet, contact our customer service dept. by phone or e-mail as listed on the front page.

**WARRANTY SERVICE:** For warranty work, you **MUST CLAIM WARRANTY** on **PRODUCT SERVICE FORM** & include a valid cash register receipt with purchase date and dealer name & phone# on it, or an invoice from previous service. If warranty provisions have been voided, there will be service charges. **ESCs returned without a serial number will not be serviced under warranty.**

### ADDITIONAL NOTES:

- Hobby dealers or distributors are not authorized to replace Novak products thought to be defective.
- If a hobby dealer returns your ESC for service, submit a completed **PRODUCT SERVICE FORM** to the dealer and make sure it is included with the ESC.
- Novak Electronics, Inc. does not make any electronic components (transistors, resistors, etc.) available for sale.

[www.teamnovak.com](http://www.teamnovak.com)