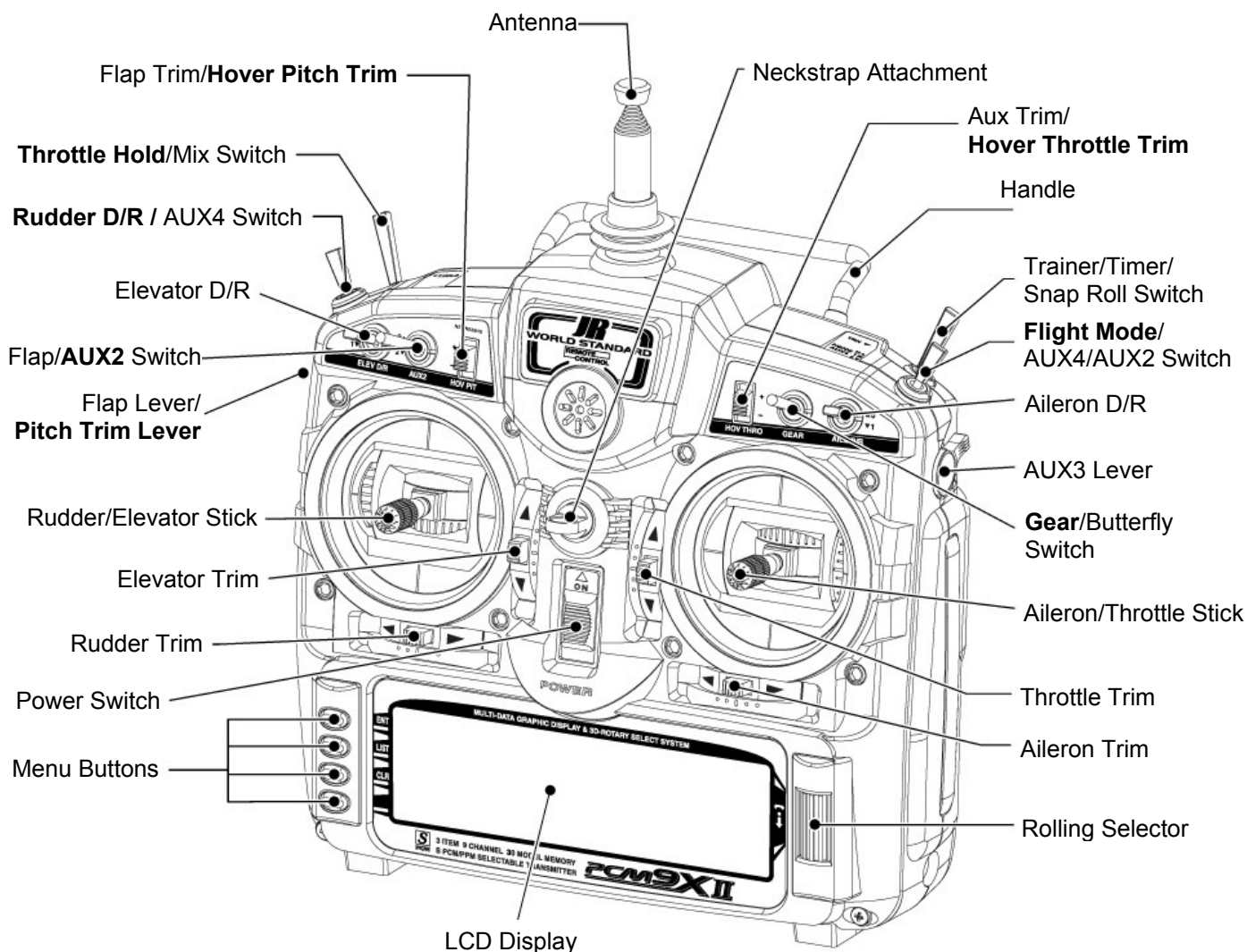


Helicopter – HELI Mode

PCM9X II Transmitter Features (Front)



Transmitter shown with stick mode 1 selected and switch labels relevant to Heli mode highlighted on multi-function switches

Switch Labels	Airplane Menus	Sailplane Menus	Heli Menus
RUDD D/R / AUX4	RUD D/R	RUD D/R	RUD D/R
T.HOLD / MIX	MIX SW	BTFL SW	HOLD SW
ELEV D/R	ELE D/R	ELE D/R	ELE D/R
FLAP / AUX2	FLAP SW	AUX4 SW	AUX2 SW
GEAR	GEAR SW	MOTO S/W	GEAR SW
AILE D/R	AIL D/R	AIL D/R	AIL D/R
F.MODE / AUX4 / AUX2	AUX2 SW	FMOD SW	FMOD SW
(Spoiler Stick)		SPOI ST	
TRN / SN ROLL	SNAP SW	TIME SW	
(Menu Button)		TIM KEY	
(Left Side Lever)	FLAP LV	FLAP LV	Pit.T LEV
(Right Side Lever)	AUX3 LV	AUX3 LV	AUX3 LEV

Switch Naming in the Menus

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Helicopter – HELI Mode

INTRODUCTION

The Heli mode of the PCM9X II system is intended for use in model helicopters in all types of Swashplate mixing. It contains a host of advanced features that are easy to set up and use. The features have been designed to assist the pilot in realizing the full potential of the helicopter. These features include but are not limited to:

- Switch Assignments for Specific Channels/Functions
- Flight Modes (up to 6)
- Dual Rates/Exponential (up to 3 settings each for Aileron, Elevator and Rudder)
- Swashplate Type (Normal, 120, 140, and 90 CCPM)
- Adjustable Trim Rates (10 – 100 Trim Steps)
- Built-In Cyclic to Throttle Mixing for Aileron, Elevator, and Rudder
- Special Governor Pre-Program Mix
- Throttle Curves (up to 5) with up to 7 Points
- Pitch Curves (up to 6) with up to 7 Points
- Gyro System (In Flight Gain Selection of up to 3 Gains)
- 6 Programmable Mixes (Includes 2 Multi-Point and 4 Standard Mixes)
- Fail Safe (Hold or Predetermined Positions)
- Trainer System (Selectable Channels for Student Control)
- Timers (Stopwatch, Count-Down, Integrated)
- Servo Monitor (Automatically Renames Channels According to Assignments)

In addition to the numerous features listed above, the PCM9X II provides the ability to combine, activate, and deactivate multiple features such as Dual Rates, Gyro Gain, and Governor settings, using the Flight Mode switch. This capability dramatically reduces the pilot's workload, allowing the pilot to focus more on the task of flying.

HELI PROGRAMMING - PLEASE READ

Those who are comfortable with programming are still encouraged to continue reading this part of the manual in order to acquire an understanding of the basic PCM9X II programming philosophy, functions, and techniques.

The PCM9X II's menus and functions are presented here in the order that they should be addressed when setting up a new helicopter. This manual begins with entering the System Menu, selecting a model and activating the HELI Mode, and progresses through the remainder of the System Menu options and then

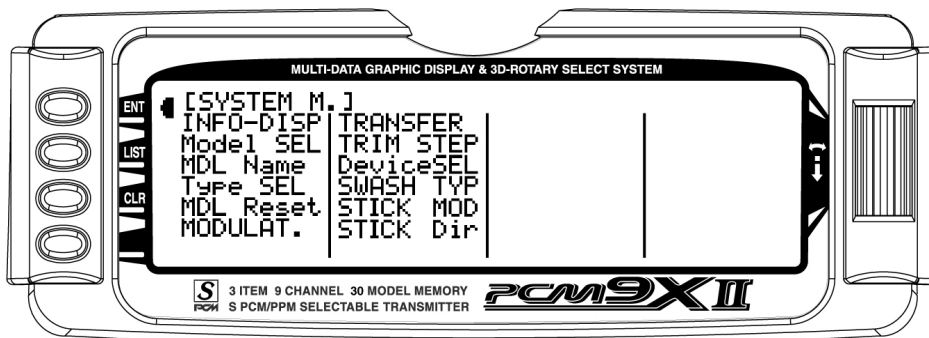
through the individual functions. The descriptions here are general in nature and serve not only to identify the functions that are available, but why the functions are included in the HELI Mode and when a particular function might be used.

Those who have some experience with computer radios will probably be able to program their helicopter as they read through this section, owing to the fact that the individual functions are generally simple in nature and the PCM9X II is a very intuitive system.

HELI - GETTING STARTED – SYSTEM MENU BASICS

Getting started always begins with accessing the SYSTEM Menu. This is where models are selected, the mode is identified, modulation type is indicated, and where other high-level information is collected about the model. It is also used to activate some of the more advanced programming features such as Swashplate Types and Governor Program activation.

This section describes system functions that are specific to the HELI mode. The system functions that are common to all 3 model types are described in the common section at the front of this manual, and should be referred to set up a model memory, activate the HELI mode, give the model a name and select the appropriate modulation type.



HELI - SYSTEM MENU - ADVANCED FUNCTIONS

There are two functions in the SYSTEM Menu that control some of the more advanced features of the PCM9X II system. They are the **Devic. SEL** and **Swash Type** functions.

The **Devic. SEL** function is used to activate and deactivate 2 additional Flight Modes; change switch assignments from the system defaults; activate and deactivate switches/channels and to activate/deactivate the Hover Throttle, and Hover Pitch levers, and to Activate/Deactivate the Governor function.

The **Swash Type** function is used to indicate the Swashplate type (Normal (1 Servo), CCPM 180, 120, 140, and both 3 and 4 servo 90).

Each of the options in these two functions is described below to the extent necessary to determine if they should be used for the helicopter being programmed. More detailed descriptions of these functions can be found later in the HELI section.

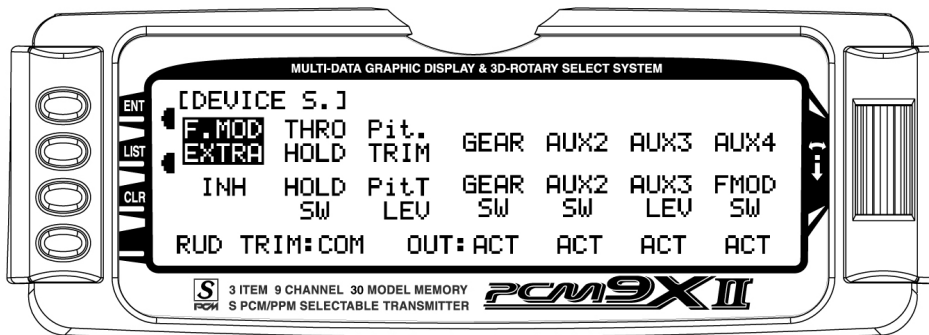
Additional Flight Modes 3 and 4

The PCM9X II is capable of offering the pilot up to 6 separate flight modes. The PCM9X II is factory preset to offer the pilot 4 separate Flight Modes (N, 1, 2, H). There are 2 additional forward flight modes, numbered 3 and 4, that can be activated through the Device Select function.

If the additional flight modes are desired, please follow the activation procedure below.

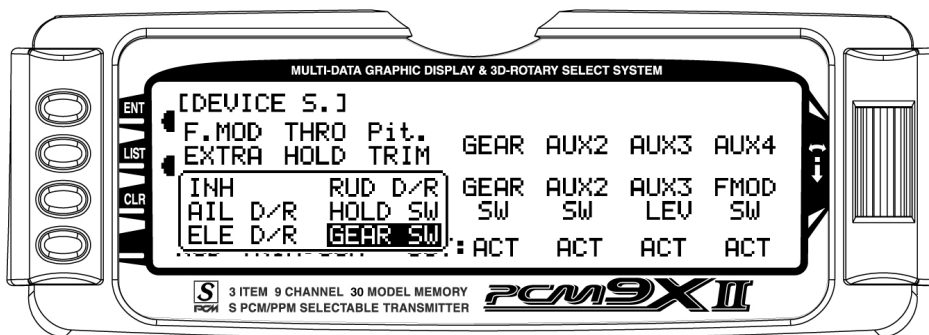
To Activate 2 Additional Flight Modes (Flight Modes 3 and 4)

1. From the **SYSTEM Menu** highlight and select **Devic. SEL** by using the Rolling Selector.



2. Highlight and select **F.MOD Extra** using the Rolling Selector. When selected, five options appear: **AIL D/R**, **ELE D/R**, **RUD D/R**, **HOLD SW**, and **GEAR SW**.

Highlight and select the switch that is to be used to access Flight Modes while flying. The example below shows that the **GEAR** switch has been selected.



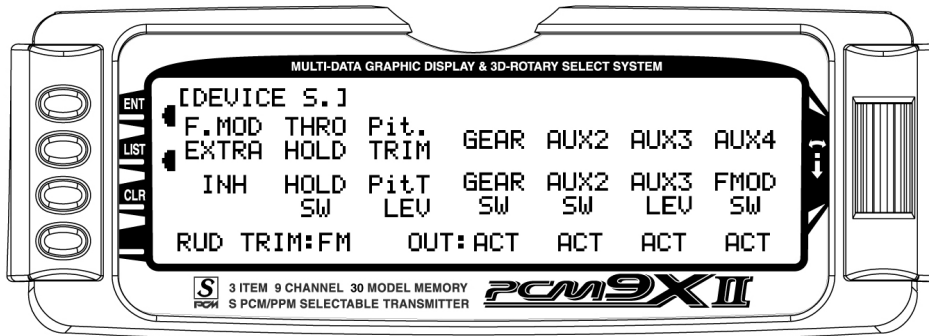
Once Flight Modes have been activated, two additional sets of Throttle and Pitch curves numbered 3 and 4 will appear in the Function Mode.

RUD TRIM: COM – (Flight Mode Trim Options)

The Rud Trim function is designed to allow the pilot to choose between 1 set of trim settings for the Rudder channel only in all flight modes (COM) or a separate set of trim settings for each of the flight modes (FM).

The RUD TRIM: COM parameter can be toggled back and forth between COM and FM by pressing the Rolling

Selector when COM or FM is highlighted. If left in the COM mode, the digital trim for rudder is Common or shared by the 3 Flight Modes. If FM is selected, the PCM9X II keeps track of the digital trims independently for each Flight Mode, which means the pilot can re-trim the rudder using the digital trims for each Flight Mode.

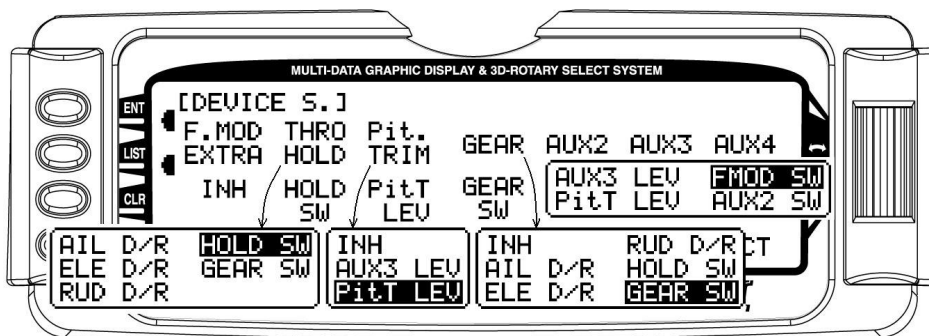


Switch Assignments

The PCM9X II provides the ability to change the standard default switch assignments for THRO Hold, PIT Trim, GEAR, AUX2, AUX3, and AUX4. Changing the assignments may be a matter of preference or to help overcome a disability in one hand. In any event, the standard switch assignments may be changed in Devic.SEL function contained in the SYSTEM Menu.

To change one or more switch assignments:

1. From within the **Devic.SEL** function, use the Selector to highlight and select **THRO HOLD, PIT Trim, GEAR, AUX2, AUX3, or AUX4** along the top line of the display.
2. Once a switch is selected, a list of available replacement switches is displayed. Highlight and select the desired switch with the Selector.

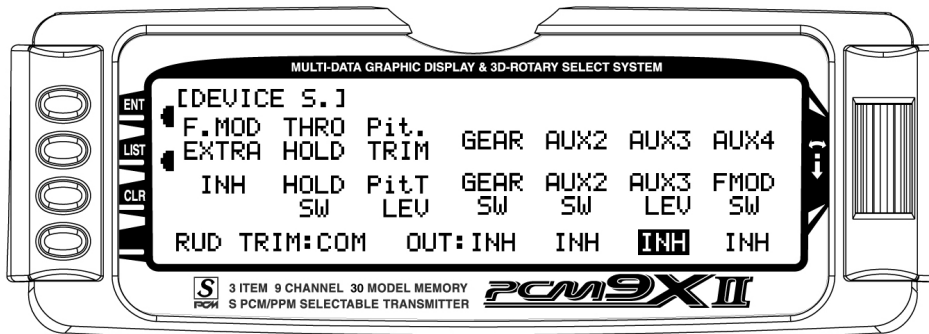


3. Repeat for as many switches as desired.

Activate/Deactivate Switches

The PCM9X II provides the ability to disable a number of the switches on the transmitter – Pit TRIM, GEAR, AUX2, AUX3, and AUX4. This is very useful when auxiliary channels are used for special or mixing purposes. In this instance, the auxiliary channels are no longer to be operated by their auxiliary switches but rather the program mix selected or transmitter sticks.

1. If PIT TRIM, GEAR, AUX2, AUX3, or AUX4 are to be used as a 2nd primary flight control, then inhibit the corresponding switch by highlighting ACT, along the bottom line of the display and pressing the Selector until INH appears under the switches that are to be turned-off. The example below shows all switches as INH or being turned-off, making them all available to be used as a 2nd channel for a primary flight control.



Governor Program Activation

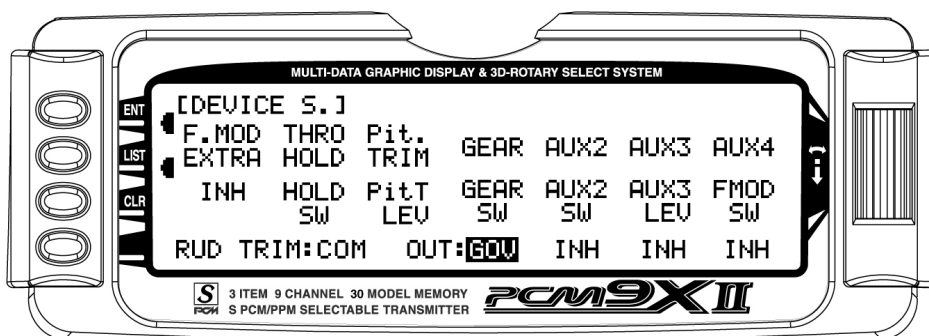
The PCM9X II features a special Governor program that can be activated in the Device Select screen.

The Governor program is designed to be used with most currently available Governor systems, and allows for independent rpm settings for each of the active flight modes.

1. From within the **Devic.SEL** function use the Selector to highlight and select **OUT:ACT** located at the

bottom of the **GEAR** column along the bottom line of the display.

2. Press the Selector until the word **GOV** appears on the display. This indicates that the Governor function has been activated. The Governor program will now be visible in the Function Mode List.



SWASH TYP-Swashplate Type

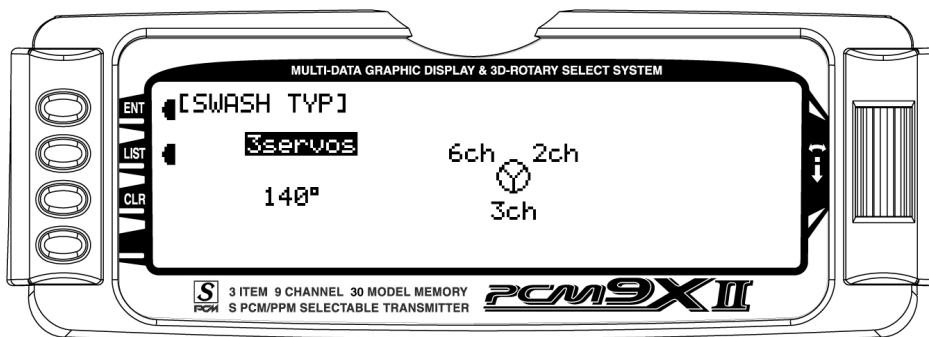
The Swashplate Mixing function enables the PCM9X II system to operate many different types of swashplate control systems, including 5 different versions of CCPM.

The Swashplate options are:

1 Servo	Non-CCPM, standard mixing type
2 Servo/180°	CCPM
3 Servo/120°	CCPM (JR style, most popular)
3 Servo/140°	CCPM (JR Vigor CS)
3 Servo/90°	CCPM
4 Servo/90°	CCPM

Accessing the Swashplate Type Function

1. While pressing the ENT key, switch the transmitter to the ON position to enter the system mode.
 2. Roll the Rolling Selector until **SWASH TYP** is highlighted, then press the Selector to access.
 3. Press the Rolling Selector again, and the screen will display the available swashplate types. Move the Selector to highlight the desired swashplate type, and then press the Selector to select.
 4. Pressing the **CLR** key will reset the Swashplate Type to the factory default (Normal) position.
 5. To exit the Swashplate Type function, roll the Rolling Selector to highlight LIST, and press.
- This concludes the **SYSTEM Menu** portion of the Heli Mode. Continue with FUNCTION LIST below to complete the Heli setup.



Trim Step

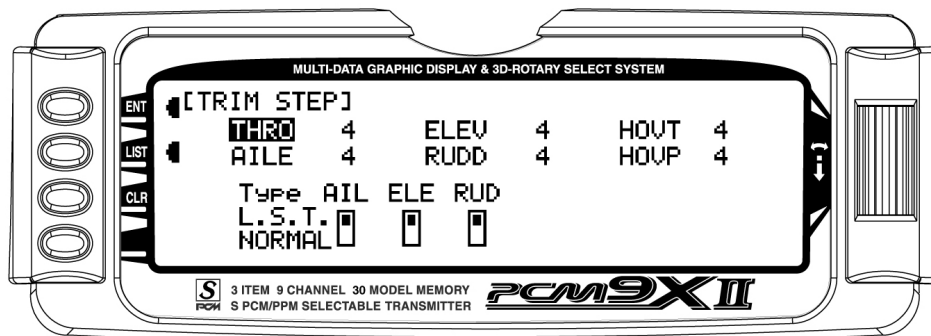
The Trim Step function provides for adjusting the sensitivity of the PCM9X II trim levers and switches. It is useful during and after initial trimming of the helicopter in order to trim the helicopter quickly at first, and then to make very precise adjustments to helicopter trim. The digital trims may have a setting of 0–10 with 10 being the coarsest adjustment. When the value is set to 10, there are only 10 trim increments from center to each end. When set to 5, there are 20 trim increments from center to each end. When set to 4, there are 25 increments. When set to 3, there are 34 increments, and when set to 1, there are 100 trim increments! When set to 0 the trim levers cease to function and can no longer be used to change the trim of the helicopter.

When adjusting the digital trims (THRO, AILE, ELEV, RUDD, HOVT, HOVP), the total trim travel does not change – only the number of increments (beeps)

changes, which makes for finer or coarser trim movements. When adjusting the analog throttle trim, however, the total trim travel is actually reduced when set to less than 100%.

Use a fairly coarse setting, such as the factory default 4, when test flying the helicopter in order to be able to trim it quickly, and then use a finer setting, such as 3–1, for final precision trimming. The exception to this would be for Rudder. Since most Gyros amplify the servo's travel and sensitivity, a trim value of 1 or 2 for the Rudder trim usually achieves the best results.

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



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

4. Select the type of trim required. On a normal trim, adjustment of the trim will affect the end points. On L.S.T (Limit Stroke Trim), the end points will NOT be affected by the trim, this prevents the trim from overdriving the servos.

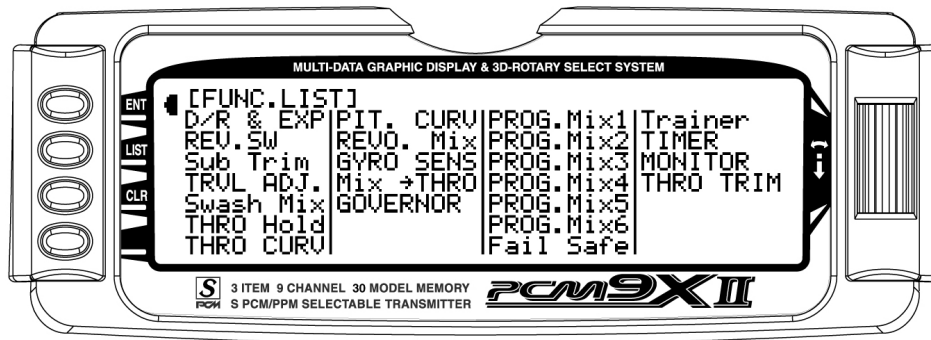
FUNCTION MODE

HELI – FUNCTION LIST

Once the basic helicopter configuration has been defined in the SYSTEM Menu, the functions found in the FUNCTION LIST are used to complete the setup and then to adjust how the helicopter flies and how it is controlled. Note that the Throttle Cut and Trim, Fail Safe and Trainer functions are covered in the general

section at the front of this manual. The functions are presented below in the order that they appear in the **Function List**.

Press the LIST button after the transmitter is powered-up to obtain the FUNCTION LIST.



Note: The **GOVERNOR** function is only listed/shown in the Function Mode when first activated/selected in the Device Select function in System Mode.

The CCPM Swashplate Mixing function **Swash Mix** is only displayed when Swashplate types 2s 180, 3s 120,

3s 140, 3s 90 or 4s 90 are selected in the Swashplate type Selection in System Mode.

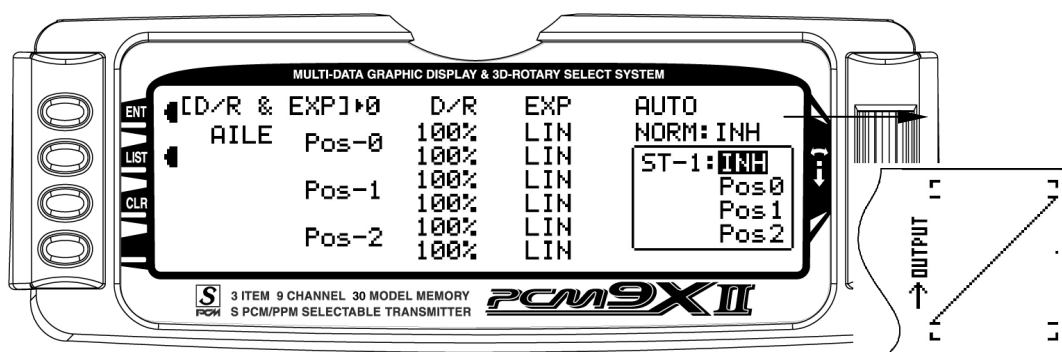
The **Fail Safe** function is available only when SPCM has been selected as the Modulation Type in the System Menu.

D/R & EXP – Dual Rate and Exponential

Dual Rates and Exponential curves can be very effective in setting up a helicopter to have a particular “feel” when performing different types of maneuvers. Just changing D/R and EXPO values can change the helicopter’s personality, causing the helicopter to take on traits that make certain maneuvers easier for the pilot. At times we may want the helicopter to feel very crisp, such as when performing aerobatics, and then feel softer for other maneuvers such as Hovering, and yet other times when we would like the helicopter to be very crisp but without the tendency to be over-controlled, like in performing 3D maneuvers. Dual Rates and Exponential curves can be combined to

produce these traits for almost any helicopter. When programming a Dual Rate and Exponential curve, think about what kind of response is desired from the helicopter. For an in-depth description of D/R and Exponential, please refer to the Dual Rates and Exponential Curves article in the General Section of this manual.

1. Highlight and select D/R & EXP in the FUNC.LIST to obtain the D/R & EXP display. There will be 3 sets of values displayed for each channel – Aileron, Elevator and Rudder.



2. Use the Selector to change between Aileron, Elevator and Rudder. Then use it to set dual rate and exponential values. If exponential has never been used before, try a low positive value like +20. After a

while, increase it gradually until the desired feel is obtained. Use only positive (+) percentages unless there is a distinct need to increase control sensitivity.

Auto Dual Rate

The Automatic Dual Rate function allows you the opportunity to change the dual rate and expo values of the elevator, aileron, and rudder by changing the flight mode or throttle hold switch positions.

This feature simplifies the operation of multiple switches during flight.

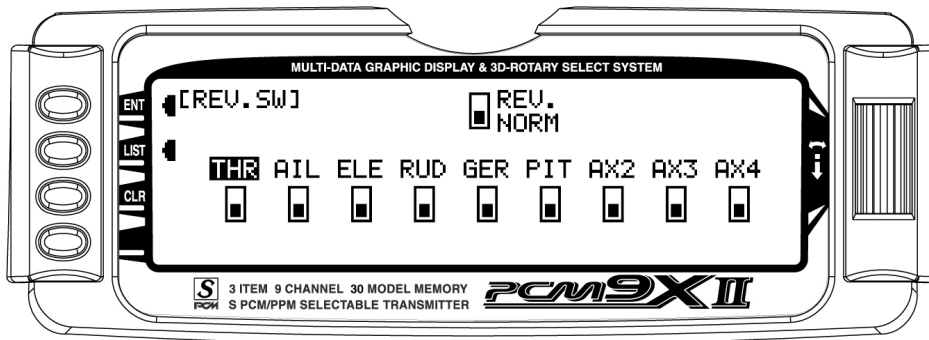
To access the Auto D/R feature, simple roll the selector to the right until the D/R Expo graph is replaced by the Auto D/R Flight Mode list.

Highlight the Flight Mode to be set for Auto D/R, then press the selector to pick the desired D/R setting to be used for this flight mode. Repeat as necessary to assign D/R positions for each flight mode.

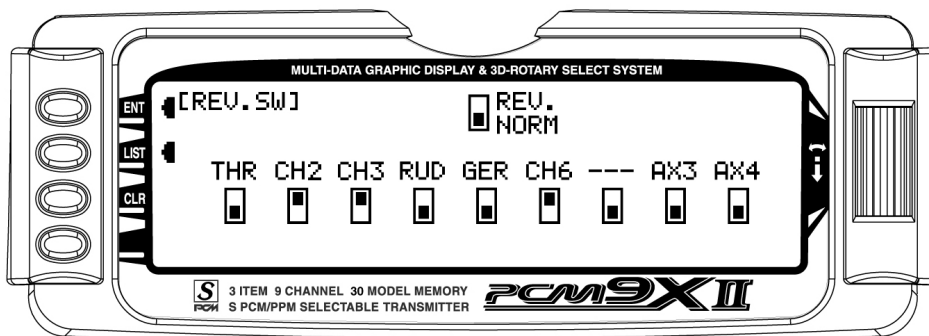
REV.SW - Servo Reversing

Once all servos have been plugged into their proper channels in the receiver, the first thing to check is the direction of travel of each servo. Move all sticks and switches/levers while observing each servo to determine if the servos are moving in the correct directions. Make note of those servos that are not traveling in the correct direction and use the REV.SW function to reverse the direction of travel for these servos.

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



Note: If any of the versions of CCPM have been selected, the 3 CCPM channels will be re-named to CH2, CH3, and CH6, etc. on the display.



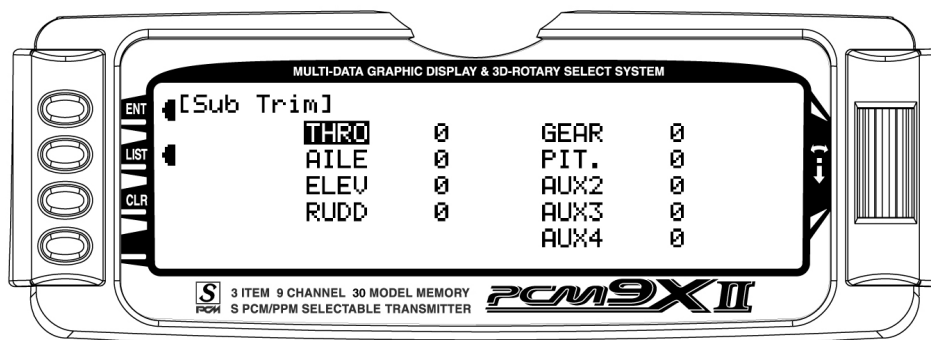
Sub Trim

Sub Trims are intended for relatively minor adjustments to servo linkages and not for major trim adjustments to the helicopter. Using excessive sub trim percentages can cause a loss in servo resolution where the servo reaches its travel limit and stops moving before the control stick is fully deflected. For more information on Sub Trims and linkage setups please refer to the Sub Trim Usage and Mechanical Advantage article contained in the General Section.

Use Sub Trims to fine-tune the alignment of servo arms. Install servo arms on the servos so that the arms are at 90° or perpendicular to the servo case/linkage. As JR® servos feature an odd number of splines on the

output shaft, you can rotate and reinstall the arms to try and obtain a better position for the servo arm that will require a lesser amount of sub trim. Now use the Sub Trim function to fine-tune the servo arms until they are in the desired position.

1. Highlight and select **Sub Trim** in the **FUNC.LIST** to obtain the Sub Trim Display.
2. Highlight and select the channels where the servo arms are not quite at the desired position. Once a channel is selected, rotate the Selector until the servo arm is in the desired position.

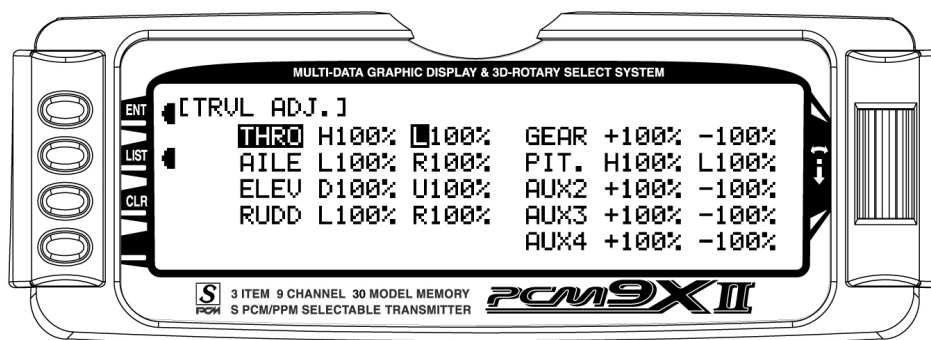


Note: If a form of CCPM has been selected, channel naming will vary.

TRVL ADJ. – Travel Adjust

Travel Adjust, sometimes referred to as ATV, is used to adjust how far a servo travels in each direction. After the linkages have been installed and attached to the servos, adjust the amount of servo travel in each direction. Travel Adjust allows from 0-150% (0 degrees to 60 degrees) independent adjustment of servo travel for each direction of servo travel. For more information on Servo Travel and Mechanical Advantage please refer to the Sub Trim Usage and Mechanical Advantage article contained in the General Section.

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



Note: If a form of CCPM has been selected, channel naming will vary.

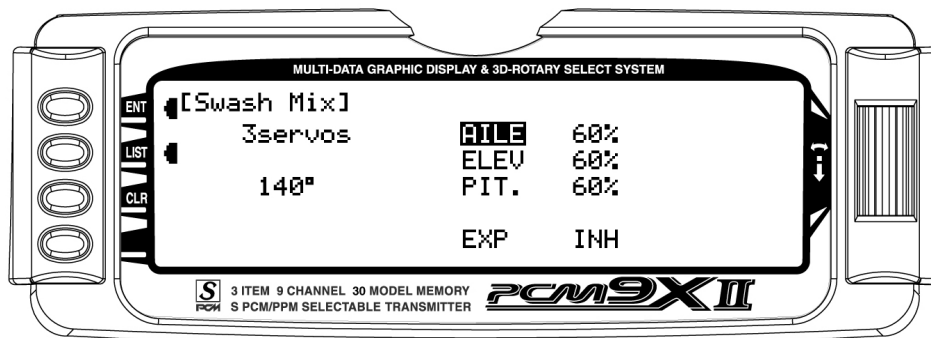
Swash Mix- CCPM SWASHPLATE Mixing

This section is for those that have activated CCPM Swashplate mixing. If CCPM Mixing has not been activated, skip to Throttle Hold/Throttle Curves)

Note: The CCPM Swashplate Mixing screen is only displayed when Swashplate types 2s 180, 3s 120, 3s 140, 3s 90 or 4s 90 are selected in the Swashplate type Selection in System Mode.

The CCPM Swashplate Mixing function (Cyclic Collective Pitch Mixing) of the PCM9X II is designed to allow the PCM9X II to be used in model helicopters that utilize 2-servo (180°), 3-servo (120°), 3-servo (90°) type and 4-servo (90°) swashplate control systems.

The desired swashplate mixing type must first be selected at the Swash Type Selection in System Mode.



Variations of CCPM Mixing

1) Normal (Standard Mechanical Mixing)

This is the most common form of Swashplate Mixing, and uses each of the three servos to move the swashplate individually for pitch, Aileron, and Elevator changes. If one servo (NORM) is selected in the System Mode (Factory Default), the Swashplate Type function will not appear on the LCD screen in this section.

2) 2-servo 180 degrees

2 servos are used to move the swashplate, and are spaced at 180 degrees apart. This is not a very common control system configuration.

3) 3-servo 120 degrees

3 servos are used to move the swashplate, and are spaced at 120 degrees apart. This is the most

common form of CCPM, and is found in JR and other brands of helicopters.

4) 3-servo 140 degrees

3 servos are used to move the swashplate, and are spaced at 140 degrees apart. This is a special JR developed form of CCPM, and is found in JR Vigor CS CCPM models.

5) 3-servo 90 degrees

3 servos are used to move the swashplate, and are spaced at 90 degrees apart. This is also not a very common control system configuration.

6) 4-servo 90 degrees

4 servos are used to move the swashplate, and are spaced at 90 degrees apart. This is a very common control system configuration, used predominantly for Scale models like Vario, Graupner, etc.

CCPM Servo Connection/Channel Numbers					
2-servo (180°)			3-servo (140°)		
Ch 2&6 Aileron	Ch 3 Elevator	Ch 6 Pitch	Ch 2&6 Aileron	Ch 2, 3&6 Elevator	Ch 2,3&6 Pitch
3-servo (90°)			4-servo (90°)		
Ch 2&6 Aileron	Ch 3 Elevator	Ch 2,3&6 Pitch	Ch 2&6 Aileron	Ch 3&8 Elevator	Ch 2,3,6&8 Pitch
3-servo(120°)					
Ch 2&6 Aileron	Ch 2,3&6 Elevator	Ch 2,3&6 Pitch			

CCPM Exponential

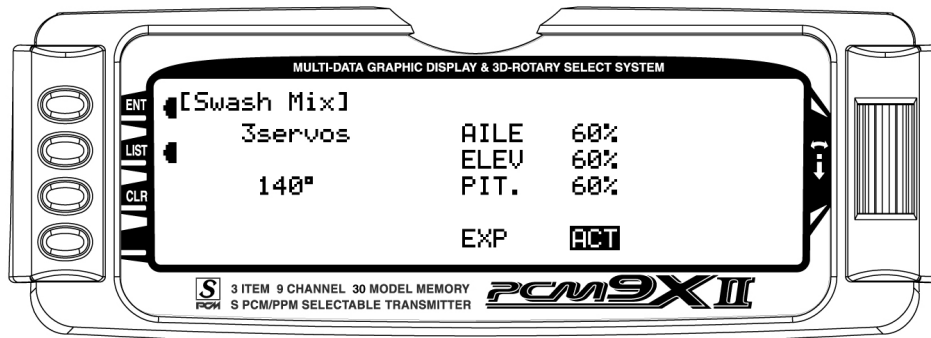
The purpose of this exponential is to remove the non-linear, or rough movement of the swashplate due to the mechanical differential of the servo horn.

This will be a help to change circular movement of servo horn to linear movement. The Exponential function can be turned on and off by highlighting the EXP function with the Rolling Selector, then pressing the Rolling Selector to select INH (Off) or ACT (On).

Accessing the Swashplate Mixing Function

1. Place the transmitter power switch in the ON position.
2. Access the **Function Mode** by pressing the LIST key.

3. Move the Rolling Selector and highlight **Swash Mix**. Press the Rolling Selector to access.
4. Move the Rolling Selector until the desired channel to be adjusted is highlighted.
5. Press the Rolling Selector, then rotate left and right to increase/decrease the **CCPM Travel** values as needed
6. Follow the same procedure for the remaining channels.
7. To exit the Swashplate Type function, move the Rolling Selector to highlight LIST, then press.



THRO HOLD- Throttle Hold

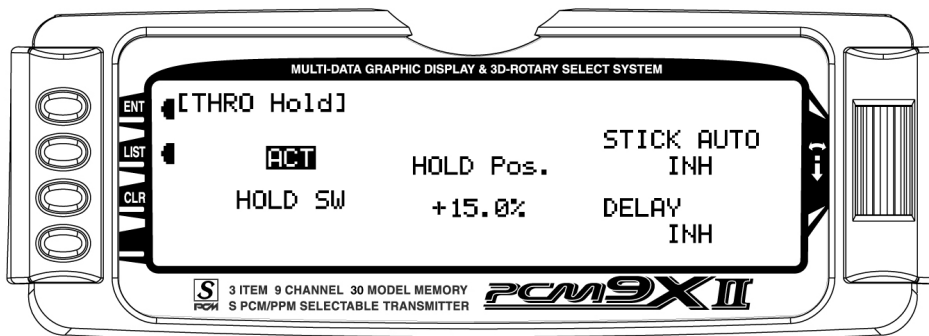
The Throttle Hold function is designed to hold the throttle servo in a specific position during an autorotation. This is very useful for practicing autorotation landings. The Throttle Hold switch is located on the top left-rear corner of the transmitter (unless a different switch has been selected in the Device Sel section in the System Mode. In the forward position, Throttle Hold is on; in the rear position Throttle Hold is off.

The proper Throttle Hold value should deliver the proper engine idle rpm for your helicopter. The adjustable range is (-20% – +50%). Once you establish the proper idle trim value for your engine, you can use this value for Throttle Hold as well. To shut the engine off for autorotation, a negative or zero value should be input.

Accessing the Throttle Hold Function

1. Place the transmitter switch in the **ON** position.

2. Press the List key, then move the Selector until **THRO HOLD** is displayed. Press the Selector to access.
3. Pressing the Selector will activate (**ACT**) or inhibit (**INH**) the Throttle Hold function.
4. Once the Throttle Hold function is activated, the screen will display the current Throttle Hold value.
5. Move the Selector to highlight **HOLD Pos**, then press. Roll the Selector to increase or decrease the Throttle Hold value to the desired position.
6. To exit the Throttle Hold function, move the Selector to highlight LIST, then press.



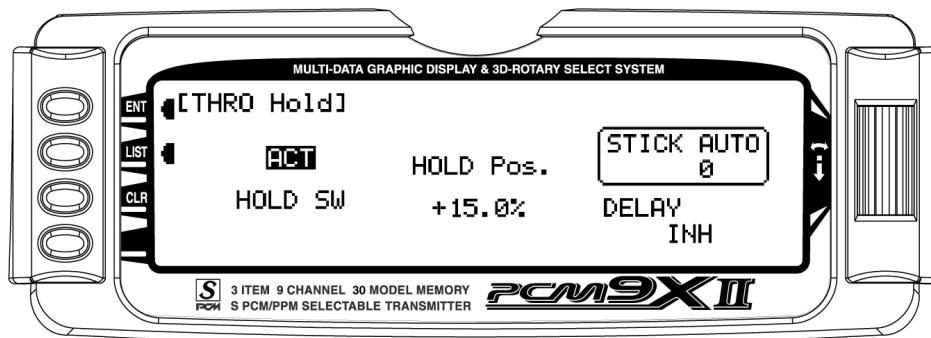
Stick Auto- Auto Cut Setting

The Stick Auto setting may be easier to think of as an automatic Throttle cutoff point, since this is the feature that it performs.

This feature allows you to select the throttle stick position in which the throttle hold function can be activated in the Throttle Hold mode. Although the throttle Hold switch is active, when using this feature the throttle will continue to function until the throttle stick

is moved below the desired cut position selected by you.

To activate the Stick Auto function, highlight the Stick Auto function with the selector, and press to access. Next, roll the selector to increase/decrease the position of the cutoff point.

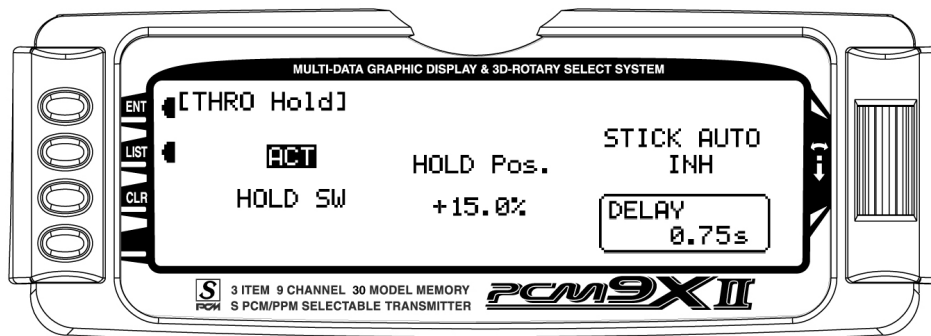


Hold Delay

The Hold Delay function allows the throttle servos movement to be slowed when switching from Throttle Hold back to a previous Flight Mode. This feature is helpful when practicing Autos. If the autorotation attempt is not going well, when the Throttle Hold switch is released, the throttle will increase more slowly, eliminating any sudden bursts of throttle which could damage the mechanics of the model.

The adjustable range is from 1/10 of a second, up to a full 2 seconds of delay.

To activate the Hold Delay, highlight the Hold Delay function with the selector, and press to access. Next, roll the selector to the desired delay position, and press the selector to store. A good starting value is .75 (3/4) of a second.



THRO CURV – Throttle Curves

Note: When the Throttle Hold is activated, and the switch is on, the "HLD" indication on the LCD will be displayed just under the battery voltage bar.

The PCM9X II offers up to five (5) separate throttle curves with up to seven adjustable points per curve. This function allows you to customize the throttle curve and pitch curve together to maximize engine performance at a particular pitch setting. Once the throttle curves are established, each can be activated in flight using the 3-position flight mode switch. If the additional 2 flight modes (numbers 3 and 4) have been activated in the Device Select portion of the system mode, an additional switch will be used to activate these modes.

The flight mode switch offers three selectable ranges:

N=Normal, 1=Stunt 1, and 2=Stunt 2.

Optional: 3= Stunt 3, and 4= Stunt 4

The N (Normal) position should be used as the hover throttle curve.

Positions 1 and 2 (Stunt 1 and Stunt 2) should be used for aerobatic maneuvers and forward flight. Optional flight modes 3 and 4 are also designed for use with aerobatic maneuvers and forward flight.

Note: The throttle trim and hovering throttle levers 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. Also, adjusting the hovering throttle lever and throttle trim has no effect on the input values of the throttle curve. Each of the five points of the throttle curve are independently adjustable from 0–100%. These five points correspond to the position of the throttle stick.

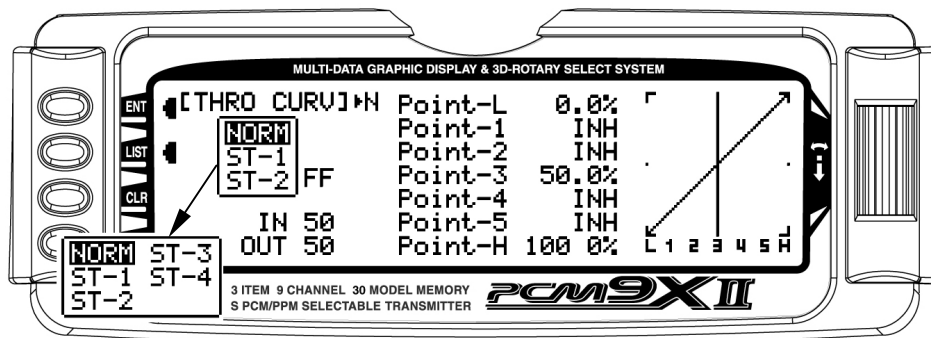


Figure 1: Throttle Curve Normal

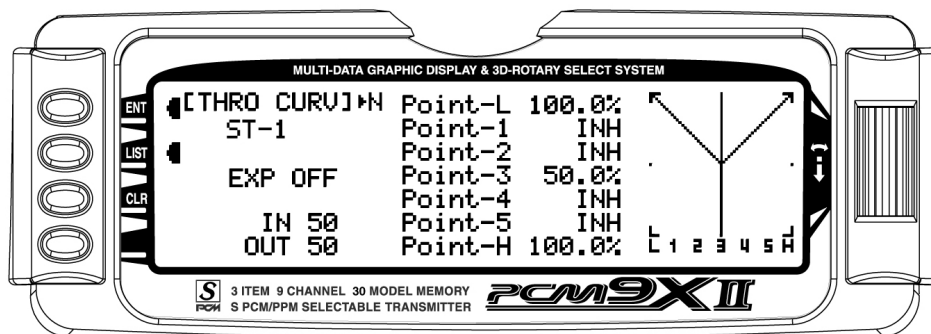


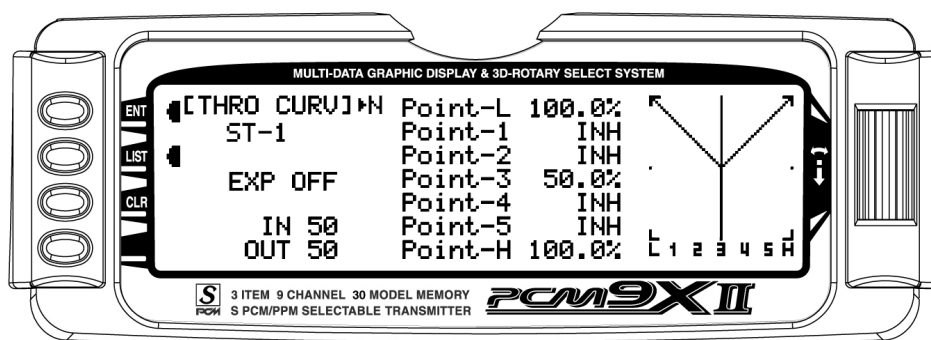
Figure 2: Throttle Curve Stunt 1

The transmitter is preset at the factory to the throttle curve as indicated by the solid line in figure 1 above. Individual middle points can be activated and their values increased or decreased to suit your specific needs.

The throttle trim lever position will affect the low-point position as shown when in the Normal mode Throttle Curve.

Accessing the Throttle Curve Function

1. Place the transmitter switch in the ON position.
2. Press the List key simultaneously to enter the Function Mode.
3. Roll the Rolling Selector to highlight the **THRO CURV** function, then press to access.
Note: The letter/numbers directly to the right of THRO CURV at the top left of the LCD displays the current Flight mode or throttle hold switch position.
Use **NORM** for hover curves and 1, 2, 3, and 4 (3 and 4 optional) for stunt curves. We will concentrate on the hovering curve during this example.
4. Move the Rolling Selector and highlight the desired throttle point to be adjusted. Press the Rolling Selector to open the point value, then roll the Rolling Selector to increase and decrease the point value.
5. To set curves for flight mode switch position 1, highlight **NORM** with the Selector, press, then select ST-1 from the drop down box and repeat steps 4 and 5.
6. To set curves for flight mode switch positions 2 through 5, repeat step 6 above.
7. To exit the Throttle Curve function, highlight the LIST with the Selector, and press.



Throttle Curve, Stunt 1

Note: In each curve, the factory setting indicates INH for points 1, 2, 4 and 5. These values are 16.5%, 33%, 66.5% and 83.5% respectively if no value changes are made to any other points. If any of the other points have been changed while these points were inhibited, the inhibited points will also change to plot a smooth curve.

If you want to keep this from happening, highlight each point and press the Rolling Selector twice to activate each of the points. Repeat as necessary. The values for each of these points can then be fully adjusted by the Rolling Selector. To inhibit the points, highlight the desired point with the Rolling Selector, press the Rolling Selector to open the point, then press the clear key (CLR) to inhibit.

Throttle Trim Lever Function

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 power when the flight mode switch is in the Normal mode. The throttle trim lever has no effect on flight modes 1, 2, 3, 4, or in throttle hold.

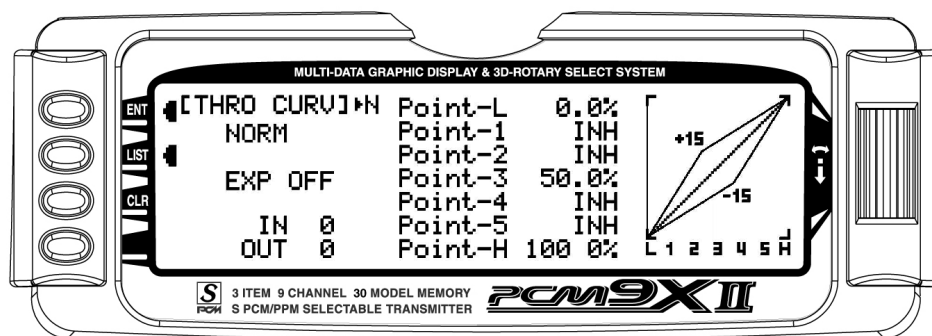
Note: Making changes to the throttle trim lever does not change the input values for any of the points on the throttle curve; it merely makes adjustments to the engine idle speed position.

Hovering Throttle Lever

The Hovering Throttle lever increases or decreases the engine output power for the middle three points set for the throttle curve. As shown in the figure below, use of the hovering throttle lever shifts the curve upward or downward parallel with the original curve. Therefore, operation of the hovering throttle knob does not cause any change to the original settings of the throttle curve.

The throttle trim range will affect the throttle curve as shown. The adjustable range of output using the hovering throttle lever is approximately +/-15 points as shown in the diagram below.

Note: The Hovering Throttle has no effect on flight mode switch positions 1 and 2.



Throttle Curve Exponential

With the PCM9X II system, individual throttle curves are selectable to be either straight (linear) or curved (exponential) setting. With the exponential function on, you will notice that any sharp angles of the throttle curve will become more “rounded” or “smooth”, creating more equal throttle servo movement during the entire curve range.

Accessing the Throttle Curve Exponential Function

1. From the **Throttle Curve** function, press the Channel key until “**EXP**” appears at the center of the LCD screen.
2. Highlight the **EXP OFF** with the Selector. Press the Selector to change the display from **OFF** to **ON**.
3. To exit the Throttle Curve function, move the Selector to highlight LIST and press.

PIT. CURV- Pitch Curves Function

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. There are up to six independent types of pitch curves available: Normal, Stunt-1, Stunt-2, Stunt-3, and Stunt-4 (Stunt 3 and 4 optional) and Hold. Each

pitch curve contains up to seven adjustable points: L, 1, 2, 3, 4, 5, and H.

Note: The pitch curve for the Throttle Hold function and Stunt Modes 3 and 4 can only be set if these functions have been activated in the System mode previously.

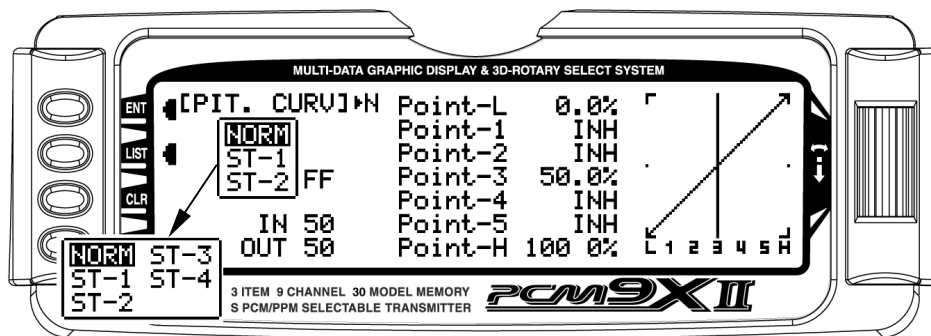
Accessing the Pitch Curve Function

1. Place the transmitter switch in the ON position.
2. Press the LIST key to enter the **Function mode**.
3. Use the Selector to highlight the **PIT. CURV** function, and press the Selector to access.

Note: The Letter, numbers directly to the right of PIT. CURV at the top right portion of the LCD is the current flight mode switch position (N, 1, 2, 3, 4 or H).

Use **NORMAL** for hover curves and 1 through 4 (3 and 4 optional) for stunt curves. We will concentrate on the hovering curve during this example.

4. Move the Rolling Selector and highlight the desired Pitch point to be adjusted. Press the Rolling Selector to open the point value, then roll the Rolling Selector to increase and decrease the point value.
5. To set curves for flight mode switch position 1, highlight **NORM** with the Selector, press, then select ST-1 from the drop down box and repeat steps 4 and 5.
6. To set curves for flight mode switch positions 2 through 5, repeat step 6 above.
7. To exit the Pitch Curve function, highlight the LIST with the Selector, and press.



Note: In each curve, the factory setting indicates INH for points 1, 2, 4 and 5. These values are 16.5%, 33%, 66.5% and 83.5% respectively if no value changes are made to any other points. If any of the other points have been changed while these points were inhibited, the inhibited points will also change to plot a smooth curve.

If you want to keep this from happening, highlight each point and press the Rolling Selector twice to activate each of the points. Repeat as necessary. The values for each of these points can then be fully adjusted by the Rolling Selector. To inhibit the points, highlight the desired point with the Rolling Selector, press the Selector to open the point, then press the clear key (CLR) to inhibit.

Hovering Pitch Lever

The Hovering Pitch lever operates in the same manner as the Hovering Throttle knob. It is only operable while the flight mode switch is in the "N" (normal) position,

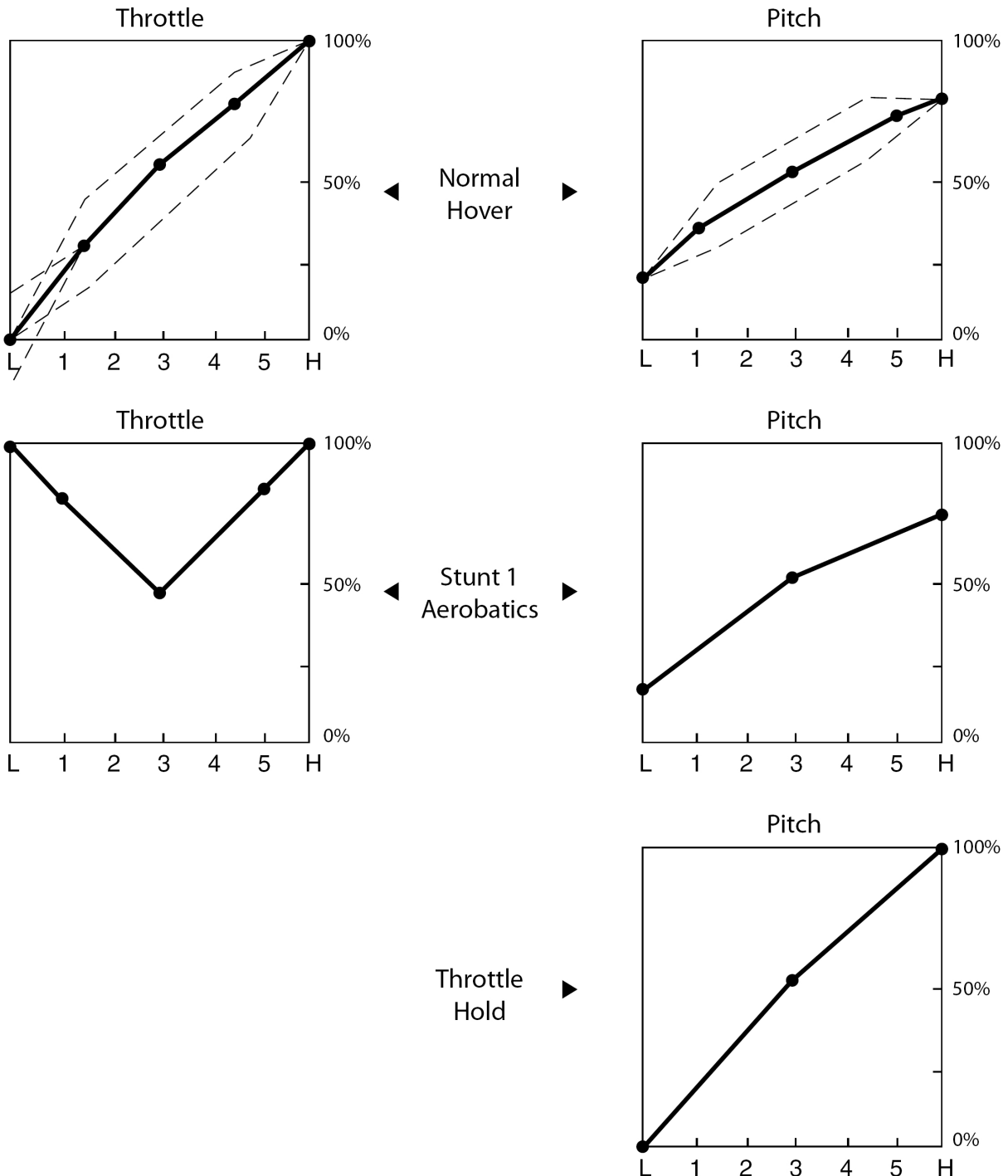
and its function is to shift the middle portion of the curve upward or downward.

Example of Throttle Curve and Pitch Curve Settings

An example of throttle curve and pitch curve settings for aerobatic specifications is shown below in the form of graphs. Details of the curves will differ depending on the helicopter specifications. In these examples, the throttle open-close stroke and autorotation pitch stroke

are set 0 to 100 to ease your understanding of other curves.

Note: Dotted line indicates Throttle and Pitch curve range/movements using the Hover Throttle and Hover Pitch levers.

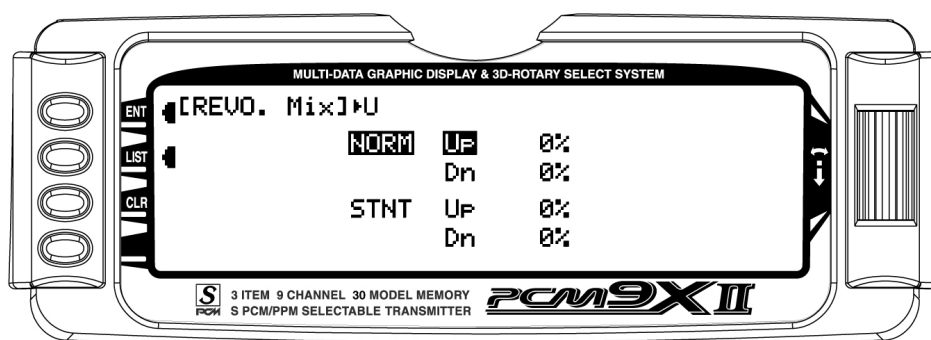


REVO.MIX- Revo Mix Function: Non Heading Lock Gyros Only

The Revolution Mixing function is designed for use with conventional "Rate" gyros only, and mixes tail rotor with the Throttle and Pitch Curve functions 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 PCM9X II offers two 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 (Up) mixing

adjusts the tail rotor compensation for the mid to high throttle setting and the D, or down, mixing adjusts the tail rotor compensation for the mid to low throttle setting. Thus, if you were to move the throttle from the low to high position, the tail rotor servo would move from D through Hover (mid) and to the U setting.

Note: A letter will appear directly to the right of the **REVO.MIX** on the top of the LCD to indicate the current throttle stick/mix position (U for Up, D for Down).



Accessing the Revolution Mixing Function

1. Place the transmitter switch in the ON position.
2. Press the LIST key to enter the **Function Mode**.
3. Move the Rolling Selector to highlight the **REVO.MIX** function, then press the Rolling Selector to access.
4. Move the Rolling Selector to highlight the desired Revo Mix value to be adjusted. Press the Rolling Selector to open the desired value. Rotate the Rolling Selector to increase or decrease the value as needed.
5. Press the CLR key to reset the values to 0% if needed.
6. To exit the Revolution Mixing function, move the Rolling Selector to highlight LIST, and press.

Setting Up Revolution Mixing

Set up the helicopter so that it will hover with the tail rotor trim centered. Establish the helicopter into a stable hover, then steadily increase the throttle to initiate a steady 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 climbs with no tendency to turn. At a safe altitude, close the throttle; the helicopter will descend and the body will turn in the same direction as the main rotor rotation. Increase the D, or down, mix until the helicopter descends with no tendency to turn. Throttle stick movements should be slow, and the initial acceleration and deceleration swings should be ignored.

When throttle is in the hold position (autorotation), revolution and acceleration mixings are off. The Acceleration Mixing function is provided to compensate for the main rotor acceleration (and deceleration) torque. The magnitude and duration of the signal to the tail rotor depends on the rate of the throttle changes. Thus, quick, jerky throttle inputs will yield more noticeable tail compensation.

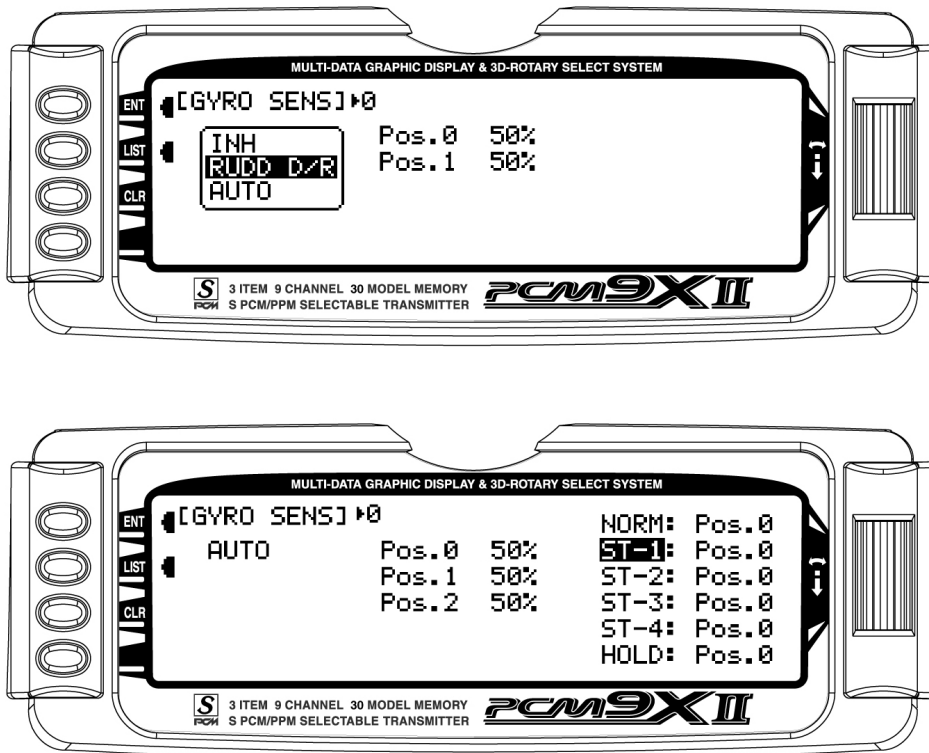
GYRO SENS- Gyro Gain Function

The PCM9X II offers two different types of Gyro Gain Sensitivity Adjustments: manual or automatic. This feature gives the user the choice of selecting gyro sensitivity through the rudder dual rate switch (AUX-2) or automatically through the flight mode switch. The Gyro Gain function allows you to have 2 different gyro gain settings in Manual (RUDD D/R) mode, and 3 separate gain settings in AUTO Mode.

If the manual (**RUDD D/R**) mode is selected, gain changes are made manually by the pilot using the Rudder D/R switch.

If Auto mode is selected, the Gyro gain is automatically changed by linking directly to the Flight Mode switch.

If you do not intend to use this function, leave this operation at the factory default position (**OFF**).



Accessing the Gyro Gain Function

1. Place the transmitter switch in the ON position.
2. Press the LIST key to enter the **Function mode**.
3. Move the Rolling Selector and highlight the **GYRO SENS** function. Press the Rolling Selector to access.
4. Highlight **INH** with the Rolling Selector, then press to open the options box. Highlight the desired function type Manual (**RUDD D/R**) or **AUTO**, then press the Rolling Selector to select.
5. Move the Rolling Selector to highlight the function to be adjusted.
6. Press the Rolling Selector to select the gain position to be adjusted, then roll the Rolling Selector to increase or decrease the gain values as needed.
7. If **AUTO** mode has been selected, once the gain values for positions 0, 1, and 2 have been set, move the Rolling Selector to highlight the mode positions (**NORM**, **ST-1**, **ST-2** and **HOLD**) or (optional **ST-3**, **ST-4**), and select the gain position (value) for each mode.
8. To exit the Gyro Gain function, move the Rolling Selector to highlight LIST, and press.

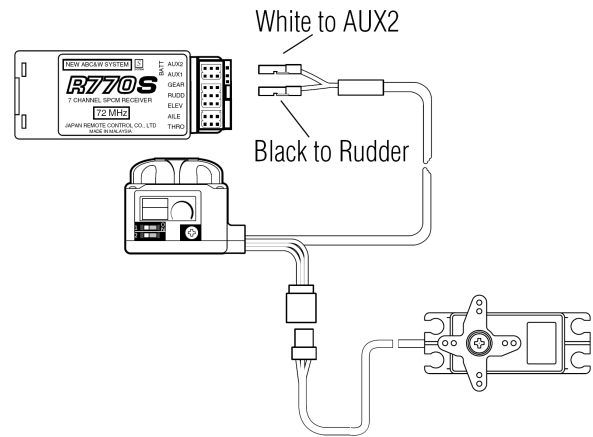
Flight Modes/ Recommended Gyro Gain positions

Normal:	0
Stunt 1:	1
Stunt 2:	2
Hold:	1

Gyro Remote Gain Connections: JR G500T & Other Remote Gain Gyros

Connect the white connector from the G500T to the AUX2 channel of the receiver, and the black connector to the rudder channel.

Note: This function is designed to be used only with gyros that have in-flight proportional gain adjustment capability. Single and dual rate gyros that use a potentiometer to adjust the gain cannot utilize this function.



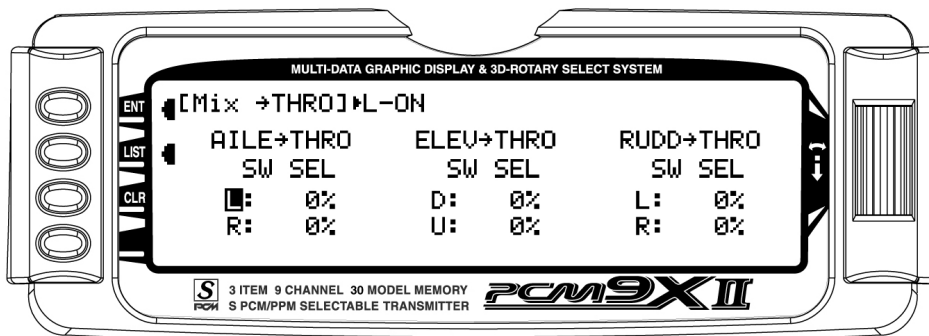
Mix→Thro Cyclic-to-Throttle Mixing

The PCM9X II's Cyclic-to-Throttle function is designed to correct any under- or over-speeding of the main rotor resulting from load changes placed upon the engine when an Aileron, Elevator, or Rudder control is given.

The most common use for Cyclic-to-Throttle mixing is for Stunt Modes 1-4, allowing the main rotor RPM to remain consistent throughout aerobatic and 3D maneuvers. It is not necessary to use Cyclic-to-Throttle

mixing in Hover (Normal) mode since control inputs are generally small and much less aggressive.

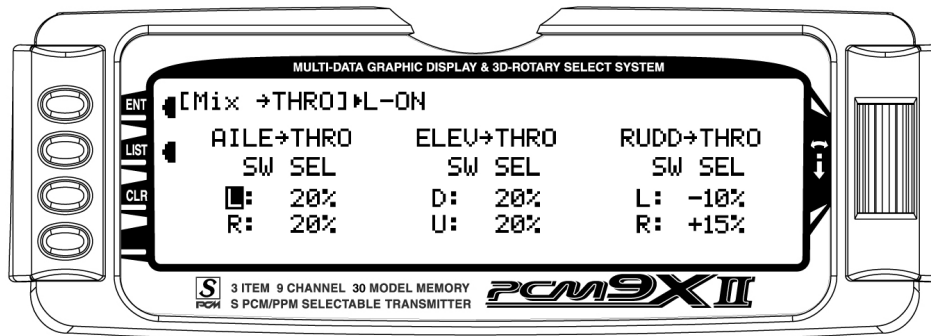
Note: If a Governor will be used for rpm control, it is not necessary to use the Cyclic-to-Throttle Mixing, and all values should be left at the factory default position (0%).



Rudder-to-Throttle Mixing

During 540 stall turns and fast pirouettes, the tail rotor absorbs power and the main rotor rpm decays. This can be compensated for through the use of the **RUDD→THRO** mix. By adding a throttle value to this mix, when rudder is applied, the throttle is advanced or reduced depending on the desired change in rpm. A

good starting value would be +15% for R (right mixing) and -10% for L (left mixing). Final tuning needs to be performed during flight-testing. A + value increases throttle; a – value decreases throttle.

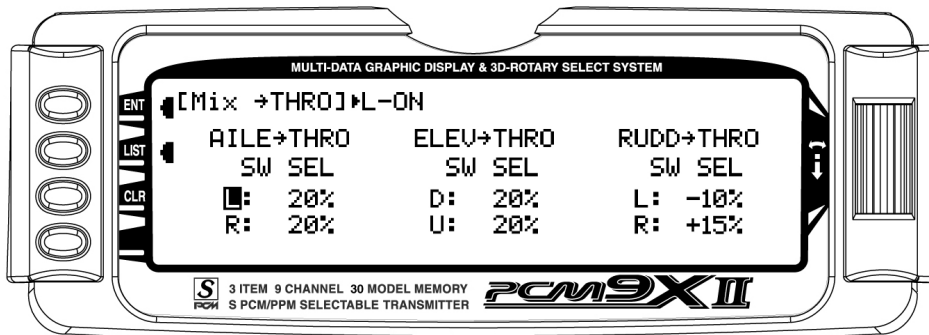


Aileron-to-Throttle and Elevator-to-Throttle Mixing

When doing a roll, flip, or anytime hard-over cyclic is used, the main rotor's rpm can decay due to increased loads. This can be compensated for through the use of the AILE→THRO, and ELEV→THRO mixing. By adding a throttle value to these mixes, when Aileron or Elevator Cyclic control is applied, the throttle is advanced to compensate for the increase in loading to the engine. A good starting value is between 10%–30 % in both directions for both Aileron and Elevator. Final tuning needs to be performed during flight-testing. A + value increases throttle; a – value decreases throttle.

Accessing the Cyclic-to-Throttle Function

1. Place the transmitter switch in the ON position.
2. Press the LIST key to enter the Function mode.
3. Move the Rolling Selector and highlight the **MIX-THRO** function. Press the Rolling Selector to access.
4. Highlight the desired value to be adjusted with the Rolling Selector, then press to open the options box. Roll the Rolling Selector to adjust the value as needed.

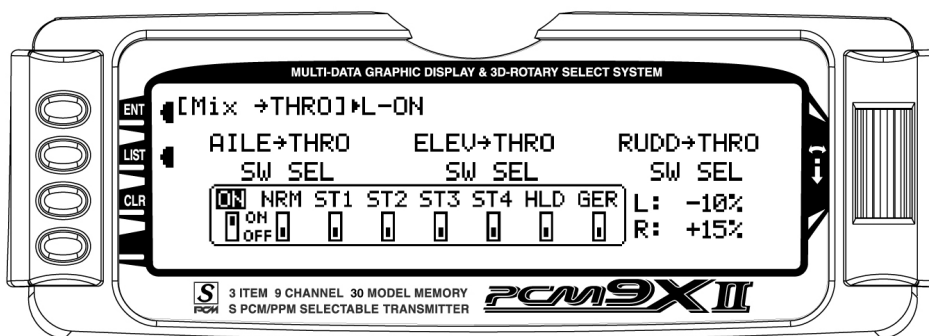


Setting the Desired Flight Modes for Cyclic-to-Throttle Mixing

The PCM9X II allows you to select the specific Flight modes that the Cyclic-to-Throttle Mixing will be active. The factory default position is ON for all Flight modes, which is not ideal in most cases. As mentioned above, the Cyclic-to-Throttle mix is generally used for Stunt (Flight) modes only, so it will be necessary to select the Cyclic-to-Throttle Mixing for the desired flight modes.

5. Move the Rolling Selector to highlight the **SW SEL** for each of the Cyclic-to-Throttle Mixes to be used.

6. Press the Rolling Selector to open the Flight Mode options box. Highlight the desired flight mode to be set (**NRM, ST1, ST2, ST3, ST4, GER**), then press the Rolling Selector to turn the mixing on or off for each of the active flight modes.
7. To exit the Cyclic-to-Throttle function, move the Rolling Selector to highlight LIST, and press.



GOVERNOR- Governor Function

Note: The GOVERNOR function is only listed/shown in the Function Mode when first activated/selected in the Device Select function in System Mode.

The PCM9X II's Governor function is designed to be used with most currently available Governors on the Market. The Governor function allows the Governor rpm values to be set for each of the Active Flight modes, and will automatically change the Governor rpm values as set when the Flight Mode switch is moved through each of the active flight modes.

The value range in the Governor function is +/- 0%–125%, and its values follow the Travel Adjust values exactly. In other words, a desired Travel Adjust value of +55% would also be +55% in the Governor function.

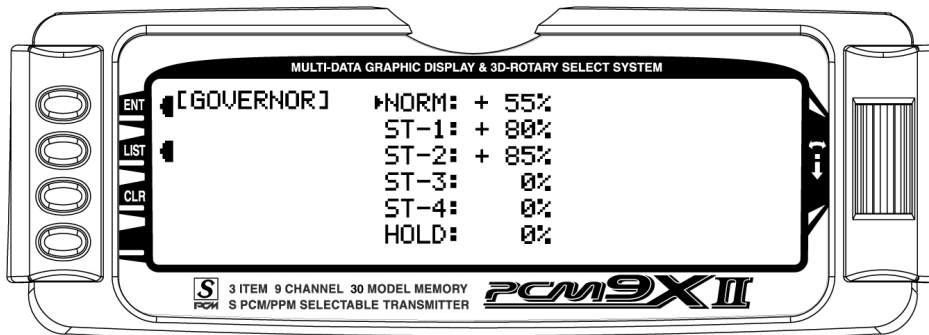
The Governor program, when activated in System Mode, functions through the GEAR channel (Channel 5) of the PCM9X II. When connecting a Governor to the receiver, the rpm signal lead from the Governor would

be connected to the Gear (CH5) channel for proper operation.

Accessing the Governor Function

1. Place the transmitter switch in the ON position.
2. Press the LIST key to enter the **Function mode**.
3. Move the Selector and highlight the **GOVERNOR** function. Press the Selector to access.
4. Highlight the desired value to be adjusted with the Selector, and then press to access the value. Roll the Selector to adjust the value as needed.
5. To exit the Governor function, move the Selector to highlight LIST, and press.

Note: Flight Modes ST-3 and ST-4 will only be shown if activated previously in **System Mode**.



For Governors like the Model Avionics® "Throttle Jockey™," you would leave the Travel Adjust values for the Gear channel at +/-100%, and you would then set your Governor rpm values from the rpm calculator in the Governor function.

For other brand Governors, you would also leave the Travel Adjust values for the Gear Channel (CH5) at +/-100%. You could then increase the values in the

Governor function above +/-100% up to +/-125% to increase the rpm remotely from the preset rpm selected at the Governor.

Note: To turn off the Governor Function for engine tuning, etc. it will be necessary to return the value for the desired flight mode to zero. Remember the value so it can be re-entered after tuning.

PROG MIX 1-6 – Programmable Mixes 1 through 6

The PCM9X II System provides 4 Standard programmable mixes (PROG.MIX3 through PROG.MIX6) and 2 Multi-Point programmable mixes (PROG.MIX1 & PROG.MIX2). Programmable mixes are used whenever the pilot wants a channel to react or move as a result of providing input to another channel, or to simply cause a channel to move by moving a switch or lever. They are typically used to compensate for deficiencies in helicopter design/setup such as eliminating a pitch to aileron, or pitch to elevator trim change issue when collective is given. They are also used to activate special helicopter functions like Retracts, Landing Lights, etc.

Multi-Point Mixing provides the ability to define a customized “curve” of travel that the Slave channel will follow as it reacts to the Master channel. It is different from Normal Mixing in the sense that Normal Mixing results in a linear movement of the Slave channel in relation to the Master. With Multi-Point Mixing there are 7 points (includes end points) along the travel of the Master channel that can be adjusted to control the action of the Slave channel (more or less travel in the same/opposite direction) and provides the ability to deviate from a linear mixing action.

The channel that receives the original input from the pilot is called the Master channel, while the channel that reacts to the Master is called the Slave channel. Mixing occurs when the pilot provides an input to the Master channel or by moving a stick, switch, or lever. The transmitter automatically generates an input for the Slave channel based on the pilot’s input to the Master channel and the parameters defined in the programmable mixer.

Mixes are programmable, allowing any of the 9 channels to be Master, Slave or both. The mixing parameters are also programmable and include the direction of travel of the Slave channel; the amount of travel for the Slave channel; the Offset (where the mix

starts and changes direction) and the switches/levers/sticks that are used to turn a mixer on and off. All of these elements are selectable and adjustable in Programmable Mixes.

Some examples of how programmable mixers might be used include but are certainly not limited to:

• **Swashplate Timing: Improves Rolling and Vertical Manoeuvre tracking**

This is a condition when the heli will not roll on its axis (tail boom) correctly, or pulls to the Left or Right during vertical Maneuvers (loops, stall turns, etc.)

Most Helis need and can benefit from this form of mix to improve their overall flight performance. This trick mixing is used by most of the pros to make their models fly more accurately, and in turn, more easily.

2 Separate Mixes are required

Mix 1: Elevator to Aileron (Corrects vertical tracking)

By using a program mix Elevator to Aileron to correct an Vertical pull/ issue, the mix will allow the Aileron servo to move just a little bit in the opposite direction of the out of track direction in order to keep the aircraft from pulling left or right when a vertical maneuver is performed. This standard mixer would designate the Elevator as the Master and the Ailerons as the Slave.

Mix 2: Aileron to Elevator (Corrects Rolling Manoeuvres)

To add swashplate timing for Rolling maneuvers, a similar mix of Aileron (Master) to Elevator (Slave) would be created additionally. For these types of mixes, you would use Standard Program Mix, numbers 3 through 6.

PROG MIX 1-6 – Programmable Mixes 1 through 6 (continued)

• Eliminate Pitch to Collective Trim Changes (non CCPM only)

This is a condition when the Heli rolls left or right, or pitches fore or aft when a collective input is given. This is commonly caused by a mechanical geometry issue in the design of the servo linkages and mechanical mixers/levers. By using a program mix for Pitch-to-Aileron to correct an Aileron trim change issue, the mix will allow the Aileron servo to move just a little bit in the opposite direction of the out of trim direction in order to keep the helicopter from rolling, while Collective pitch is added or reduced. This standard mixer would designate the Pitch (Collective) as the Master and the Ailerons as the Slave. For this type of Mix, you would use Standard Program Mixes 3 through 6.

• Activating Retractable Gear via the Flight Mode switch

This form of mix would allow you to activate your retractable landing gear via your Flight mode switch. It could be set so that in Normal (Hover) and Throttle Hold (Hold) modes, the retracts would be down, and when you move the Flight Mode switch to positions 1 or 2, the retracts would automatically go up and stay up in these modes until you return to Normal or Throttle Hold. This type of mix reduces the workload on the pilot, so they can be more focused on flying the model. This type of mix would use Multi Point Programmable mixes 1 or 2, and would designate FMOD (Flight Mode switch) as the Master and Gear or another unused auxiliary channel as the slave.

The possibilities are endless and limited only by the imagination.

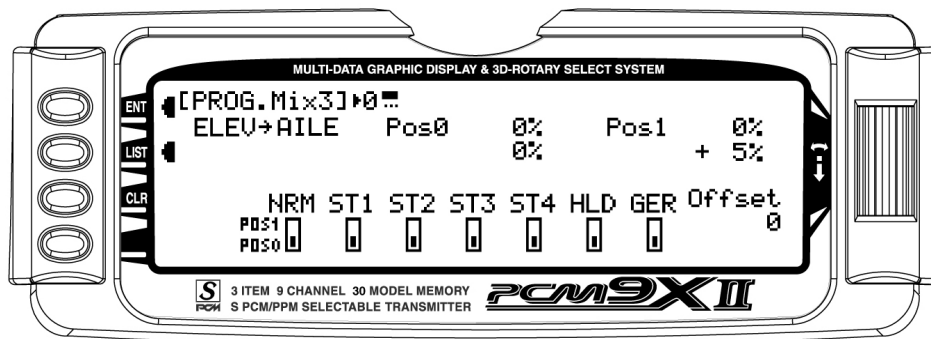
Swashplate Timing Mixes Example: Elevator-to-Aileron (Corrects vertical tracking)

Perhaps the best way to describe a Programmable Mix is by example. The example below demonstrates a program mix for a heli that pulls or climbs to the left when pulling vertical into a maneuver such as a loop or stall turn. If a mix is set up to provide a couple of degrees of Right aileron when up Elevator is given, the aircraft will then climb vertically with no change in Aileron tracking.

This mix uses the Elevator as the Master and the Aileron as the Slave. The mix can be turned on and off via the Flight Mode switch, so that you can activate the mix only in the flight modes where the trim change is noted, most commonly forward flight modes 1–4 only.

The mix parameters will be selected and set in the following order: Program Mix number (3-6), Master and Slave channels, Mix Position and Flight Mode. This is generally a good sequence to follow when setting up a Programmable Mix. In this situation, the Offset value would remain at 0% (1/2 Stick).

Program Mix Number. Highlight and select one of the Standard Programmable Mixers (**PROG.MIX3 - PROG.MIX6**) to obtain the first Programmable Mix display. Then press **ACT** next to CLR or highlight and select **INH** to obtain the main mix display. The example is using **PROG.MIX3**.

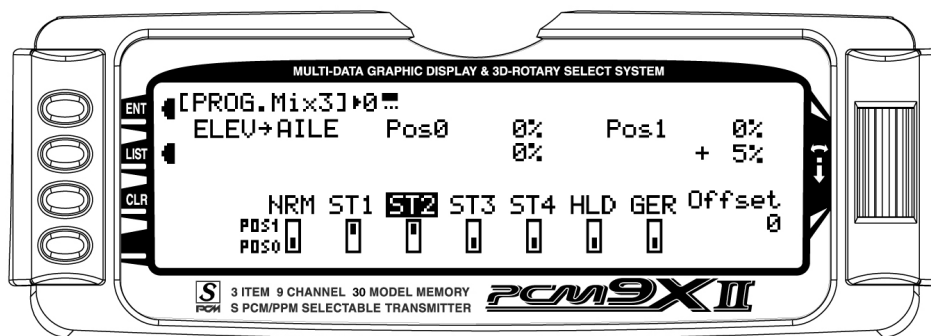


1. Select Master. All Programmable Mixers default to Throttle as Master and Throttle as the Slave (**THRO->THRO**). The first **THRO** is the Master and the second **THRO** represents the Slave. Since the Elevator is to be the Master in this example, highlight the first channel with the Selector and select **ELEV** to the left of the arrow.

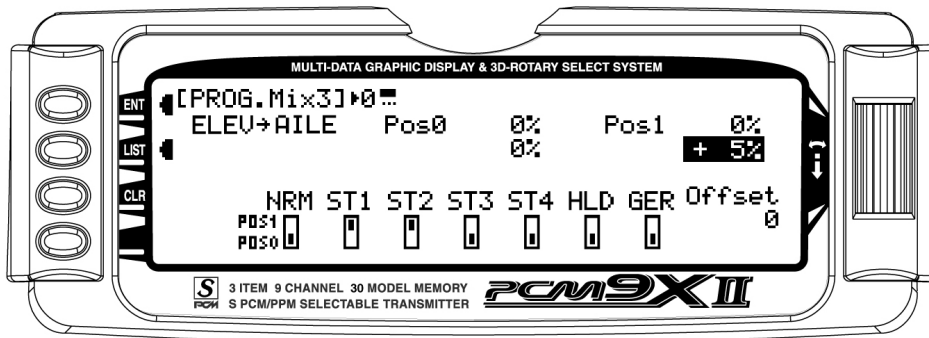
2. Select Slave. Highlight and select **THRO** to the right of the arrow to obtain a list of channels that can be used as the Slave. Highlight and select **AILE** as the Slave.

3. Select Position and Flight Modes. Move the Selector to highlight each of the active flight modes (**NRM, ST1, ST2, ST3, ST4, HLD, GER**), and then select the mix position (0 or 1) to be used. Since we will set the mix value in position 1, and flight modes where the mix would not be required would be set to the POS 0 mix position (will be left at 0%). Note that **HLD** only appears if Throttle Hold is active.

The number will change from 0 to 1 as the switch is moved back and forth. When the number is 0, the mixer is looking at the Pos0 values (not programmed yet) and when it is a 1 it is looking at the Pos1 values (also not programmed yet). For this example, we will assume that this mix will be used in Stunt Modes 1 and 2 only



Swashplate Timing Mixes (continued)



4. Travel and Direction. Highlight POS 1 with the Selector and Press to access the values. Move the Elevator stick to the full up position and the lower value next to Pos1 should be highlighted. Set the lower Pos1 parameter to a low negative or positive value (check aileron function for proper direction) to a starting value of between 3% and 5%. This is the amount of deflection of the Aileron (Slave channel) that is to occur when the mixer is turned on and the Elevator is pulled up.

Example: If the model pulls to the left during a loop, you would want to set a value so that when up Elevator is given, the mix would provide a small amount of right Aileron to correct this problem.

If an Elevator-to-Aileron mixing value is also required for Down Elevator, move the Elevator stick to the down

position. The upper POS 1 value will then be highlighted and can be adjusted as needed.

5. Offset. Leave the offset value to 0% for this mix, and 0% will correspond to the center stick position.

6. Verify Proper Mix Operation. Move the Flight Model switch to the Stunt 1 or Stunt 2 positions, and move the elevator stick from center to full up, and from center stick to full down. If the mix is activated and functioning properly, you should see a slight aileron servo movement (easiest to see at the aileron servo arm) when the Elevator stick is moved. Please verify that the Aileron servo is moving in the desired direction to correct the trim problem at this time. Next, switch the Flight Mode switch to the Normal or Throttle Hold positions (set to off in this example), and verify that the mix is being turned off for these desired flight modes.

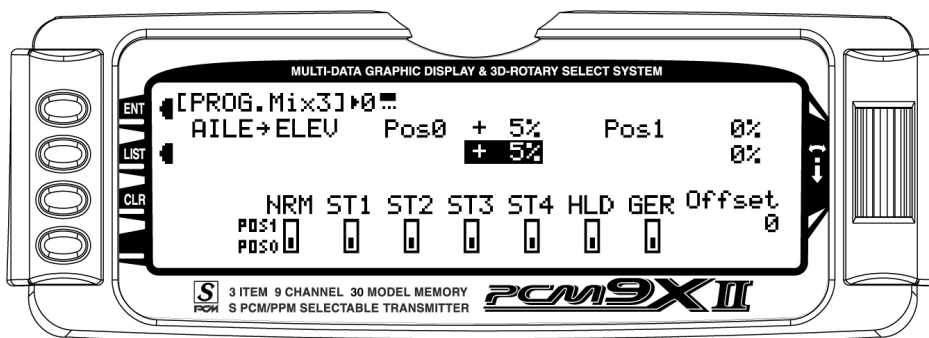
Swashplate Timing: Aileron-to-Elevator (Corrects Rolling Maneuvers)

This form of mix functions and is set up exactly as we have outlined in the Elevator-to-Aileron Mix section, and allows the helicopter to roll more axial along the Tail Boom of the model by adding a slight amount of Elevator to each direction of Aileron.

Setup Tip: Most helicopters that have a Clockwise Rotation Rotor require a small amount of Up Elevator

for right rolls, and a small amount of Down Elevator for left rolls.

Highlight and select one of the Standard Programmable Mixers (**PROG.MIX3 - PROG.MIX6**) to obtain the first Programmable Mix display. Then press **ACT** next to CLR or highlight and select **INH** to obtain the main mix display. The example is using PROG.MIX3.

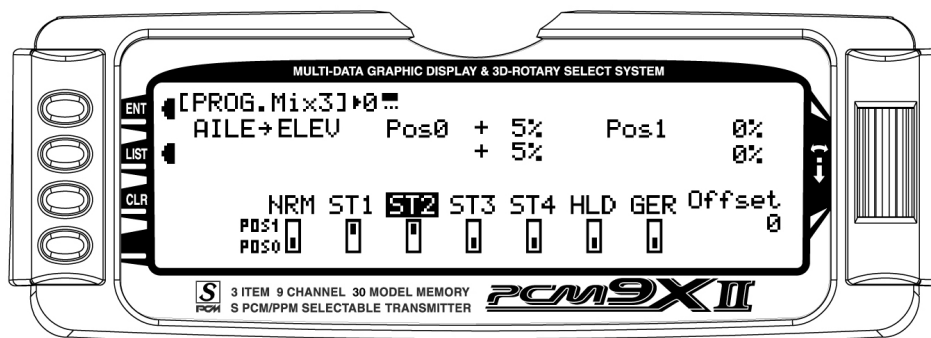


Swashplate Timing: Aileron to Elevator (continued)

1. Select Master. All Programmable Mixers default to Throttle as Master and Throttle as the Slave (**THRO**→**THRO**). The first **THRO** is the Master and the second **THRO** represents the Slave. Since the Aileron is to be the Master in this example, highlight the first channel with the Selector and select **AILE** to the left of the arrow.
2. Select Slave. Highlight and select **THRO** to the right of the arrow to obtain a list of channels that can be used as the Slave. Highlight and select **ELEV** as the Slave.

3. Select Position and Flight Modes. Move the Selector to highlight each of the active flight modes (**NRM**, **ST1**, **ST2**, **ST3**, **ST4**, **GER**, and then select the mix position (**0** or **1**) to be used. Since we will set the mix value in position 1, and flight modes where the mix would not be required would be set to the Pos0 mix position (will be left at 0%).

The number will change from 0 to 1 as the switch is moved back and forth. When the number is 0, the mixer is looking at the Pos0 values (not programmed yet) and when it is a 1 it is looking at the Pos1 values (also not programmed yet). For this example, we will assume that this mix will be used in Stunt Modes 1 and 2 only.



4. Travel and Direction. Highlight Pos1 with the Selector and press to access the values. Move the Aileron stick to the full right position and the lower value next to **Pos1** should be highlighted. Set the lower **Pos1** parameter to a low negative or positive value (check elevator function for proper direction, you want up elevator) to a starting value of between **3%** and **5%**. This is the amount of deflection of the Elevator (Slave channel) that is to occur when the mixer is turned on and the Aileron is pushed Right.

Example: If the model ends in a nose high attitude after a right roll, you would want to set a value so that when Right Aileron is given, the mix would provide a small amount of up elevator to correct this problem.

If the model ends in a nose down position after a Left Roll, you would want to set a value so that when Left Aileron is given, the mix would provide a small amount of Down Elevator to correct this problem. The upper

Pos1 value will then be highlighted and can be adjusted as needed.

4. Offset. Leave the offset value to 0% for this mix, a d 0% will correspond to the center stick position.

Verify Proper Mix Operation. Move the Flight Model switch to the Stunt 1 or Stunt 2 positions, and move the Aileron stick from center to full Right, and from center stick to full Left. If the mix is activated and functioning properly, you should see a slight Elevator servo movement (easiest to see at the elevator servo arm) when the Aileron stick is moved. Please verify that the Elevator servo is moving in the desired direction to correct the trim problem at this time. Next, switch the Flight Mode switch to the Normal or Throttle Hold positions (set to off in this example), and verify that the mix is being turned off for these desired flight modes.

STANDARD PROGRAMMABLE MIXES

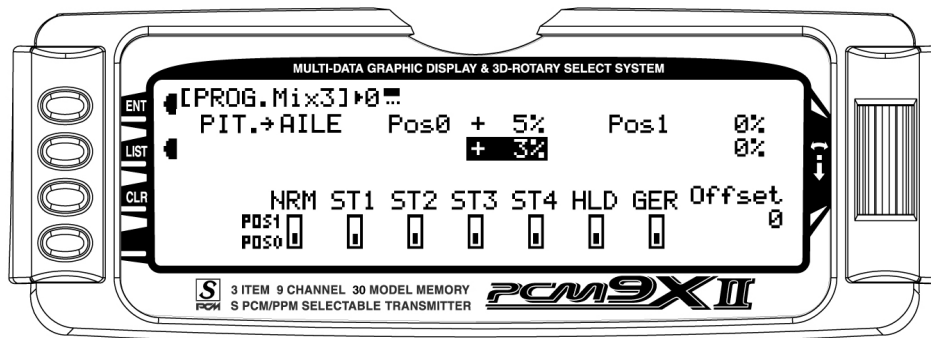
– Example: Right Aileron with Positive Pitch

Perhaps the best way to describe a Programmable Mixer is by example. The example below demonstrates a program mix for a heli that pulls or climbs to the left when collective pitch is added. If a mix is set up to provide a couple of degrees of Right aileron when positive pitch is added, the helicopter will then climb vertically with no change in Aileron trim. Once the throttle is advanced below mid stick, the mix would not affect the Aileron trim unless trim in this direction is needed and added to the mix.

This mix uses the Pitch as the Master and the Aileron as the Slave. The mix can be turned on and off via the Flight Mode switch, so that you can activate the mix only in the flight modes where the trim change is noted.

The Mix parameters will be selected and set in the following order: Program Mix number (3–6), Master and Slave channels, Mix Position and Flight Mode. This is generally a good sequence to follow when setting up a Programmable Mix. In this situation, the Offset value would remain at 0% (1/2 Stick). For more information regarding Programmable Mixers please see the detailed descriptions of the functions that are included later in the HELI section.

1. Program Mix Number. Highlight and select one of the Standard Programmable Mixers (**PROG.MIX3 - PROG.MIX6**) to obtain the first Programmable Mix display. Then press **ACT** next to CLR or highlight and select **INH** to obtain the main mix display. The example is using **PROG.MIX3**.



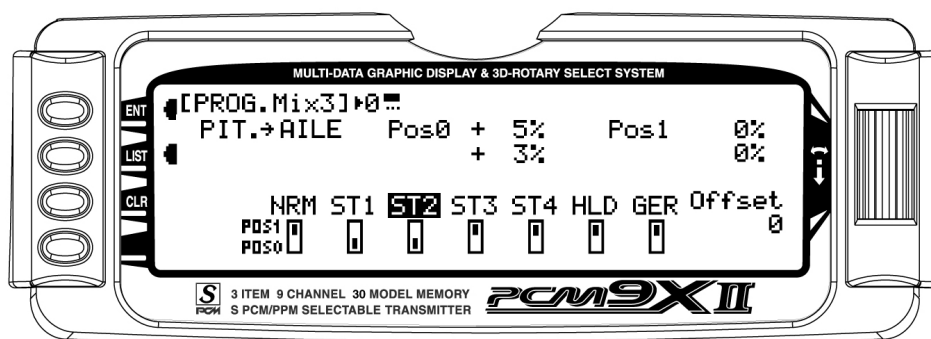
STANDARD PROGR. MIXES

– Example: Right Aileron with Positive Pitch (continued)

2. Select Master. All Programmable Mixers default to Throttle as Master and Throttle as the Slave (**THRO**→**THRO**). The first **THRO** is the Master and the second **THRO** represents the Slave. Since the Pitch is to be the Master in this example, highlight the first channel with the Selector and select **PIT** to the left of the arrow.
3. Select Slave. Highlight and select **THRO** to the right of the arrow to obtain a list of channels that can be used as the Slave. Highlight and select **AILE** as the Slave.

4. Select Position and Flight Modes. Move the Selector to highlight each of the active flight modes (**NRM**, **ST1**, **ST2**, **ST3**, **ST4**, **GER**), and then select the mix position (**0** or **1**) to be used. Since we will set the mix value in position 0, and flight modes where the mix would not be required would be set to the POS 1 mix position (will be left at 0%).

The number will change from 0 to 1 as the switch is moved back and forth. When the number is 0, the mixer is looking at the Pos0 values (not programmed yet) and when it is a 1 it is looking at the Pos1 values (also not programmed yet). For this example, we will assume that this mix will be used in Stunt Modes 1 and 2 only.



5. Travel and Direction. Highlight **Pos0** with the Selector and Press to access the values. Move the throttle stick to the full high position and the upper value next to Pos0 should be highlighted. Set the higher Pos0 parameter to a low negative or positive value (check aileron function for proper direction) to a starting value of between 3% and 5%. This is the amount of deflection of the Aileron (Slave channel) that is to occur when the mixer is turned on and the throttle is moved from center to full throttle.

If an Aileron mixing value is also required for center stick to low Pitch, move the throttle stick to the low position. The lower Pos0 mix value will then be highlighted and can be adjusted as needed.

6. Offset. Leave the offset value to 0% for this mix, and 0% will correspond to the center stick position.
7. Verify Proper Mix Operation. Move the Flight Model switch to the Stunt 1 or Stunt 2 positions, and move the Throttle stick from center to full throttle, and from center stick to low throttle. If the mix is activated and functioning properly, you should see a slight aileron servo movement (easiest to see at the aileron servo arm) when the throttle stick is moved. Please verify that the Aileron servo is moving in the desired direction to correct the trim problem at this time. Next, switch the Flight Mode switch to the Normal or Throttle Hold positions (set to off in this example), and verify that the mix is being turned off for these desired flight modes.

MULTI-POINT MIXES

– Example: FMOD to Gear Mixing (Retract and other Functions)

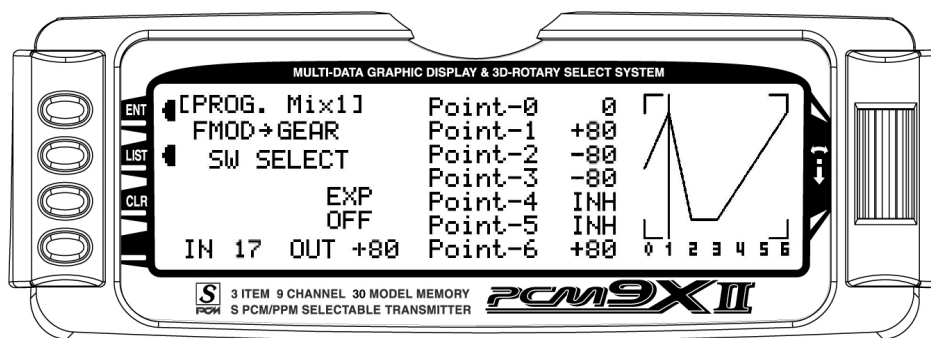
The example below demonstrates a Multi-Point Program Mix for coupling the Retractable Gear function to the Flight Mode switch so that the Gear will automatically move up and down when moving through the Flight modes.

This Multi-Point mix (mixes 1 and 2) will use the FMOD (Flight Mode switch) as the Master and the Gear (or other available auxiliary channels) as the Slave. The mix will be activated with the Flight Mode switch.

The Mix parameters will be selected and set in the following order: Program Mix number (1 or 2), Master and Slave Channels, switch Selection, Set Points

Travel/Direction, and Expo. This is generally a good sequence to follow when setting up Multi-Point Programmable Mixers. For more information regarding Multi-Point Programmable Mixers, please see the detailed descriptions of the functions that are included later in the HELI section.

1. Program Mix Number. Highlight and select one of the Multi-Point Programmable Mixers (**PROG.MIX1** or **PROG.MIX2**) to obtain the first Multi-Point Programmable Mix display. Then press ACT next to CLR or highlight and select INH to obtain the main mix display. The example is using **PROG.MIX1**.



Flight Mode switch in Normal position

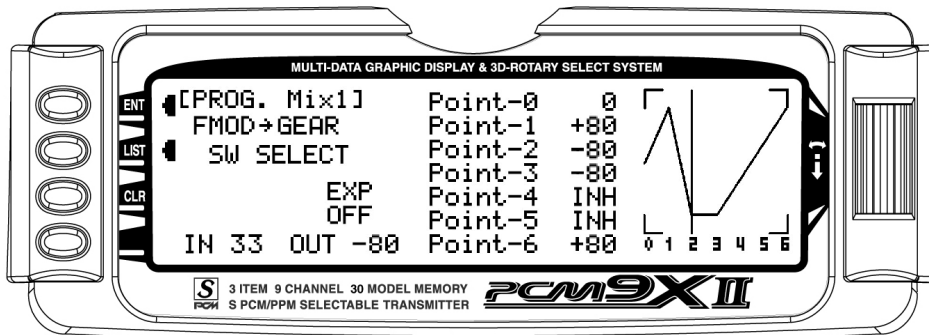
2. Select Master. All Programmable Mixers default to Throttle as both the Master and the Slave (**THRO->THRO**). The first **THRO** is the Master and the second **THRO** represents the Slave. Highlight and select the first **THRO** to the left of the arrow to obtain a list of channels and select **FMOD** as the Master.

3. Select Slave. Highlight and select **THRO** to the right of the arrow to obtain a list of channels that can be used as the Slave. Highlight and select **GEAR** as the Slave. Now, if you move the Flight Mode or Throttle Hold switches, you will see the vertical cursor on the screen move to one of the 7 points for each of the flight modes. Point 1 will be Normal, Point 2 will be Stunt 1, Point 3 will be Stunt 2, and Point 6 will be Throttle Hold.

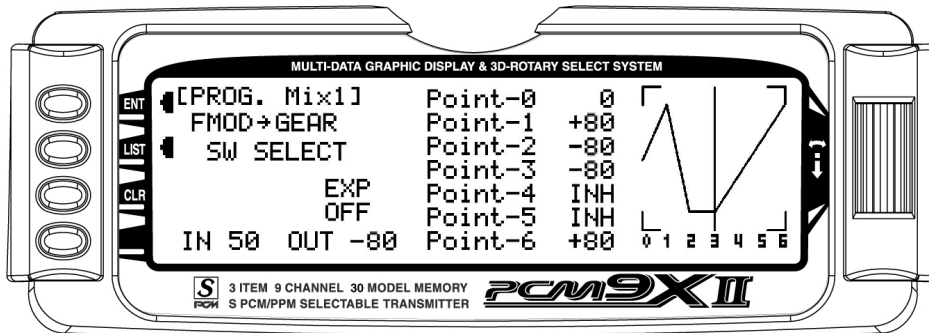
MULTI-POINT MIXES – FMOD to Gear (continued)

4. Select switch. Scroll down, highlight, and press **SW SELECT**. The Box will open to display the activated Flight Modes. Move the Selector to highlight each of the Flight Modes, and press to select **ON** or **OFF** for

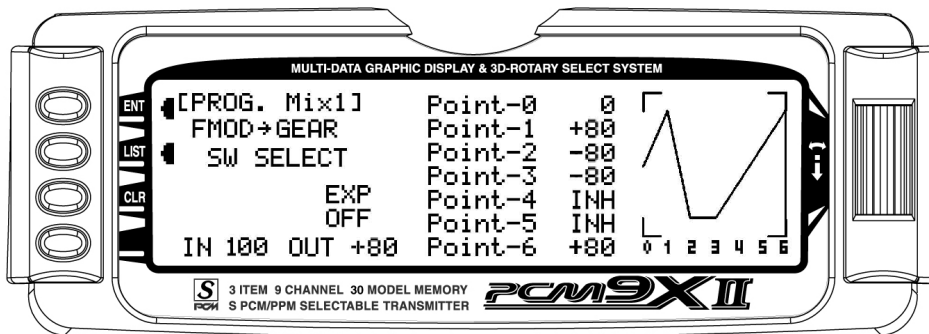
the mix in each of the Flight Modes. For this example, the Mix will be set to the ON position for Flight Modes **NRM**, **ST1**, **ST2**, and **HLD**.



Flight Mode switch in ST1 position



Flight Mode switch in ST2 position



Flight Mode switch in Hold position

MULTI-POINT MIXES – FMOD to Gear (continued)

5. Set Points for Travel and Direction. There are 7 points displayed. A negative value at a point typically indicates a Gear Up movement at that point and a positive value, a Gear Down movement. The direction of travel may be reversed (Up Gear vs. Down Gear) by changing values from negative (-) to positive (+) (moving the point values above and below the 0% line).

Set the points initially to the following values.

Point-0 -0%

Point-1 +80% (Normal Mode, Gear Down)

Point-2 -80% (Stunt 1, Gear Up)

Point-3 -80% (Stunt 2, Gear Up)

Point-4 INH (Stunt 3 if Activated)

Point-5 INH (Stunt 4 if Activated)

Point-6 +80% (Throttle Hold, Gear Down)

7. EXP (Expo). With this mixing example, it is not necessary to activate the Expo option.

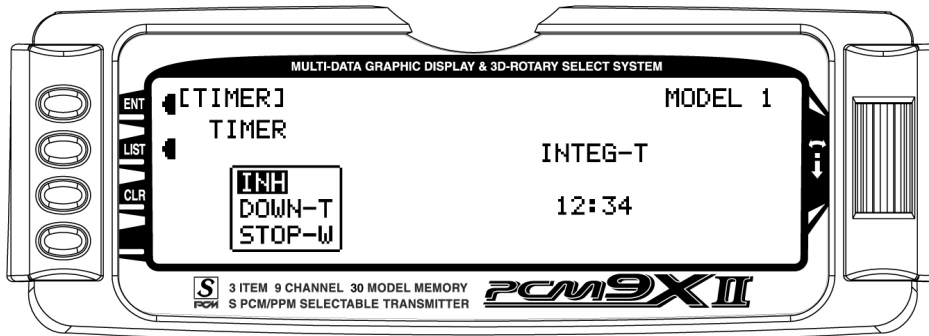
8. Verify Operation. Power up the receiver, making sure that the heli is elevated for the first time in case the Gear is functioning in the opposite direction desired. Move the Flight Mode and Throttle Hold switches, and note the position (Up or Down) of the retracts. If the retracts are functioning in the opposite direction desired, then enter the mix again and change the value from a + to a -, or a - to a + as needed and retest.

Timer – Timer System

The PCM9X II contains a Timer System that contains two timers when in ACRO or HELI modes. One is an integrated timer that keeps track of total TX-on time for the model and it is displayed on the Main display. The other timer can be configured as a Countdown timer or as a Stopwatch. These timers also appears on the Main

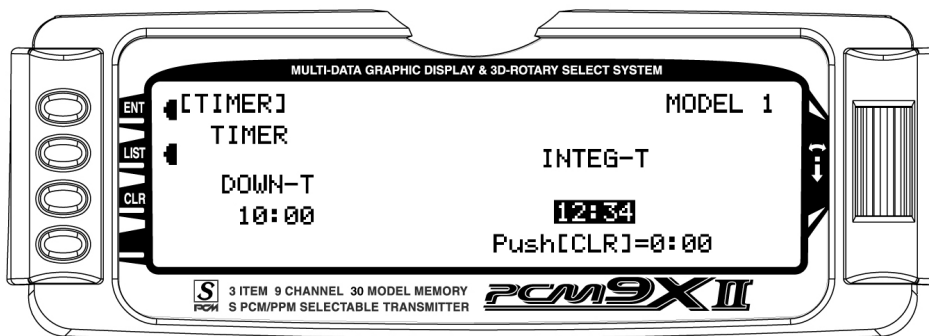
display when active and can be started, stopped and reset from the Main display.

1. To Reset the Integrated Timer, highlight and select the time under **INTEG-T** and **Push [CLR]=0:00** appears on the display. Press the CLR button to the left of the display to reset the integrated timer.



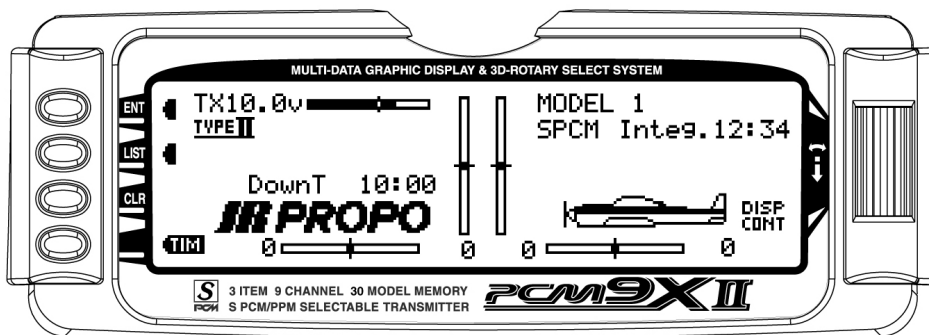
2. To configure the timer as a Countdown timer, highlight and select **Timer** in the **FUNCTION LIST** to obtain the Timer display. Highlight and select **INH**

under **TIMER** and then select **DOWN-T**. Use the Selector to set the countdown start time.



3. Once the timer is set, **TIM** will appear on the Main display in the lower left corner. Pressing the button next to **TIM** on the Main display starts and stops the timer while pressing the button next to **CLR** resets

the timer to the programmed value. The timer can also be started and stopped using the Trainer switch.

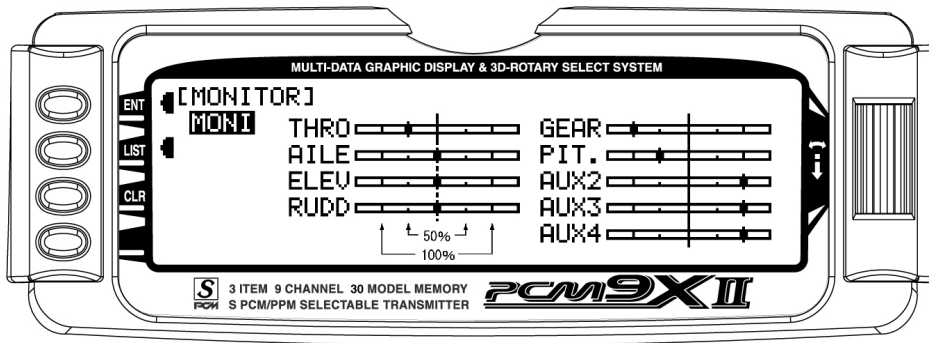


MONITOR- Servo Monitor

The Servo Monitor function displays each channel and shows the movement of channels when sticks, levers and switches are moved. It renames channels according to special assignments to assist in identifying what is moving. For instance, when 120 CCPM Swashplate Type is selected, the Servo Monitor will display CH-2, CH-3, and CH-6. It is a handy way to determine what channels are mixed with other channels

and to verify programming when the helicopter is not at hand. The Monitor function also displays the current value of all digital trims.

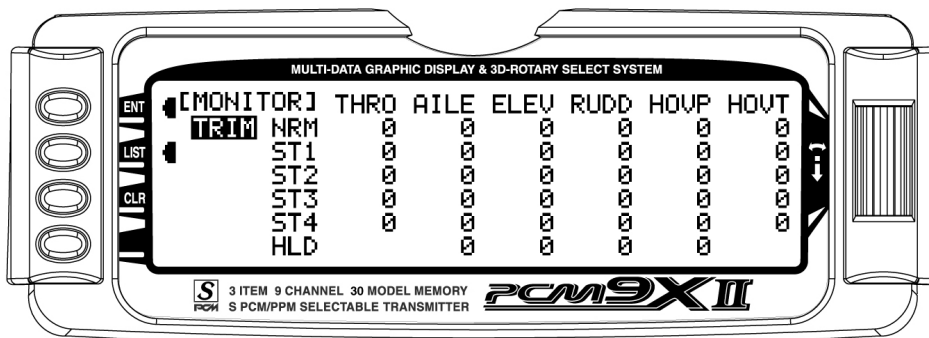
1. To access the Monitor function, highlight and select MONITOR in the FUNCTION LIST to obtain the Monitor display.



2. The default display (MONI) shows the settings of all digital trims. To view the Monitor display of all channels, highlight and select MONI. View the display while moving sticks, switches and levers to see the movements of various channels.
3. To view the Digital Trim values and Hover Pitch (HOV P) and Hover Throttle (HOV T) Lever values, Highlight MONI with the Selector and press. The

word MONI will change to TRIM to show the trim values for these levers. To move back to the Channels display, press TRIM to return to MONI and the servo travel and output positions will be displayed once again.

Note: If a form of CCPM mixing has been selected, channel naming will vary.



PCM9XI I DATA SHEET HELI

MODEL NO. _____

MODEL NAME _____

MODULATION SPCM • PPM

D/R • EXP	Pos0	D/R	AILE	ELEV	RUDD	
			%	%	%	
		EXP	%	%	%	
			%	%	%	
		Pos1	D/R	%	%	%
				%	%	%
	EXP		%	%	%	
			%	%	%	
	Pos2		D/R	%	%	%
				%	%	%
		EXP	%	%	%	
			%	%	%	

GYRO SENS (AUX2)	INH • RUDD D/R • AUTO	NORM	Pos. 0 • Pos. 1 • Pos. 2	
		ST-1	Pos. 0 • Pos. 1 • Pos. 2	
		ST-2	Pos. 0 • Pos. 1 • Pos. 2	
	Pos. 0	%	ST-3	Pos. 0 • Pos. 1 • Pos. 2
	Pos. 1	%	ST-4	Pos. 0 • Pos. 1 • Pos. 2
	Pos. 2	%	HOLD	Pos. 0 • Pos. 1 • Pos. 2

SWASH MIX	TYPE		AILE	%
	1s • 2s180	ELEV	%	
	3s120 • 3s140	PIT.	%	
	3s90 • 4s90	EXP	INH • ACT	

AUTO D/R	NORM	INH • Pos0 • Pos1 • Pos2
	ST-1	INH • Pos0 • Pos1 • Pos2
	ST-2	INH • Pos0 • Pos1 • Pos2
	ST-3	INH • Pos0 • Pos1 • Pos2
	ST-4	INH • Pos0 • Pos1 • Pos2
	HOLD	INH • Pos0 • Pos1 • Pos2

GOVERNOR (GEAR)	NORM	%
	ST-1	%
	ST-2	%
	ST-3	%
	ST-4	%
	HOLD	%

A. D. T.	THRO	AILE	ELEV	RUDD	HOV. PIT.	HOV. THRO
	NORM					
	ST-1					
	ST-2					
	ST-3					
	ST-4					
	HOLD					
	TRIM STEP					
TRIM Type		L. S. T. • NORM	L. S. T. • NORM	L. S. T. • NORM		

THRO HOLD	INH • ACT	
	POS	%
	STICK AUTO	
	Delay	sec

REVO MIX	NORMAL	Up	%
		Down	%
	STUNT	Up	%
		Down	%

DEVICE SELECT	FLIGHT MODE EXTRA		THROTTLE HOLD		PITCH TRIM		GEAR		AUX2		AUX3		AUX4	
	INH	RUD D/R	AILE D/R	HOLD SW	INH	AUX3 LEVER	AILE D/R	HOLD SW	AUX3 LEVER	Pit. TRIM LEVER	AUX3 LEVER	Pit. TRIM LEVER	AUX3 LEVER	Pit. TRIM LEVER
	AILE D/R	HOLD SW	ELE D/R	GEAR SW	AUX3 LEVER		ELE D/R	GEAR SW	Pit. TRIM LEVER	FLIGHT MODE SW	Pit. TRIM LEVER	FLIGHT MODE SW	Pit. TRIM LEVER	FLIGHT MODE SW
		GEAR SW	RUD D/R		Pit. TRIM LEVER		RUD D/R		FLIGHT MODE SW	AUX2 SW	FLIGHT MODE SW	AUX2 SW	FLIGHT MODE SW	AUX2 SW
	RUDD TRIM: COM • FM						INH • ACT • GOV		INH • ACT • GYR		INH • ACT		INH • ACT	

REVERSE SW	THRO		AILE		ELEV		RUDD		GEAR		PIT.		AUX2		AUX3		AUX4	
	NORM	REV	NORM	REV	NORM	REV	NORM	REV	NORM	REV	NORM	REV	NORM	REV	NORM	REV	NORM	REV
SUB TRIM																		
TRAVEL ADJUST	H	%	L	%	D	%	L	%	+	%	H	%	+	%	+	%	+	%
	L	%	R	%	U	%	R	%	-	%	L	%	-	%	-	%	-	%
FAIL SAFE (SPCM)																		

CHANNEL	AILE→THRO				ELEV→THRO				RUDD→THRO			
SW SELECT	ON: NRM • ST1 • ST2 • ST3 • ST4 • GER				ON: NRM • ST1 • ST2 • ST3 • ST4 • GER				ON: NRM • ST1 • ST2 • ST3 • ST4 • GER			
MIX	L	%	R	%	D	%	U	%	L	%	R	%

		EXP	L	1	2	3	4	5	H
THRO CURVE	NORM	OFF • ON	%	%	%	%	%	%	%
	ST-1	OFF • ON	%	%	%	%	%	%	%
	ST-2	OFF • ON	%	%	%	%	%	%	%
	ST-3	OFF • ON	%	%	%	%	%	%	%
	ST-4	OFF • ON	%	%	%	%	%	%	%
PITCH CURVE	NORM	OFF • ON	%	%	%	%	%	%	%
	ST-1	OFF • ON	%	%	%	%	%	%	%
	ST-2	OFF • ON	%	%	%	%	%	%	%
	ST-3	OFF • ON	%	%	%	%	%	%	%
	ST-4	OFF • ON	%	%	%	%	%	%	%
	HOLD	OFF • ON	%	%	%	%	%	%	%

PROGRAM		CHANNEL	SW	EXP	0	1	2	3	4	5	6
	MIX	MIX1	→	ON • NR • S1 • S2 • S3 • S4 • HD • GR	OFF • ON						
MIX2		→	ON • NR • S1 • S2 • S3 • S4 • HD • GR	OFF • ON							
				POS-0 +	POS-0 -	POS-1 +	POS-1 -	OFFSET			
MIX3		→	NR • S1 • S2 • S3 • S4 • HD • GR	%	%	%	%				
MIX4		→	NR • S1 • S2 • S3 • S4 • HD • GR	%	%	%	%				
MIX5		→	NR • S1 • S2 • S3 • S4 • HD • GR	%	%	%	%				
MIX6		→	NR • S1 • S2 • S3 • S4 • HD • GR	%	%	%	%				

