

Hitec Optic 6 Radio Tutorial **For ACRO functions**

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Hitec Optic 6

Supplemental System Programming Manual

This System Handling manual is designed to provide you with an in-depth understanding of your new Hitec Optic 6 system. There are many features and options to select from within the Optic 6 System, and if the Optic 6 is your first computer controlled radio system, you may be overwhelmed by the variety of features presented by the Optic. By reading through this System Handling Manual, you will become much more familiar with how the system works, and how to get the most from it.

Please note that for the advanced modeler, some of the explanations presented here may be common knowledge to you, and therefore may seem redundant to review. The information will be presented in an explanatory manner, beginning with the radio system in the normal transmitting mode, and then brought forward to the feature being explained, just as you would in the field. By using this format, you can zip right on over to the desired feature you wish to find out about without having to remember everything about what was written in the pages before. We will not present basic information on the radio system, as this is covered in-depth with the Hitec System Instruction Manual.

System Modes

The Optic 6 is capable of being programmed for acrobatic models, as well as for helicopters and most gliders. Each mode has dedicated features to assist with the set-up of that particular type of model. Most modelers will use the Acro mode in many cases, and this mode will provide a multitude of options for a wide variety of model types. Aircraft which use V-tails, flying wings using elevons, larger models using two ailerons servos in a discreet manner, and scale models which mix the rudder to ailerons are all accommodated in the Acro mode. Additionally, aircraft equipped with flaps can be employed using the Optic 6's Landing Mixing options. And, you have two free-mix programs in the system, allowing you to mix any two channels together from one control input.

For you Helicopter fans, the Optic 6 can provide pitch and throttle curves, high and low rev mixing, throttle-to-rudder (tail rotor) mixing, adjustable gyro settings, and even 120-degree CCPM head mixing.

Accessing the system mode is made easy with the Optic 6. With the radio turned OFF, depress both the UP and DOWN Edit keys at the same time and then turning the power switch to the Optic 6 to the ON positions while still holding the Edit keys. Your instruction manual calls this the Model Set-Up Functions section, and the following selections can be made:

- Model Selection (8 models in memory)
- Model Name (5 characters only)
- Model Type (Acro/Glider or Helicopter)
- Swashplate Type (for helicopters only)
- Copy Model (to copy one set-up to another memory location)
- Shift Direction (to change signal shift type, positive or negative)
- Modulation (either PPM or QPCM)
- Mode (for transmitter stick Mode I or Mode II)
- Time Setup (the Optic's two self timers)
- Reset Memory (to reset a memory position to factory defaults)



Model Selection

The Optic 6 can retain 8 models into the internal memory. This memory is non-volatile memory and requires no back-up battery or other power source to retain any of the model settings. You may remove the main battery pack without worry of memory loss within the transmitter. Each model memory position is separate and distinct from all others, meaning that whatever settings you create or delete on one model will have no bearing upon any other model memory setting. The factory default for any model position in memory is the Acro/Glider (ACGL) type.

This function allows you to select which model in the transmitter memory you wish to bring up for use. By holding down the two EDIT keys while simultaneously turning the power on, you will enter into the Model Setup Function menu and this will be the first function on the screen. Simply select the model by using to the Cursor Right (>) or Left (<) button. If you are not sure of which model is being selected by the model number, select which model number you think is correct and then press the UP or DOWN Edit key to scroll to the model Name. This should confirm for you which model you have selected. Once you have the correct model on screen, turn the transmitter OFF, and the next time you turn the power ON again, the model you selected will be operational.



Model Name:

You may also name the model by scrolling to the Model Name screen. Press the UP Edit key and this will take you to the Model Name screen. The first place mark will be flashing, meaning you may change this letter to read whatever you wish. In this case, let's name the plane "Alpha". Use the Data (-) or (+) keys to change the letters until you get to the letter "A". Move to the next place by pressing the Cursor Right (>) key once and then select another letter. Continue doing this until you have completed the name. Once completed, you may now press the UP cursor key once more to go to the Model Type Select screen.



Model Type, ACRO/GLID or HELI

In the Model Type select screen we select the Model Type either ACRO or HELI, the default is Acro/glider mode (ACGL), and this will be flashing at you on the screen. To change this to the Helicopter mode, simply press the Cursor Right (>) key once, and the mode will be changed. You have now selected which model in memory you wish to use, given the model a name for identification, and selected the type of model to program. Let's move on to some other options you can perform while in the Model Setup Menu.



COPY

You may copy the settings of one model in memory to another memory location using the COPY command. This is very useful when experimenting with new settings for the aircraft, as you can retain all of your existing setting with the original memory location while trying any new settings in the copied model location. This way, you may always fall back on the original settings if you need to do so. It is a good idea not to retain the same name for the model to the copied memory location, just to keep from being confused later on. The procedure for making a COPY is to enter the Model Setup Functions screen by depressing both the UP and DOWN Edit keys while turning ON the main power switch to the Optic 6, then use either the UP or DOWN Edit keys until you scroll to the COPY screen. The default screen will have an arrow indicator above Channel 1, for the Master model, and there will be a flashing arrow indicator below Channel 1 to indicate the Slave model location, which is the model location where the Master model will be copied to. To select the model location where the copy will be sent to, use the > Cursor key to move the Slave arrow indicator to the model location you wish. To make the copy, press down both the (-) and (+) Data keys at once and the Optic 6 will beep rapidly to indicate the copy process has started. When the beeping stops, the copy is completed and ready to use. To exit the screen, simply turn your Optic 6 transmitter OFF and then turn ON the transmitter to use the system.



TRANSMIT SHIFT DIRECTION

This feature allows you to select the method of signal shift that is used to encode the signals to your receiver. The type of shift used in the modeling world is either Negative Shift or Positive Shift. Airtronics (Sanwa), and JR Radio brand systems utilize a Positive Shift signal, while Futaba and Hitec radios use the Negative Shift signal. With the Optic 6 system, it does not matter which brand of receiver you may wish to use as the Optic can accommodate most all receivers regardless of shift, except for PCM type receivers. The Optic 6 can utilize the Hitec QPCM receivers only for PCM signal encoding. Setting the shift mode in one model in memory does not affect any other model in memory, and so it is normal to have any number of models in memory using negative shift or positive shift, as needed by you, the pilot. Selection of the shift type is easily accomplished, as follows:

Enter the Model Setup Functions screen by depressing both the UP and DOWN Edit keys while turning ON the main power switch to the Optic 6, then use either the UP or DOWN Edit keys until you scroll to the SFT-N screen. As the default, the letter "N" should be flashing, indicating the shift is set for Negative Shift mode. Use the > or < Cursor key to change the shift type from Negative to Positive or back as you wish. To exit this screen, you may simply turn the Optic 6 power OFF. All settings will remain in memory as changed.



MODULATION

The Optic 6 system is capable of transmitting a signal using a standard PPM (Pulse Proportional Modulation) encryption method, or QPCM (Hitec's Q Pulse Code Modulation) encryption method. PPM mode is the "normal" FM type of signal encryption used by a majority of modern radio system and is common to all major brands of radios. QPCM is Hitec's exclusive system that adds another layer of reliability to your radio system by using digital signal encryption to provide better signal reception with less chance for interference by static or stray signals. Only the Hitec QPCM receivers may be used with this mode of transmission. To change the Modulation type of your Optic 6, enter the Model Setup Functions screen by depressing both the UP and DOWN Edit keys while turning ON the main power switch to the Optic 6, then use either the UP or DOWN Edit keys until you scroll to the flashing PPM screen or QPCM screen, whichever was left active in this model memory position. To switch the modulation type, simply press either the < or > Cursor key and note the screen. If you wish to use PPM, the screen should flash PPM. If you wish to use the Hitec QPCM signal encryption, the screen should be flashing QPCM. To exit the screen, simply turn the Optic 6 transmitter OFF.

MODE I or MODE II STICK STYLE Screen Shot Missing

Mode I and Mode II style sticks deals with the control stick set-up and channel assignment. In Mode I, the elevator and rudder controls are assigned to the Right stick assembly, while the ailerons and throttle are assigned to the Left stick assembly. This mode is the predominant style of flying in Europe and for precision aerobatic pilots, where separation of the pitch and roll control is desired. Mode II style sticks has the ailerons and elevator on the Right side sticks and rudder with throttle on the Left side sticks. This is most popular style of arrangement within the United States. Your Optic 6 will arrive as a Mode II design, unless purchased by special order as a Mode I style system. We do not recommend changing the transmitter from one mode to another on your own. Instead, if you need to have the Mode switched, please contact us at Hitec for assistance.



TIMER SETUP

Your Optic 6 system has two internal timers, plus a system timer to assist you in many ways. Many times, it is wise to keep track of how long you have been in the air and to make sure you still have fuel left to make a safe landing. Other times, it's good to know just how long you have been airborne while taking advantage of those summertime thermals that seem to be endless. Just remember that the timers provide a convenient method of reminding you when it may be time to land your aircraft. Programmable timer No. 1 provides a "count-down" style of timing from 60 minutes or less, down to a minimum set time of one (1) minute. You may start a timer at anytime during your flight as well as stop the timer function at anytime by pressing the Right cursor key once. To stop the timer, press the Right cursor key again. You may reset the timer by pressing the Left cursor key. During the final 10 seconds of a timed sequence, the

Optic timer will provide an audio signal every second down to zero time. When the timer reaches the “zero mark”, the timer will return to the original start time pre-set by you.

Timer Number in the Optic 6 is a “count-up” timer that is set for a specific time up to a maximum time of 60 minutes and a minimum time of one minute. This timer is activated when you move the throttle stick upward above the idle setting of the throttle. It automatically stops when the throttle stick is returned to idle. This timer is useful for powerplane pilot who wishes to monitor his flight time by the fuel consumption of his model. During the final 20 seconds of Timer 2, an audio signal is given to you to let you know of the time expiring without causing you to look away from your aircraft. The timer will continue to move forward, keeping track of the time even after passing your preset stop time.

To set these timers, depress the UP and DOWN Edit keys at the same timer while also turning the transmitter power ON. Press the DOWN or UP Edit keys until you arrive at the TIME screen. You may select Timer 1 or Timer 2 by pressing one of the Cursor keys. Now, set the time you desire the timer to track for you in whole minutes only. When finished, simply turn the transmitter power OFF, and the next time the transmitter is turned ON again, the timers will be ready.

Meanwhile, the Optic 6 system timer runs at all times to keep track of the amount of time your Optic 6 transmitter has been in service with power ON. This is convenient for use when determining how much battery capacity may be remaining in the transmitter during a long day of flying. This system timer records only in whole minutes, and is displayed along side the voltage reading on the LCD display in the normal operating mode. To reset this timer to zero, simply press the CLEAR key once while in the normal flight mode.



RESET MEMORY

This function allows you to erase all of the settings placed into memory for the current model now in service. It will not erase any other memory positions other than the current model. When this feature is used, the model memory for this model will return to the factory defaults of an Acro/Glider type model on PPM with no mixing circuits in use. You should use the Reset Memory function only when you are sure you will no longer need the programming you have placed into this position. Unfortunately, this may be necessary when a plane is sold or crashed and no longer flyable. However, doing so will also free up this model memory position in preparation for a new model set-up when desired. Use of the Reset Memory function is accomplished by entering the Model Setup Functions screen by depressing both the UP and DOWN Edit keys while turning ON the main power switch to the Optic 6, then use either the UP or DOWN Edit keys until you scroll to the REST screen. Along the top of the screen, you will see an arrow indicator above the current model in use. Use the < or > Cursor key to select which model you wish to reset the data with, and then press both the (-) and (+) Data keys at the same time. The Optic 6 transmitter will beep twice to indicate the reset function has been done, and you may now begin re-programming this model position. Resetting of a model set-up in memory will affect only the model currently loaded in the system. There is no method of resetting all of the models in memory to the factory defaults at one time.

MAIN MENU FUNCTIONS Acrobatic and Glider Models (ACGL)

In this section, we will explain the main programming features of the Optic 6 and provide you with examples of how to use these features. Before we begin, remember to read and understand the basic control system set-up for your aircraft as provided by the manufacturer of the model. While modern radio systems allow for a wide variety of adjustments to be made without making mechanical adjustments to the actual linkages on the plane, it is always wise to install the control rods and linkages correctly and without excessive play or loose fittings. Install your servos with the output arms centered up such that the arms will move equally in both directions and allow for maximum control rod movement. Control rods must be free from binding or bending under any load to allow complete movement of the control surfaces and for the servo to return the surface to its' neutral position. Servos must be installed on a solid mount, free from movement, which may prevent the control surfaces from moving consistently or from centering accurately. Once you are confident about your equipment installation, we can begin programming your Optic 6 to get your aircraft ready for flight.

In this section, we will begin with basic set-up operations, starting the way that most builders will perform a set-up once the servos are installed.



SERVO REVERSING (REV)

The first thing to check on a new installation is the direction of the control surface movement. You need to make sure that left rudder actually makes the rudder move to the left. If you find that the rudder moves in the wrong direction, then servo reversing will correct this. Begin by depressing both the UP and DOWN Edit keys after the transmitter has been turned ON. This will bring up the Main Menu Functions. Use the UP or DOWN Edit keys to find the REV screen on the LCD display. To reverse the direction of a servo, use the Left(<) or Right(>) Cursor key to highlight the channel you wish to correct. In the case of the rudder, we wish to reverse channel 4. Once Channel 4 has been selected, simply press the CLEAR key once to reverse the servo direction. Pressing the CLEAR key a second time will return the direction back to where it was previously. Now, check the actual movement on your model to confirm the servo now moves in the correct direction. You may do this for all 6 channels under the Optic system. To return to the normal mode, depress both of the Edit keys at the same time once again.



SUB-TRIMS (S-TRM)

It's actually pretty often that you find that your control surfaces are not at the neutral position when you first set-up the model with radio gear. You may have been very careful to center up the servo arms and match the pushrods to proper length, but the end result may still show the

control surface being a bit off. Your Sub-Trim feature on the Optic 6 will assist you here. The Sub Trims will allow you to change the neutral position of the servo electronically without doing the same by mechanical methods. In the Main Menu Functions list, scroll down to the S.TRM option, and select which channel you wish to adjust by using the Left (<) or Right(>) Cursor key. Once you have selected the channel to adjust, you may use the (+) or (-) Data keys to trim the neutral position until the control surface is straight as desired. Using the Sub Trim does not affect the trim tabs or amount of trim available from the trim tabs on the transmitter. Please note that the use of the Sub Trim is not to replace the requirement to adjust the mechanical linkages to get the control surfaces as close to neutral as possible. It will assist you in getting the control surface to neutral in addition to making corrections on the actual linkages.



END POINT ADJUSTMENT (EPA)

End Point Adjustment (EPA) allows you to adjust the position that your servo will stop when commanded to by the control sticks of the Optic 6. Most model kits and their instructions will state how much control surface movement is ideal for the aircraft design to fly with for best results. Using the EPA function, you can match this quite easily. While in the Main Menu Functions list, scroll down to the EPA option screen, where Channel one, Ailerons, will be highlighted by the pointed icon, and a default value of 100% will be shown to the right. 100% value means that for a normal servo, the amount of travel is about 60 degrees from one end to the other. You may increase this amount to a value of 125%, or about 75 degrees of rotation. You may also decrease this value down to zero movement.

In use, let us assume you have a typical sport aircraft with the radio system installed and operational. Turn both the receiver and transmitter ON, and enter into the Main Menu Functions list by depressing both the UP and DOWN Edit keys at once. Use the UP or DOWN Edit keys to scroll to the EPA option on the LCD display. Let's start with the ailerons. The instructions for your model may recommend 3/8" inch upward movement of the aileron and 1/4" inch downward movement. Hold the Right control stick of your Optic 6 to the right side of the transmitter and watch the right aileron of your model move upwards. With the control stick all the way to the right, your aileron may have moved a total of 1/2 "inch up, which would be more than the recommended motion. While still holding the control stick completely to the right, depress the (-) Data key, which will decrease the amount of motion from the servo. As you do so, the aileron will begin moving downward and when it matches the recommended position of 3/8" inch above the neutral position, you may release the (-) Data key. Now, move the Right control stick to the left, which will make the aileron deflect down. Again, use the (-) or (+) Data key as required to make the aileron match the recommended position of 1/4" inch downward movement. That's it! You have set the end points of the servo movement to match the model instructions for the ailerons. Repeat this procedure for the elevator and rudder channels as well.

When it comes to the throttle channel, your task is a bit easier. In most models using internal combustion engines (nitro or gas powered), you must set the throttle servo to match the carburetor throttle body. Begin by setting the mechanical linkage such that the throttle is halfway open and the servo is centered as is the throttle stick on the transmitter. Adjust the mechanical linkage as required to achieve this. Now, select the throttle position within the

EPA menu function, (channel 3), and then move the throttle stick all the way up, for full throttle. Observe the servo, throttle linkage and carburetor body while doing this. Ideally, you want the servo to open the carburetor fully with the throttle stick in the up position. If this is not the case, you may increase the end point setting to insure the throttle is completely open. If the servo moves too much and jams the linkage against the carburetor, then you will need to decrease the end point setting to prevent the jamming. Now, move the throttle stick to the idle, or low, position on the transmitter. Observe the servo, throttle linkage and carburetor body while doing so. The servo should close the carburetor such that almost no opening is left within the carburetor throat. It should not be pulling hard against the carburetor and buzzing, as it has been stalled if so. You will need to decrease the end point of the low throttle position to prevent servo stalling. Or, if the throttle does not close enough, increase the end point to decrease the throttle position, taking care not to stall the servo. You should also check the carburetor stop screw to insure the throttle body will allow the throttle to close as needed. Additional information on EPA adjustments is found on page 19 of your Optic 6 instruction manual.

For the most part, you have completed 90% of the basic set-up requirement for a common powered aircraft. You can now enhance the capabilities of your flight controls with the following Menu Functions. It is not always necessary to use these features, depending on your own personal needs and the way your model is equipped. So, let's take a look at what you can do to make your flying experience even easier.



DUAL RATE SET (D/R)

Dual Rates are used to either increase or decrease the amount of control surface movement while in flight, allowing for a change in the control surface response from the model. Using the Dual Rate controls is simply a matter of moving a Dual Rate switch position to change the rates. Information on how to set the dual rates is also found on Page 20 of your Optic 6 Instruction Manual, but let's take the time to set up the dual rates on your ailerons.

In this case, we wish to have a model that is easy to fly using the ailerons, but also can roll very fast when needed for someone who is more skilled at flying. Enter into the Menu Functions program by pressing both the UP and DOWN Edit keys while the transmitter is already ON. Use the Edit keys to scroll up or down to reach the Dual Rate (D/R) screen. Note that the value shown on the right of the LCD screen will have a value of 100%, meaning the servo will move to the maximum amount you allowed the servo to move after setting the End Point Adjustment. You may set this value up to a maximum of 125% and a minimum of zero percent, meaning it is possible to exceed the End Point Adjustment (EPA) or to reduce the movement to zero, (Please see the "Caution Note" below).

The first thing to do is to select the channel you wish to have a dual rate value placed upon. The cursor arrow should be above channel 1, Ailerons, when first entering into the D/R screen. You may select channel 1, 2 or 4 only (ailerons, elevator or rudder only). Once you have selected the channel you wish, (in this case, let's do the ailerons), we can begin setting the dual rate. In this example, let's assume we have a model that is aerobatic, but rolls too fast for a new pilot to handle. We can reduce the aileron response greatly by decreasing the control

surface movement. The Aileron Dual Rate switch (SW-3) may be in the upper or lower position, but let's place it into the lower position for now. This will be the normal position in this example, and the aileron movement should be at 100% for full response. Now, flip the switch to the UP position. The value remains at 100%. Using the (-) Data key, begin decreasing the value to 75% and stop there. Now, turn the aircraft receiver on and move the aileron control stick. You should see that the amount of motion by the aileron is less than what you set under the End Point Adjustment, and this indicates the changes you made in the Dual Rate is working. While holding the control stick fully to the right, for example, and then flipping the Dual Rate switch downward, you should see the aileron increase the motion as the switch is used. If so, then you have set the Dual Rate control. Note that the dual rate control will affect both directions of movement at one time. For example, if you programmed the ailerons to be reduced to 70%, both right aileron control and left aileron control will be reduced by 70%. This is in contrast to setting the End Point Adjustment, where one direction is set separately from the other direction. You may set the Dual Rate percentage amount to any value down to zero percent. *CAUTION NOTE: Do not set the dual rate at a value of zero, or you will have no control of the flight surface control, possibly resulting in a crash or loss of the model. The value must be above zero percent, and we recommend nothing less than 10% in order to retain control of the model.*

In use, you may wish to begin the flight with the Dual Rate switch, (SW-3) in the UP position, giving a lowered control surface value and gentler aircraft response. When you wish to increase the control surface authority for faster control response, simply move the Dual Rate switch to the lower position. Programming of the elevator and rudder Dual Rate is the same, but using the Elevator/Rudder Dual Rate switch, (SW-1). Both elevator and rudder dual rates are affected by the same switch, but each control surface may be set-up independently. To reset the Dual Rate value to the factory default of 100%, simply select the channel you wish to reset while in the Menu Function program and touch the CLEAR button once.



EXPONENTIAL CONTROL (EXP)

Exponential (Expo) controls is a way of describing a control stick motion in relation to the control surface motion. Without Expo, you may move the control stick halfway, and the servo would move half with you. Whenever the servo moves in exactly the same one-to-one relationship with the control stick, we call this a linear relationship. However, if the servo moves with a varying percentage of motion in relation to the control stick, it is called an exponential relationship. For example, if you moved the control stick $\frac{1}{4}$ of the way to the right in an exponential relationship, the servo may only move $\frac{1}{8}$ of its' travel instead of $\frac{1}{4}$. However, by the time the control stick reaches 100% of its travel, the servo will have caught up to the control stick, also providing 100% of its' travel. The result is that the servo moves very little when there is a significant amount of motion from the control stick, yet will provide full motion when the control stick is given full motion at the limits of the stick travel. Using this example, a model aircraft that is very sensitive to control input can be made to fly gently until a large amount of control stick motion is made. Many pilots favor this control enhancement. It replaces the use of Dual Rates for some pilots, but in the Optic 6, you can have both Dual Rates and Expo simultaneously.

Expo, as described above, can make a model slower to respond around center, or much more sensitive around center, if desired. This is considered to be negative expo or positive expo, with negative expo being less sensitive around center and positive being more sensitive around center. A great majority of pilots will use negative expo to tone down the control response without using Dual Rates. Let's set up a model using expo on the ailerons.

With the receiver and transmitter turned ON, enter the Menu Functions program by pressing both the UP and DOWN Edit keys at the same time and then scroll up or down until you reach the EXP screen. Place SW-3 to the DOWN position for now. The cursor arrow should be above channel 1, ailerons, at this time. The value shown to the right of the screen should be 0%, indicating there is no exponential value programmed at this time. To decrease the sensitivity of the aileron function use the (-) Data key to set a value of 30% at this time. Doing so will mean that you have decreased the sensitivity of the aileron function about 30% around the center point of the control movement. You may confirm this by moving the aileron stick slightly and noting that very little movement is being made by the aileron. The movement should increase greatly as you move the control stick to the extremes of motion. Moving the SW-3 switch to the upper position should return you to a normal linear response condition and out of the exponential condition. The procedure for using expo on the elevator and rudder is the same, except that SW-1 switch is used to activate or inhibit expo for these functions. Additional information can be found on Page 28 of your Optic 6 Instruction Manual.



THROTTLE CUT

Throttle cut is a way to kill the engine on your nitro or gas powered aircraft without changing the idle trim setting of your transmitter. The most common method of killing the engine without Throttle Cut is to pull the throttle trim all the way down, hoping this may be enough to stop the engine. Afterwards, you have to reset the throttle trim back to where it was, if you remember that position. On the Optic 6, this is no longer necessary. Using the Throttle Cut feature, you need only touch one button on the top of the transmitter to effectively kill the engine without touching the throttle trim setting.

To use this feature, set up the throttle control as you normally would, using the End Point Adjustment to achieve fully opened throttle and fully closed throttle with a good idle setting. (It may be necessary to set the actual idle with the engine running). Use the End Point Adjustment to set the primary low throttle setting with the throttle trim set to the highest possible position. Make sure that the carburetor throttle stop screw allows the carb opening to be completely closed when commanded by the throttle servo. Now, enter into the Throttle Cut option in the Menu Functions program by depressing both the EDIT keys at once and then scroll up or down to reach the T.CUT screen. The default setting is 0%. With the throttle stick set to the idle position and after you have set the idle position on the carb to the proper place, depress the Throttle Cut button located on the top right of the transmitter body. Keep the button pressed and then use the (-) minus or (+) plus Data keys to make the carb opening on the engine close down completely. When you release the button, the servo will delay returning to the normal idle position for approximately 3-seconds, which is normal. The Throttle Cut option has now been set.

In operation at the field, the Throttle Cut function will allow you to set the idle and high speed settings of your engine as you wish, and should effectively kill the engine when the button is depressed without touching the throttle trim setting. It will work independently of the trim setting. *CAUTION: Make sure that when setting up the Throttle Cut function that the servo is not stalled by forcing it beyond the limits of the throttle body on the engine or the pushrod ends. All movement by the servo should easily accomplished without stalling the servo.*



PROGRAMMABLE MIXERS (PMIX1)

Programmable mixing is the ability to mix two channels together to perform a common task. This is an important feature to learn, as without the ability to mix channels, many of the advanced features on the Optic 6 cannot be performed. Your Optic 6 has two programmable mixing circuits, and each is a separate operation, although it is possible for one mixing circuit to affect another mixing circuit. Remember that when using a mixing circuit, you must always specify which channel is a MASTER channel, and which channel is a SLAVE channel. The Master channel is the control circuit that the Slave channel follows.

To use the Programmable mixers, enter into the Menu Functions program by depressing both the two Edit keys at once, and then use the UP or DOWN Edit keys to get to the PMX1 function. Once there, you will need to activate the Programmable Mixing option by pressing the CLEAR key once. This will bring you to the active Programmable Mixing screen. On the display, you will notice that all channels of control are displayed and there is a small indicator cursor above the channels and below the channels. The top indicator cursor is for the Master Channel indication, while the lower arrow is for the Slave Channel indication. Use the Cursor > or Cursor < key to get the Master indicator to begin flashing. This means that you may now select the Master channel you need. Use the (+) or (-) key to select the Master Channel. Pressing on the > cursor key will cause the Slave indicator to begin flashing, meaning you may now select the channel to be slaved. Again the (+) or (-) cursor key will allow you to select the channel for slaving. Note that you cannot slave the same two channels. Press the > cursor key to highlight the L/U or R/D indicator to the right side as well as the % sign. This means you are ready to begin setting the amount of mixing the Slave will perform in relation to the Master. The amount of mixing can be set between a value of -100% to +100% in relation to the master channels' movement. Let's mix something very common to models, this being the use of two servos to move the ailerons.

In this example, a common set-up has a servo working one aileron each. Connecting to the receiver, you could use a "Y" connecting wire, but this would not allow you to use other options. So, let us connect the left aileron servo to Channel one (1) on the receiver and the right side aileron servo to Channel 6 of the receiver. It does not matter which way the servos are facing in relation to the aileron control surfaces, as you can reverse them during the set-up. Now, enter into the Menu Functions program by depressing both the UP and DOWN Edit keys at the same time. Now scroll to the PMX1 option and activate the function by pressing the CLEAR button once. Use the (-) or (+) cursor key to select Channel 1, aileron as the Master channel, and then press the > key to select the Slave indicator. Select channel 6 as the slave channel. You have now made your Master and Slave relationship. At this point, the default

value for the program mix is 100%, meaning that the slaved channel will mix completely with the master channel. For our example of mixing the two aileron servos, this would be correct. To turn on the mixer, use SW-3 in the lower position for Programmable Mix circuit 1 as the default.

In the event that both aileron servos moved the same direction, (both moved upward at the same time, for example), it is possible to reverse the Slave channel by using a negative percentage. In this case, your Optic 6 can be changed to -100% value, which means the Channel 6 servo will move in opposite direction of travel to channel 1. You have completed a programmable mix. Programmable Mixing circuit No. 2 works the same way, and it uses SW-1 in the down position to activate as the default. *(Please see Switch Select to change the switch used to activate your programmable mixes.)* Exit the Programmable Mixing option by depressing both of the UP and DOWN Edit keys at one time.



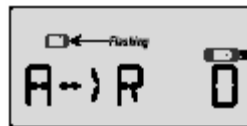
AILERON DIFFERENTIAL

Aileron Differential is the term used to describe the uneven (or different) movement of the ailerons in relation to the amount of motion moving upwards and moving downwards. On aircraft with under-cambered wings or high-aspect ratio wings like a glider, the ailerons are more effective when the amount of movement upwards is significantly more than the movement downwards. When an aileron control surface moves downward on a wing, the amount of lift it creates will increase, causing the wing to rise upward in the roll axis. However, the amount of movement downward can quickly turn from lift to drag, meaning the aileron no longer lifts the wing upward into the roll, but pulls the wing back instead, similar to the wing being stopped in flight. Obviously this is not good, and you want to prevent this from occurring in order to keep the aircraft flying smoothly. However, the amount of movement upward by an aileron does not cause this drag effect near as quickly. So, it makes sense that to keep the aircraft smooth in flight during turns, you should limit the amount of down motion by the aileron, and so you need aileron differential.

On your Optic 6, you can activate the Aileron Differential function by entering into the Menu Functions program by depressing both the EDIT keys at once. *Note that this function can only be used when two servos and two separate channels are used to control the Ailerons. (Please see the Program Mix section for details on using two servos for Ailerons).* Use the UP and DOW scroll keys to locate the ADIF function. To activate the ADIF, press the CLEAR key once. The LCD screen will change from “ADIF Inh” to the new display of “ADIF On”. The default value in this function is 100%, meaning that both directions of travel by the aileron servos are at their maximum control throws as set by the EPA. Move the cursor to the adjustment screen by depressing the right > cursor key once. You should now see the two channels affected by the aileron differential function, which by default would channels 1 and 5. The Master indicating cursor should be over channel 1 with the Slave indicating cursor under Channel 1. This means your adjustment will be made to channel 1 at this time. To the right, the L/U indicator should be showing, meaning that the direction of movement being changed is LEFT/UP. By moving the aileron stick to the right, the L/U indicator will change to R/D,

meaning the RIGHT/DOWN direction of movement will be affected by your changes. Changes are made by using the (-) or (+).

Let's use the Aileron Differential function in real life application. Let us assume that we are setting up a small glider with two servos used for the aileron function and we have already used the Program Mix No. 1 to slave channel 5 to the Aileron channel 1. Entering into the ADIF menu, activate the function by depressing the CLEAR key once. With the Master and Slave indicator cursors on Channel 1, move the aileron stick to the left, and the L/U indicator will be showing. Your current value should be set at 100%. Your aircraft assembly instructions may tell you how much movement is recommended, and could be something like 3/8-inch up and 3/16-inch down. This represents 2:1 ratio, as 3/8-inch is double the amount of 3/16-inch. To get this ratio, move the aileron stick to the right and the R/D indicator will be showing on the LCD screen. Use the (-) Data key to change the value to 50%. Now, move the aileron stick both directions and observe the aileron movement on the model. The ailerons should move twice as much upward as they do downward. If so, you have set the aileron differential to the recommended 2:1 ratio. Exit this function by depressing both the UP and DOWN edit keys at once.



AILERON TO RUDDER MIXING

Your Optic 6 system also has a few pre-programmed mixing options that are available to you without using up your free-channel programmable mixes. The first one we discuss is the Aileron to Rudder mixer, which is commonly used in scale models as well as sailplanes and high wing models like the Piper J-3 Cub, to assist in making smooth, coordinated turns. Like the Programmable Mixers, you may mix the slaved rudder control to move with or against the aileron master control. Most planes would use a positive mix of moving the rudder in the same direction as the ailerons. However, this is just the opposite when the model uses a V-tail.

To use the Aileron to Rudder mixer, enter the Main Functions program and scroll down to the A-R (Aileron to Rudder) mix screen option. The default of this program is to have the mixer inhibited. To activate the function, press the CLEAR key once. You are now in the active Aileron to Rudder mixer program. By touching the > cursor button once, the *PERCENT* symbol (%) will begin flashing, indicating that you may now change the mixing value to whatever you need. Note that you will see the L/U symbol, meaning LEFT/UP is being programmed, and by moving the Right control stick to the right, the R/D symbol will appear, ready to program. The mixing value is changed by using the (+) and (-) keys as you need. Let's set-up a model using the aileron to rudder mixing function.

In this case, we want to smooth out the turns from a Piper J-3 Cub, a very popular model. With the Aileron to Rudder Mixing circuit activated and ready to program, move the aileron stick (right side control stick) to the right and begin changing the value to +50%. Turn the receiver with servos connected to the ON position and observe the movement of both the ailerons and rudder. The right side aileron should rise upward and at the same time, the rudder should also move to the right. If it moves to the wrong direction, change the value to -50%, which should correct the movement. Now, move the stick to the left to program the left direction relationship, again setting the value on the LCD screen to 50%. Again, observe the movement of the left

aileron and the rudder should also move left with it. If this is correct, you have just completed programming 50% movement of the rudder to 100% movement of the ailerons. In use, pull the SW-2 switch, located on the top right side of the Optic 6 case, towards you to activate the function in flight. *(Please see Switch Select to change the switch used to activate your programmable mixes.)* Exit the option by depressing both the UP and DOWN Edit keys at one time.



ELEVON MIXING

Elevon mixing is needed when flying aircraft built as flying wings, which are very common to slope soaring with slope combat aircraft. It is when the wing ailerons are also used as the elevators and requires special mixing of these flight surfaces to gain both roll and pitch control with the same surface. With the Optic 6, Elevon mixing is easily accomplished using this preprogrammed mixing option

Let's set up a slope combat wing using the Elevon mixing option. For this example, you will need to have a servo for each aileron surface with the left aileron servo connected to Channel 1 of your receiver and the right aileron servo connected to Channel 2 of the receiver. Enter the Menu Functions screen by depressing both the UP and DOWN Edit keys at once, and then use the Up or Down Edit keys to locate the ELVN (Elevon) screen. Activate the Elevon Mix option by pressing the CLEAR key once, and this should bring you to the programming screen for Elevon Mixing. Note that there is a Master indicator arrow above Channel 2 and a Slave indicator arrow below Channel 2. This means that the elevator command is being programmed for the left side control surface on your plane. The default setting is 100% of the End Point Adjustment. Pull back the elevator control stick on your transmitter for full UP elevator control and observe the left aileron control surface. It should move upwards. If it does not, use the (-) Data key to change the value shown on the LCD screen from 100% to -100%. This will reverse the direction of movement for the left side only. Now, observe the right side aileron control surface and make sure it moves in the correct UP direction. If not, press the > cursor key once to move the Slave indicator arrow under the Channel 1 symbol. Using the (-) Data key, change the value shown on the LCD to -100% to reverse its' direction as needed.

You have set up the elevator function. Now, let's set up the aileron function. Press the > cursor button once to move the Master indicator arrow above the Channel 1 symbol and the Slave indicator symbol will also be under Channel 1. Move your transmitter control stick to the right and observe the right aileron. It should move upwards with the control stick. If not, change the value shown on the LCD screen to a negative number. By moving the control stick to the left, the Left aileron should rise up with the control stick command. Adjust the value if needed. You have now completed the basic set-up for Elevon mixing and you can adjust the amount of movement using the percent value on the LCD screen as needed to fit your style of flying. Note that once you activate the Elevon mixing circuit, you may not turn this option ON or OFF from one of the option switches on the transmitter face. The Elevon mixer remains active until deactivated by inhibiting the option in the Menu Function program. Exit the Elevon Mixing option by depressing both the UP and DOWN Edit keys at once.

V-TAIL MIXING OPTION



The use of the V-Tail mixing option is very much like the Elevon Mixing option with the exception that the V-Tail mixer will coordinate the use of rudder control with the elevator control. In fact, the set-up of the V-Tail is almost identical to that of the Elevon mix option. In the V-Tail option, you will use channels 2 and 4 for your servos with Channel 2 connected to the servo moving the Right V-tail surface and Channel 4 connected to the Left V-tail surface. Many sailplane models and some powered models use a V-tail section, making this option well used. Let's set up a typical sailplane model using the V-Tail mixer.

With the servos connected as described above, enter into the V-Tail mixing option by first entering the Menu Function program, depressing both the UP and DOWN Edit keys at once. Now, scroll UP or DOWN to locate the VTAL mixing screen. Activate the V-Tail mixing circuit by pressing on the CLEAR key once, which will bring you to the V-Tail Programming screen. The default value on the programming screen is 100% and the Master indicator arrow should be above the Channel 2 symbol, as will be the Slave indicator arrow. This means that the Right side elevator surface will be programmed. Pull fully back on the elevator control stick and observe the right elevator surface. It should move upwards. If it does not, change the value shown on the screen from the present value of 100% to a value of -100% by using the (-) Data key. The left elevator surface should also move upwards at this time, and if not move the Slave indicator arrow under the Channel 4 symbol and change the value there to -100%. You should now have both elevator surfaces moving upward with your control stick. Your elevator control is now programmed.

Now, move the Master indicator arrow above the Channel 4 symbol. Move the rudder control stick to the right on your transmitter and the Left elevator should rise while the Right elevator should deflect downward. If not, change the value of the LCD screen to a negative number to reverse the motion and get proper movement. (*When using the V-Tail as the rudder command, the left side rises with a Right turn and the right side rises on a Left turn.*) To program the Right side elevator, if necessary, press the > cursor key to bring the Slave indicator arrow under the Channel 4 symbol and change the LCD screen value as needed to match the opposite side. You may use the percentage values to match the recommended control surface movement by the aircraft manufacturer. Note that once the V-Tail option is activated, it remains ON constantly and cannot be turned OFF in flight using a program switch. Also, you may not use both Elevon mixing and V-Tail mixing at the same time. Only one or the other. To exit this option, depress both the UP and DOWN edit keys at once.



FLAP TRAVEL FUNCTION

The Flap Travel function really is the first thing you will need to perform if you wish to use other functions that use the flaps or ailerons with the Optic 6. It only requires that your aircraft is set up with two aileron servos; one for each aileron. It is controlled using the Right slide lever of the Optic 6 transmitter. This function not only activate the two servos on the aileron function, but this also sets the maximum angle your flaps will move when used.

Let's set-up a basic model using the Flap Travel function. First, make sure you have both aileron servos installed with the Right side servo on Channel 1 of the receiver and the left aileron on Channel 6 of the receiver. Enter the Menu Functions screen by depressing the UP and DOWN Edit keys at once and then use the Edit keys to scroll up or down until you arrive at the Flap Travel screen, (FLPT). Once there, you will see this screen needs for you to only set the value for the flaps when commanded. With the right side slide lever in the DOWN position, you may set the total amount of flap travel by changing the value on the screen. Note that you must also activate the Flaperon option to get the ailerons to drop down as the flaps. If this is not active, the right lever will only trim out the normal flaps on Channel 6. Once you have programmed the flaps for the desired motion, you may exit this option by depressing both the UP and DOWN Edit keys at once.



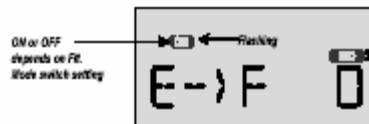
FLAPERON MIXING

Flaperon mixing is used to get both ailerons to drop down at the same time to give a model the effect of flaps for landing, or just to slow it up in flight. You may also raise the ailerons if desired using this function, and this ability comes into play with other mixing functions for the Optic 6. Additionally, the flaps function can be used in the Landing Mode (LAND) function of the Optic 6, as well as the Elevator to Flaps mixing function for 3-D maneuvers. Your original Optic 6 instruction manual has good guidance on the activation of Flaperon mixing, but let's set up a model to see how a practical example works.

In this example, we look at a model that is equipped with two aileron servos, and the rest of the model being quite typical of a sport model. The Right aileron servo should be plugged into Channel 1 of the receiver and the Left aileron servo is plugged into Channel 6 of the receiver. Before programming look on the right side of your Optic 6 transmitter and locate the right Lever switch. Move this switch to the up position at this time. Enter into the Menu Function program by depressing both the UP and DOWN Edit keys at once and then use the Edit keys to scroll up or down until you arrive at the Flaperon (FLPN) screen. Activate the function by pressing the CLEAR key once and the new FLPN screen will appear with the ON symbol to let you know the function has been activated. Pressing Right Cursor key one time will change the screen to the programming screen of the option, and here you will see the Master indicator arrow above the Channel 1 symbol and the Slave indicator arrow also under Channel 1. This means we are programming the Right aileron.

With the receiver ON, move the right side aileron stick on the transmitter to check the direction of movement from both ailerons. If you give a right turn, the Right Aileron should rise and the Left Aileron should drop. If this is correct, then you have no changes to make. However, if the right aileron moves downward instead, you will need to reverse the direction by programming a negative value for this servo. Use the Data (-) or (+) keys to change the values as needed to correct the value and reverse the servos as needed. Before moving to the flap portion, make sure the ailerons move in the correct direction with the transmitter sticks.

Now, press the Cursor Right key so that the Master indicator arrow is placed above the Channel 6 symbol and the Slave indicator arrow is below the Channel 6 symbol. This will put you into the Flap programming mode. The flaps are operated by the right side Lever switch of your Optic 6 transmitter. Make sure the switch is in the UP position at this time. Both ailerons should be centered on the wings, and if not, use your Sub-Trim function to center the ailerons. Once centered, move the Right Lever switch downward to make the flaps move down as well. Both should drop at the same time with your Lever switch movement. If one or the other moves upward, then you must reverse the direction by changing the value of the flap program. With the Slave indicator arrow under Channel 6, a change to the value will affect only Channel 6, or the left Aileron/Flap. If you need to change Channel 1, the right side, then press the Cursor Right key once and the Slave indicator arrow should move under the Channel 1 symbol. Make your changes using the Data (-) or (+) keys. Program in the amount of flap deflection you need with the screen values. Your Flaperon programming is complete and you may exit this function by depressing both the UP and DOWN Edit keys at once.



ELEVATOR TO FLAP MIXING

Elevator to flap mixing is normally used to increase the lift of the wing when pulling UP on the elevator, but has come into popular use with new 3-D and Fun-Fly type models that take advantage of high lift situations to perform fast and tight maneuvers. You may use this function alone or in conjunction with the Flaperon mixing option. If you use the flaperons mixer, the ailerons will move as flaps using the Elevator to Flap mixer. This is especially useful for 3-D models where high-alpha stunts are performed and the model does not have separate flaps. Let's set up a typical 3-D bird using elevator to flap mixing.

First, we must insure that both ailerons use a separate servo for each side of the wing. Now, activate the Elevator to Flap mixer (E→F) option by entering into the Menu Functions screen by depressing both the UP and DOWN Edit keys at the same time and then scroll UP or DOWN until you reach the E→F menu option. It will say it is inhibited as the default, and you may activate it by pressing the CLEAR key once. Once activated, you will find the ON notice flashing to show the option is working at this time. If not, use the three-way SW-4 switch on the top right of the Optic 6 transmitter to turn the function ON or OFF. In the ON position, you may add the amount of flap mixing you feel necessary for your aircraft. Let's program a sport Fun-Fly type model using the Elevator to Flap mixer.

In this exercise, make sure you have your aircraft set-up with a servo for each aileron and Channel 1 assigned to the Right aileron servo and Channel 6 assigned to the Left aileron servo. Activate the Elevator to Flap option as described above and then turn on the receiver with the

aileron servos active. Now, pull back on the elevator stick with the Elevator to Flap option ON. Notice the LCD screen shows the L/U symbol, indicating that you will be programming the UP elevator portion and you should have the flaps dropping down at the same time. With full elevator stick pulled in, change the percentage of flap mixing using the Data (-) or (+) keys. Let's start with 30%. Now, when you pull back on the elevator, the flaps should drop down with the elevator going up. This is correct and will allow tighter pitch maneuvers. Now, push the elevator stick forward for DOWN elevator and program the desired amount of flaps in. When completed, you should have up flaps with down elevator and down flaps with up elevator. If so, then you have successfully programmed your Elevator to Flap options.



CROW MIXING (CROW)

CROW Mixing is used to dramatically slow down a aircraft in flight as well as increase the sink rate of the aircraft for short field landing or spot landings. This option is used when the aircraft has ailerons and flaps on the wings and combines the use of ailerons, flaps and elevator controls. Many sailplanes and fun-fly type models use this type of option. (CROW is also called "Butterfly" mixing).

To use the CROW mixer on the Optic 6, make sure that Channel 1 is used for the Right aileron, Channel 5 is used for the Left aileron, and Channel 6 is the flap control. Note that right slider switch on the transmitter will also move the flaps separately if the Flap Trim is not set to zero. Let's set up a model using the CROW mixing function.

In this case, the model we are going to program will be a fun-fly type model. Note that a Sailplane will be set-up similarly. With the servos assigned to the receiver plugs as shown above, let's begin programming. Enter the Menu Functions screen by depressing both the UP and DOWN Edit keys at once and then use the Edit keys to scroll to the CROW option screen. The default screen is the inhibited screen and you may activate the function by pressing the CLEAR key once. This will bring you to the active programming screen with the ON or OFF indicator flashing on the left of the screen and the channels to be programmed shown in the center of the screen. You may turn the CROW mixer ON or OFF using SW-2 on the upper left face of the transmitter. Let's leave it ON for now. The LEFT slider switch is used to work the CROW mode in flight, making this a linear response to your command. Let's bring that lever all the way downward for programming. Now, press the RIGHT cursor key once and you will notice the arrow indicator is now placed over Channel 1, ailerons, for programming. Use the (-) or (+) Data keys to adjust the Right aileron as needed for CROW mix. Normally, this means the aileron should raise up about 15 to 20 degrees. Raising the ailerons will increase the sink rate of the wing and you may adjust this on the aircraft to suit your needs in the sink rate. Once set, press the Right cursor key once. This will allow you to now set the elevator rate. Normally, when you drop the flaps on a model, the nose of the plane will tend to rise up, or balloon. Down elevator is used to compensate for this and the proper amount of elevator compensation is a trial and error situation. For now, start with about 10 to 15 degrees of DOWN elevator. Remember this is only a starting point is most likely incorrect. Only flight testing will allow you to program the proper amount of elevator compensation. Now, press the Right cursor key to place the arrow indicator over the Channel 5 symbol, which is the Left aileron. Program this aileron to match the direction and angle of the Right aileron. Press the

Right Cursor one more time to place the indicator arrow over the Channel 6 symbol to program the flaps. The flaps should drop downward and you may program the desired amount of flap throw as necessary to get the effect you need. Your preliminary programming is complete and you may exit the programming screen by pressing both the UP and DOWN Edit keys at once.

In the field, you will most likely need to adjust the CROW mix to suit your needs. When flying, carefully deploy the CROW mixer and watch the attitude of the model in flight. If the nose pitches upward, you will need to add more DOWN elevator mix. If the model drops its nose when flaps are deployed, they you have too much DOWN elevator mix and requires you to decrease the amount of elevator mix. Continue to adjust this until there is no change noticed when using the CROW mix. If you find the model need a better glide in the CROW mode, decrease the amount of UP aileron mixing to extend the glide. If the model doesn't come down fast enough in the level glide, then you need to increase the amount of UP aileron in the mix. Adjust the mix completely until you feel comfortable with the results. You have just completed one of most sophisticated mixing options used in the field! Congratulations!



CAMBER CONTROL (CAMB)

Camber control adds a bit of additional lift to a wing to perform things like a short field take-off or to increase the glide capability of a sailplane. This differs from the flap only function in that camber control also affects the ailerons and elevator to increase the overall effect. In this option, you must have two aileron servos, and a single flap servo or two servos using a “Y” connector for the flaps. With the ailerons, you may mix Channel 1 and Channel 5 with the Aileron Differential option activated. You may also simply plug the Left aileron into Channel 5 and mix this channel into Channel 1 using one of your free mix programs.

Let's setup a model using Camber Control, and in this case a sailplane with separate flaps and ailerons. Hook up Channel 1 to the Right aileron, Channel 5 to the Left aileron, Channel 6 to the flaps and Channel 2 to elevator. Enter into the Menu Functions screen by depressing both the UP and DOWN Edit keys at once and then use the UP or DOWN key to scroll to the Camber Control (CAMB) option screen. The default is the “CAMB Inh” screen and to activate the option, press the CLEAR button once. This will open the CAMB function screen, with the ON/OFF symbol flashing on the left of the screen and the channels to be programmed shown across the top of the screen. To turn the CAMB option ON, push the SW-4 switch located at the top right of your Optic 6. The screen should show the option in the ON position. Now, turn on your receiver in the model. Press the Right cursor button once and the programming arrow will be above Channel 1, indicating this channel will be programmed now. Using the (-) or (+) Data keys, you may now adjust the Right aileron position. Because a sailplane is normally sensitive to camber adjustments, you would need to program in about 1/16-inch of downward movement on the ailerons. If you used Aileron Differential, Channel 5 will also appear on the screen, and this will be used to program the Left aileron to the matching downward position of the Right aileron. Now place the Programming arrow over Channel 2. With an increase in lift on the wing, the nose of the model may pitch upward when Camber is used. You may program in a small amount of Down elevator, if necessary, to compensate for any pitching effect. Now move the programming arrow over Channel 6, Flaps. Adjust the flaps such that they match the amount of downward movement as the ailerons. Now, flip the

option switch for Camber Control, (SW-4) forward. The control surfaces should return to their neutral position. Flip the switch back and the Camber Control should move the control surfaces to the position you have programmed. If so, you've done great and you have successfully programmed in Camber Control. Remember that the final position of all flight controls for using Camber is found in the flight testing of your model. Don't be afraid to readjust your model as necessary to make the model behave the way you want it to perform.



LANDING MIX FUNCTION (LAND)

The Landing Mix Function is used to pre-program the flaps and elevator to a position allowing a slower and controlled landing of your model than may be possible without the use of flaps and elevator programming. This option is not a proportional control function, meaning the flaps and elevator will be either in the normal position or in the fully deployed position. When used in powered models, the use of throttle will control the descent rate of the model with the landing mode ON. Let's program the Landing mix in a typical powered model equipped with flaps, such as a sport scale warbird like the AT-6 Texan.

Make sure your model is set up such that the flaps operate from Channel 6. If you use two servos for the flaps, you may connect the two servos together using a "Y" connector going to the receiver. Enter into the Menu Functions program by depressing both the UP and DOWN Edit keys at once and then use the UP or DOWN Edit keys to scroll to the LAND option screen. The default screen is the "LAND Inh" screen and to activate the function, press the CLEAR key once, opening the LAND option screen. On the left of the screen, the ON/OFF indicator symbol will be flashing and to the right will be the Channel 2 and 6 symbols used for programming this mixer. The Landing function is turned on by flipping switch SW-4 forward towards the face of the transmitter. Now, turn ON your receiver with servos plugged into the proper connectors. Flip switch SW-4 forward to turn ON the Landing function and then press the Right cursor button once to set the programming arrow over Channel 2, for elevator programming.

Most aircraft tend to rise or pitch upward when flaps are lowered, therefore requiring some down elevator compensation. You can only know this by actual flight testing, or if the aircraft instructions advise you of this possibility. In either case, the exact amount of down elevator movement needed for your aircraft will require a few flights to determine. For now, program in a value of about 15% or -15%, depending on which direction the elevator moved when the programmed value was input. Make sure the elevator moves downward during this stage. Now, press the Right cursor button to move the arrow indicator over Channel 6 to begin programming the flaps. Again, input a value to move the flaps downward to the position recommended by the aircraft manufacturer for the landing position. Make sure both flaps match in the movement and stopping point when deployed to insure that the plane does not perform an unwanted rolling motion. Now, flip switch SW-4 back to the center position, and both the flaps and elevator should return to their original positions. If this is what happens, then you have completed the programming for your Landing option! Again, it will require flight testing to get the exact perfect setting for your model, but the results will be well worth the effort.



AILEVATOR CONTROL FUNCTION (AILV)

The use of Ailervator is quite popular with the advent of modern 3-D capable aircraft. Simply put, Ailervator is the use of your elevators to also compliment the roll axis with the same control surface, common to 3-D aircraft. This option will require the use of two servos, one for each elevator control surface, and using channel 2 and Channel 5 of the receiver. (For models using Channel 5 for retractable landing gear functions, please use Channel 6 for the Ailervator) Once this function is activated in the transmitter it will remain on at all times for this given model memory location until the function is inhibited through the Menu Functions screen.

Let's set up a typical 3-D model using the Ailervator mixing function. First Channel 2 should be assigned to the Right control surface and Channel 5 (or 6) assigned to the Left control surface. With the Ailervator function inhibited, you should see only one elevator half move with your Optic 6 control stick. We're going to fix that. Enter into the Menu Functions screen by depressing both the UP and DOWN Edit keys at once and then use the UP or DOWN Edit keys to scroll to the AILV option screen. The default screen is the "AILV Inh" screen. Activate the option by pressing the CLEAR button once, which will bring you to the AILV programming screen. This screen will show the function as being ON, along with the Channel 1, 2 and 5 channel symbols shown. Press the Right Cursor key once and this will enter you into the programming mode. The programming arrow will be placed above Channel 1 and below Channel 2 to indicate that an elevator surface will be slaved to the ailerons. At this time, you may move the elevator stick on the transmitter and the elevators should work normally. By moving the Aileron stick to the right, the right aileron should move upward and the right elevator should also move upward. You may adjust the amount of movement by increasing or decreasing the data value using the (-) or (+) data keys. Now, move the Slave indicator arrow under Channel 5 and then move the aileron stick to the left. The left elevator should rise with the left aileron. Again, use the Data (-) or (+) keys to make any adjustments necessary. If the elevator surface moves in the opposite direction as commanded, then you need to reverse the data value shown on the screen using the Data keys. Once you have matched the movement of both elevator halves and set the values, you have completed programming the Ailervator mix! Note that the perfect amount of mix may only be determined by actual flight testing. Don't be afraid to experiment as this is the only way to get the model to perform the way you want it to perform. Your Optic 6 is the tool to allow you to be successful.

Other Valuable Optic Transmitter Functions



FAILSAFE FUNCTION (FAIL)

The use of the Failsafe function is pre-program a setting for your aircraft to assume should the loss of signal from your transmitter occur in flight. This loss of signal may be due to interference from other sources. Failsafe mode will not assist you in the event of a power loss by the on-board battery. On the Optic 6, the use of Failsafe can only be done using the Hitec QPCM receiver and you must program your Optic 6 to use the QPCM mode of signal transmission when making the initial model set-up.

The settings you program in may be to reduce the throttle and deploy flaps to slow the model in flight. All channels will move to the Failsafe position upon any loss of signal from the transmitter. The receiver will regain full control when the signal is restored and normal flight will continue.

To program in the Failsafe is quite fast and easy. Let's program a common sport model using four channels. Again, only the Hitec QPCM receiver, Model No. HPD-07-RH, is capable of using the Failsafe option. The model now being programmed must use the QPCM mode of transmission and to program this, depress both the UP and DOWN Edit keys while turning the Optic 6 transmitter power ON. Use the Up or DOWN Edit keys to scroll to the transmission mode screen, which has a default of "PPM". By pressing the Left Cursor key once, the mode will change to QPCM. Now turn the Optic 6 power switch OFF. With the Optic 6 transmitter ON once again (in the normal power ON mode) and the receiver power ON, enter into the Menu Function screen of the Optic 6 by depressing both the UP and DOWN Edit keys at once. The default screen will show the "FAIL Inh" message. By pressing the CLEAR key once, you will activate the Failsafe mode. Now, move your control sticks to the position you wish for the control to move to if you experience a loss of signal and hold the sticks in this position. While holding the control sticks, press both the (-) and (+) Data keys at once and the positions you have selected are placed into the failsafe memory of the receiver. A double beep heard when you pressed the Data keys will confirm the position is given. Now, turn the Optic 6 transmitter Off and then back On once again. When the transmitter was turned Off, the servos should have moved to the Failsafe position. If so, you have successfully completed programming the Failsafe option. You may change the Failsafe position at anytime using this same procedure.



SWITCH SELECTION (S/W SEL)

Your Optic 6 has the ability to allow the user to assign certain functions to a switch position of your choice. This allows the pilot to be more comfortable with the Optic transmitter by placing the option used most often in a switch position most favored by the pilot. The following functions may be assigned to a different switch position:

Aileron-to-Rudder Mix
Camber Mix
Landing Mix
Program Mixer 2

Elevator-to-Flap Mix
CROW Mixing
Program Mixer 1

When programming your Optic 6 for various mixing options, you will have the choice of having the mixing circuit ON at all times, or to allow you to turn the mixing option on or off as needed while in flight by simply flipping a switch. Let's run through an example of assigning a mixing option to a switch that is not the default switch location. In this case, let's select the Aileron-to-Rudder (A/R) mixing circuit.

Enter into the Menu Function screen by depressing both the UP and DOWN Edit keys at once and then use either the UP or DOWN Edit key to scroll through the menu options until you arrive at the S/W SEL screen. This screen is a bit different from the other option screens in that the screen name is very small and placed about in the center of the screen. An additional message simply says MX.55 and has no value. Notice the four number symbols along the top of the screen. These represent the switches on the Optic 6 transmitter that may be used during this operation. Use the Data (-) or (+) keys to move through the mixer options to make a switch selection. Let's find the Aileron-to-Rudder mixing option by pressing the (-) Data key until the A->R screen is displayed. Note that there should be an arrow indicator above the number 4 symbol on the top of the screen. This indicates that Switch 4 on the Optic 6 transmitter is being used to toggle the mixing option ON or OFF. Switch 4, (SW-4) is located on the top right side of the Optic 6 transmitter. SW-4 is a three way switch and the middle position is ST-1, the forward position is ST-2 and the rearward position is NOR, or normal position. You may scroll through the switches available to use for selecting the activation of the A->R mixer by pressing the < or > Cursor buttons and the arrow indicator will move from one switch number to the next. On SW-4, the arrow indicator will remain there for three presses of the Cursor button while the switch position indicator appears at the bottom of the screen. In this exercise, we will assign the A/R Mix to SW-2 by pressing the RIGHT cursor key until the arrow indicator remains above the Number 2 symbol. That's all there is to it and the Aileron-to-Rudder mixing activation is now handled by SW-2, located on the front left panel of the Optic 6 transmitter. You may also program the Optic 6 to make the mixing option permanent for this model by using the < or > Cursor button until the On message appears next to the A->R message. This means that when you return the Optic 6 to the normal transmitting mode for flying, the mixing circuit will be on at all times and unable to be turned off in flight. In many cases, this is desirable. To exit the Switch Select screen, depress both the UP and DOWN Edit keys at once.

THROTTLE LOCK

No screen shot for this feature

Your Optic 6 system is quite unique, utilizing a special Throttle Lock function. This feature is a significant safety feature in that it is possible to prevent accidental bumping of the throttle, which might lead to an accident. The use of the Throttle Lock feature is quite easy. Location of the Throttle Lock button is on the lower right side of the transmitter face, marked "Lock". To activate the Throttle Lock, simply depress the Lock button once. The "LOCK" message will appear on the LCD display, indicating that the throttle lock is active and holding the position of the throttle setting when the lock was activated. With the Throttle Lock active, the throttle control stick is disabled and the throttle will not respond to your command. To deactivate the Throttle Lock, simply depress the Lock button once again. The LOCK message on the LCD display will disappear, indicating that Throttle Lock is no longer active. *CAUTION! When deactivating the Throttle Lock function, it is wise to move the throttle stick to the idle position. This will prevent accidental advancement of the throttle and acceleration of the powerplant.*

Let's try using the Throttle Lock feature on a common nitro powered aircraft. With the engine already running, bring the throttle stick to the idle position. Now, depress the Lock button once. The Throttle Lock feature should be activated. Confirm this by viewing the LCD display and finding the LOCK message on the screen. Now, move the throttle to accelerate the engine. With the Throttle Lock ON, no acceleration should occur. Return the throttle stick back to idle and depress the Lock button once again. The LOCK message on the LCD display should disappear and the throttle stick should now function normally.

On electric powered aircraft, this is a very important safety feature. In use, you would bring the throttle stick to the idle position and activate the Throttle Lock. Now you may plug in your main motor battery and turn the receiver switch ON to activate the aircraft radio system. All functions except throttle should work normally. When you are completely ready to fly and have assured yourself of all safety precautions, check the throttle stick to see that it is in the idle position and then depress the Lock button to deactivate the Throttle Lock feature. With Throttle Lock activated, your electric motor will not accelerate out of control as the throttle function is safely locked at the OFF position. Deactivating the Throttle Lock will return the throttle function to normal. *CAUTION: Always check an electric powered aircraft for safe operation before and after connecting the main battery pack for power. Check the motor operation for proper direction and power levels before take-off.*