

## Checking your Climb

If the Control Switch is left ON the rudder waging will continue for as long as the plane is rising. Of course, the tail waging produces a great deal of drag and is not conducive to good altitude gain. This is why you must turn the Control Switch OFF once you locate a thermal. However, even with the switch off, the *Thermal Scout* is still analyzing the altitude gain. So, at any time, you can turn the Control Switch ON and the rudder will immediately wag if the plane is still rising. This allows you to briefly turn on the Control Switch to check if you are

still in the thermal. If so, turn the switch off and continue circling. If not, leave the switch on and resume your search.

Once you have found a thermal, you can use brief applications of the Control Switch to locate the boundaries of the thermal and find its center to maximize altitude gain.

***Fly safely. Remember: turn the Control Switch ON only when scouting for thermals. Always be sure the switch is OFF when launching or landing. – Enjoy!***



Winged Shadow Systems  
Innovative Electronics for Model Aviation

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### WARRANTY

We want you to be happy with your purchase. If you are not satisfied with any product purchased directly from us, return it within 30 days for a full refund of your purchase price. We also provide a one-year replacement warranty on any device that stops working properly - regardless of cause (even crash damage).

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### SPECIFICATIONS

**Voltage Range:**  
3.4V min., 12.0V max.

**Current Input:**  
8.0 mA max.

**Size (circuit board):**  
0.95 x 0.60 in. (24.1 x 15.2 mm)

**Weight (with wires & connectors):**  
0.125 oz. (3.6 grams)

**Lift Threshold:**  
6.5 in/sec (16.5 cm/sec)

Requires 1 additional channel for control

### The Simple Way to Better Soaring

- Wags the rudder and rocks the wings to indicate lift
- Installs between your receiver and rudder servo
- *Flight Filter™* technology removes false lift signals
- For all R/C gliders and motorgliders



Nothing matches the feeling of piloting your R/C glider higher and higher powered only by invisible lifting currents of warming air – thermals. The *Thermal Scout* greatly aids your ability to find thermals by indicating when your plane is rising in lifting air. When your plane enters lift, the *Thermal Scout* will wag the plane's rudder. This creates an overall rocking motion that allows you to see when you've entered a thermal. The invisible becomes visible!

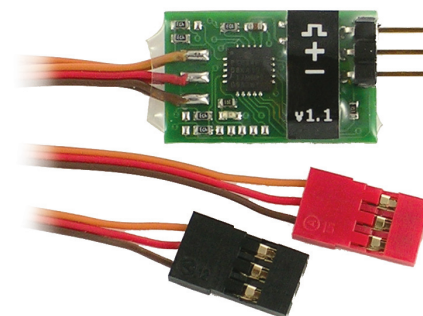
You control the *Thermal Scout* from your transmitter. Once you have found lift, switch off the unit and circle in the rising air. At any time you can switch the system back on and the waving rudder will verify that you are still in lift.

The exclusive *Flight Filter™* technology greatly reduces false lift signals due to turbulence and minor control inputs. Only true, sustained lift will activate the rudder swing.

***For safe operation it is extremely important that you carefully read and understand these instructions. You should be familiar with your plane's flight characteristics and proficient at controlling it before installing the Thermal Scout.***

## Installation

Before installing the *Thermal Scout* make sure that your radio system and servos are properly installed and functioning. In particular, check that the rudder servo operates smoothly, centers properly, and that the extreme right and left travel do not cause the servo to stall or buzz. Program your transmitter end-point or travel controls, or adjust mechanical linkages to resolve any issues.



The *Thermal Scout* connects between your receiver's rudder channel and the rudder servo. It also requires an additional control channel. This must be a free channel that is not used to control any flight surface. A channel activated by a transmitter switch (like the gear/retract, aux, or flap channel) is ideal. While less desirable, a channel controlled by a rotary knob or stick can be used.

Figure 1 illustrates *Thermal Scout* connections. The universal connectors will work with most popular radio brands. The **RED** connector connects to the **Rudder** channel; the **BLACK** connector to the **Control** channel. Take care to insure that the connectors are inserted in the proper direction.

When connecting the rudder servo to the 3-pin connector be sure to observe the polarity markings. On most servos the negative "–" lead is black or brown.

***Be sure to connect both the RED and the BLACK connectors to your receiver. An unplugged RED connector can result in servo damage.***

The *Thermal Scout* senses tiny changes in atmospheric air pressure to determine changes in altitude. As such, it needs to be located in "static" air that is equal in pressure to the air surrounding the plane. Fortunately, on most planes, the inside of the fuselage

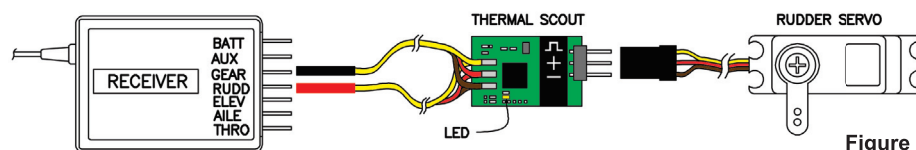


Figure 1

## Alternative Installations

**Rudder Channel** – In these instructions “rudder channel” and “rudder stick” refer to the channel that is used to control the rudder servo. On gliders without ailerons, it is common practice to use the aileron channel to control the rudder servo. In this case, the *Thermal Scout*’s red connector would plug into the aileron channel on the receiver.

**Flying Wings and V-Tails** – If your glider does not have a conventional rudder, you can install the *Thermal Scout* between the receiver and one of the elevator or ruddervator servos. Use extra care on your first flights to see how your plane reacts. You may need to adjust the amount of servo movement (see Setup Mode) to find a level that provides clearly visible movement without unwanted over control.

is an excellent location. Simply mount the unit with a patch of Velcro® or double-sided tape. Or, wrap it loosely in foam and wedge into a convenient spot. If the unit is mounted externally, avoid the top of the wing (it is a speed-dependent low-pressure region). The side of the fuselage, aft of the wing is suitable on many models.

The status LED (Light Emitting Diode) must be viewable for initial setup, but need not be visible during normal operation.

## Label your Transmitter

The control channel switch (or knob, or stick) on your transmitter is extremely important. In the ON position the *Thermal Scout* will control the rudder servo when lift is encountered. In the OFF position your normal rudder control is simply passed through to the servo. To fly safely, you **MUST** always know exactly which switch controls this function and which direction is ON and OFF. To avoid any possibility of confusion LABEL YOUR TRANSMITTER. A yellow adhesive label is enclosed. Clean the surface next to the switch, flex the label to remove the split backing, and apply to your transmitter. You can fashion your own label if you wish, but do not fail to label your transmitter in some way.

## Initial Setup

In Setup Mode you will teach the *Thermal Scout* the range of movement of your rudder servo and select options. The yellow status LED will guide you through the procedure.



Turn on your transmitter and receiver. Test the transmitter control channel switch (Control Switch). The LED will flash once per second when the Control Switch is in the OFF position; it will stay on steady when the Control Switch is in the ON position. (You can reverse the direction of the Control Switch using your transmitter’s servo reversing function. You can also reverse the direction later in the *Thermal Scout* setup if your transmitter does not have this capability.)

Test the rudder control. The rudder servo should react normally to control stick inputs regardless of the Control Switch position (since the plane is not in lift). If the LED or servo do not operate properly, remove power and check your connections.

## Entering Setup Mode

With the transmitter and receiver on, center the rudder stick, and place the Control Switch in the OFF position (LED flashing once per second).

### Enter setup mode by switching the Control Switch ON-OFF-ON-OFF-ON.

Note that this sequence consists of five clicks of the switch and ends with the switch ON. The LED will blink rapidly to indicate successful entry into setup mode. To avoid accidental entry into setup mode the five-click sequence must be completed within 4 seconds (but no faster than 1 second). You can exit setup mode at any time by switching the Control Switch OFF.

Once in setup mode perform the following sequence:

- 1. Move the rudder stick fully to the RIGHT, then back to center.**
- 2. Move the rudder stick fully to the LEFT, then back to center.**

It is important to move the stick to the **RIGHT** first. The *Thermal Scout* saves the maximum servo travel for your specific plane. This is the distance it will move the rudder when indicating lift.

Once the travel limits are set, the unit enters Option Mode allowing you to select specific options. The LED will flash the option number (“flash-pause” for Option 1, “flash-flash-pause” for Option 2, and so on). Move the rudder stick to the **LEFT** or **RIGHT** to select each option setting as shown in the following chart:

OPTION MODE SETTINGS			
Option Number (flashes)	Function	Move Rudder Stick to Select Setting	
		LEFT	RIGHT
1	Rudder Movement	Smooth*	Step
2	Control Direction	Normal*	Reversed
3	Custom Feature**	Off*	On

\* Initial Factory Default Values

\*\* Future Option -- Not Currently Used  
See box below for info on Rudder Movement

The setup will sequence through each option. After making a choice for Option 1 (Left or Right), the sequence will proceed to Option 2 and so on. There is no time limit. Take as much time as you want to make each stick movement. After you make a choice for all three options the *Thermal Scout* will save your choices and exit Setup Mode. Your *Thermal Scout* is now ready to use.

## Testing Operation

Double check the Control Switch to make sure you did not inadvertently change its direction. When ON the LED stays on; when OFF the LED flashes each second.

To test overall operation turn the Control Switch ON and place your plane on the ground for at least 4 seconds. Then, lift the

plane up over your head for 4 seconds. The unit will move the rudder through at least one side-to-side sequence in response to the gain in altitude. The LED will flicker when rudder movement is in progress. Unless you want to change the rudder endpoints or the options you will not need to enter setup mode again.

## Flying with the Thermal Scout

Since the *Thermal Scout* operates differently from any other R/C accessory, it will take a few flights to learn how to get the most out of it. However, in a short time you will be finding thermals and soaring like an eagle.

When flying with the *Thermal Scout* you will spend most of the flight with the Control Switch OFF. You will only switch it on when scouting for thermals or briefly checking if you are still in a thermal. Regardless of how you launch your glider (winch, high-start, hand-launch, or motor power) **NEVER TURN THE CONTROL SWITCH ON DURING LAUNCH**. The sustained climb of a launch is indistinguishable from a thermal. As a result the rudder would cycle from side-to-side. This tail wag motion would be very bad during a high speed launch – causing control difficulty or even structural failure.

## Scouting for Thermals

Once you have launched your plane to a reasonable altitude, establish an unpowered glide at a comfortable speed. Now turn the Control Switch ON. Fly smoothly using gentle turns to cover areas of potential thermal activity. If your plane enters a thermal and begins to gain altitude, the *Thermal Scout* will wag the rudder. Congratulations, you’ve found lift! At this point, turn the Control Switch OFF and begin circling in the thermal.

The *Thermal Scout* signals lift with complete 2-second side-to-side rudder movements (unless you turn the Control Switch OFF). This allows you to easily distinguish the lift signal from minor jostling due to air turbulence.

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## Rudder Movement Option

Option 1 allows you to select smooth or stepped rudder movement. The “smooth” setting moves the rudder smoothly from side to side when lift is detected. The “step” setting swings the rudder fully to one side then fully to the other, pausing one second at each extreme. For gliders with quick rudder response the smooth setting produces a nicely controlled motion. For slower gliders the step setting produces a more clearly visible motion.