sensor
USERS GUIDE

Version 2.0
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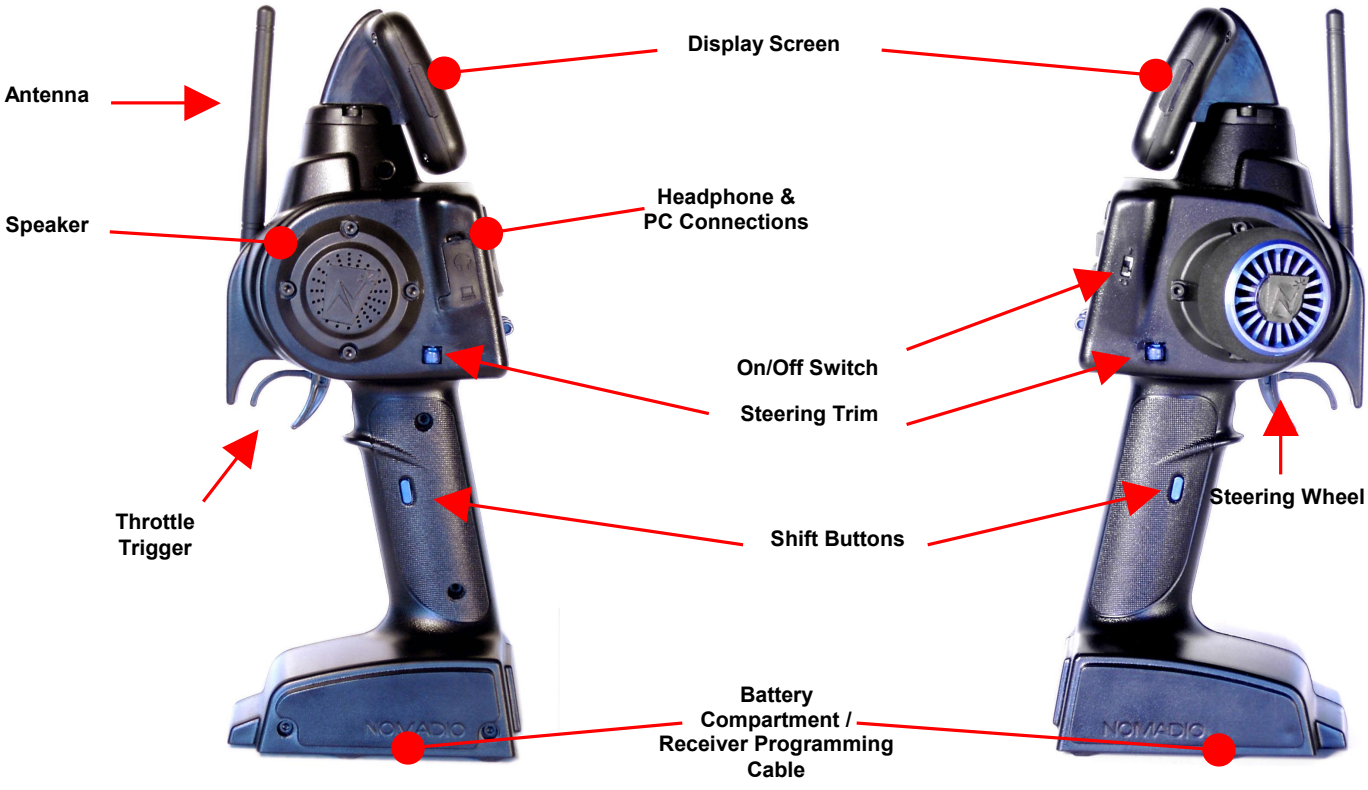
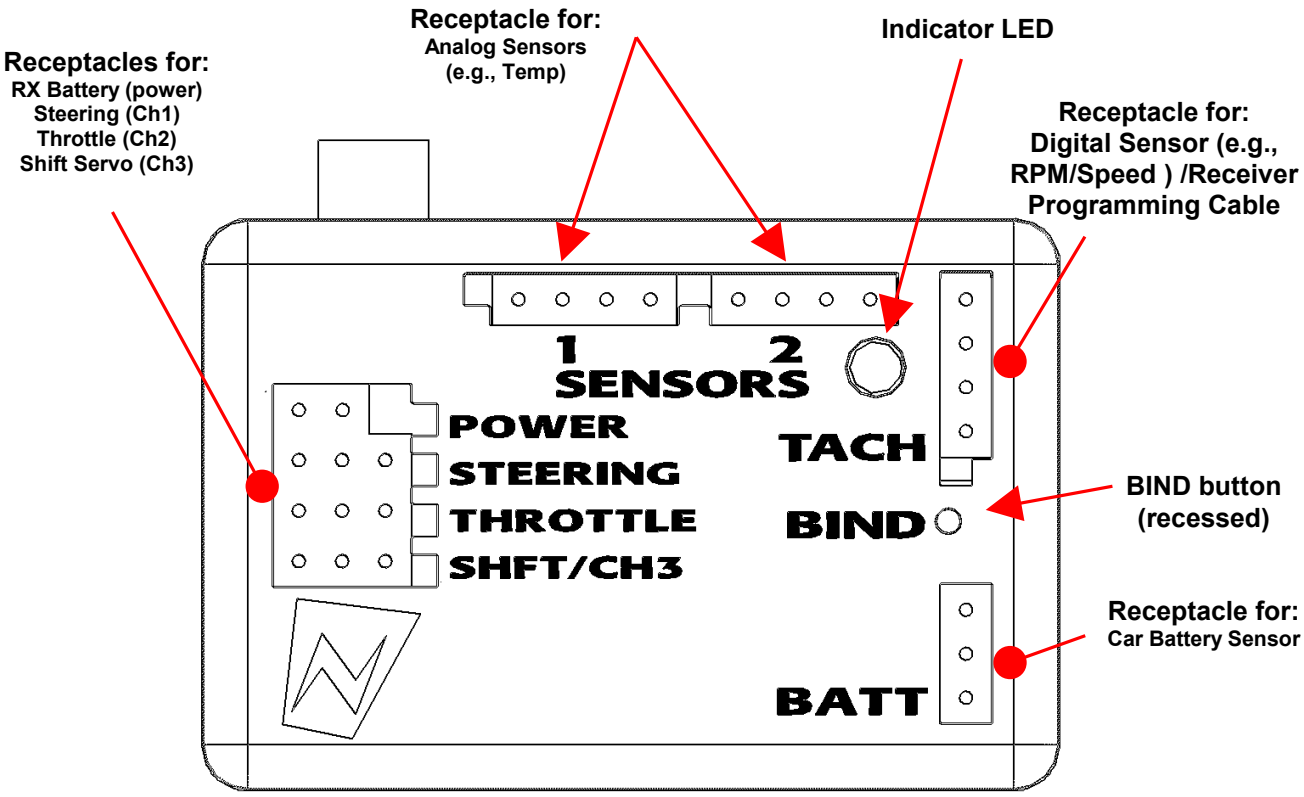
NOMADIO
digital telemetry & control systems

Sensor Quick Reference



Transceiver Quick Reference



Driving Screen Quick Reference

Key Drive Screen Controls

Pressing this button toggles Sensor between the driving screen and the top level function menu, or returns to the previous level from a sub-menu.

Displays the previous statistic.

Displays the next statistic.

Contents

Statement of Compliance

FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
– Reorient or relocate the receiving antenna.
– Increase the separation between the equipment and receiver.
– Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
– Consult the dealer or an experienced technician for help.

• This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada.
Operation is subject to the following two conditions:
1) this device my not cause harmful interference, and
2) this device must accept any interference received, including interference that may cause undesired operation.
• The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Warning: Changes or modifications made to this equipment not expressly approved by Nomadio may void the FCC authorization to operate this equipment.

RF Exposure Statement

This transmitter has been tested and meets the FCC RF exposure guidelines when used with the Nomadio accessories supplied or designated for this product, and provided at least 20 cm separation between the antenna and the user's body is maintained. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

Modular Approval Statement

If you install the Sensor transceiver inside of a vehicle, and you are not the final end user, FCC regulations require you to make the Sensor transceiver's FCC ID easily visible to the end user. In order to do this, please, print the image below onto a permanent sticker, and place it in a visible location such as on the bottom of the vehicle:

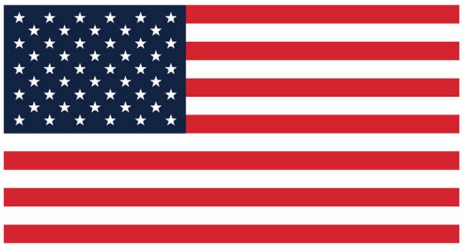
For V2 Transceiver

For V1 Transceiver

Racing Association Approvals

The Sensor system has been approved for competitive use by the following racing organizations. In many cases, the use of telemetry is prohibited or regulated, please consult your race director for details. For an updated list, please consult the Nomadio support website, where a current list is always maintained:

ROAR
EFRA
IFMAR
QSAC



Sensor and its software are designed and manufactured in the United States of America.

Getting to know your Sensor

Power Switch

This switch turns the Sensor on and off. It is recessed to prevent accidental switching during travel or use.

Display Screen

Driving screen

This is the screen you'll be seeing 95% of the time while using the Sensor. It displays radio and battery status, telemetry data that you select, and your servo information.

Menu screen

This screen is the gateway to the Sensor's menu system, which is described in detail later. You can always go back to the driving screen by just pressing the menu key.

Menu Button

Pressing this button toggles Sensor between the driving screen and the top level function menu, or returns to the previous level from a sub-menu.

Navigation Buttons

Button	In the driving screen	In the function menu
		Moves to next higher menu item.
		Moves to next lower menu item.
	Displays previous reading.	Decreases selected value.

Displays next reading.

- Increases selected value.
- Goes to next sub-menu.

- Goes to selected sub-menu
- Saves the change to the selected setting.

Selection Buttons

In the function menu

Sets the currently edited value to its maximum value.

Sets the currently edited value to its minimum value.

Cancels any changes made and resets value to where it was before you started editing.

Resets the value to the factory default

Trim Buttons

T1	Adjusts the throttle dual rate setting.
T2	Adjusts the steering dual rate setting.
T3	Adjusts the throttle trim setting.
Left steering trim button	Adjusts the steering trim to the left or right (for left handed use)
Right steering trim button	Adjusts the steering trim to the left or right.

Grip Buttons

Performs shifting action on channel 3.

Connection Ports

Headphone port

Accepts a 1/8” stereo headphone jack. The output is the same in each ear (mono).

Computer port

This connects to the USB port of your computer using the supplied cable.

Charging and Installing Batteries

The Sensor is powered by four AA-size batteries (1.2~1.5V). You may use the four AA-size 1.2V NiMH batteries provided with the Sensor, or you may use AA-size alkaline batteries (1.5V). Before using your Sensor, make sure the batteries are fully charged.

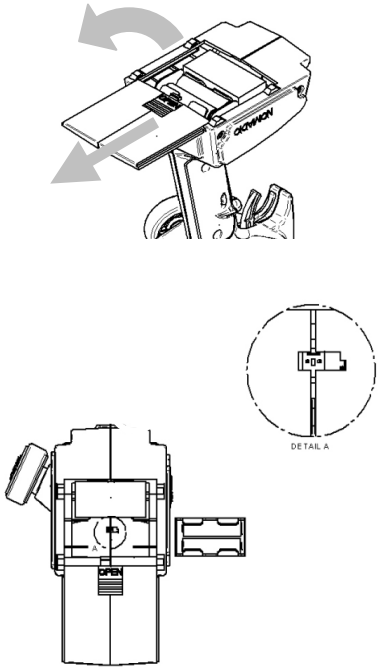
The Sensor is reverse voltage protected: installing batteries backwards cannot damage it. If the batteries are backwards, simply reverse the battery connector.

Also inside the battery compartment is the 4 wire Receiver Programming Cable. This cable can be plugged into the receiver's TACH pins in order to upgrade the software on the receiver. The RC Desktop will instruct you when a software upgrade is available.

Charging the Supplied NiMH Batteries

When using the supplied NiMH batteries, charge the batteries for 12-14 hours (using the supplied charger) before using the Sensor. Be sure to get the polarity correct when installing the batteries into the charger.

Installing the Batteries



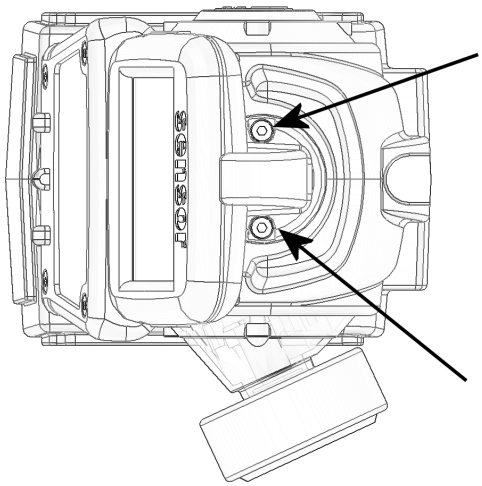
1. Slide and remove the battery compartment cover at the bottom of the Sensor.
2. Remove the battery holder.

NOTE:
The battery holder wires connect to a receptacle in the battery compartment.
It is not necessary to unplug the connector when you remove the battery holder. However, if you do unplug the connector, note its orientation first. If you plug it in wrong, your Sensor will not turn on - no damage will be done to your Sensor, just remove and reverse it.
3. Install the batteries in the battery holder. Observe proper polarity.
4. Plug the battery holder connector into the receptacle in the battery compartment. The red wire (+) goes toward the front panel of the Sensor. If you get the connector wrong, your Sensor will not turn on but no damage will be done – just remove and reverse the connector.
5. Place the battery holder in the battery compartment. Make sure the wires do not pinch.
6. Slide the battery compartment cover into place.

Adjusting the Screen

The display screen at the top of the Sensor can be repositioned for easier viewing.

Tools needed: 7/64" hex wrench

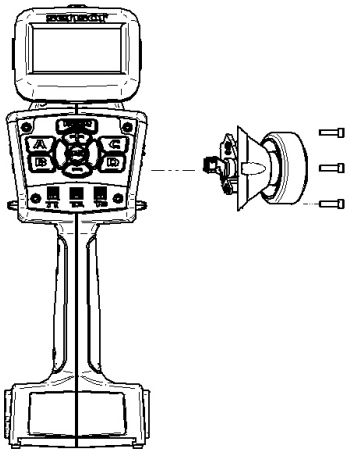


1. Make sure Sensor is turned off before moving the screen.
2. Using the hex wrench, loosen the two screws holding the display screen.
3. Reposition the display screen.
4. Retighten the screws

Converting for Left Handed Use

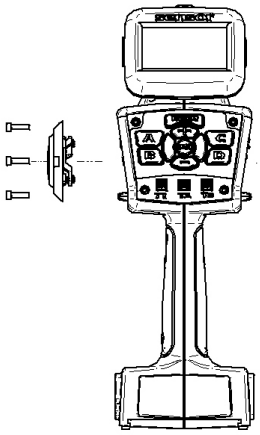
You can easily convert the Sensor to left-handed use. *Tools needed:* #2 Phillips screwdriver, 7/64" hex wrench

A: Remove the Steering Wheel Assembly



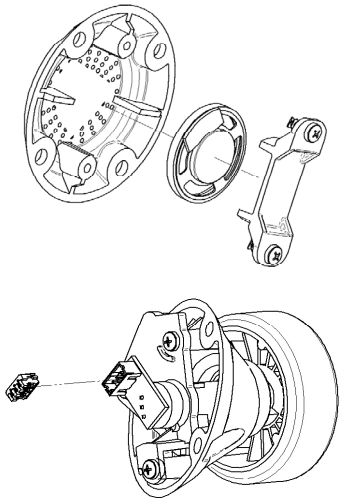
A1: Make sure the Sensor is turned off
A2. Carefully remove the Nomadio emblem in the center of the steering wheel. It is held in place by friction and pulls toward you, it does not twist.
A3. Use the Phillips screwdriver to loosen and remove the screw holding the steering wheel. Remove the steering wheel.
A4. Use the hex wrench to remove the three screws holding the steering wheel assembly.
A5. Carefully pull the steering wheel assembly away from the Sensor body.
A6. Carefully unplug the connector from the steering wheel assembly.

B: Remove the Speaker Assembly



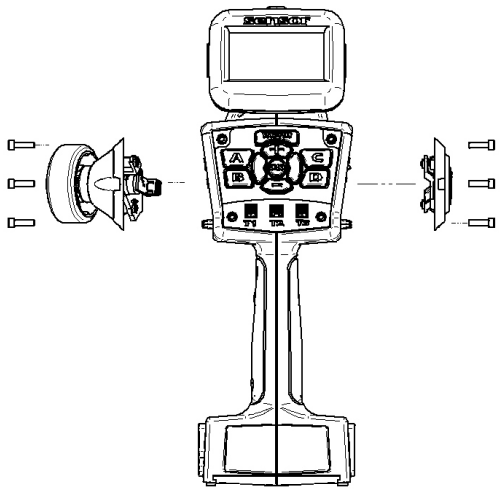
B1. Use the hex wrench to remove the four screws holding the speaker assembly.
B2. Pull the speaker assembly away from the Sensor body.
B3. Carefully unplug the connector from the speaker assembly

C: Swap the Assemblies



C1. Pass the steering wheel connector wire through the Sensor body so it comes out the LEFT side hole (where the speaker used to be).
C2. Pass the speaker connector wire through the Sensor body so it comes out the RIGHT side hole (where the steering wheel used to be).

D: Re-assemble



D1. Reconnect the speaker wire to the speaker assembly. Be careful not to over tighten and break the speaker clamp.
D2. Reconnect the steering wheel wire connector to the steering wheel.
D3. Reattach the speaker assembly to the RIGHT side of the Sensor body.
D4. Reattach the steering wheel assembly to the LEFT side of the Sensor body.
D5. Reattach the steering wheel.
Make sure the steering wheel has full left-and-right movement.
D6. Reinsert the Nomadio emblem in the center of the steering wheel.

Installing the Transceiver

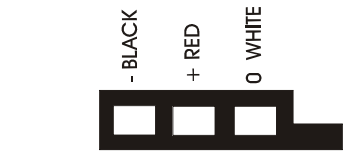
Mounting the Transceiver

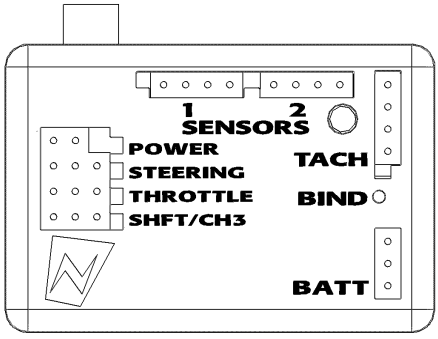
- Install the transceiver so it is protected from vibration or shock.
- Use double-sided tape or Velcro® to mount the transceiver.
- Position the transceiver where it will not contact other solid components.
- Mount the transceiver away from moving parts, sharp corners, and possible contaminants (fuel, dirt, etc.).
- When possible, waterproof and protect the transceiver by wrapping it in foam rubber and placing it in a rubber balloon or plastic bag. If you accidentally get moisture or fuel inside the transceiver, intermittent or erratic operation may result.
- Position the transceiver so the sensors can be easily connected to it.

Antenna

- The thinner portion at the end of the antenna wire must be outside the vehicle body
- DO NOT CUT the antenna wire

Connecting the Transceiver





Servo Input Plugs

The transceiver is designed to use Futaba J-style input plugs with wiring order as shown in the diagram.

Servo lead wires **MUST** be in this order. If the servo wires are in a different order, you must re-order the wires in the input plug. Check with your servo manufacturer about the color and order of the servo lead wiring.

When you insert the servo input plug into the transceiver, note that the input plug may have an alignment tab. Orient the alignment tab properly before inserting the input plug.

To remove in input plug from the transceiver, pull the input plug rather than the servo wires.

Servo Connection

Connect the servos to the appropriate positions in the transceiver:

Connect…	**…into transceiver receptacle**
Receiver battery / Channel 4 servo	"Power"
Steering servo	"Steering"
Throttle servo or ESC	"Throttle"
Shifting servo	"Shft/CH3"

FCC Compliance Reminder

If you install the Sensor transceiver inside of a vehicle, and you are not the final end user, FCC regulations require you to make the Sensor Transceiver's FCC ID easily visible to the end user. See the FCC Compliance section for more information:

Installing the Sensors

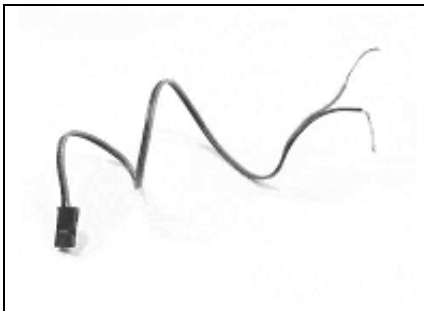
Your Sensor radio system comes with several sensors that you can install in your vehicle and connect to the transceiver. When properly installed and connected, these sensors will send information back to the Sensor so that you can monitor the readings while you drive.

Receiver Battery Sensor

The transceiver monitors the receiver battery voltage from the POWER receptacle. There is no installation necessary for this sensor.

Voltage Sensor

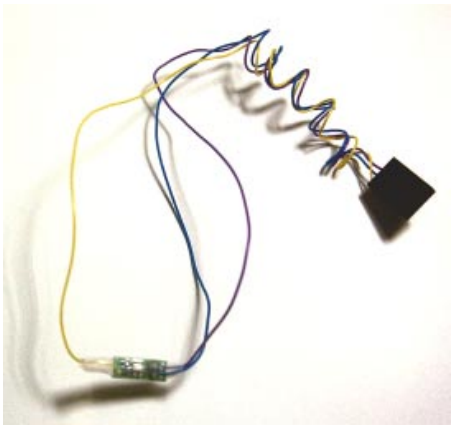
The voltage sensor is used to monitor the voltage of a separate battery pack (for example, an electric car's main battery pack). In a Nitro car, this sensor is not needed.



Connecting the Voltage Sensor

1. Connect the RED wire of the voltage sensor to the positive terminal and the BLACK wire of the voltage sense to the negative terminal of the battery pack you want to monitor.
2. Carefully route, protect, and secure the sensor wires.
3. Plug the voltage sensor into the BATT receptacle.

Temperature Sensor



The temperature sensor is used to monitor the temperature of a vehicle component such as a main battery pack, electric motor, or nitro engine.

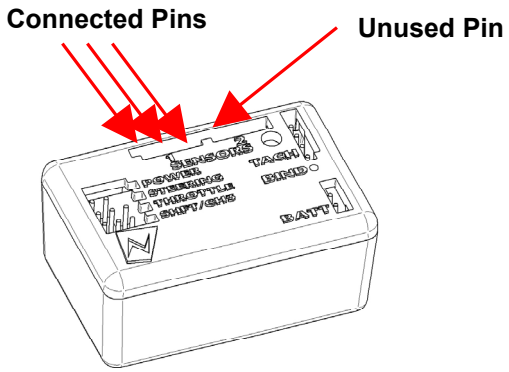
Installation

The green circuit board of the sensor is the active measuring element. Install the sensor so that this board is pressed against the item whose temperature you wish to measure.

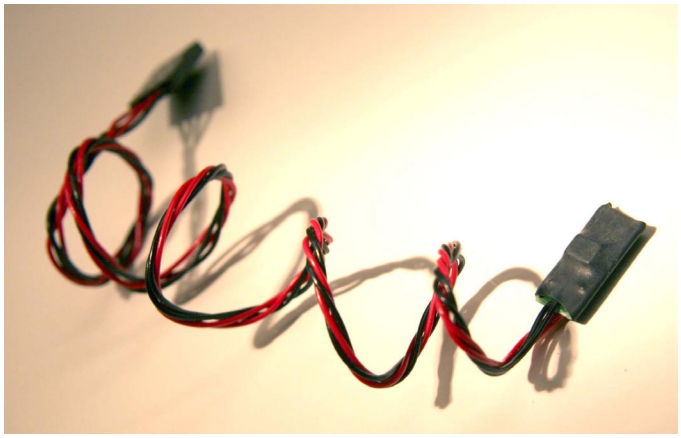
The sensor has been designed to be thin enough to fit between the fins on a heat sink. The mounting wires are strong enough to be used to hold the sensor in place by wrapping them around a cylinder head or ESC heat sink. Alternately, a high-temperature epoxy may be used to secure the sensor.

When installing on a nitro motor, place the sensor as low as possible on the head, opposite the exhaust port. The sensor may also be installed on an electric motor, battery pack, or ESC heat sink.

Connection

	Connecting the Temperature Sensor After you install the temperature sensor in the vehicle, plug it into the "Sensor 1" or "Sensor 2" receptacle. The four-pin connector on the sensor cable has only three wires populated. The unpopulated pin should be the one furthest from the connector key in the receiver plastic. The Sensor transceiver will automatically detect which sensors are installed.

Tachometer Sensor



The tachometer ("tach") sensor is used to monitor the rotation speed of a vehicle component such as a driveshaft and this speed is converted into vehicle speed.

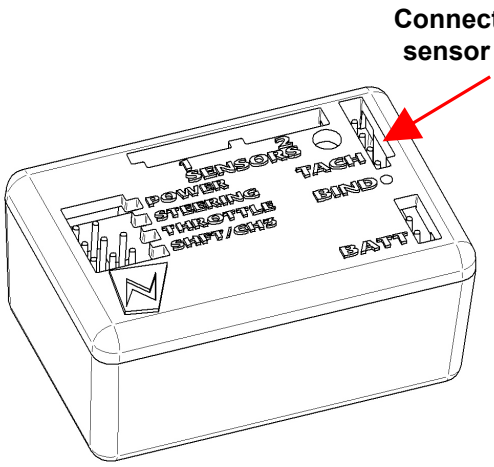
You will need to measure the distance your model rolls in order to provide the Sensor with enough information to give you an accurate speed. We recommend that you get a tape measure and measure several rotations of the wheel to reduce the measurement error.

Installation

1. Choose the mounting location
   - In the drivetrain, after any clutch or transmission. We recommend that you do not try to mount the magnets on your motor for magnetic reasons (electric motors) and balance reasons (nitro motors).
   - Smaller diameter mounting points are better.
   - The tach sensor must be able to be mounted within 1-2mm of the magnet surface, so you'll need a solid mounting point that can position the sensor in the right place.
   - The completed installation should be rigid enough that proximity is maintained without the magnets impacting the sensor.
2. Install the magnets
   - Stick two magnets together, mark the exposed faces, then separate them.
   - Install the magnets with the marked sides out, exactly 180º apart to preserve rotational balance. IMPORTANT: For correct operation, the sensor must see alternating north and south magnetic poles.
   - Ideally, countersink the magnets into the surface.
   - Magnets may be carefully ground to smooth edges or reduce overall thickness; take care not to overheat, as demagnetization may result.
3. Install the tach sensor

• The sensor side of the tach circuit board must be mounted closest to magnets. The sensor is on the opposite side from the large chip that protrudes from the shrink tubing. The graphic above shows where the sensor is so you can mount it correctly.
• When moving, the magnets should pass directly over the center of the sensor.
• We have used a variety of methods of mounting tach sensors, depending on the car and the chosen location. Some ideas include cable ties, epoxy/hot glue, wire, making a wooden housing that holds the sensor in a specific place, etc. The only "wrong" way to mount it is if the magnets hit the sensor or are too far away, or if the sensor moves while the car is running.

Connection



Connecting the Tach Sensor

After you install the tach sensor in the vehicle, plug it into the "TACH" receptacle.

Plug connector into transceiver – tachometer connector pin 1 (designated with a red wire and an arrow on the connector body housing) corresponds with the keyed end of transceiver digital port connector (labeled "tach"). The transceiver will automatically detect which sensors are installed.

Test your sensor's installation

- Power on Sensor and transceiver and bind them
- Verify communication between tachometer and transceiver by selecting RPM reading from drive screen
- Correct mechanical installation can be verified by noting RPM value changes on your controller screen while you spin the wheels of your model.
- If you don't see changing RPM values, the magnets or sensor are out of position, or the sensor could be plugged into the wrong sensor port on your transceiver. If your magnets are hitting the sensor or a part of your car when the wheels are turning, you must re-mount them so they do not hit anything.

Binding the Transceiver

The binding process "locks" the Sensor and a transceiver together so that they listen only to each other.

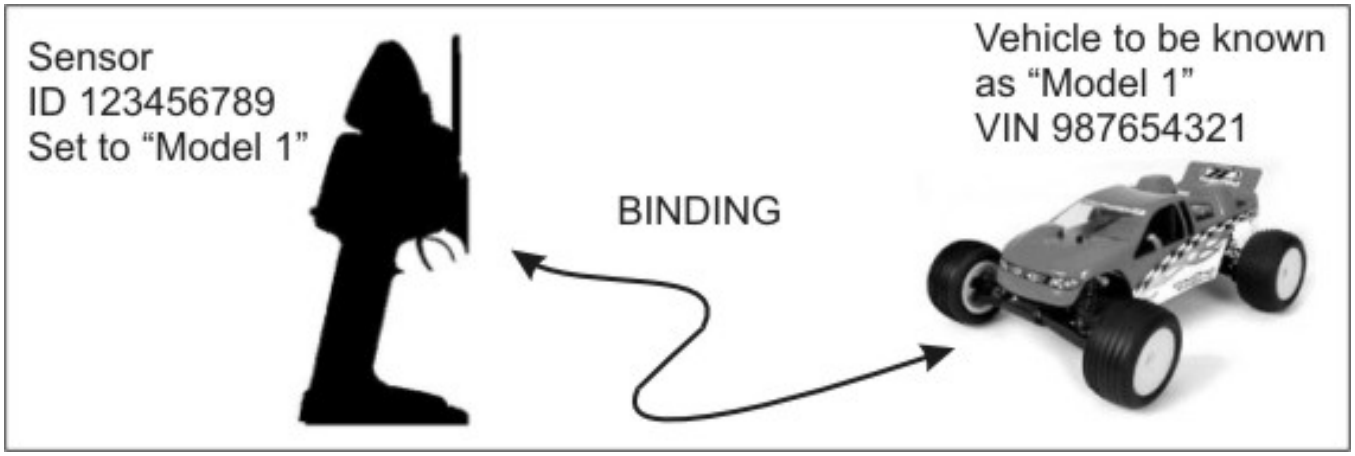
Since the Sensor has forty model memories, it is possible that your Sensor will be used to communicate with as many as forty transceivers. You must therefore perform the binding process once for each transceiver that will communicate with your Sensor.

Note that the Sensor cannot communicate with all of the transceivers at the same time, but rather the Sensor will communicate only with the transceiver associated with the Sensor's currently active model. For more information, see "Managing Models" later in this instruction manual.

How the Binding Process Works

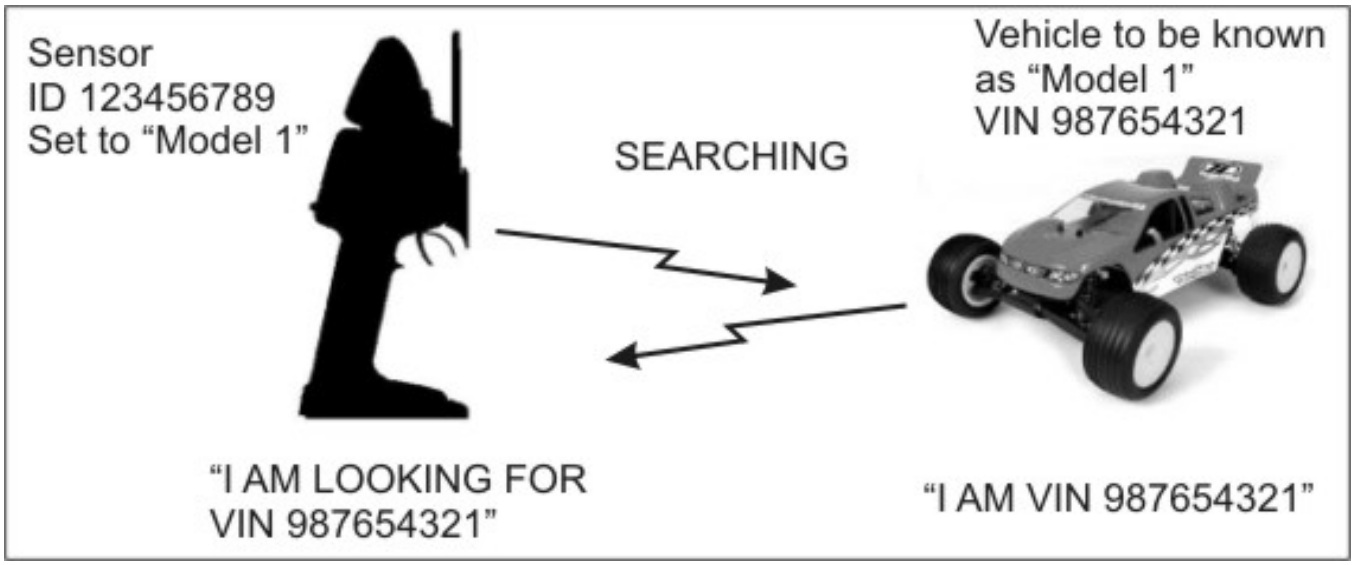
The binding process is set in motion by depressing the "bind" button on the transceiver when the Sensor is in "bind mode." The transceiver broadcasts an inquiry message, indicating that it is looking for a Sensor to bind to.

The Sensor responds back to the transceiver, indicating its ID number (for example, the Sensor ID may be 123456789). The transceiver responds back to the Sensor, indicating its own VIN number (for example, the VIN may be 987654321). After that, the binding process is complete.

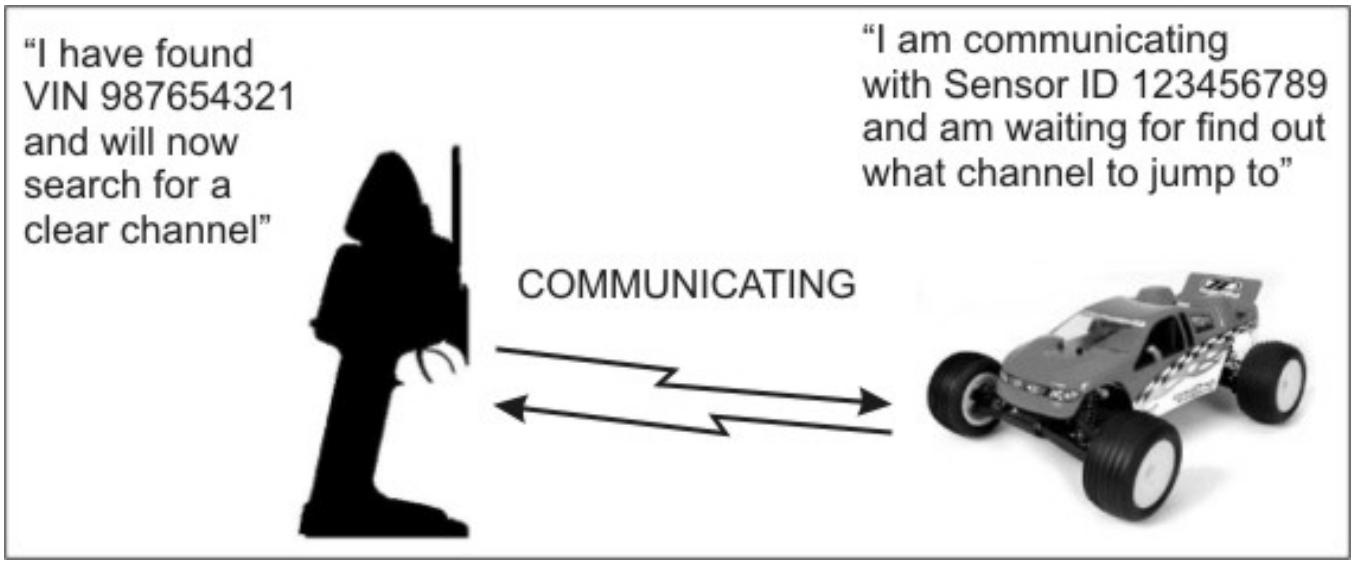


Now, every time you turn on the Sensor and set it to the appropriate model ID (see "Managing Models" later in this manual), the Sensor goes to a special "lookup channel" and searches for messages from the appropriate VIN.

When you turn on the vehicle's transceiver, the transceiver goes to the lookup channel and broadcasts its VIN so it can be found by the appropriate Sensor.



When the Sensor finds the appropriate VIN, the connection is made. The Sensor then searches for a clear frequency channel; when one is found, the Sensor "tells" the transceiver to jump to that clear frequency channel.



Binding your transceiver the first time

1. Install a transceiver into your vehicle.
(For this example, install a transceiver into your electric touring car, which will be known to the Sensor as "Model 1.")

2. In the Sensor's "Manage Models" function menu, go to "Active Model" and select the appropriate model ID for the vehicle you are going to bind to. (For this example, select "Model 1.")

3. After putting your model on a stand to prevent runaways, power up the vehicle and transceiver.

4. Bring the Sensor close to the model. This will help the transceiver and Sensor to "find" each other more easily.

5. In the Sensor's "Manage Models" function menu, select "Rebind."

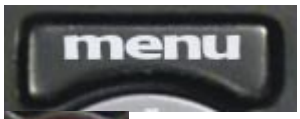
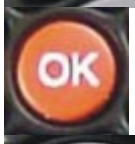
6. Using an extended paperclip, depress and hold the transceiver's "bind" button until the onboard LED illuminates.

7: Confirm binding on your Sensor by pressing the "OK"as the transceiver VIN number is displayed.

The binding process is now complete!

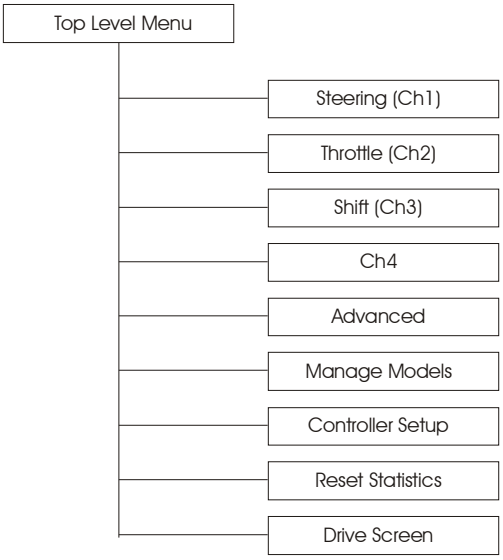
Sensor Controls

The functions of the Sensor are controlled through the function menu and/or trim controls.

To perform this action…	Press…
Toggles between the driving screen and the function menu or returns to the previous level from a sub-menu	
Menu: Go to the selected sub-menu	
Menu: Move to the next higher menu item. Menu: Move to the next lower menu item.	
Menu: Go to the selected sub-menu. Drive: Display next statistic.	
Menu: Decrease the selected value setting. Drive: Display previous statistic.	
Menu: Set currently edited value to maximum.	
Menu: Set currently edited value to minimum.	
Menu: Cancel changes made to the current parameter.	
Menu: Reset currently edited value to factory default.	

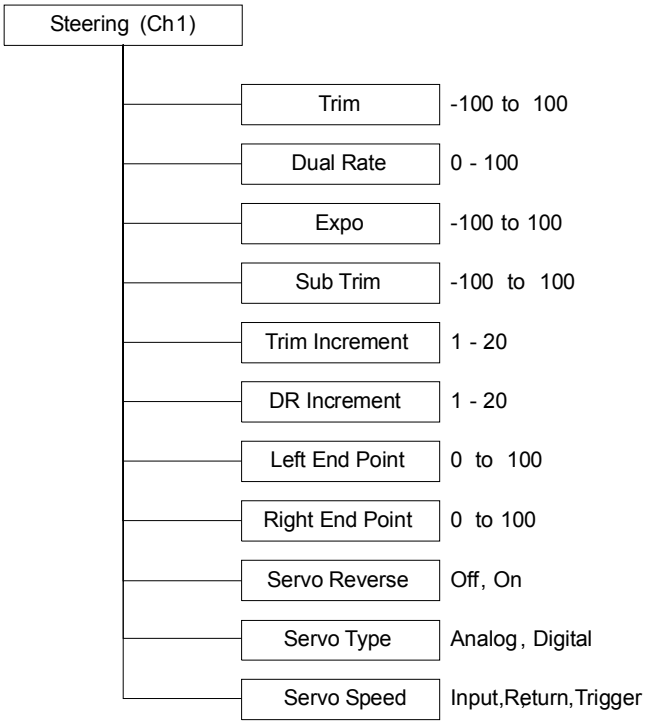
Top Menu Level

The following illustration shows the function menu structure for the top level menu. All main sub-menus may be accessed from the top menu level. Channels 3 & 4 have identical setups, and are documented together.

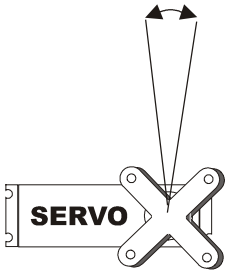


Steering Functions

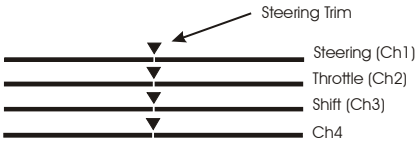
The following illustration shows the function menu structure for the steering functions:



Steering trim adjusts the center point of the steering servo by adjusting the center point within the steering servo's total travel range. Unlike steering sub-trim, the steering left and right end points are unaffected by steering trim; by moving the center point of the steering servo using trim, the center position moves closer to one end point or the other.

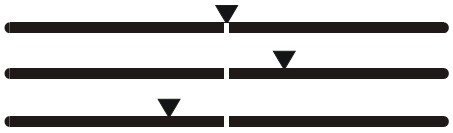


Steering trim should be used only after you have initially adjusted steering sub-trim.



On the driving screen, steering trim is represented by the position of the pointer on the upper bar.

As you change the steering trim, it is shown graphically on the driving screen trim indicator bars:



Steering trim is centered in range (value = 0)

Steering trim is offset to the RIGHT (+ve value)

Steering trim is offset to the LEFT (-ve value)

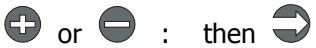
If you find that you have to use a large amount of steering trim to get the vehicle to drive straight, you should consider resetting the steering trim to 0 and re-adjusting the servo horn on the servo output shaft.

Adjusting Steering Trim using the Function Menu

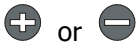
Use the navigation controls to adjust steering trim as follows:

1. Access the top function menu from the driving screen.

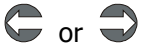
2. Navigate to the **Steering (Ch1)** menu.



3. Navigate to **Trim**.



4. Change the value.



Value	Description
0	Steering trim is centered within the servo range.
-ve value (-100 → -1)	Steering trim is to the LEFT.
+ve value (1 → 100)	Steering trim is to the RIGHT.

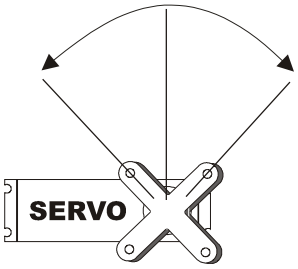
Adjusting Steering Trim using the Steering Trim Buttons

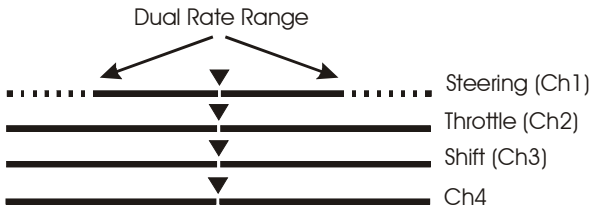
You can use the steering trim buttons on the left and right sides of the Sensor to adjust steering trim. Push the trim button forward to advance the trim, backward to reduce it. If you have a sound attached to the trim adjustment you will hear the sound each time the trim is changed.

A trim (or sub-trim) setting of 100 is equivalent to an End point setting of 25.

Steering Dual Rate

Steering dual rate adjusts the range of servo movement when the steering wheel is fully turned in either the left or right direction. This is used to increase or decrease the steering sensitivity across the entire servo range. The steering dual rate value is applied to both left and right sides, and is expressed as a percentage of servo range (configured by end point adjustments).





On the driving screen, steering dual rate range is represented by the solid length of the upper bar.

The total length of the bar (solid and dotted) represents the servo range. The length of the solid bar represents the range set by the dual rate value.

As you change the dual rate setting it is shown graphically on the driving screen trim indicator bars:

Full servo range is used.

Lower dual rate value reduces servo range.

Adjusting Steering Dual Rate using the Function Menu

Use the navigation controls to adjust steering dual rate as follows:

1. Access the top function menu from the driving screen. menu or OK
2. Navigate to the **Steering (Ch1)** menu. ⊕ or ⊖ : then ➡
3. Navigate to **Dual Rate**. ⊕ or ⊖
4. Change the value. ⬅ or ➡

Value	Description
0	Steering servo range is set to minimum (0%).
1-99	Steering servo range is set to a percentage of full range. For example, value "50" gives 50% of full servo range.
100	Steering servo range is set to full (100%)

Adjusting Steering Dual Rate using the Trim Button

You can also use the T2 trim button to adjust the steering dual rate.

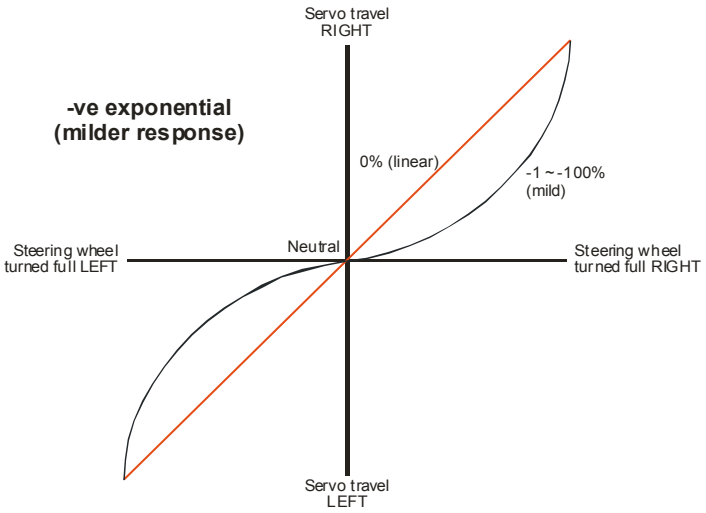
Dual Rate and End Point Adjustment

Full servo range is determined by the left and right end point adjustments. The dual rate value determines the relative servo range between the left and right end points. The servo will never move beyond the set end point adjustments, no matter what dual rate setting is applied.

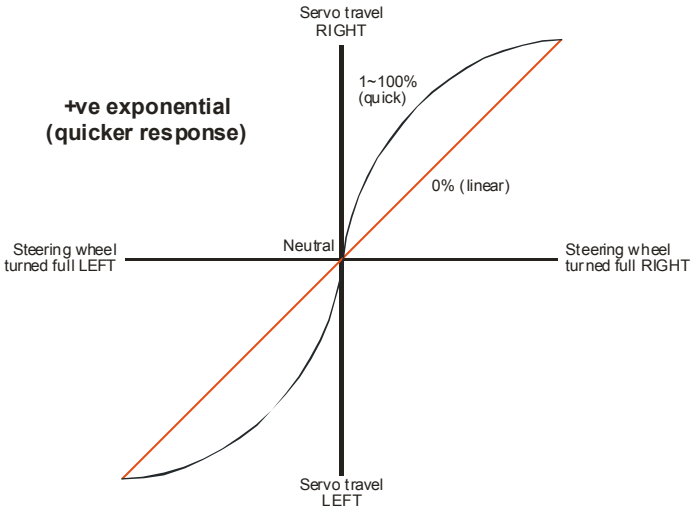
Steering Exponential

Steering exponential adjusts how quickly or slowly the steering servo responds with respect to the amount that the steering wheel is turned. This affects the sensitivity of the steering servo near its neutral position (center).

Adjusting the steering exponential value affects both left and right steering response at the same rate.



A negative (-ve) exponential value gives a milder steering response near the steering neutral point, making it LESS responsive to steering inputs at the steering wheel.



A positive (+ve) exponential value gives a quicker steering response near the steering neutral point, making it MORE responsive to steering inputs at the steering wheel.

Adjusting Steering Exponential

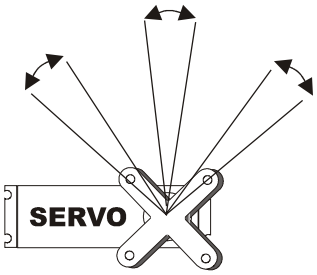
Use the navigation controls to adjust steering exponential as follows:

1. Access the top function menu from the driving screen. menu
2. Navigate to the **Steering (Ch1)** menu. ⊕ or ⊖ : then ➡
3. Navigate to **Expo**. ⊕ or ⊖
4. Change the value. ⬅ or ➡

Value	Description
0	Neutral steering response (linear).
-ve value (-1 to -100)	Milder steering response near center.
+ve value (1 to 100)	Quicker steering response near center.

Steering Sub-Trim

Steering sub-trim adjusts the center point of the steering servo. This differs from steering trim in that steering sub-trim adjusts the servo's entire travel range; by moving the center point of the servo, the left and right end points (left, right) stay the same relative "distance" from the servo center.



Steering sub-trim should be initially adjusted after you have assembled your vehicle's steering system; after you begin driving the vehicle, use steering trim to make fine adjustments to center the steering within the total steering range. If you find that you have to use a large amount of steering sub-trim to get the vehicle to drive straight, you should consider resetting the steering sub-trim to 0 and re-adjusting the servo horn on the servo output shaft.

Adjusting Steering Sub-trim

Use the navigation controls to adjust steering sub-trim as follows:

1. Access the top function menu from the driving screen. menu
2. Navigate to the **Steering (Ch1)** menu. ⊕ or ⊖ : then ➡
3. Navigate to **Sub Trim**. ⊕ or ⊖
4. Change the value. ⬅ or ➡

Value	Description
0	Steering sub-trim is centered within the servo range.
-ve value (-100 → -1)	Steering sub-trim is to the LEFT.
+ve value (1 → 100)	Steering sub-trim is to the RIGHT.

Trim and EPA Interaction

A trim (or sub-trim) setting of 100 is equivalent to an End point setting of 25.

Steering Trim Increment

Steering trim increment adjusts the sensitivity of the steering trim buttons on the left and right sides of the Sensor, by adjusting the amount that the servo trim value increments for one "step" of adjustment.

For example, setting the trim increment value to "5" changes the steering trim value by 5 each time that a steering trim button is pressed once.

Adjusting the steering trim increment value affects both left and right steering trim at the same rate.

Adjusting Steering Trim Increment

Use the navigation controls to adjust steering trim increment as follows:

1. Access the top function menu from the driving screen. menu
2. Navigate to the **Steering (Ch1)** menu. ⊕ or ⊖ : then ➡
3. Navigate to **Trim Increment**. ⊕ or ⊖
4. Change the value. ⬅ or ➡

Value	Description
1-20	Steering trim value changes by set increment. Use smaller values for finer trim control. Use larger values for coarser trim control.

Steering Dual Rate Increment

Steering dual rate increment adjusts the sensitivity of the steering dual rate by adjusting the amount dual rate value increments for one "step" of adjustment.

For example, setting the dual rate increment value to "5" changes the steering dual rate value by 5 each time that a steering dual rate trim button is pressed once.

Adjusting Steering Dual Rate Increment

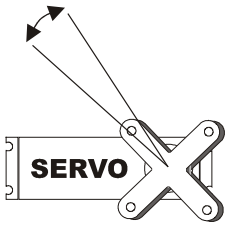
Use the navigation controls to adjust steering dual rate increment as follows:

1. Access the top function menu from the driving screen. menu
2. Navigate to the **Steering (Ch1)** menu. ⊕ or ⊖ : then ➔
3. Navigate to **DR Increment**. ⊕ or ⊖
4. Change the value. ⬅ or ➔

Value	Description
1-20	Steering dual rate value changes by set increment. Use smaller values for finer dual rate control. Use larger values for coarser dual rate control.

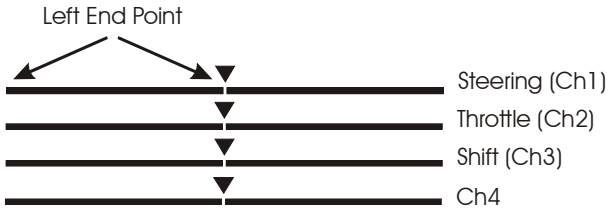
Steering Left End Point

The steering left end point value adjusts how far the steering servo turns to the LEFT with respect to its full range of motion to the left. End point adjustment should be adjusted prior to other steering settings, as the left end point value affects other steering settings.



The left end point is set independently of the right end point (which adjusts how far the steering servo turns to the RIGHT). The left end point setting should be used to do the following:

- Limit steering throw to reduce mechanical binding or servo strain that may occur on full servo throw to the left. For example, if the servo is trying to turn the steering system to the left farther than it is mechanically able.
- Adjust steering throw to change steering characteristics when turning to the left. For example, if the current amount of steering throw to the left causes oversteer or understeer when turning to the left.

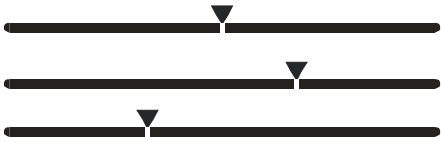


On the driving screen, the left end point is represented by the length of the bar to the left of the pointer on the upper bar.

The greater the left length of the bar, the greater the left end point value.

The position of the pointer on the bar is affected by the end point settings (left and right) and trim settings.

Changing the left end point value has the following visual effect on the driving screen bars.



Left end point value is approximately the same as the right end point value.

Increased left end point value (more servo travel to the left is possible).

Decreased left end point value (less servo travel to the left is possible).

The position of the pointer on the bar is affected by the steering end point settings (left and right) and trim setting; increasing the left end point value may visually appear to have the same effect as decreasing the right end point value.

An end point setting of 50 (the default) is typical for most servos, and should always be used for ESCs. Larger setting values may overdrive some servos

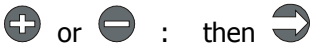
Adjusting the Left End Point

The left end point value is a relative value, and is expressed as the percentage of full travel to the left. For example, setting the left end point value to "50" allows the steering servo to turn only 50% of full travel to the left.

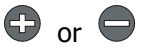
Use the navigation controls to adjust the left end point as follows:

1. Access the top function menu from the driving screen.

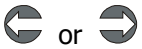
2. Navigate to the **Steering (Ch1)** menu.



3. Navigate to **Left End Point**.



4. Change the value.



Value	Description
0	Minimum left end point; allows NO turning motion to the left.
1-99	Left end point value is set to a percentage of full left-turning range. For example, a value of "50" gives 50% of full left-turning range.
100	Maximum left end point; allows FULL left-turning range.

Trim and EPA Interaction

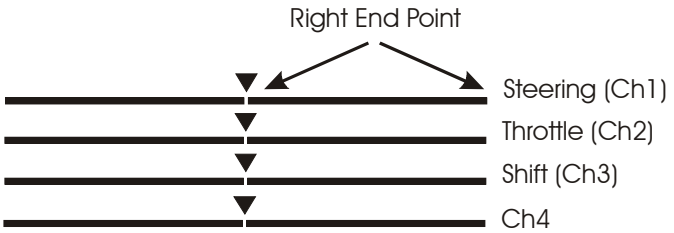
A trim (or sub-trim) setting of 100 is equivalent to an End point setting of 25.

Steering Right End Point

The steering right end point value adjusts how far the steering servo turns to the RIGHT with respect to its full range of motion to the right. End point adjustment should be adjusted prior to other steering settings, as the right end point value affects other steering settings.

The right end point is set independently of the left end point (which adjusts how far the steering servo turns to the LEFT). The right end point setting should be used to do the following:

- Limit steering throw to reduce mechanical binding or servo strain that may occur on full servo throw to the right. For example, if the servo is trying to turn the steering system to the right farther than it is mechanically able.
- Adjust steering throw to change steering characteristics when turning to the right. For example, if your car is oversteering when turning to the right, then reduce the Right End Point value to reduce the range of the steering servo on the right.

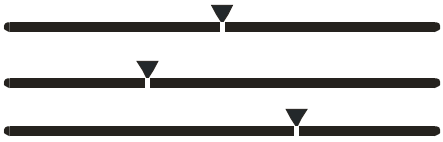


On the driving screen, the right end point is represented by the length of the bar to the right of the pointer on the upper bar.

The greater the right length of the bar, the greater the right end point value.

The position of the pointer on the bar is affected by the end point values (left and right) and trim setting.

Changing the right end point value has the following visual effect on the driving screen bars.



Right end point value is approximately the same as the left end point value.

Increased right end point value (more servo travel to right is possible).

Decreased right end point value (less servo travel to right is possible).

The position of the pointer on the bar is affected by the steering end point values (left and right) and trim setting; increasing the right end point value may visually appear to have the same effect as decreasing the left end point value.

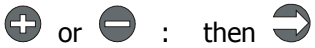
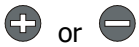
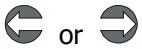
An end point setting of 50 (the default) is typical for most servos, and should always be used for ESCs. Larger setting values may overdrive some servos

Adjusting the Right End Point

The right end point value is a relative value, and is expressed as the percentage of full travel to the right. For example, setting the right end point value to "50" allows the steering servo to turn only 50% of full travel to the right.

Use the navigation controls to adjust the right end point as follows:

1. Access the top function menu from the driving screen. 

2. Navigate to the **Steering (Ch1)** menu.  or : then
3. Navigate to **Right End Point**.  or
4. Change the value.  or

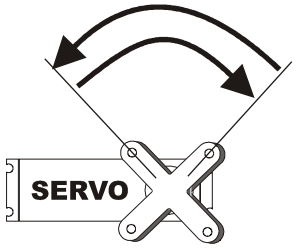
Value	Description
0	Minimum right end point; allows NO turning motion to the right.
1-99	Right end point setting is set to a percentage of full right-turning range. For example, a value of "50" gives 50% of full right-turning range.
100	Maximum right end point; allows FULL right-turning range.

Trim and EPA Interaction

A trim (or sub-trim) setting of 100 is equivalent to an End point setting of 25.

Steering Servo Reverse

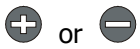
Steering servo reversing reverses the direction the servo moves upon receiving an input from the steering wheel.



Changing the Steering Servo Reverse Setting

Use the navigation controls to change the steering servo reverse setting as follows:

1. Access the top function menu from the driving screen. 

2. Navigate to the **Steering (Ch1)** menu.  or : then
3. Navigate to **Servo Reverse**.  or
4. Change the value.  or

Value	Description
Off	Standard servo direction.
On	Reversed servo direction.

Steering Servo Type

Steering servo type lets you select the type of steering servo (analog or digital) in the vehicle. Analog servos are sent signals at 50 frames/sec, while Digital servos are sent signals at 100 frames/sec.

If you have high end analog servos, they may operate better with the digital setting, try both settings and choose the best performance.

Changing the Steering Servo Type

Use the navigation controls to change the steering servo type as follows:

1. Access the top function menu from the driving screen. — menu
2. Navigate to the **Steering (Ch1)** menu. — ⊕ or ⊖ : then ➡
3. Navigate to **Servo Type**. — ⊕ or ⊖
4. Change the value. — ⬅ or ➡

Value	Description
Analog	Steering servo is analog.
Digital	Steering servo is digital.

Steering Speed

Steering speed allows you to limit the maximum speed that the steering servo will be driven to match your movements on the wheel. There are three parameters that can be adjusted to precisely set up your limiting.

Trigger sets the minimum amount of control input before the speed limiter becomes active. At 0%, limiting is always active (input is always >= 0%). At 50%, limiting is only active if the wheel is turned half way or more.

Input speed determines the limited speed that is applied to motions away from center that are above the trigger setting. 100 is maximum servo movement rate. 1 is minimum rate. Default is 100 (full speed)

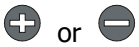
Return speed determines the limited speed that is applied to motions back toward center that are above the trigger setting. 100 is maximum servo movement rate. 1 is minimum rate. Default is 100 (full speed)

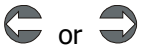
Changing the Steering Speed

Use the navigation controls to change the steering servo type as follows:

1. Access the top function menu from the driving screen. 

2. Navigate to the **Steering (Ch1)** menu.  or : then

3. Navigate to **Steering Speed**.  or

4. Change the values.  or

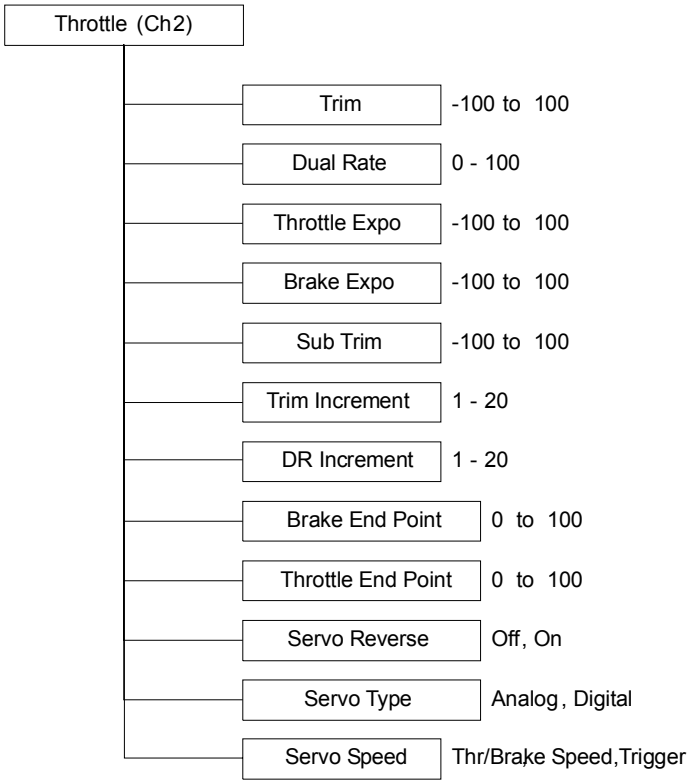
Value	Description
Input Speed	The percentage of full speed applied to servo motion away from center once the trigger amount has been exceeded.
Return Speed	The percentage of full speed applied to servo motion toward center once the trigger amount has been exceeded.
Trigger	The threshold above which speed limiting will be applied.

Interaction with other parameters

Servo Speed is applied after Expo. The trigger level for Servo Speed refers to the curved input value.

Throttle Functions

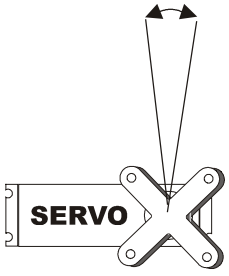
The following illustration shows the function menu structure for the throttle functions:

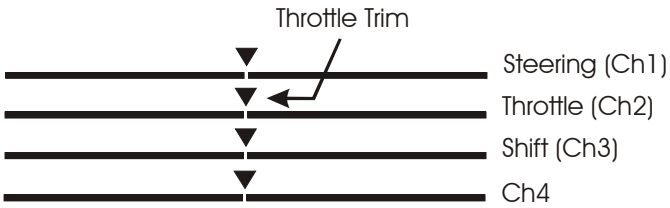


Throttle Trim

Throttle trim adjusts the resting (centered) position of the throttle servo horn (electric or nitro vehicle) or the neutral point of an ESC (electric vehicle).

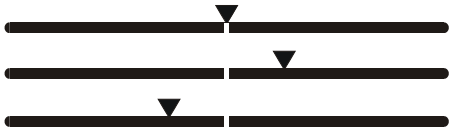
When initially setting up the vehicle, the throttle trim setting should be set to 0. On a throttle servo, the servo horn should be positioned as appropriate on the servo.





On the driving screen, throttle trim is represented by the position of the pointer on the middle bar.

Changing the throttle trim has the following visual effect on the driving screen bars:



Throttle trim is centered in range (value = 0)

Throttle trim is offset to throttle end (+ve value)

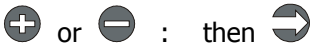
Throttle trim is offset to brake end (-ve value)

Adjusting Throttle Trim using the Function Menu

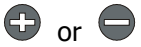
Use the navigation controls to adjust throttle trim as follows:

1. Access the top function menu from the driving screen.

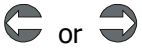
2. Navigate to the **Throttle (Ch2)** menu.



3. Navigate to **Trim**.



4. Change the value.



Value	Description
0	Throttle trim is centered within servo range.
-ve value (-100 → -1)	Throttle trim is to the BRAKE end.
+ve value (1 → 100)	Throttle trim is to the THROTTLE end.

Adjusting Throttle Trim using the Trim Button

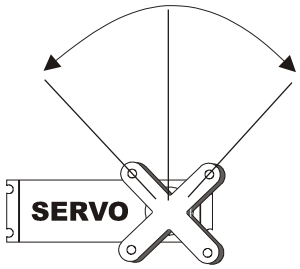
You can also use the T3 trim button to adjust throttle trim.

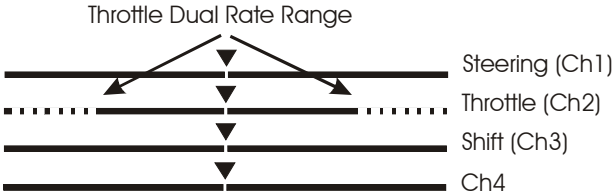
Trim and EPA Interaction

A trim (or sub-trim) setting of 100 is equivalent to an End point setting of 25.

Throttle Dual Rate

Throttle dual rate adjusts the range of servo movement when the throttle trigger is moved from full brake to full throttle position. This is used to increase or decrease the throttle sensitivity across the entire servo range. The throttle dual rate value is applied to both throttle and brake end, and is expressed as a percentage of servo range (configured by end point adjustments).





On the driving screen, throttle dual rate range is represented by the solid length of the middle bar.

The total length of the bar (solid and dotted) represents the servo range. The length of the solid bar represents the servo range set by the dual rate value.

Changing the dual rate setting has the following visual effect on the driving screen bars:

Full servo range is used.

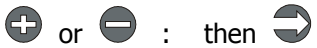
Lower dual rate value reduces servo range.

Adjusting Throttle Dual Rate using the Function Menu

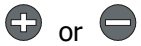
Use the navigation controls to adjust throttle dual rate as follows:

1. Access the top function menu from the driving screen.

2. Navigate to the **Throttle (Ch2)** menu.



3. Navigate to **Dual Rate**.



4. Change the value.

Value	Description
0	Throttle/brake range is set to minimum (0%).
1-99	Throttle/brake range is set to a percentage of full range. For example, value "50" gives 50% of full servo range.
100	Throttle/brake range is set to full (100%)

Adjusting Throttle Dual Rate using the Trim Button

You can also use the T1 trim button to adjust throttle dual rate.

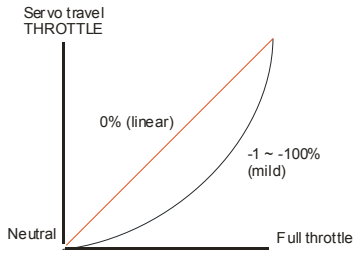
Dual Rate and End Point Adjustment

Full servo range is determined by the throttle and brake end point adjustments. The dual rate value determines the relative servo range between the throttle and brake end points. The servo will never move beyond the set end point adjustments, no matter what dual rate setting is applied.

Throttle Exponential

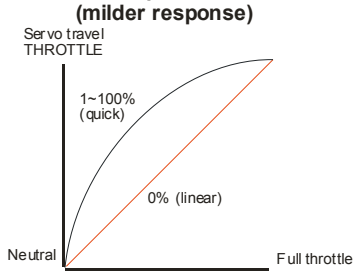
Throttle exponential adjusts how quickly or slowly the throttle servo responds with respect to the amount that the throttle trigger is moved to the THROTTLE end. This affects the sensitivity of the throttle servo near its neutral position.

Adjusting the throttle exponential does not affect the brake exponential; these settings are set individually.



-ve exponential
(milder response)

A negative (-ve) exponential value gives a milder throttle response near the throttle neutral point, making it LESS responsive to braking inputs at the throttle trigger.



+ve exponential
(quicker response)

A positive (+ve) exponential value gives a quicker throttle response near the throttle neutral point, making it MORE responsive to braking inputs at the throttle trigger.

Adjusting Throttle Exponential

Use the navigation controls to adjust throttle exponential as follows:

1. Access the top function menu from the driving screen.

menu

2. Navigate to the **Throttle (Ch2)** menu.

or : then

3. Navigate to **Throttle Expo**.

or

4. Change the value.

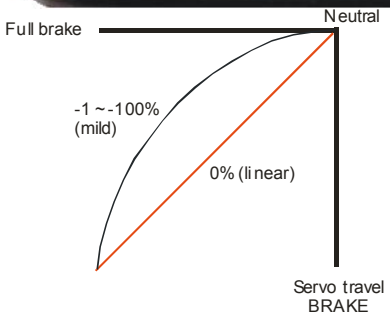
or

Value	Description
0	Neutral throttle response (linear).
-ve value (-1 to -100)	Milder throttle response near neutral.
+ve value (1 to 100)	Quicker throttle response near neutral.

Brake Exponential

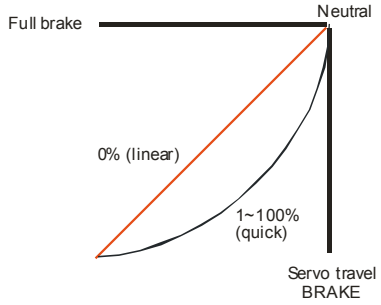
Brake exponential adjusts how quickly or slowly the throttle servo responds with respect to the amount that the throttle trigger is moved to the BRAKE end. This affects the sensitivity of the throttle servo near its neutral position.

Adjusting the brake exponential does not affect the throttle exponential; these settings are set individually.



-ve exponential (milder response)

A negative (-ve) exponential value gives a milder braking response near the throttle neutral point, making it LESS responsive to braking inputs at the throttle trigger.



+ve exponential (quicker response)

A positive (+ve) exponential value gives a quicker braking response near the throttle neutral point, making it MORE responsive to braking inputs at the throttle trigger.

Adjusting Brake Exponential

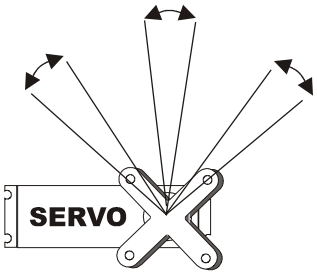
Use the navigation controls to adjust brake exponential as follows:

1. Access the top function menu from the driving screen. — menu
2. Navigate to the **Throttle (Ch2)** menu. — ⊕ or ⊖ : then ➡
3. Navigate to **Brake Expo**. — ⊕ or ⊖
4. Change the value. — ⬅ or ➡

Value	Description
0	Neutral braking response (linear).
-ve value (-1 to -100)	Milder braking response near neutral.
+ve value (1 to 100)	Quicker braking response near neutral.

Throttle Sub-Trim

Throttle sub-trim adjusts the center point of the throttle servo. This differs from throttle trim in that throttle sub-trim adjusts the servo's entire travel range; by moving the center point of the servo, the throttle and brake end points (throttle, brake) stay the same relative "distance" from the servo center.



Throttle sub-trim should be initially adjusted before using throttle trim, which is used to make fine adjustments to center the throttle within the total steering range.

If you find that you have to use a large amount of throttle sub-trim to adjust the throttle position, you should consider resetting the steering sub-trim to 0 and re-adjusting the servo horn on the servo output shaft.

Adjusting Throttle Sub-trim

Use the navigation controls to adjust throttle sub-trim as follows:

1. Access the top function menu from the driving screen. menu
2. Navigate to the **Throttle (Ch2)** menu. ⊕ or ⊖ : then ➡
3. Navigate to **Sub Trim**. ⊕ or ⊖
4. Change the value. ⬅ or ➡

Value	Description
0	Throttle sub-trim is centered within the servo range.
-ve value (-100 → -1)	Throttle sub-trim is to the BRAKE end.
+ve value (1 → 100)	Throttle sub-trim is to the THROTTLE end.

Trim and EPA Interaction

A trim (or sub-trim) setting of 100 is equivalent to an End point setting of 25.

Throttle Trim Increment

Throttle trim increment adjusts the sensitivity of the throttle trim button, by adjusting the amount that the throttle trim value changes for one "step" of adjustment.

For example, setting the throttle trim increment value to "5" changes the throttle trim value by 5 each time that the throttle trim button is pressed once.

Adjusting Throttle Trim Increment

Use the navigation controls to adjust throttle trim increment as follows:

1. Access the top function menu from the driving screen. menu
2. Navigate to the **Throttle (Ch2)** menu. ⊕ or ⊖ : then ⇨
3. Navigate to **Trim Increment**. ⊕ or ⊖
4. Change the value. ⇦ or ⇨

Value	Description
1-20	Throttle trim value changes by set increment. Use smaller values for finer trim control. Use larger values for coarser trim control.

Throttle Dual Rate Increment

Throttle dual rate increment adjusts the sensitivity of the throttle dual rate by adjusting the amount throttle dual rate value increments for one "step" of adjustment.

For example, setting the throttle dual rate increment value to "5" changes the throttle dual rate value by 5 each time that the throttle dual rate trim button is pressed once.

Adjusting Throttle Dual Rate Increment

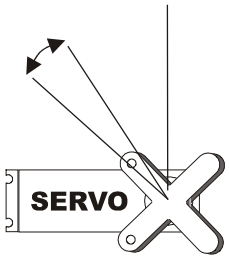
Use the navigation controls to adjust throttle dual rate increment as follows:

1. Access the top function menu from the driving screen. menu
2. Navigate to the **Throttle (Ch2)** menu ⊕ or ⊖ : then ➔
3. Navigate to **DR Increment**. ⊕ or ⊖
4. Change the value. ⇦ or ⇨

Value	Description
1-20	Throttle dual rate value changes by set increment. Use smaller values for finer dual rate control. Use larger values for coarser dual rate control.

Brake End Point

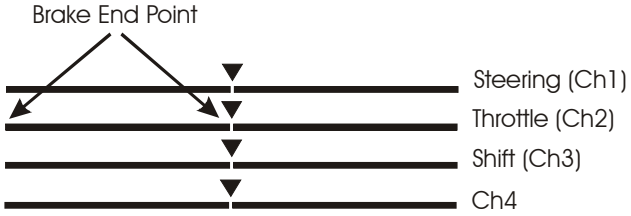
The brake end point value adjusts how far the throttle goes to the BRAKE end with respect to its full range of motion to the brake end. End point adjustment should be adjusted prior to other throttle settings, as the brake end point value affects other throttle settings.



The brake end point is set independently of the throttle end point (which adjusts how far the throttle moves to the THROTTLE end).

The brake end point setting should be used to do the following:

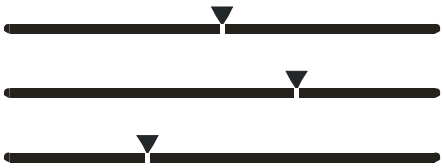
- Limit throttle throw to reduce mechanical binding or servo strain that may occur on full servo throw to the brake end. For example, if the servo is trying to pull a mechanical brake linkage farther than it is mechanically able.
- Adjust braking range to reduce the full braking force of the vehicle.



On the driving screen, the brake end point is represented by the length of the bar to the left of the pointer on the middle bar. The greater the left length of the bar, the greater the brake end point value.

The position of the pointer on the bar is affected by end point settings (throttle and brake) and trim setting.

Changing the brake end point value has the following visual effect on the driving screen bars.



Brake end point value is approximately the same as the throttle end point value.
Increased brake end point value (more servo travel for BRAKING is possible).
Decreased brake end point value (less servo travel for BRAKING is possible).

The position of the pointer on the bar is affected by end point settings (throttle and brake) and trim setting; increasing the brake end point value may visually appear to have the same effect as decreasing the throttle end point value.

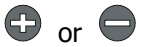
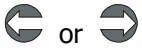
An end point setting of 50 (the default) is typical for most servos, and should always be used for ESCs. Larger setting values may overdrive some servos

Adjusting the Brake End Point

The brake end point value is a relative value, and is expressed as the percentage of full travel to the BRAKE end. For example, setting the brake end point value to "50" allows the throttle to go to only 50% of full brake.

Use the navigation controls to adjust the brake end point as follows:

1. Access the top function menu from the driving screen. 

2. Navigate to the **Throttle (Ch2)** menu.  or : then
3. Navigate to **Brake End Point**.  or
4. Change the value.  or

Value	Description
0	Minimum brake end point; allows NO brake travel.
1-99	Brake end point value is set to a percentage of full braking travel. For example, a value of "50" gives 50% full brake travel.
100	Maximum brake end point; allows FULL brake travel.

Trim and EPA Interaction

A trim (or sub-trim) setting of 100 is equivalent to an End point setting of 25.

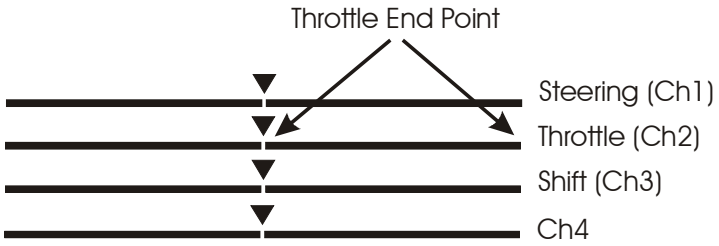
Throttle End Point

The throttle end point value adjusts how far the throttle goes to the THROTTLE end with respect to its full range of motion to the throttle end. End point adjustment should be adjusted prior to other throttle settings, as the throttle end point value affects other throttle settings.

The throttle end point is set independently of the brake end point (which adjusts how far the throttle servo turns to the BRAKE end).

The throttle end point setting should be used to do the following:

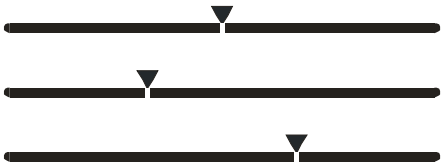
- Limit throttle throw to reduce mechanical binding or servo strain that may occur on full servo throw to the throttle end. For example, if the servo is trying to pull a mechanical throttle linkage farther than it is mechanically able.
- Adjust throttle range to reduce the top speed of the vehicle.



On the driving screen, the throttle end point is represented by the length of the bar to the right of the pointer on the middle bar. The greater the right length of the bar, the greater the throttle end point value.

The position of the pointer on the bar is affected by end point values (throttle and brake) and trim setting.

Changing the throttle end point value has the following visual effect on the driving screen bars.



Throttle end point value is approximately the same as the brake end point value.
Increased throttle end point value (more servo travel for THROTTLE is possible).
Decreased throttle end point value (less servo travel for THROTTLE is possible).

The position of the pointer on the bar is affected by end point values (throttle and brake) and trim setting; increasing the throttle end point value may visually appear to have the same effect as decreasing the brake end point value.

An end point setting of 50 (the default) is typical for most servos, and should always be used for ESCs. Larger setting values may overdrive some servos

Adjusting the Throttle End Point

The throttle end point value is a relative value, and is expressed as the percentage of full travel to the THROTTLE end. For example, setting the throttle end point value to "50" allows the throttle to go to only 50% of full travel to the throttle end.

Use the navigation controls to adjust the throttle end point as follows:

1. Access the top function menu from the driving screen.

menu

2. Navigate to the **Throttle (Ch2)** menu.

or : then

3. Navigate to **Throttle End Point**.

or

4. Change the value.

or

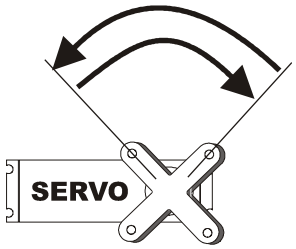
Value	Description
0	Minimum throttle end point; allows NO throttle.
1-99	Throttle end point value is set to a percentage of full throttle travel. For example, a value of "50" gives 50% full throttle travel.
100	Maximum throttle end point; allows FULL throttle travel.

Trim and EPA Interaction

A trim (or sub-trim) setting of 100 is equivalent to an End point setting of 25.

Throttle Servo Reverse

Throttle servo reversing reverses the direction the throttle servo moves upon receiving an input from the throttle trigger.



Changing the Throttle Servo Reverse Setting

Use the navigation controls to change the throttle servo reverse setting as follows:

1. Access the top function menu from the driving screen. — menu
2. Navigate to the **Throttle (Ch2)** menu. — ⊕ or ⊖ : then ⇨
3. Navigate to **Servo Reverse**. — ⊕ or ⊖
4. Change the value. — ⇦ or ⇨

Value	Description
Off	Standard servo direction.
On	Reversed servo direction.

Throttle Servo Type

Throttle servo type lets you select the type of throttle servo (analog or digital) in the vehicle. Analog servos are sent signals at 50 frames/sec, while Digital servos are sent signals at 100 frames/sec.

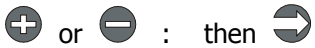
If you are running an electric car with an ESC, it may perform better with the digital setting. Some ESCs may not operate at all with the higher frame rate. Try both settings and choose the best performance.

Changing the Throttle Servo Type

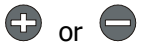
Use the navigation controls to change the throttle servo type as follows:

1. Access the top function menu from the driving screen.

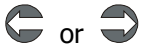
2. Navigate to the **Throttle (Ch2)** menu.



3. Navigate to **Servo Type**.



4. Change the value.



Value	Description
Analog	Throttle servo is analog.
Digital	Throttle servo is digital.

Throttle Speed

Throttle speed allows you to limit the maximum speed that the throttle servo will be driven to match your movements on the trigger. There are four parameters that can be adjusted to precisely set up your limiting.

Throttle Speed determines the percentage of full speed that is applied to the throttle movements that are above the throttle trigger setting. 100 is maximum servo movement rate. 1 is minimum rate. Default is 100 (full speed).

Brake Speed determines the percentage of full speed that is applied to braking movements that are above the trigger setting. 100 is maximum servo movement rate. 1 is minimum rate. Default is 100 (full speed).

Throttle Trigger sets the minimum amount of control input before the speed limiter becomes active. At 0%, limiting is always active (input is always >= 0%). At 50%, limiting is only active if the throttle is on half way or more.

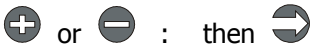
Brake Trigger sets the minimum amount of control input before the speed limiter becomes active. At 0%, limiting is always active (input is always >= 0%). At 50%, limiting is only active if the brake is on half way or more.

Changing the Throttle Speed

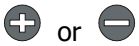
Use the navigation controls to change the steering servo type as follows:

1. Access the top function menu from the driving screen.

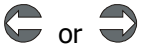
2. Navigate to the **Steering (Ch1)** menu.



3. Navigate to **Throttle Speed**.



4. Change the values.



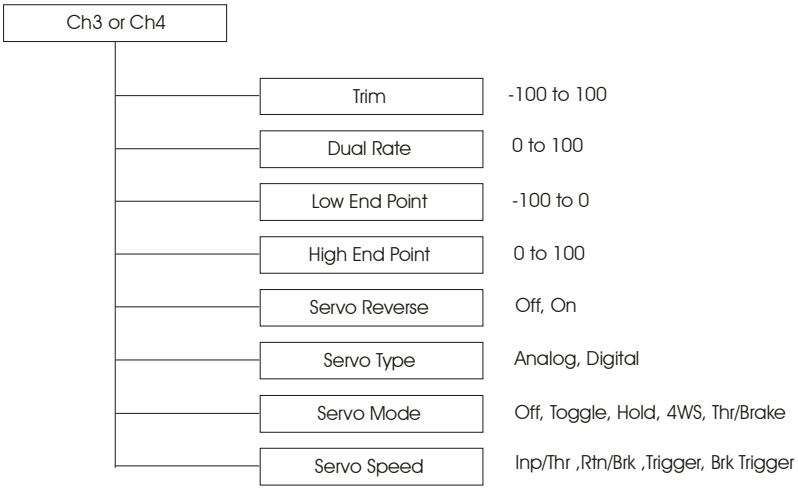
Value	Description
Throttle Speed	The amount of limiting applied to servo throttle motion once the trigger amount has been exceeded.
Brake Speed	The amount of limiting applied to servo brake motion once the trigger amount has been exceeded.
Throttle Trigger	The percentage of full throttle range that will be limited.
Brake Trigger	The percentage of full braking range that will be limited.

Interaction with other Settings

- Servo Speed is applied after Expo. The trigger levels refer to the curved input value.
- ABS is applied after Brake Speed, so Brake Speed can limit how quickly the brake input moves to the ABS Active region, but once there ABS pulses happen at full speed.
- Servo Speed is applied after AutoStart, so if the AutoStart Level is set higher than the Throttle Speed Trigger, the servo movement will be slowed.
- Idle Up only takes effect when the trigger is centered. Throttle Speed can slow down the return to center, and therefore slow down Idle Up activation. Once Idle Up is started, the servo will jump to the set position.

Channel 3 and Channel 4 Servo Functions

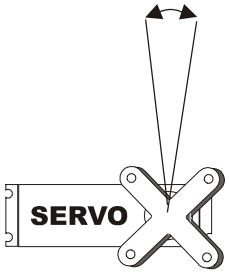
Each of these servos can be used as a number of auxiliary functions such as shifting or acting as a second braking or steering servo. The following illustration shows the function menu structure for Channel 3 (Shift) and Channel 4 (Power):

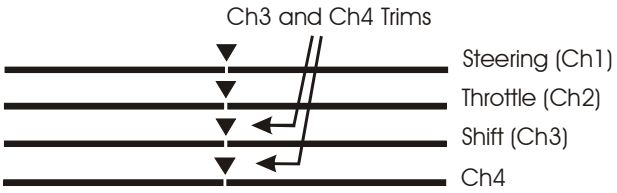


Channels 3 / 4 Servo Trim

Channel 3 and Channel 4 servo trim adjusts the resting (centered) positions of the servos.

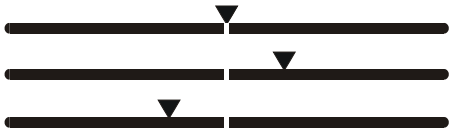
When initially setting up the vehicle, the shift servo trim setting should be set to 0. On the servo, the servo horn should be positioned as appropriate on the servo.





On the driving screen, Channel 3 and Channel 4 servo trims are represented by the position of the pointers on the bottom bars.

Changing the servo trim has the following visual effect on the driving screen bars:



Servo trim is centered in range (value = 0)

Servo trim is offset to high end (+ve value)

Servo trim is offset to low end (-ve value)

Adjusting Channel 3 / 4 Servo Trims

Use the navigation controls to adjust shift servo trim as follows:

1. Access the top function menu from the driving screen. menu
2. Navigate to the **Shift (Ch3)** or **Channel 4** menu. ⊕ or ⊖ : then ➔
3. Navigate to **Trim**. ⊕ or ⊖
4. Change the value. ⬅ or ➔

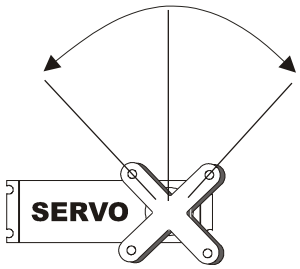
Value	Description
0	Shift servo trim is centered within the servo range.
-ve value (-100 → -1)	Shift servo trim is to the LOW end.
+ve value (1 → 100)	Shift servo trim is to the HIGH end.

Trim and EPA Interaction

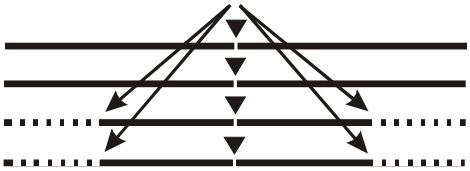
A trim (or sub-trim) setting of 100 is equivalent to an End point setting of 25.

Channel 3 / 4 Servo Dual Rate

Channel 3 and Channel 4 servo dual rates adjust the range of servo movement when the grip buttons are activated. The servo dual rate value is applied to both low and high ends, and is expressed as a percentage of servo range (configured by end point adjustments).



Ch3 / Ch4 Dual Rate Ranges



On the driving screen, servo dual rate range is represented by the solid length of the bottom bar. The total length of the bar (solid and dotted) represents the servo range. The length of the solid bar represents the servo range as set by the dual rate value.

Changing the dual rate setting has the following visual effect on the driving screen bars:

Full servo range is used.

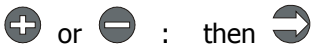
Lower dual rate value reduces servo range.

Adjusting Channel 3 /4 Servo Dual Rate

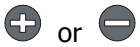
Use the navigation controls to adjust servo dual rate as follows:

1. Access the top function menu from the driving screen.

2. Navigate to the **Shift (Ch3)** or **Channel 4** menu.



3. Navigate to **Dual Rate**.



4. Change the value.

Value	Description
0	Servo range is set to minimum (0%).
1-99	Servo range is set to a percentage of full range. For example, value "50" gives 50% of full servo range.
100	Servo range is set to full (100%)

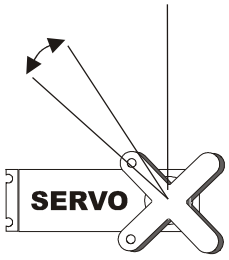
Dual Rate and End Point Adjustment

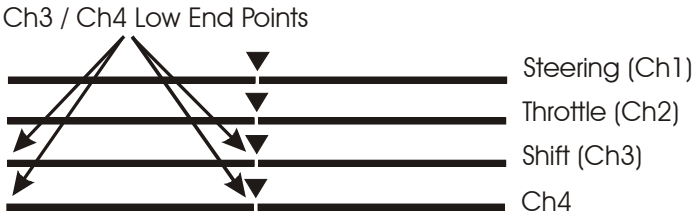
Full servo range is determined by the shift servo low and high end point adjustments. The dual rate value determines the relative servo range between the low and high end points. The servo will never move beyond the set end point adjustments, no matter what dual rate setting is applied.

Low End Point

The servo low end point value adjusts the shift servo's starting position at reset. This is intended to be low gear and goes with the downshift sound event. The end point adjustments should be adjusted prior to other settings.

The low end point is set independently of the high end point (which adjusts how far the servo moves to the HIGH end).

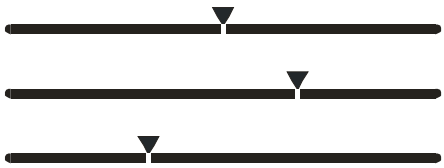




On the driving screen, the low end point is represented by the length of the bar to the left of the pointer on the lower bar. The greater the left length of the bar, the greater the low end point value.

The position of the pointer on the bar is affected by end point settings (low and high) and trim setting.

Changing the low end point value has the following visual effect on the driving screen bars.



Low end point value is approximately the same as the high end point value.
Increased low end point value (more servo travel on LOW end is possible).
Decreased low end point value (less servo travel on LOW end is possible).

The position of the pointer on the bar is affected by end point settings (low and high) and trim setting; increasing the low end point value may visually appear to have the same effect as decreasing the high end point value.

An end point setting of 50 (the default) is typical for most servos, and should always be used for ESCs. Larger setting values may overdrive some servos

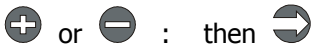
Adjusting the Low End Point

The low end point value is a relative value, and is expressed as the percentage of full travel to the LOW end. For example, setting the low end point value to "50" allows the servo to move only 50% of full travel to the low end.

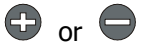
Use the navigation controls to adjust the low end point as follows:

1. Access the top function menu from the driving screen.

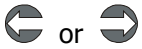
2. Navigate to the **Shift (Ch3)** or **Channel 4** menu.



3. Navigate to **Low End Point**.



4. Change the value.



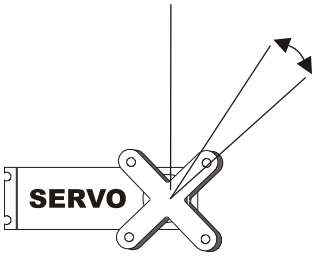
Value	Description
0	Minimum low end point; allows NO travel to low end.
1-99	Low end point value is set to a percentage of travel range to low end. For example, a value of "50" gives 50% of full travel to low end.
100	Maximum low end point; allows FULL travel to low end.

Trim and EPA Interaction

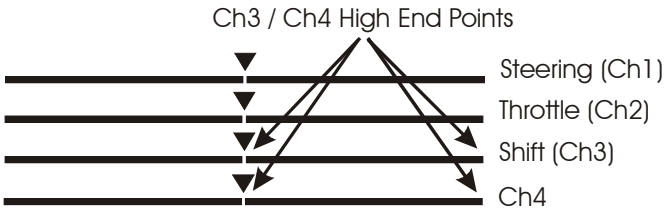
A trim (or sub-trim) setting of 100 is equivalent to an End point setting of 25.

High End Point

The shift servo high end point value adjusts the servo's ending position after shifting upwards. This is intended to be high gear and goes with the upshift sound event. The end point adjustments should be adjusted prior to other settings.



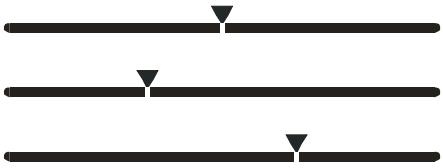
The high end point is set independently of the low end point (which adjusts how far the servo moves to the LOW turns end).



On the driving screen, the high end point is represented by the length of the bar to the right of the pointer on the upper bar. The greater the right length of the bar, the greater the high end point value.

The position of the pointer on the bar is affected by end point settings (low and high) and trim setting.

Changing the high end point value has the following visual effect on the driving screen bars.



High end point value is approximately the same as the low end point value.
Increased high end point value (more servo travel on HIGH end is possible).
Decreased high end point value (less servo travel on HIGH end is possible).

The position of the pointer on the bar is affected by end point settings (low and high) and trim setting; increasing the high end point value may visually appear to have the same effect as decreasing the low end point value.

An end point setting of 50 (the default) is typical for most servos, and should always be used for ESCs. Larger setting values may overdrive some servos

Adjusting the High End Point

The high end point value is a relative value, and is expressed as the percentage of full travel to the HIGH end. For example, setting the high end point value to "50" allows the servo to move only 50% of full travel to the high end.

Use the navigation controls to adjust the high end point as follows:

1. Access the top function menu from the driving screen. menu
2. Navigate to the **Shift (Ch3)** or **Channel 4** menu. ⊕ or ⊖ : then ⇨
3. Navigate to **High End Point**. ⊕ or ⊖
4. Change the value. ⇦ or ⇨

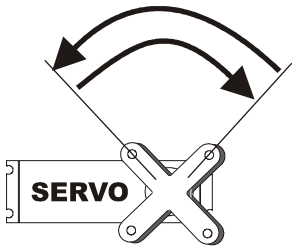
Value	Description
0	Minimum high end point; allows NO travel to high end.
1-99	High end point value is set to a percentage of travel range to high end. For example, a value of "50" gives 50% of full travel to high end.
100	Maximum high end point; allows FULL travel to high end.

Trim and EPA Interaction

A trim (or sub-trim) setting of 100 is equivalent to an End point setting of 25.

Channel 3 /4 Servo Reverse

Servo reversing reverses the direction the shift servo moves upon receiving an input from the grip buttons.



Changing the Channel 3 / 4 Servo Reverse Setting

Use the navigation controls to change the servo reverse setting as follows:

1. Access the top function menu from the driving screen. menu
2. Navigate to the **Shift (Ch3)** or **Channel 4** menu. or : then
3. Navigate to **Servo Reverse**. or
4. Change the value. or

Value	Description
Off	Standard servo direction.
On	Reversed servo direction.

Channel 3 / 4 Servo Type

Servo type lets you select the type of servo (analog or digital) in the vehicle. Analog servos are sent signals at 50 frames/sec, while Digital servos are sent signals at 100 frames/sec.

If you are running an electric car with an ESC, it may perform better with the digital setting. Some ESCs may not operate at all with the higher frame rate. Try both settings and choose the best performance.

Changing the Channel 3 / 4 Servo Type

Use the navigation controls to change the shift servo type as follows:

1. Access the top function menu from the driving screen. menu
2. Navigate to the **Shift (Ch3)** or **Channel 4** menu. or : then
3. Navigate to **Servo Type**. or
4. Change the value. or

Value	Description
Analog	Shift servo is analog.
Digital	Shift servo is digital.

Channel 3 / 4 Servo Mode

Shift servo mode controls the behavior of the channel 3 and channel 4 servos.

Changing the Channel 3 / 4 Servo Mode

Use the navigation controls to change the servo mode as follows:

1. Access the top function menu from the driving screen. menu
2. Navigate to the **Shift (Ch3)** or **Channel 4** menu. or : then
3. Navigate to **Mode**. or
4. Change the value. or

Value	Description
Off	No action; shift servo stays at trim position.
Toggle	Shift servo starts at Low. Pressing the grip button moves the shift servo to High. Releasing and pressing the grip button again moves the shift servo back to Low.
Hold	Servo starts at Low. Holding the grip button moves the shift servo to High. Releasing the grip button moves the servo back to Low.
4WS	4-wheel steering mode. Shift servo output is controlled by the steering wheel, just like the steering servo.
Thr/Brake	Throttle/Brake mode. Shift servo output is controlled by the trigger, just like the Throttle servo

Note: In 4WS or Thr/Brake mode the settings on this screen (End Points, Dual Rate, Trim, Reverse, Type, and Servo Speed) still take effect. However, the Expo setting from the master channel is also used. For Thr/Brake mode, Auto Start, Idle Up, and ABS also apply.

Channel 3 / 4 Servo Speed

Input/Throttle Speed determines the percentage of full speed that is applied to the throttle movements that are above the throttle trigger setting. 100 is maximum servo movement rate. 1 is minimum rate. Default is 100 (full speed).

Return/Brake Speed determines the percentage of full speed that is applied to braking movements that are above the trigger setting. 100 is maximum servo movement rate. 1 is minimum rate. Default is 100 (full speed).

Trigger sets the minimum amount of control input before the speed limiter becomes active. At 0%, limiting is always active (input is always >= 0%). At 50%, limiting is only active if the throttle is on half way or more.

Brake Trigger sets the minimum amount of control input before the speed limiter becomes active. At 0%, limiting is always active (input is always >= 0%). At 50%, limiting is only active if the brake is on half way or more.

The parameters of this function operate differently depending on which mode CH3/CH4 is currently set for. (See Channel 3 and Channel 4 Servo Mode above).

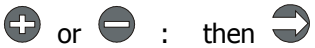
Shift Servo mode set for **4WS**	Shift Servo mode set for **Thr/Brake**
Input/Throttle Speed acts as Input Speed Return/Brake Speed acts as Return Speed Trigger acts as Trigger Brake Trigger is not used	Input/Throttle Speed is Throttle Speed Return/Brake Speed acts as Brake Speed Trigger acts as Throttle Trigger Brake Trigger acts as Brake Trigger

Changing the Channel 3 / 4 Servo Speed

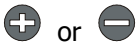
Use the navigation controls to change the steering servo type as follows:

1. Access the top function menu from the driving screen.

2. Navigate to the **Shift (Ch3)** or **Channel 4** menu.



3. Navigate to **Throttle Speed**.



4. Change the values.

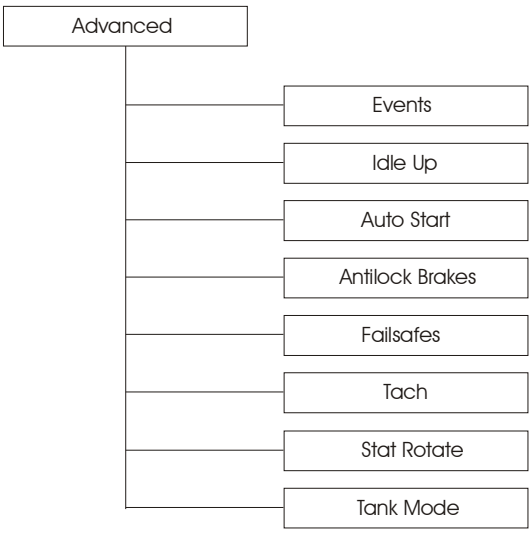
Value	Description
Input/Throttle Speed	The amount of limiting applied to servo throttle motion once the trigger amount has been exceeded.
Return/Brake Speed	The amount of limiting applied to servo brake motion once the trigger amount has been exceeded.
Trigger	The percentage of full throttle range that will be limited.
Brake Trigger	The percentage of full braking range that will be limited.

Interaction with other Settings

- Servo Speed is applied after Expo. The trigger levels refer to the curved input value.
- ABS is applied after Brake Speed, so Brake Speed can limit how quickly the brake input moves to the ABS Active region, but once there ABS pulses happen at full speed.
- Servo Speed is applied after AutoStart, so if the AutoStart Level is set higher than the Throttle Speed Trigger, the servo movement will be slowed.
- Idle Up only takes effect when the trigger is centered. Throttle Speed can slow down the return to center and therefore slow down Idle Up activation. Once Idle Up is started, the servo will jump to the set position.

Advanced Features

The following illustration shows the function menu structure for the advanced functions:



Events

The Events menu is where you control the feedback and alerts that the Sensor delivers to you, based on sensors and user actions.

Note that you configure the actual sounds and vibration patterns which are triggered by these events through the Digital RC Desktop software on your PC.

Some events have an alert setting that controls how the Sensor alerts you when that event occurs (None, Sound, Vibrations or Both).

Each event also has a level, which controls what trigger sets off the event. The meaning of the level setting varies with each event, and is documented in the table below.

Configuring Event Settings

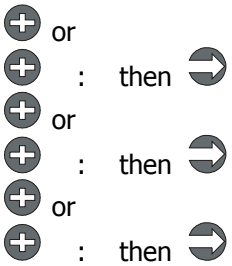
Use the navigation controls to configure the Event Settings as follows:

1. Access the top function menu from the driving screen.

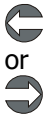
2. Navigate to the **Advanced** menu.

3. Navigate to the **Events** submenu.

4. Navigate to the submenu for the Event which you wish to configure (see table below)



5. Change the **Alert** value.



Value	Description
Off	Does not alert user (ignores any sounds or vibes selected in the RC Desktop)
Sound	Plays only the sound selected in RC Desktop for that event
Vibe	Vibrates, with pattern selected in RC Desktop, when event occurs.
Both	Plays both sound and vibrates when event occurs.

6. Change the **Level** Value — See Table Below

Event Summary

For each Event, the "Affects" column shows which Vibration Patterns and Sounds in the RC Desktop are tied to that event.

The units for Speed and Temperature are based on the Units setting in the Controller setup menu.

Event	Level	Default	Affects	Description
TX Battery	(0.0– 10.0 volts)	4.1 volts	Sound: Tx battery Vibe: TxBat Vibe	Low Transmitter battery voltage warning
Car Battery	Car (0.0 – 20.0 volts) RX (0.0 – 10.0 volts)	7.0 volts 4.1 volts	Sound: Car Battery Vibe: CarBat Vibe	Low car battery voltage warning
Temperature	(0-450 degrees)	270 degrees	Sound: Temperature Vibe: Temp Vibe	Over-temperature warning. 4 Different levels for the different temp sensor ports
Speed	(0-200)	55	Sound: Speed Vibe: Temp Vibe	Speed threshold notification
Connection	N/A		Sound: Connected, Disconnected	Notification when connecting to or

			Vibe: Connect Vibe, Disconnect Vibe	disconnecting from transceiver
Alert Over	N/A		Sound: Alert Over Vibe: Alert Over Vibe	Notification when a sensor returns to normal operating range after an alert
Startup	N/A		Sound: Startup Vibe: Startup Vibe	Action at power-up, during splash screen display
Menu	N/A		Sound: Key Click, Save, Prompt Vibe: Click Vibe, Save Vibe, Prompt Vibe	Notification when navigating through menu system, clicking keys and saving settings
Shift	N/A		Sound: Down shift, Up shift Vibe: Shift Vibe	Notification when the shift (grip) button is pressed
Trim	N/A		Sounds: Trim down, Trim up, Trim bottom, Tim top, Trim center	Notification when user adjusts the trim positions

Idle Up

Idle Up changes the throttle servo position when the trigger is centered, it has no affect at other trigger positions. When *Idle Up -> Active* is *On* and the trigger is centered, the throttle moves to *Idle Up -> Level* percent. This is typically used to warm up a nitro engine by running it at high idle (just shy of the clutch engaging).

Configuring Idle Up

Use the navigation controls to configure Idle Up as follows:

1. Access the top function menu from the driving screen.

menu

2. Navigate to the **Advanced** menu.

or or : then

2. Navigate to the **Idle Up** submenu.

or or : then

4. Change the values.

	Value	Description
or	Active	Controls whether the Idle Up feature is being used
or	Level	The position (-100 to +100) to which the throttle should go when idling

AutoStart

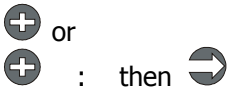
AutoStart is used to get that slight extra edge from a standing start. When *AutoStart->Armed* is *On* and the trigger is pulled more than *AutoStart->Trigger* percent, the throttle is held at *AutoStart->Level* percent until the trigger is returned to neutral. *AutoStart->Armed* automatically turns off. This is used either to limit throttle input at the start to avoid spinning on a low traction surface, or with a low trigger and high level to get an extra-quick punch off the line on a high traction surface.

Configuring AutoStart

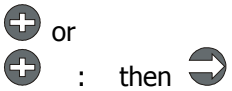
Use the navigation controls to configure AutoStart as follows:

1. Access the top function menu from the driving screen.

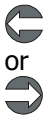
2. Navigate to the **Advanced** menu.



2. Navigate to the **Idle Up** submenu.



4. Change the values.



Value	Description
Armed	Enables or disables the AutoStart function
Level	The position (0 to +100) at which the throttle is to be maintained during AutoStart
Trigger	The percentage of trigger pull (0-100%) at which AutoStart engages

Antilock Braking System (ABS)

Sensor supports ABS brakes to give better traction during stopping.

Configuring ABS

Use the navigation controls to configure ABS as follows:

1. Access the top function menu from the driving screen.

menu

2. Navigate to the **Advanced** menu.

or

: then

3. Navigate to the **ABS** submenu.

or

: then

or

Value	Description
Active	Enables or disables ABS
Trigger	A percentage (0-100%, default 50) indicating the braking threshold above which ABS is triggered
Delay	The time in seconds (0.0-2.0, default 0) the brake must be above the trigger level before ABS engages
Depth	A percentage (0-100, default 50) indicating the reduction in braking force during the ABS coast phase. Setting Depth to 100% returns to full coast between brake pulses; setting Depth to 0% leaves braking force unchanged (this effectively disables ABS).
Brake Time	When ABS is engaged, time in seconds (0.1-5.0, default 1.0) during which brakes are applied at full strength
Coast Time	When ABS is engaged, time in seconds (0.1-5.0, default 1.0) during which brake pressure is reduced

Failsafes

You can set up the failsafe positions of the servos so that in the event of loss of signal, the servos go to their set failsafe positions. Default failsafe positions are centered steering and trim.

Setting Failsafe Modes

Use the navigation controls to set the failsafe modes as follows:

1. Access the top function menu from the driving screen. — menu
2. Navigate to the **Advanced** menu. — or : then
3. Navigate to the **Failsafe** menu. — or : then
4. Navigate to **Steering**. — or
5. Change the steering servo failsafe setting. — or

Value	Description
Hold	Steering servo holds last known position.
Set	Steering servo goes to set failsafe position.

6. Navigate to **Throttle**. — or
7. Change the throttle servo failsafe setting. — or

Value	Description
Hold	Throttle servo holds last known position.
Set	Throttle servo goes to set failsafe position.

8. Navigate to **Shift (Ch3)**. — or
9. Change the shift servo failsafe setting. — or

Value	Description
Hold	Shift servo holds last known position.
Set	Shift servo goes to set failsafe position.

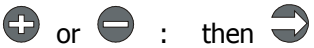
10. Navigate to **Ch4**. — or
11. Change the Ch4 servo failsafe setting. — or

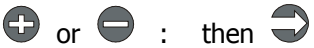
Value	Description
Hold	Ch4 servo holds last known position.
Set	Ch4 servo goes to set failsafe position.

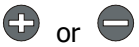
Setting Failsafe Positions

Use the navigation controls to set the failsafe positions as follows:

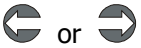
1. Access the top function menu from the driving screen. 

2. Navigate to the **Advanced** menu. 

3. Navigate to the **Failsafe** menu. 

4. Navigate to **Set Failsafes**. 

5. At the confirmation screen:
   - Select **Yes** to capture the servo failsafe settings.
   - Select **No** to abandon the operation.



6. Confirm your selection. 

7. A 3-second countdown begins on the display screen.

Before the countdown ends, use the Sensor controls to set the servo failsafe positions. (For example, on a nitro car set steering to centered and throttle to full brake.)

At the end of the countdown, a confirmation message indicates that the servo failsafe positions were stored.

8. To test the failsafe positions, turn off the Sensor and observe the reactions of the connected servos. The servos should go to the failsafe positions you just set.

Tach

The tach, or speed sensor requires several measurements to be made in order to provide you with accurate speed readout. This is where you enter those measurements.

The Sensor must be programmed with distance in inches traveled per number of revolutions. The sensor then "does the math" in real time to provide you with a speedometer function that can be used for alerts.

The two parameters that are used to make the calculations are rollout and revolutions.

Because the Sensor cannot use fractions, it is necessary to find two whole numbers that represent shaft turns and wheel turns. There are two ways to do this. One involves math and the other involves physically measuring the car's rollout.

Calculation method

The rollout can be calculated if you know the diameter of your tire and the gear reduction ratios between tachometer installation point and the wheels. If you are not sure of these ratios, you should probably use the Measurement method.

- Multiply tire diameter by PI (3.1415) to get length of one tire revolution.
- Multiply that by the gear reduction of your differential or transmission. The result is the number of inches your model will travel for each tick of the tach sensor.
- Convert that number to a fraction that can be input into the Sensor. You can do this by multiplying the number by 200 or more and then rounding to the nearest whole number. So if your model travels 4.1242 inches per tach and you multiply by 500, the "rollout" number will be 2062.1, which rounds down to 2062, and the "revolutions" number will be 500.

An Example: Your Model has 3.2" diameter tires. Multiplying by pi results in 10.053" circumference. Your Tach is mounted in front of a 13:5 gear reduction. So, the model travels 10.053 x $^{5}/_{13}$ = 3.8666 inches per tachometer. This is approximately equal to 1160/300, so the rollout parameter should be set to 1160, and the revolutions parameter should be set to 300.

Measurement method

In this method, you simply measure the distance traveled by your model over a short length and count the revolutions of your driveshaft. Due to the possibility of measurement errors, this method works best if you measure at least ten shaft revolutions. We recommend that you

mark one of your magnets with a colored sharpie or piece of tape to reduce the risk of incorrect counting. Make sure you are measuring using the same units (metric or English) that the Sensor is currently set up to use.

- Position your car against a wall with the wheels pointed straight ahead. The back end of the car should be touching the wall.
- Carefully watching the magnets on the shaft, roll the car forward until the shaft has rotated ten or more (more is better) times. The number of rotations will be your revolutions parameter.
- Measure from the wall to the back end of the car. If it should work out to an even number of inches or CM, that will be your rollout parameter. If your measurement is to the closest $1/8^{th}$ of an inch, then in order to eliminate the fraction, you must multiply the revolutions by 8 and convert the length to $1/8^{th}$ inches by multiplying the whole number of inches by 8 and then adding the number of extra 1/8ths. If you are using metric measurement, it is simple, just multiply CM length and rollout by ten.

Example: Your model was measured to travel 31 $^{5}/_{8}$" in 10 drive shaft revolutions. This is equivalent to $^{251}/_{8}$" in 10 revolutions, or 251" in 80 revolutions. Thus, the rollout parameter in should be set to 251, and the revolutions parameter should be set to 80

The higher the numbers you use, the lower your error will be and the more accurate your speed will be. The maximum value that can be used is 10,000. It may be more convenient to enter larger numbers using the Digital RC Desktop software.

Since the tach sensor measures only shaft rotation, it does not take into account other issues like wheel spin, tire expansion at speed, cornering errors, etc.

Setting Tach Parameters

Use the navigation controls to set up the tach sensor as follows:

1. Access the top function menu from the driving screen. — menu
2. Navigate to the **Advanced** menu. — or : then
3. Navigate to **Tach**. — or
4. Change the values. — or

Value	Description
Rollout	**U**nits (inches or CM) car rolls in measurement
Revolutions	Number of driveshaft rotations in measurement

Tank Mode

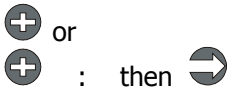
The Tank mode combines steering and throttle inputs to left-side and right-side drive. Tank mode Uses Ch1 as right drive servo and Ch2 as left drive servo. Throttle inputs affect both outputs equally. Steering input increases output on one side and decreases output on the other side. Mixing is applied after all other settings from both Ch1 and Ch2 (ABS, Autostart, both expo settings, etc). Servo travel is limited by Throttle/Brake endpoints.

Activating / Deactivating Tank Mode

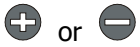
Use the navigation controls to select the active model as follows:

1. Access the top function menu from the driving screen.

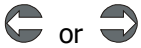
2. Navigate to the **Advanced** menu.



3. Navigate to **Tank Mode**.

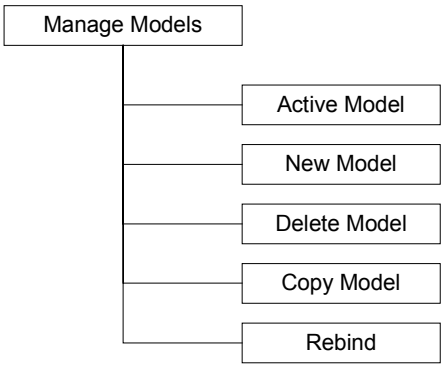


4. Select **On** or **Off**.



Model Management

The following illustration shows the function menu structure for the model management functions:



Active Model

The Sensor can store all settings for up to forty vehicles. The Active Model function is used to select the model to be used.

When you are connected to a transceiver, this list will only show models that apply to that transceiver. When unconnected, all of the models stored on your transmitter will be shown in the list.

When binding with a transceiver in a vehicle, you must first select the active model to identify the vehicle.

When preparing to operate a vehicle, select the active model, then turn on the vehicle and Sensor. The Sensor searches for the transceiver with the VIN associated with the selected active model.

For more information, see "The Binding Process" earlier in this manual.

Selecting the Active Model

Use the navigation controls to select the active model as follows:

1. Access the top function menu from the driving screen. — menu
2. Navigate to the **Manage Models** menu. — ⊕ or ⊖ : then ⇨
3. Navigate to **Active Model**. — ⊕ or ⊖
4. Select the active model. — ⇦ or ⇨

New Model

You can create a new model settings profile if there are any model memories remaining. Creating a new model allows you to store the settings for another model.

By default, the new model setting is given the number of the next highest model number (For example, if there are currently 4 model settings, creating a new model will create "Model 5" and make it the default model.)

You can change the model name from your PC using the Digital RC Desktop.

Creating a New Model

Use the navigation controls to create a new model as follows:

1. Access the top function menu from the driving screen. — menu
2. Navigate to the **Manage Models** menu. — ⊕ or ⊖ : then ⇨
3. Navigate to and activate **New Model**. — ⊕ or ⊖ : then ⇨
4. At the confirmation screen:
   - Select **Yes** to create a new default model.
   - Select **No** to cancel the operation.

   — ⇦ or ⇨
5. Confirm your selection. — OK
6. The "connecting" screen appears. You can press the "Menu" button to cancel. — menu

Delete Model

You can delete a model settings profile. This removes all stored settings for the model from memory.

Deleting a Model

Use the navigation controls to delete a model as follows:

1. Access the top function menu from the driving screen. menu
2. Navigate to the **Manage Models** menu. or : then
3. Navigate to **Active Model**. or
4. Navigate to the model you want to delete. or
5. Navigate to and activate **Delete Model**. or : then
6. At the confirmation screen:
   - Select **Yes** to delete the active model.
   - Select **No** to cancel the operation.

   or
7. Confirm your selection. OK

Copy Model

You can copy settings from one model profile to create a new duplicate model. If all model profiles already exist, you cannot copy a model.

Copying a Model

Use the navigation controls to copy a model as follows:

1. Access the top function menu from the driving screen. menu
2. Navigate to the **Manage Models** menu. ⊕ or ⊖ : then ⇨
3. Navigate to **Active Model**. ⊕ or ⊖
4. Navigate to the model for which you want to copy the settings. ⇦ or ⇨
5. Navigate to and activate **Copy Model**. ⊕ or ⊖ : then ⇨
6. At the confirmation screen:
   - Select **Yes** to create a new duplicate model. ⇦ or ⇨
   - Select **No** to cancel the operation.
7. Confirm your selection. OK
8. A new duplicate model is created and set as active model.

Rebinding

You can rebind to the transceiver in a specific model (identified by a model profile). An example of when you might use this function would be if you replaced a transceiver on your car – you need to tell the Sensor and the new transceiver to look for each other.

Rebinding to a Model

Use the controls to rebind to a model as follows:

1. Access the top function menu from the driving screen. menu

2. Navigate to the **Manage Models** menu. ⊕ or ⊖ : then ➡

3. Navigate to **Active Model**. ⊕ or ⊖

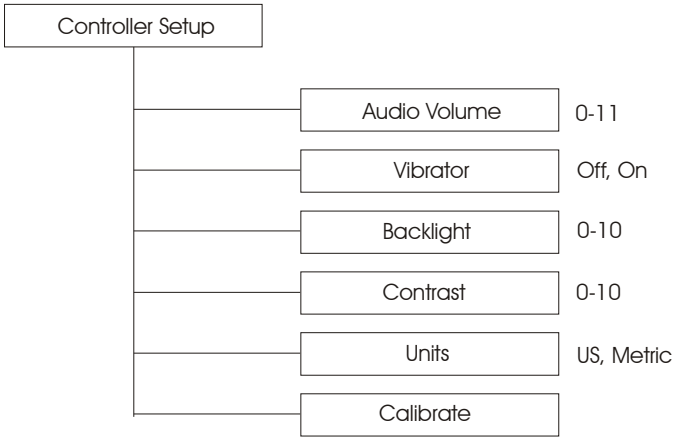
4. Navigate to the model you want to rebind with. ⬅ or ➡

5. Navigate to and activate **Rebind**. ⊕ or ⊖ : then ➡

6. If the receiver was previously bound to a different Sensor, turn on the model and perform the binding process again by activating the Bind button until the LED illuminates. Otherwise, just turn on the model.

Controller Setup

The following illustration shows the function menu structure for the controller setup functions:



Audio Volume

You can set the audio volume to one of eleven settings. While many RC controllers let you adjust the sound to just ten settings, Sensor gives you one more. It's one louder.

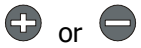
Setting the Audio Volume Level

Use the navigation controls to set the audio volume as follows:

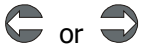
1. Access the top function menu from the driving screen.

2. Navigate to the **Controller Setup** menu.

3. Navigate to **Audio Volume**.



4. Adjust the volume level.



Value	Description
0 - 11	0 mutes the volume. 1 is lowest volume. 11 is highest volume.

Vibrator

As you might guess, this option lets you turn the vibration option on and off.

Turning the Vibrator On/Off

Use the navigation controls to turn the vibrator on/off as follows:

1. Access the top function menu from the driving screen. — menu
2. Navigate to the **Controller Setup** menu. — ⊕ or ⊖ : then ⇨
3. Navigate to **Vibrator**. — ⊕ or ⊖
4. Turn the vibration option on/off. — ⇦ or ⇨

Backlight

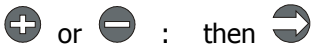
You can set the brightness of the display screen backlight. The use of the backlight consumes power and will reduce the running time of your Sensor controller.

Adjusting the Display Backlight Level

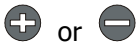
Use the navigation controls to adjust the display backlight level as follows:

1. Access the top function menu from the driving screen.

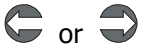
2. Navigate to the **Controller Setup** menu.



3. Navigate to **Backlight**.



4. Adjust the display screen backlight level.



Value	Description
0 - 10	0 turns backlight off. (Maximum battery life) 10 is the brightest backlight level.

Contrast

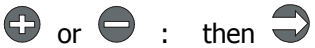
You can set the contrast of the display screen to make it lighter or darker for better visibility at your preferred viewing angle.

Adjusting the Display Contrast Level

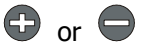
Use the navigation controls to adjust the display contrast level as follows:

1. Access the top function menu from the driving screen.

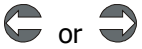
2. Navigate to the **Controller Setup** menu.



3. Navigate to **Contrast**.



4. Adjust the display contrast level.



Value	Description
0 - 10	0 is lowest contrast level (faintest). 10 is the highest contrast level (darkest).

Units

This option affects the display units for temperature (F/C), speed (MPH/KPH), and tach rollout (in/cm).

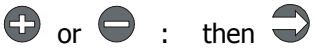
Note: Changing this setting does *not* convert existing temperature and speed alerts, nor tach rollout to the new units. You must go through and reset those settings manually after a conversion.

Selecting Unit System

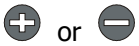
Use the navigation controls to adjust the display contrast level as follows:

1. Access the top function menu from the driving screen.

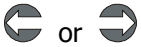
2. Navigate to the **Controller Setup** menu.



3. Navigate to **Units**.



4. Select which units system to use.



Value	Description
US	Uses US measuring system, degrees F, Miles per Hour and rollout in inches
Metric	Uses Metric measuring system, degrees C, Kilometers per Hour and rollout in centimeters

Calibrate

This function allows you to recalibrate the Sensor steering and throttle controls. It does not change any of the steering or throttle settings that are stored in the model profiles.

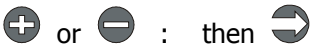
Recalibrating the Sensor

Use the navigation controls to recalibrate the Sensor as follows:

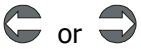
1. Access the top function menu from the driving screen.

2. Navigate to the **Controller Setup** menu.

3. Navigate to and activate **Calibrate**.



4. At the confirmation screen:
   - Select **Yes** to recalibrate
   - Select **No** to cancel the operation



5. Confirm your selection.

6. Perform the calibration routine by following the on-screen commands.

Sensor Digital RC Desktop

The innovative Sensor Digital RC Desktop can be used to program the functionality of your Sensor using your computer. The supplied adaptor cable is used to connect your Sensor to an available USB port on your computer, allowing your Sensor and the RC Desktop to communicate and exchange information. The RC Desktop interface has the same menu structure as that contained within your Sensor; and has been designed to be very easy to use.

Information may be transferred between your Sensor and the RC Desktop so that you can download your current setting information to your computer, make changes, and then upload the newer settings. Updating the Sensor firmware is as easy as uploading a file, or using your Internet connection to retrieve the latest firmware file directly from Nomadio and upload it to your Sensor in one easy step.

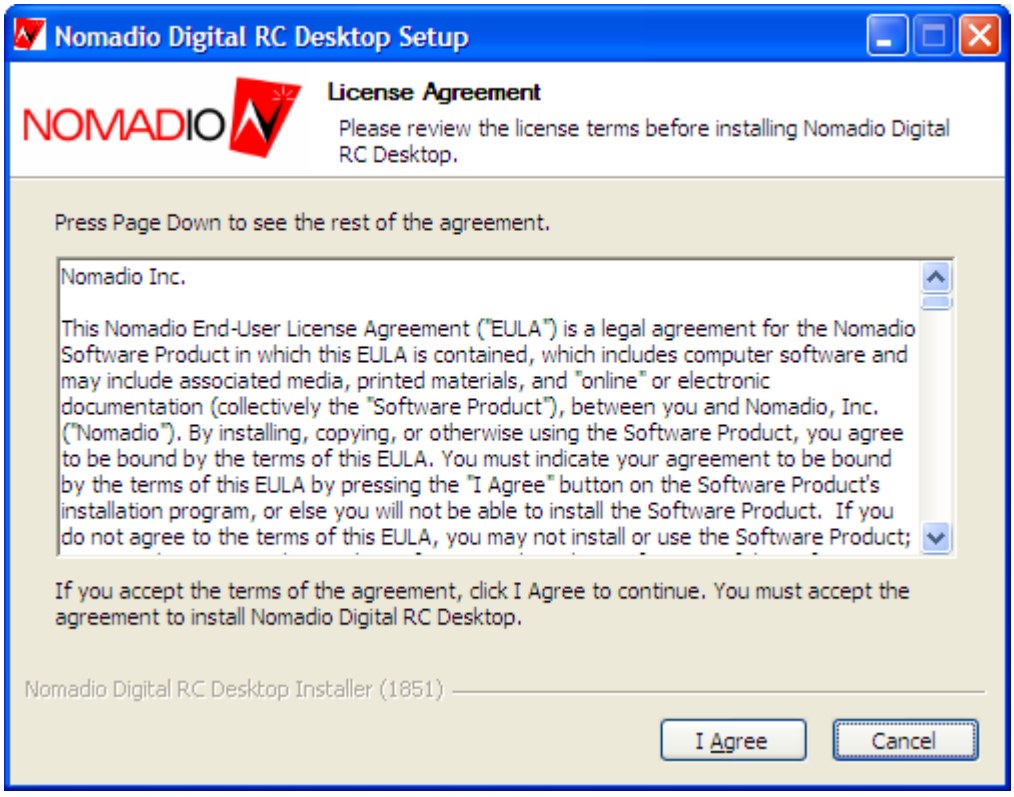
After you start using your Sensor and install your RC Desktop, we strongly recommend that you perform the registration process so that you can receive special incentives and privileges, and be kept abreast of the latest Nomadio developments and news. The online registration process is fast and easy, and requires an Internet connection.

Minimum System Requirements

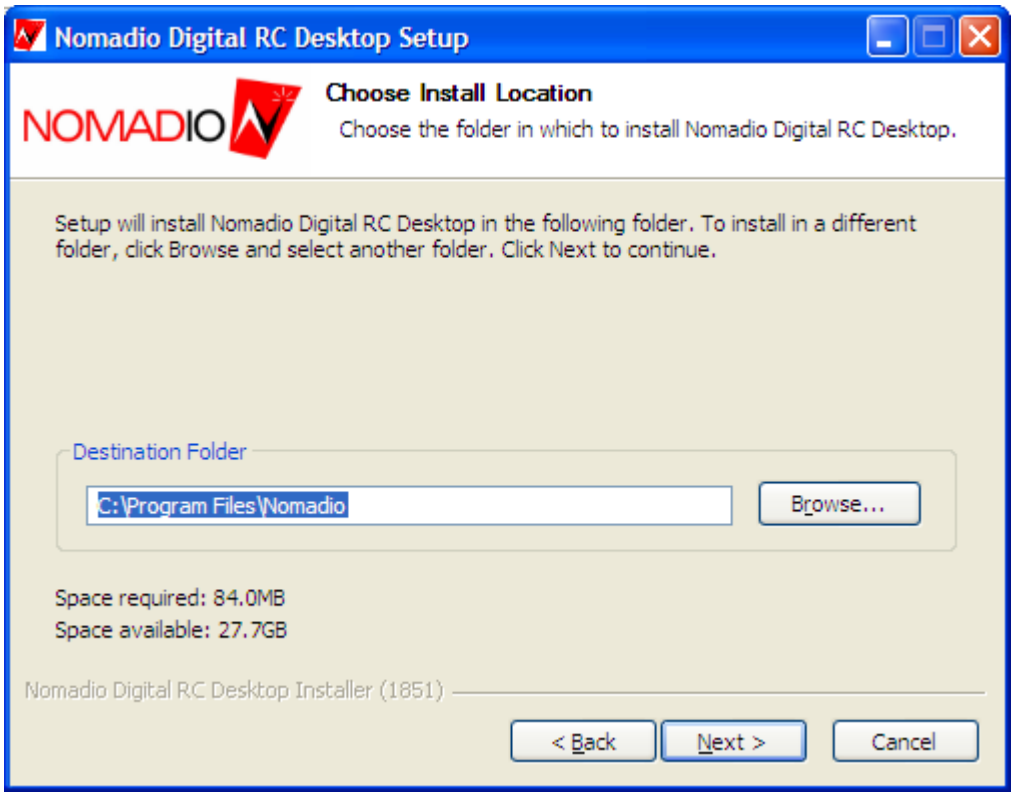
Processor:	Pentium 3
RAM:	128MB
HDD space:	100MB
CD-ROM:	Available CD-ROM drive
Display:	VGA or better
Ports:	Available USB port (1.1 or 2.0 port recommended)
OS:	Windows 2000, XP

Installing the RC Desktop

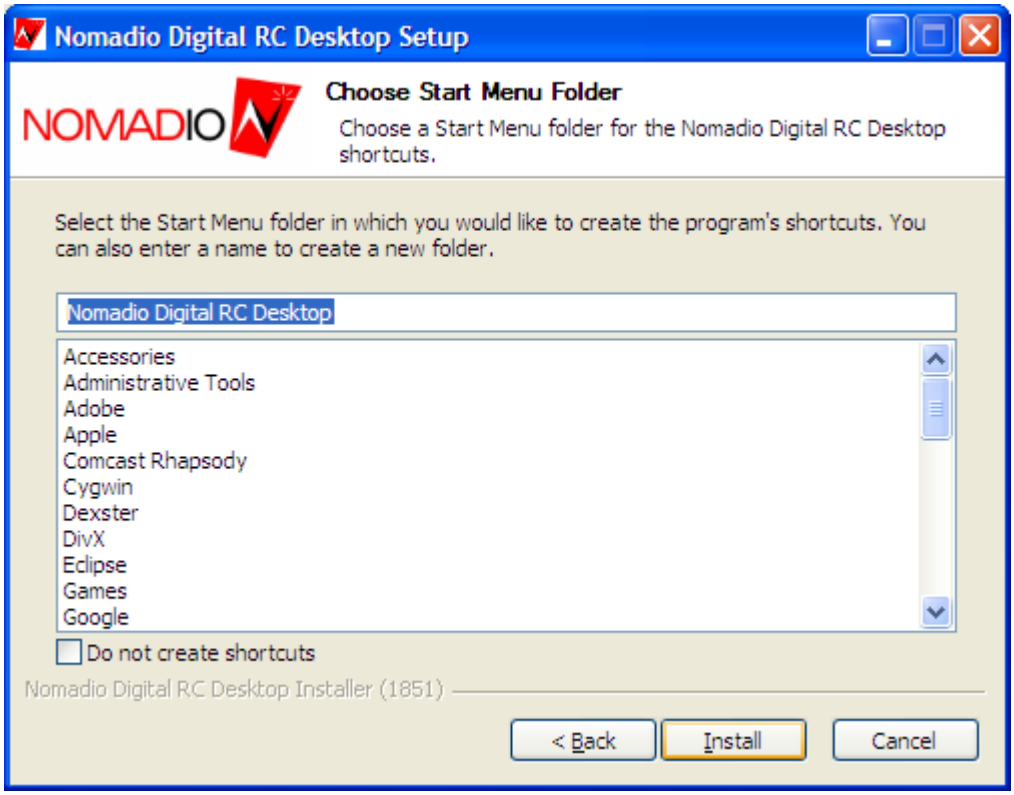
1. Install the Nomadio Digital RC Desktop CD into your computer's CD-ROM drive.
2. If your computer has AutoPlay enabled, the installation wizard begins automatically. If AutoPlay is not enabled, locate and run the **RCDesktopSetup-2.0.exe** file located in the root directory on the CD-ROM.



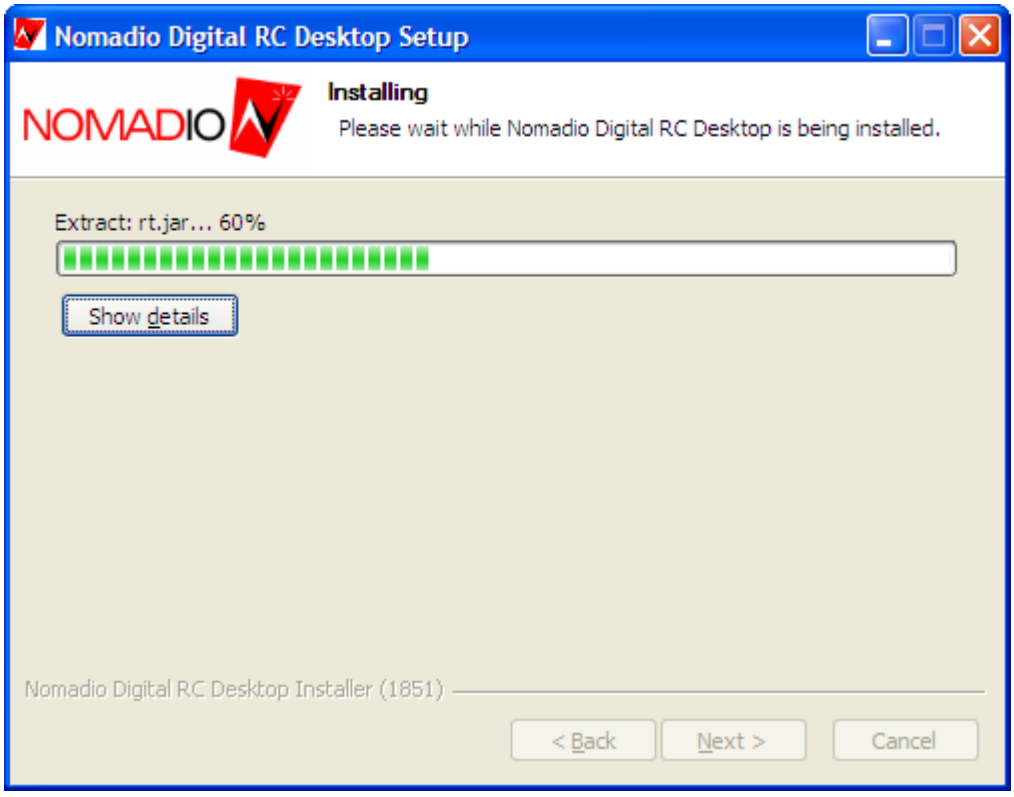
3. When the installation begins you will be presented with a Setup Wizard that begins with the Nomadio License Agreement. Click **I Agree** to continue.



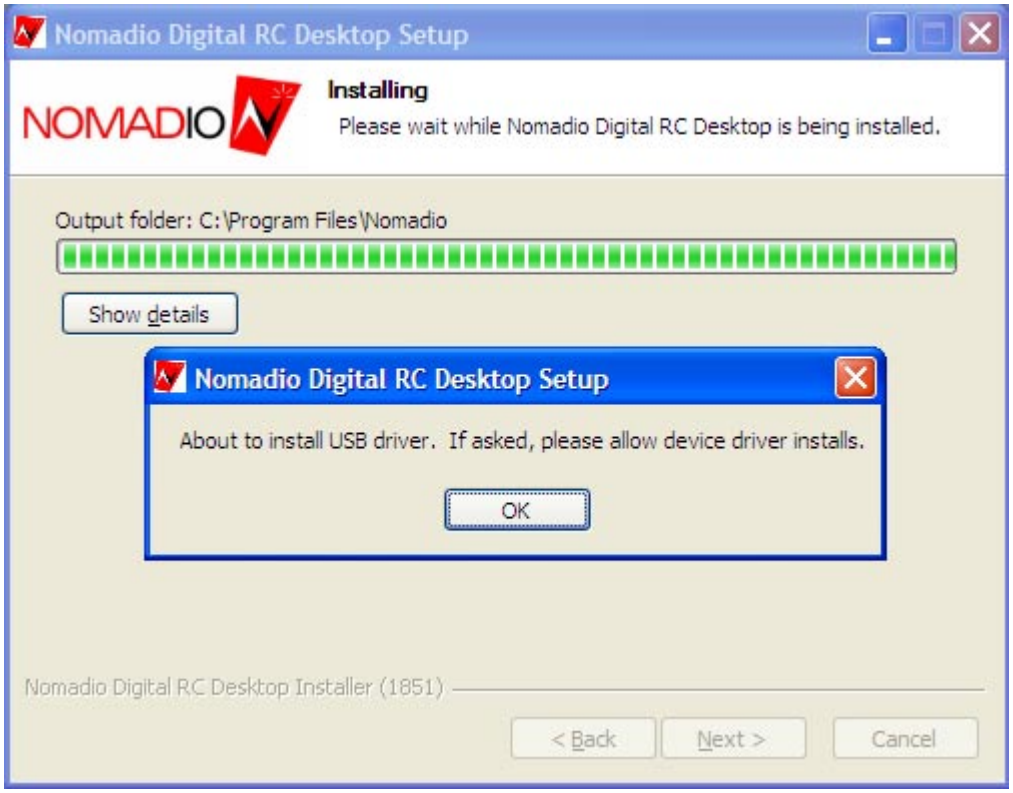
4. Next choose the destination folder for the Digital RC Desktop by either typing in the path or clicking the **Browse** button and picking the folder you wish to use. Click the **Next** button to continue.



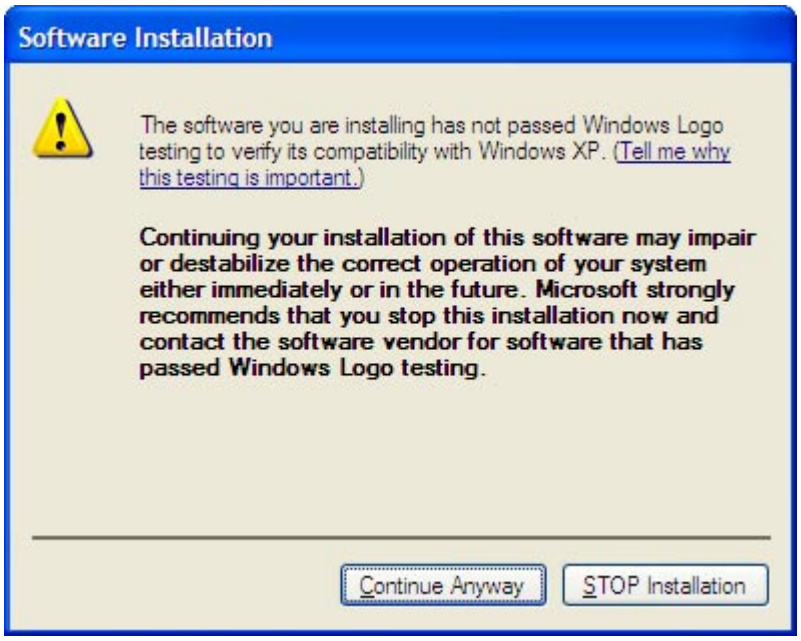
5. At the next screen, select the Start Menu folder for the Digital RC Desktop's shortcuts. Click the **Do not create shortcuts** checkbox if you do not want shortcuts created. Click **Install** to continue the Setup Wizard.



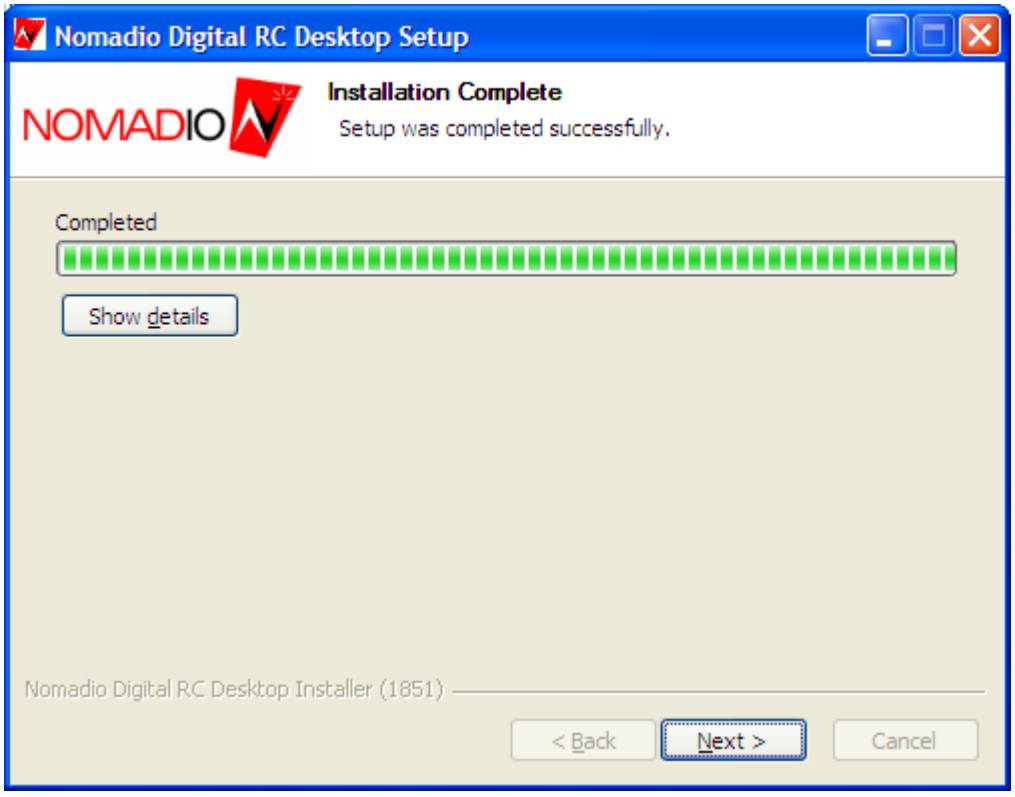
6. The Setup Wizard will next install all of the files required.



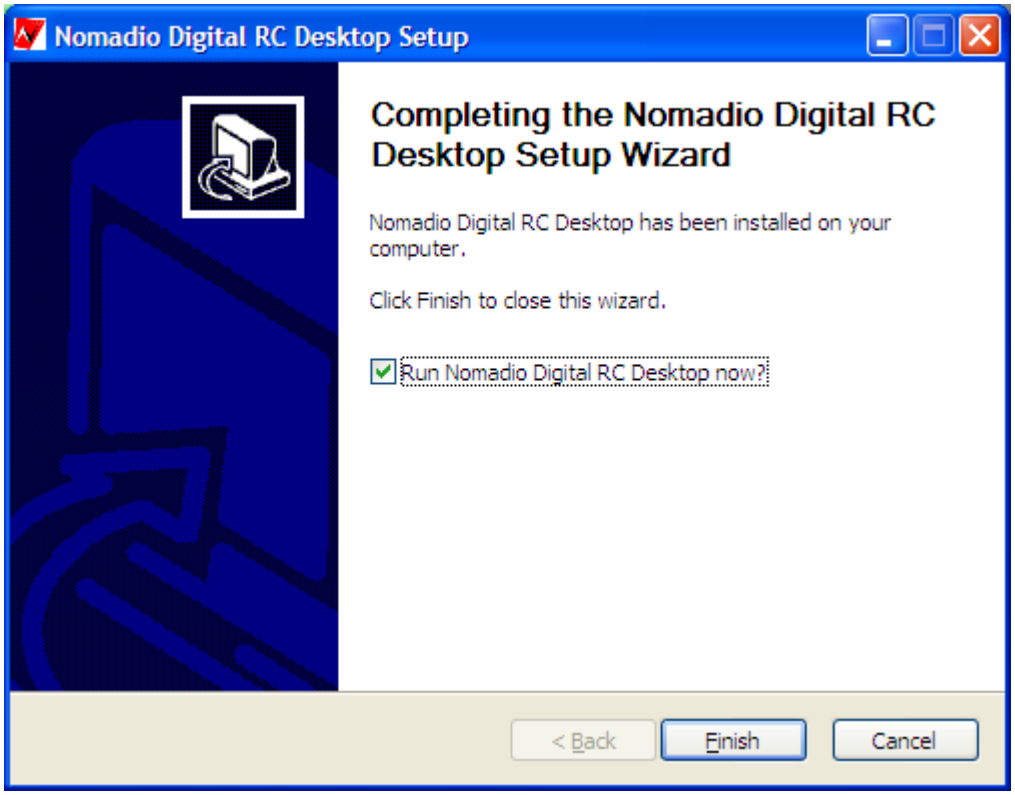
7. After installing the required files, the Setup Wizard will install the Universal Serial Bus device drivers that will allow the Digital RC Desktop to communicate with the Sensor.



8. You may be prompted if you want to install each of the two device drivers. Nomadio is actively working towards achieving Windows Logo Certification and currently passes all the required tests available from Windows Hardware Quality Labs. Click **Continue Anyway** to continue the installation.



9. Digital RC Desktop Setup is now almost done. Click **Next** to continue.

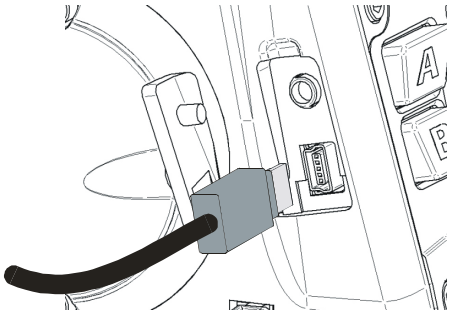


10. Leave the **Run Nomadio Digital RC Desktop now?** checkbox selected for the Setup Wizard to launch the program after exiting the Setup Wizard. Click **Finish** to exit the Nomadio Digital RC Desktop Setup.

Connecting the Sensor to your Computer

To connect your Sensor to your computer, do the following:

1. Plug the small end of the supplied adaptor cable into the receptacle on the left side of the Sensor as shown here
   .



2. Plug the other end of the cable into an available USB port on your computer.

If this is the first time that you have connected the Sensor to you computer, you may be shown the New Hardware Wizard. Accept the default option to allow the process to continue.

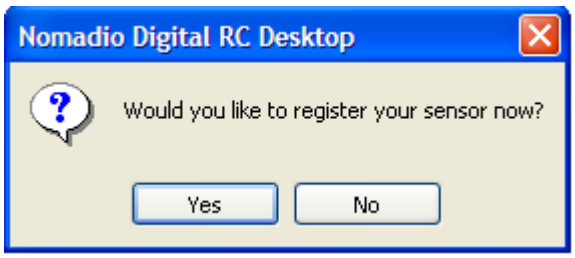
You may be asked if you want to install each of the two device drivers. Nomadio is actively working towards achieving Windows Logo Certification and currently passes all the required tests available from Windows Hardware Quality Labs. Click **Continue Anyway** to continue the installation.

Your computer will recognize the Sensor as being connected via a new serial communications port.

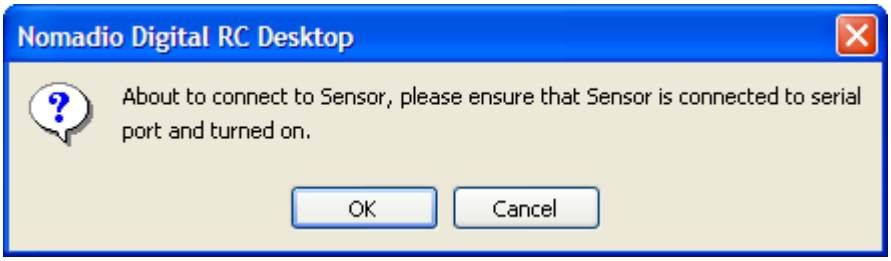
Using the Sensor Digital RC Desktop

To start the RC Desktop	From the **START** menu, click (**All**) **Programs**, **Nomadio Digital RC Desktop**, then **Nomadio Digital RC Desktop**.
To make changes to the settings	Navigate through the functions of the RC Desktop, and make changes as appropriate to global settings, or to settings for individual models.
To open a saved settings file	From the **File** menu, click **Open...**.
To save the current settings into a file	From the **File** menu, click **Save**.
To create a new model	From the **File** menu, click **Create New Model,** or right click on the file name at the top of the tree on the left, and select **Create New Model**.
To copy a model	In the tree on the left, right click on the model that you wish to copy. On the popup menu, select **Copy Model**. A new model will be created that is a copy of the selected model (though the name is not copied)
To delete a model	In the tree on the left, right click on the model that you wish to copy. On the popup menu, select **Delete Model**.
To receive the current settings from the Sensor	1. Connect the Sensor to your computer. 2. Turn on the Sensor. 3. From the **Connection** menu, click **Receive Settings from Sensor**.
To send the RC Desktop's current settings to the Sensor	1. Connect the Sensor to your computer. 2. Turn on the Sensor. 3. From the **Connection** menu, click **Send Settings to Sensor**.
To install the latest firmware into the Sensor	1. Connect the Sensor to your computer. 2. Turn on the Sensor. 3. From the **Connection** menu, click **Install Latest Sensor Firmware**.
To update the RC Desktop to the latest version	From the **Help** menu, click **Software Updates**.

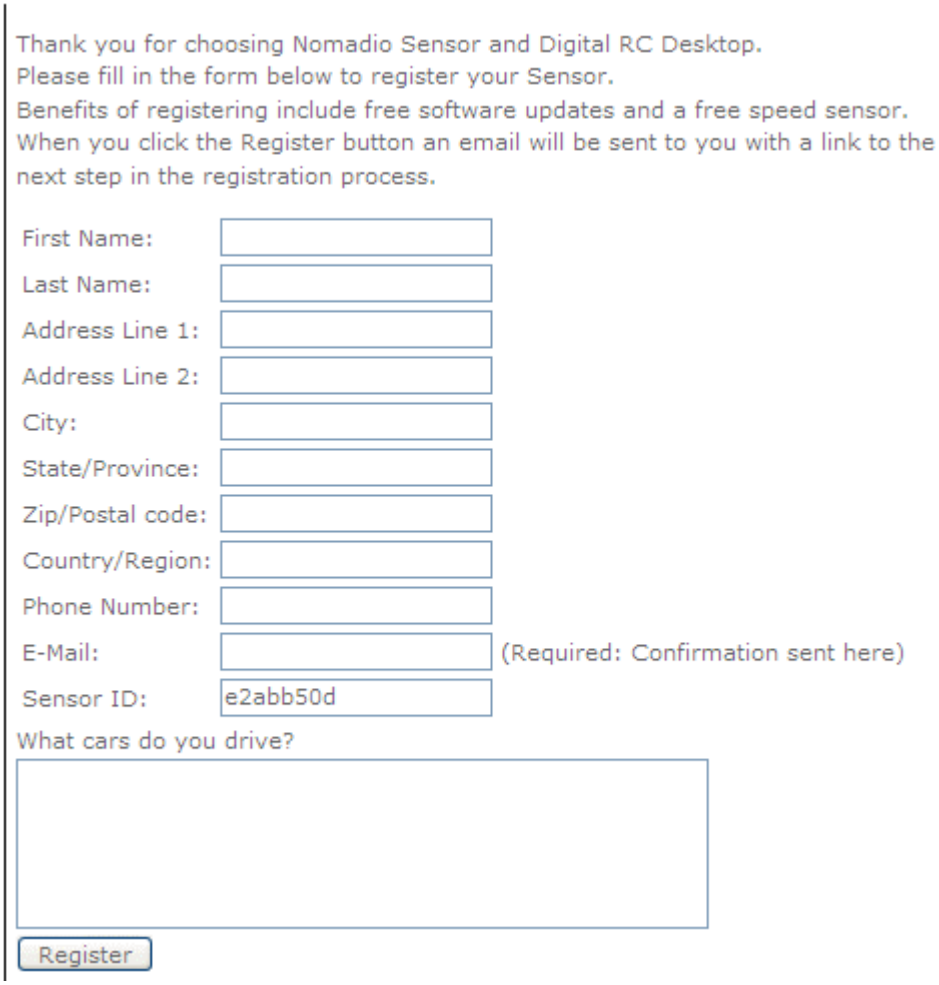
Registration



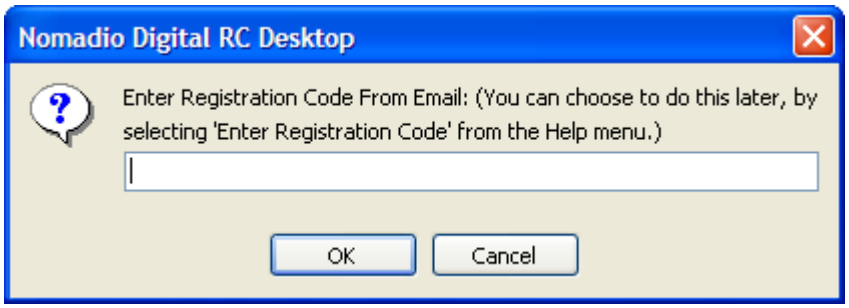
1. When you start the Digital RC Desktop the first time, you will be prompted to register. Click **Yes** to continue. If you click **No**, you can register you will be prompted again the next time you start the Digital RC Desktop. You can register immediately by choosing the **Help** menu and then choosing **Register new Sensor**.



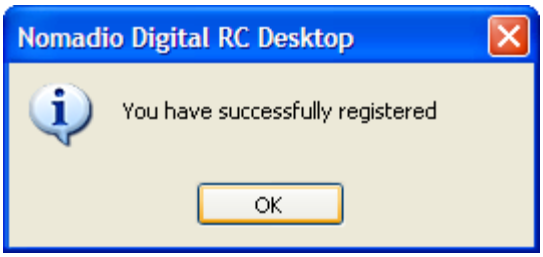
2. The Digital RC Desktop will now read your Sensor's ID. Connect and turn on your Sensor and click **OK**.



3. Your web browser will then be opened to a web page that will ask you for registration information. Your Sensor ID will be automatically read from your Sensor and filled in.
4. When you click the **Register** button, a confirmation e-mail will be sent to you. This will e-mail will contain a link back to Nomadio's registration site where you will be able to get your registration code.

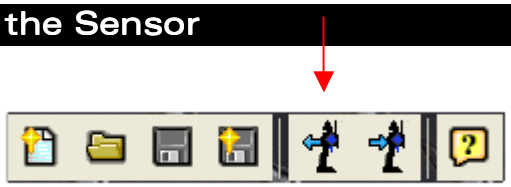


5. Enter your registration code in the Digital RC Desktop and click the **OK** button. If you press **Cancel**, you can enter your registration code by choosing the **Help** menu and choosing **Enter Registration Code**.



6. You are now registered.

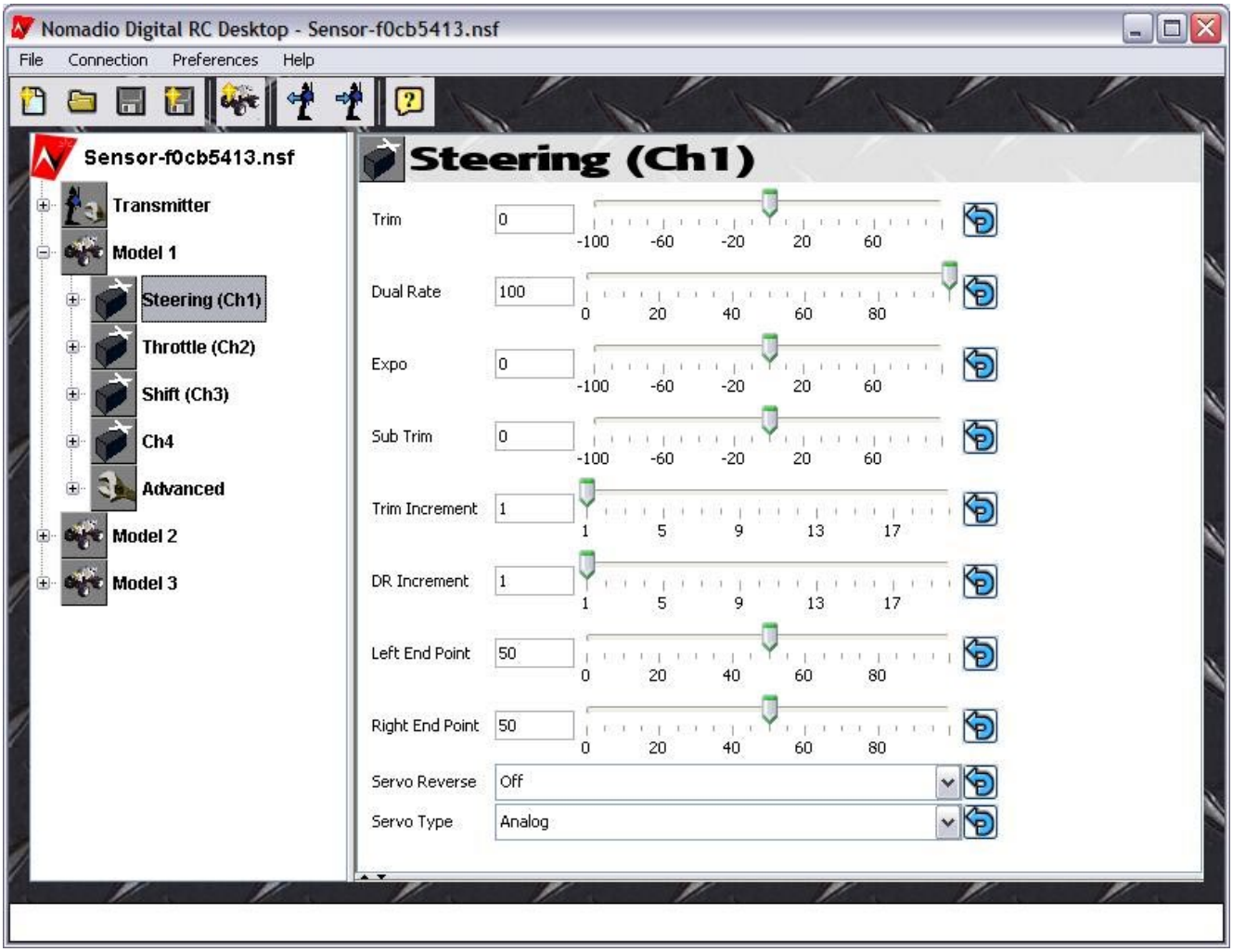
Receiving Settings From the Sensor



The Digital RC Desktop will attempt to receive settings from the Sensor on startup. You can also choose the **Connection** menu and then choose **Receive Settings from Sensor**. Finally you can choose the Receive Settings From Sensor toolbar button.

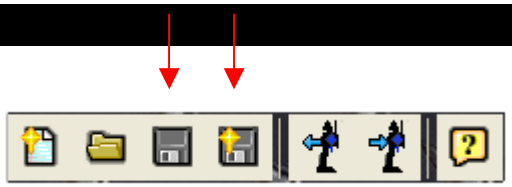
1. The Digital RC Desktop will then connect to your Sensor and download the settings from it.

Editing Settings



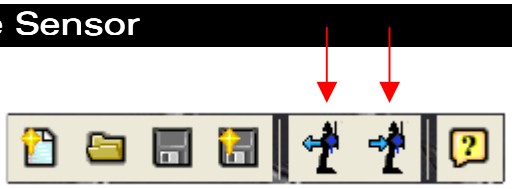
Simply use the settings menu on the left side of the screen to find the settings you wish to edit. Individual settings appear in the right side of the screen. Changes can be saved to a file on your PC and/or sent to the Sensor.

Saving Settings



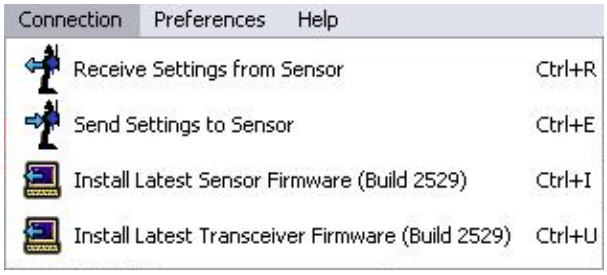
Settings can be saved by choosing the **File** menu and choosing either **Save** or **Save As...** . Choosing **Save** saves the settings to the current file name. Choosing **Save As...** lets you pick a file name. You can also save your current settings use the **Save** and **Save As** toolbar buttons. If you forget to save and then try to exit the Digital RC Desktop, you will be prompted to save.

Sending Settings to the Sensor



You can send your settings to the Sensor by choosing the **Connection** menu and then choosing **Send Settings to Sensor**. You can also send your settings by choosing the **Send Settings to Sensor** toolbar button. If you forget to send your settings to the Sensor after editing them, the Digital RC Desktop will prompt you to send your settings on exit.

Installing Sensor Firmware



To install new Sensor Firmware, choose the **Connection** menu and then choose **Install Latest Sensor Firmware**. If you have been instructed to update your transceiver(s) also, you will need to connect the transceiver to the Sensor using the Receiver Programming Cable inside the battery compartment. That cable should plug into the "TACH" port on your transceiver. Once you are connected, select **Install Latest Transceiver Firmware**.

Specifications

* Specifications subject to change without notice.

Sensor Controller

Radio Type: digital spread spectrum 2.4Ghz
Radio Mode: direct sequence (DSSS) and frequency hopping (FHSS) spread spectrum
Range: 1000ft. (approximate)
Frame Rate: 100 frames per second
Latency: 10 millisecond max, 5ms typical
Dimensions: 300mm x 139mm x 125mm (HWD)
Weight (w/Batteries): 674g
Servo Channels: 4
Rechargeable Batteries: NiMH *(included)*
Charger: included
Model Memory: 40 named, custom graphics and sound
Controller Battery Voltage Monitor: graphic and real-time
Car Battery Voltage Monitor: graphic and real-time
Timers: operation and lap timers
Trims: adjustable trims and sub-trims
Controls: dual rate, endpoints, exponential, mixing and servo speed adjust on all channels
Anti-Lock: brake anti-lock with cycle, delay, and depth
Idle Up: yes
Speaker: .75" w/headphone jack
Audio: programmable WAV file audio and tones
Tactile Alarm: programmable vibrator
Display: movable backlit monochrome LCD
Resolution: 128 x 64 pixels
Auto Modes: auto display and display only
Presets: failsafe and autostart
Telemetry: 3 channels of real time telemetry
Telemetry Sensors: speed, temperature and battery
Servos Supported: any combination of analog and digital
Left-Handed Operation: yes *(user modifiable)*
PC Connectivity: USB serial for customization, analysis and updates
Antenna: fixed 3" antenna
Architecture: software upgradeable

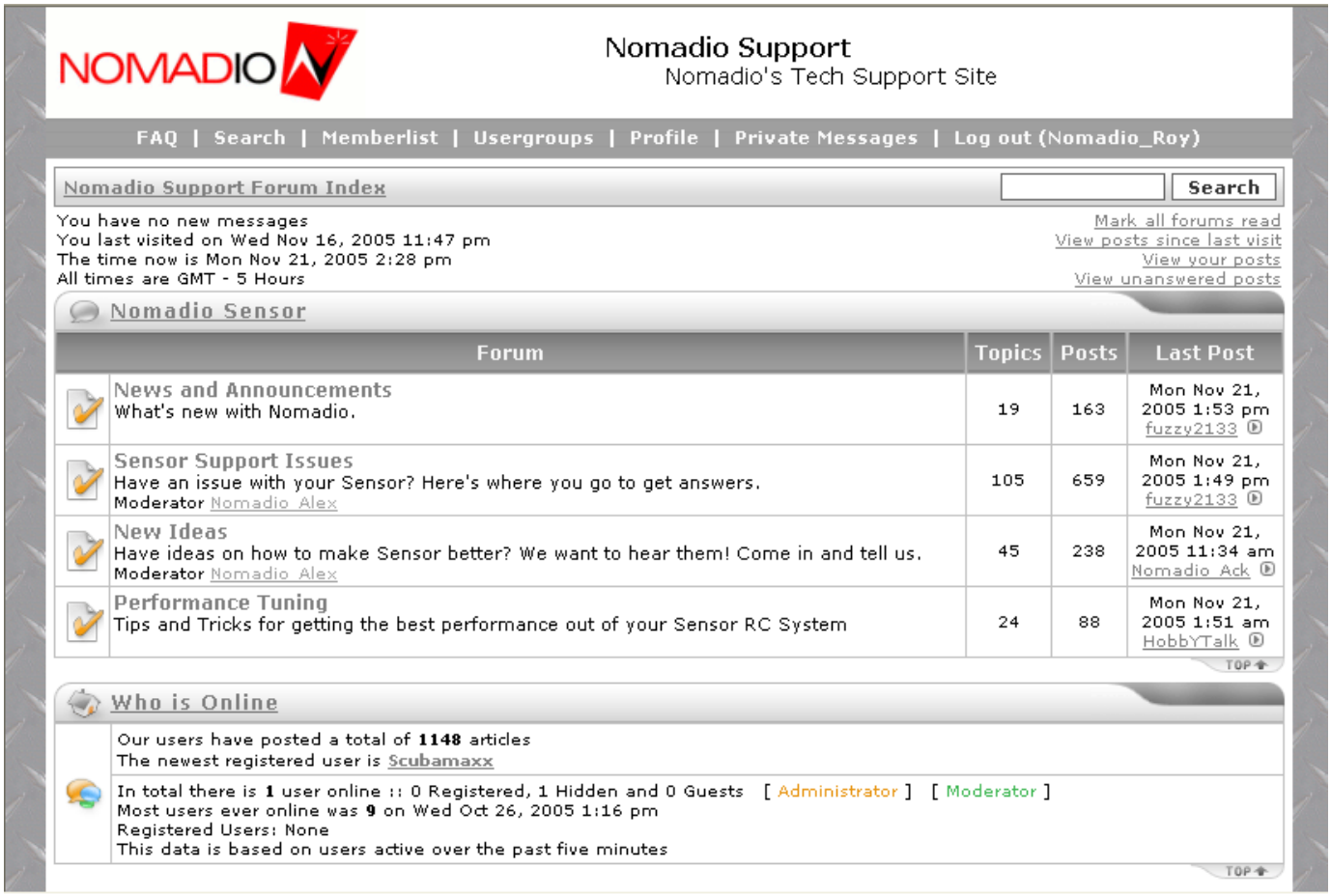
Transceiver

Dimensions: 47.7 x 30.2 x 19mm
Weight: 34g *(including antenna)*
Antenna length: 22.8cm
Antenna thickness: 1.8mm

Support

Nomadio is committed to providing the best support in the RC market for its products. If you have any issues with your Sensor, please visit our support website at

http://support.nomadio.net



There you will find a wealth of knowledge from other Sensor users as well as Nomadio's support staff. Should you need to contact Nomadio directly web support staff will give you the information necessary to get you running.

Nomadio 3 Year Limited Warranty

Warranty Coverage

Nomadio's warranty obligations are limited to the terms set forth below:
Nomadio, as defined below, warrants this Nomadio-branded hardware product against defects in materials and workmanship under normal use for a period of THREE (3) YEARS from the date of retail purchase by the original end-user purchaser ("Warranty Period"). If a hardware defect arises and a valid claim is received within the Warranty Period, at its option, Nomadio will either (1) repair the hardware defect at no charge, using new or refurbished replacement parts, or (2) exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product, or (3) refund the purchase price of the product. Nomadio may request that you replace defective parts with new or refurbished user-installable parts that Nomadio provides in fulfillment of its warranty obligation. A replacement product or part, including a user-installable part that has been installed in accordance with instructions provided by Nomadio, assumes the remaining warranty of the original product or ninety (90) days from the date of replacement or repair, whichever provides longer coverage for you. When a product or part is exchanged, any replacement item becomes your property and the replaced item becomes Nomadio's property. Parts provided by Nomadio in fulfillment of its warranty obligation must be used in products for which warranty service is claimed. When a refund is given, the product for which the refund is provided must be returned to Nomadio and becomes Nomadio's property.

Exclusions and Limitations

This Limited Warranty applies only to hardware products manufactured by or for Nomadio that can be identified by the "Nomadio" trademark, trade name, or logo affixed to them. The Limited Warranty does not apply to any non-Nomadio hardware products or any software, even if packaged or sold with Nomadio hardware. Manufacturers, suppliers, or publishers, other than Nomadio, may provide their own warranties to the end user purchaser, but Nomadio, in so far as permitted by law, provides their products "as is". Software distributed by Nomadio with or without the Nomadio brand name (including, but not limited to system software) is not covered under this Limited Warranty. Refer to the licensing agreement accompanying the software for details of your rights with respect to its use.

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This warranty does not apply: (a) to damage caused by use with non-Nomadio products; (b) to damage caused by accident, abuse, misuse, flood, fire, earthquake or other external causes; (c) to damage caused by operating the product outside the permitted or intended uses described by Nomadio; (d) to damage caused by service (including upgrades and expansions) performed by anyone who is not a representative of Nomadio or an Nomadio Authorized Service Provider; (e) to a product or part that has been modified to significantly alter functionality or capability without the written permission of Nomadio; (f) to consumable parts, such as batteries, unless damage has occurred due to a defect in materials or workmanship; or (g) if any Nomadio serial number has been removed or defaced.

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Consumer Protection Laws

FOR CONSUMERS WHO ARE COVERED BY CONSUMER PROTECTION LAWS OR REGULATIONS IN THEIR COUNTRY OF PURCHASE OR, IF DIFFERENT, THEIR COUNTRY OF RESIDENCE, THE BENEFITS CONFERRED BY THIS WARRANTY ARE IN ADDITION TO ALL RIGHTS AND REMEDIES CONVEYED BY SUCH CONSUMER PROTECTION LAWS AND REGULATIONS. Some countries, states and provinces do not allow the exclusion or limitation of incidental or consequential damages or exclusions or limitations on the duration of implied warranties or conditions, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary by country, state or province. This Limited Warranty is governed by and construed under the laws of the country in which the product purchase took place. Nomadio, the warrantor under this Limited Warranty, is identified at the end of this document according to the country or region in which the product purchase took place.

Obtaining Warranty Service

Please access and review the online help resources referred to in the documentation accompanying this hardware product before requesting warranty service. If the product is still not functioning properly after making use of these resources, please contact the Nomadio representatives or, if applicable, a Nomadio Authorized Service Provider located using the information provided in the documentation. An Nomadio representative or Nomadio Authorized Service Provider will help determine whether your product requires service and, if it does, will inform you how Nomadio will provide it. Nomadio or its Nomadio Authorized Service Providers will provide warranty service on products that are tendered or presented for service during the Warranty Period, as permitted by law. If the purchaser is outside the United States, service will be limited to the options available in the country where service is requested. Warranty service may be restricted to the country where the product is purchased. Service options, parts availability and response times will vary according to country. You may be responsible for shipping and handling charges if the product cannot be serviced in the country it is in. In accordance with applicable law, Nomadio may require that you furnish proof of purchase details and/or comply with registration requirements before receiving warranty service. Please refer to the accompanying documentation for more details on this and other matters on obtaining warranty service.

If your product is capable of storing data or software programs, you should make periodic backup copies of the data and programs contained on the product's storage media to protect your data and as a precaution against possible operational failures. Before you deliver your product for warranty service it is your responsibility to keep a separate backup copy of your user data, and disable any security passwords. Repaired products will be returned to you in factory-fresh condition. You will be responsible for reinstalling all such data and passwords. Nomadio and its Authorized Service Providers are not liable for any damage to or loss of any data, or other information stored on any media, or any non-Nomadio product or part not covered by this warranty. Recovery and reinstallation of user data are not covered under this Limited Warranty.