

Xcelorin Brushless Electronic Speed Control

Thank you for purchasing the Losi™ Xcelorin™ Electronic Speed Control (ESC). This ESC will provide you the benefit of the latest in brushless technology. Featuring an advanced software interface with which you can finely tune the feel of the ESC to your needs, or use the Advanced Quick Programming Card (AQPC) to make adjustments.

We believe it will be to your benefit to take the time and effort to read this manual.

We are confident you will be satisfied with the performance of the Xcelorin Sensorless ESC.

Losi/Horizon Support

If you have any questions concerning setup or operation of your Xcelorin ESC, please call Horizon customer support at 1 877-504-0233

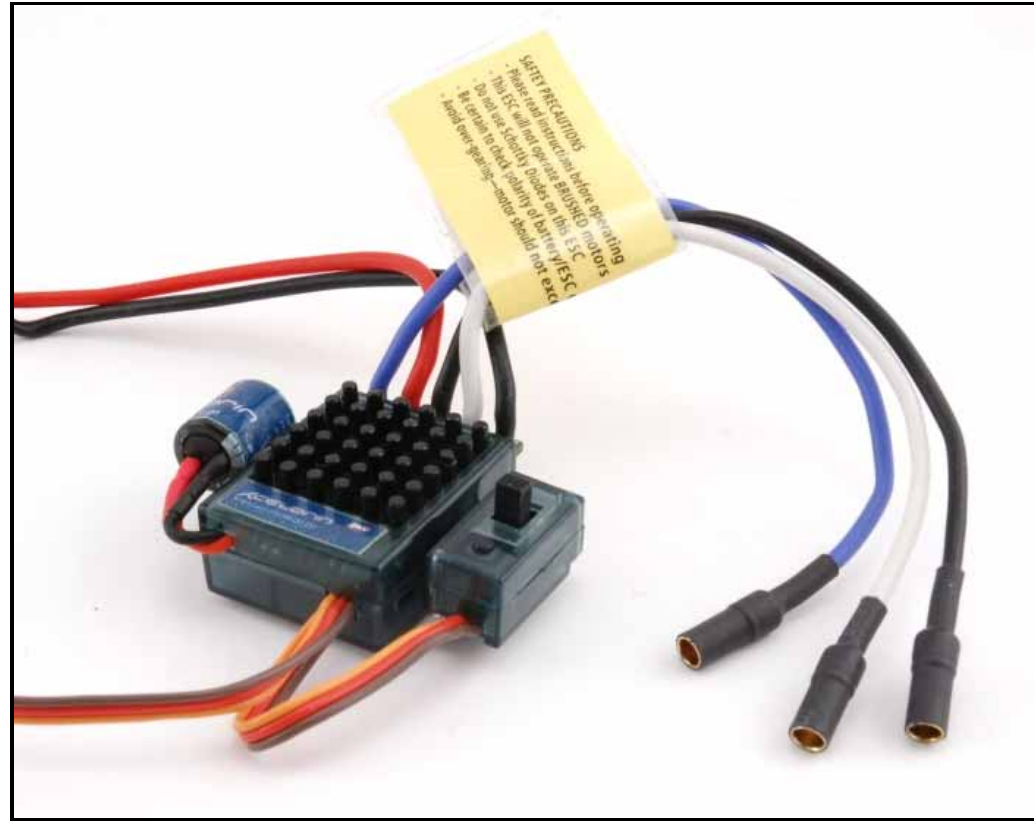
You are welcome to call us with any support issue or question you may have.

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Overview

The Losi Xcelorin electronic speed control (ESC) is specifically designed for operating Sensorless brushless motors. Featuring low on-resistance, enhanced throttle response and strong brakes, this ESC has enough features to satisfy the most demanding driver. In order to maintain 25A continuous current draw, the Xcelorin ESC uses very high quality electronics and the best MOSFET transistors available.



The Low Voltage Cutoff (LVC) is preset for NiMH batteries. For more experienced users, it can be changed to support both 2-cell and 3-cell LiPo batteries. Using the Advanced Quick Programming Card (AQPC), adjustments to the ESC can be made quickly and simply.

The Xcelorin ESC has a feature within it to prevent the vehicle from going into reverse before you have come to a complete stop. Once you have come to a

stop, release the throttle trigger to the neutral position. Once you have been at neutral, push the trigger forward to engage reverse (if active). The ESC is also programmed to prevent going directly from reverse drive to forward. The ESC will have a short pause when changing from reverse to going forward to prevent damage to the motor or drivetrain of your vehicle.

The image shows a Blue Robotics Motor Controller (BMC) and a Motor Tuning Board (MTB) connected by a ribbon cable. The BMC is a small blue PCB with a black heat sink and a red LED. The MTB is a larger black PCB with various potentiometers and switches. A yellow label is attached to the BMC.

LOSB9535 Xcelorin Electronic Speed Control v1.0

Using the Advanced QPC, you can set the following:

Cutoff Voltage

- NiMH
- 2S LiPo
- 3S LiPo

Braking Strength

- 20%
- 30%
- 40%

Drag Brake

- 8%
- 12%
- 15%
- 20%

Motor Timing

- Very Low 0°
- Low 2°
- Normal 4°
- High 6°
- Very High 8°

Brake/Reverse Role

- Forward Only
- Forward pause Reverse

Throttle Limit

- 0% (no limit)
- 80% of full throttle
- 60% of full throttle

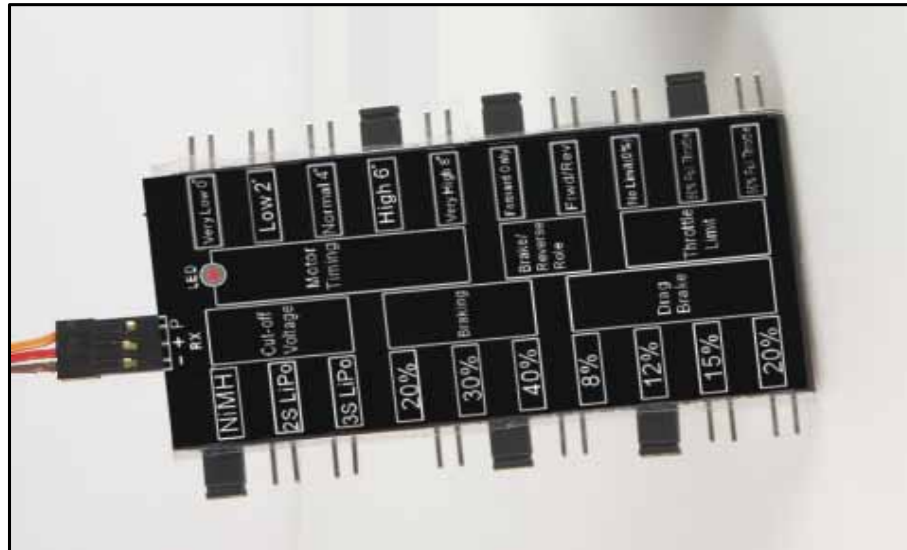
NOTE: You must use the supplied Xcelorin Setup Software to access all features of the ESC.

Initial Profile setting from the Factory

Battery Cut-off	NiMH	No Cut-Off
Brake / Reverse	Forward with pause then Reverse	
Throttle Limit	0% (no limiting)	
Reverse Throttle Limit	50%	
Motor Timing	Normal	
Initial Acceleration	Low	
Braking Percent	30%	
Percent Drag Brake	8%	
Legacy or 2.4Ghz	Legacy	
Neutral Deadband	3	
Reverse Rotation	blank	
Throttle Profile	Linear	
Brake Profile	Linear	

Using the Advanced Quick Programming Card

With the AQPC in your hand and the back facing you, notice the small jumper connectors. The jumpers are used to indicate which function you want to activate.



To change the settings rearrange the small jumpers to the desired settings.

To Upload to the ESC do the following:

1. Ensure the transmitter and vehicle are turned off.
2. Make sure a battery pack is installed that has some charge in it.
3. Connect the battery to the vehicle.

4. Turn the power on to the ESC, wait for the Blue (or Blue/Yellow) LED to come on.
5. Disconnect the Signal wire for the ESC from the receiver.
6. Connect the Signal wire to the top of the AQPC, ensure it is connected correctly.
7. Pay close attention to the ESC LEDs and you will notice the Red LED flash, and on the AQPC the Red LED will come on. If you do not notice the ESC Red LED flash, you can unplug the Signal wire from the QPC and reconnect again to verify the operation of the Red LEDs. Once you see the ESC Red flash and the QPC turn on Red, the ESC has accepted the programming.
8. Disconnect the Signal wire from the QPC, turn off the power switch.
9. Reconnect the signal wire into the receiver.
10. The ESC has been updated and you are ready.

Note: If you should happen to lose any of your jumpers they are the same jumpers used with computers and easily obtained at a computer store.

ESC Warning LEDs

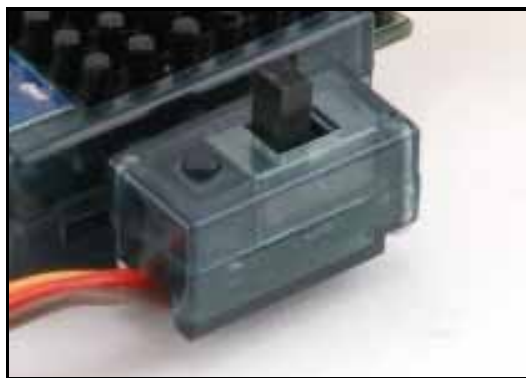
- If the Battery low voltage cutoff (LVC) is reached the Blue LED will blink.

- The Blue LED will automatically stop blinking should the battery voltage recover above the Low Voltage Cutoff.
- If the ESC has detected a thermal overload, the Blue and Green LED's will blink. Let the ESC cool down.

Setup / Calibration to Transmitter

To perform the setup/calibration between the ESC and Transmitter follow these steps:

1. Turn on the transmitter.
2. While turning on the vehicle Press and Hold the setup button, notice the Green LED is now ON solid. When the Green LED is on solid, you can release the setup button.



Note: If you cannot get the ESC to Calibrate, you may need to reverse your Throttle Servo on the transmitter.

3. Using the throttle trigger pull Full Throttle until the Green LED will flash then the Blue LED will turn ON solid.
4. Next push the throttle trigger to Full Brake until the Blue will flash and the Green and Blue LED's are both ON solid. (With the blue LED on, the green led may appear to be yellow)
5. Now return the throttle trigger to the Neutral position and the Blue and green LED's will flash and then come ON solid.
6. Turn off the vehicle/ESC power switch.
7. Turn the vehicle/ESC back ON; you are now ready to use the ESC.

Normal Operation

- After turning on the vehicle, the Blue LED will be on for normal operation.

ESC – reverse operation

Should you get into a situation that requires reverse, after you have applied any brakes you may have needed, return the throttle trigger to the neutral position. Wait a moment or two and then push the trigger forward for reverse.

Note: There is automatic protection within the Xcelorin ESC. Only after you have stopped and returned the trigger to neutral will reverse become available. If while traveling in reverse, pull the trigger to go forward. This is to help prevent serious damage to the drive train.

Connecting the Xcelorin ESC to a Sensorless Motor

There are three wires from the ESC a Black, Blue and White, which are to be connected to the motor.

Below see an Xcelorin Sensorless Brushless motor, each wire should be connected to a single motor lead of the same color. Make certain there is not a short across any of the motor connections. If shorted together, you will damage the ESC when the batteries are connected.

If the motor you are using runs backwards after installation, you can correct this in one of two ways:

- Disconnect any two motor wires, switching the position on the motor and re-connecting.
- Using the ESC Software, you can select the Reverse Rotation feature.



Connecting the Xcelorin ESC to your Receiver

The Receiver wire will connect to nearly all current receivers. Plug it into the Throttle Channel of the receiver.

Brown	- Negative
Red	- Positive
Orange	- Signal



Xcelorin Software Installation

In the box along with your Electronic Speed Control, you will find:

- Xcelorin Software CD
- USB Cable
- USB Adapter

Requirements:

LOSB9535 Xcelorin Electronic Speed Control v1.0

- Windows Operating System preferably Windows XP or higher
- USB Port to be available compatible with USB 1.0 or higher
- You must have FULL Administrator rights on your computer to install

Before installing the Losi Xcelorin Setup Software, ensure that there is no prior version(s) installed using the ADD/REMOVE Programs function found in your CONTROL PANEL.

To install the Xcelorin software make sure you have FULL Administrator rights on the machine you want to install to. If not, the install will complete but will not connect with the USB Adaptor.

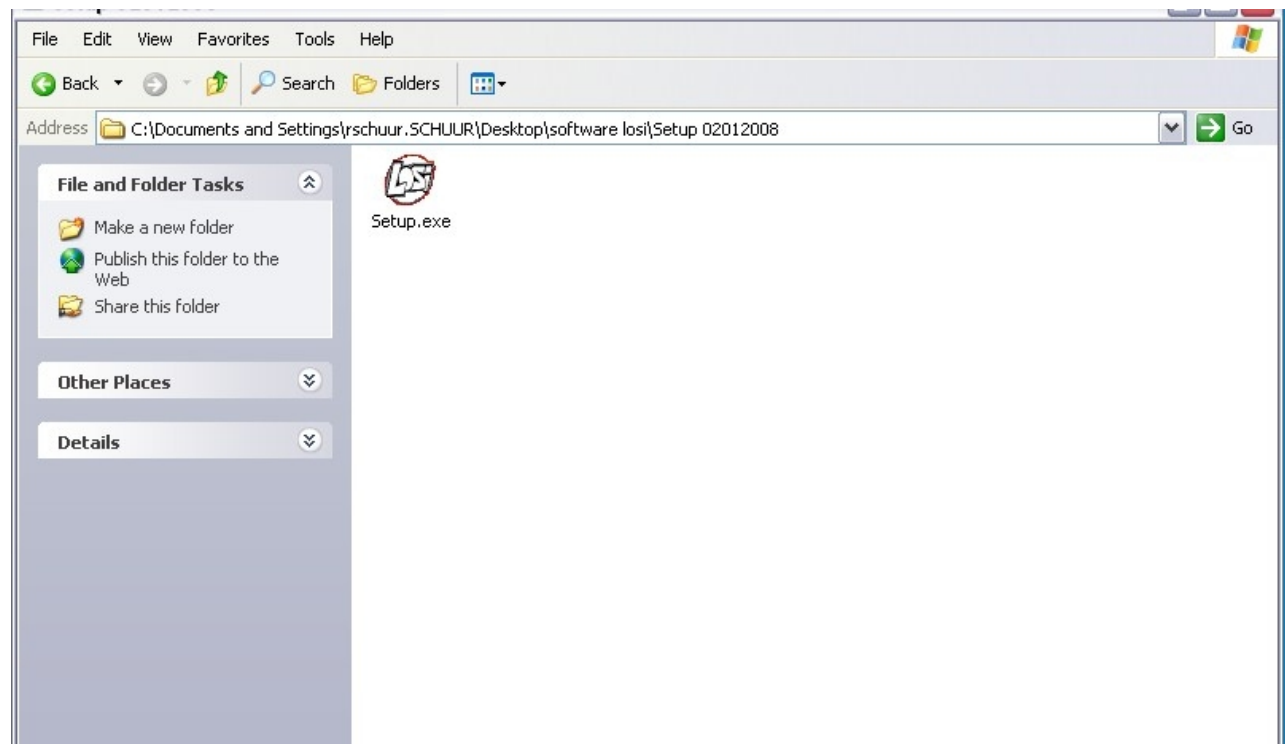
1. Now, insert the CD into your CD/DVD Player.
The following should automatically display.



2. When ready select the Next button. If you wish to cancel, select the Exit button.

If you do not get the previous panel, click on My Computer and then select (click on) the CD/DVD Drive to open it.

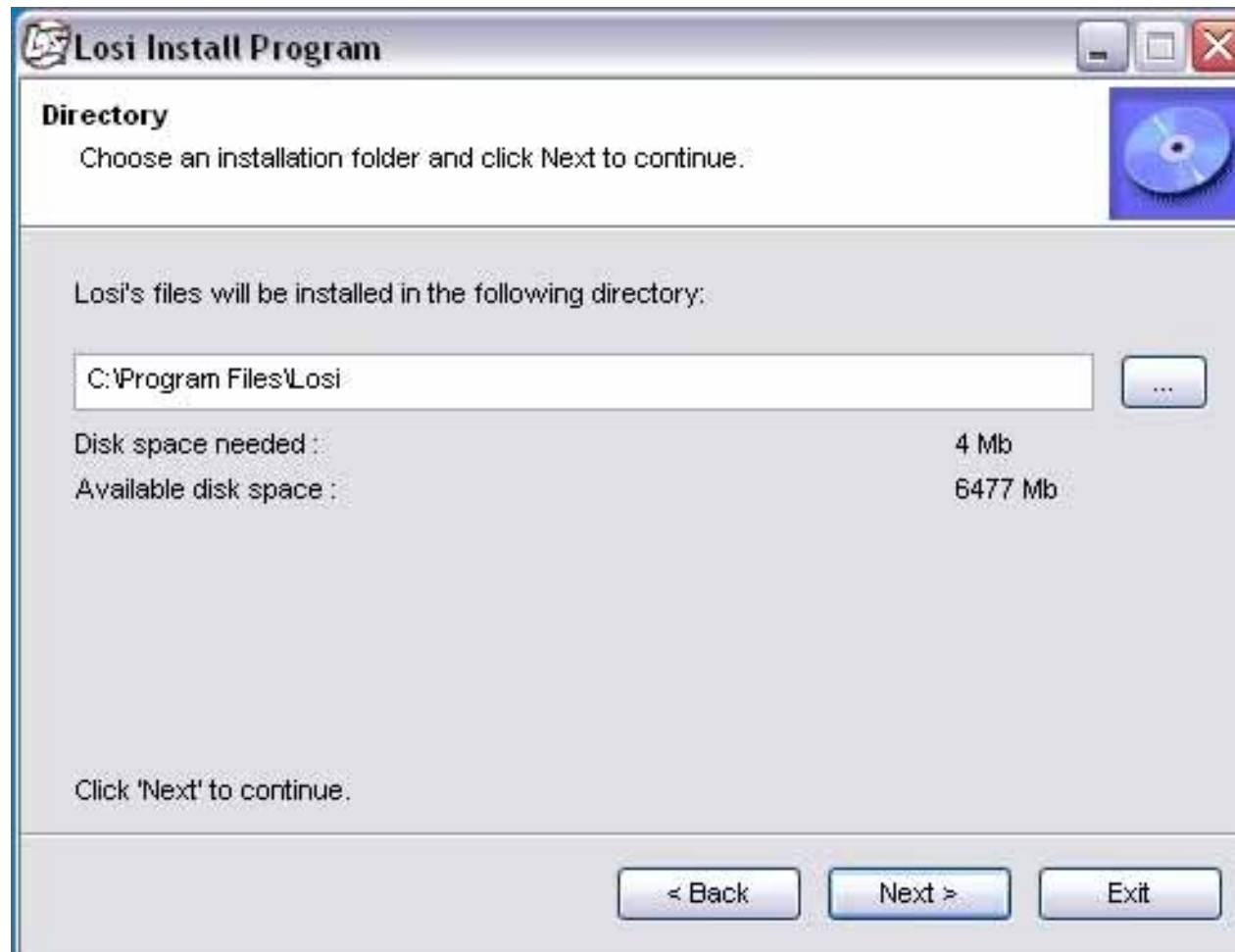
You should then have a panel similar to the one below.



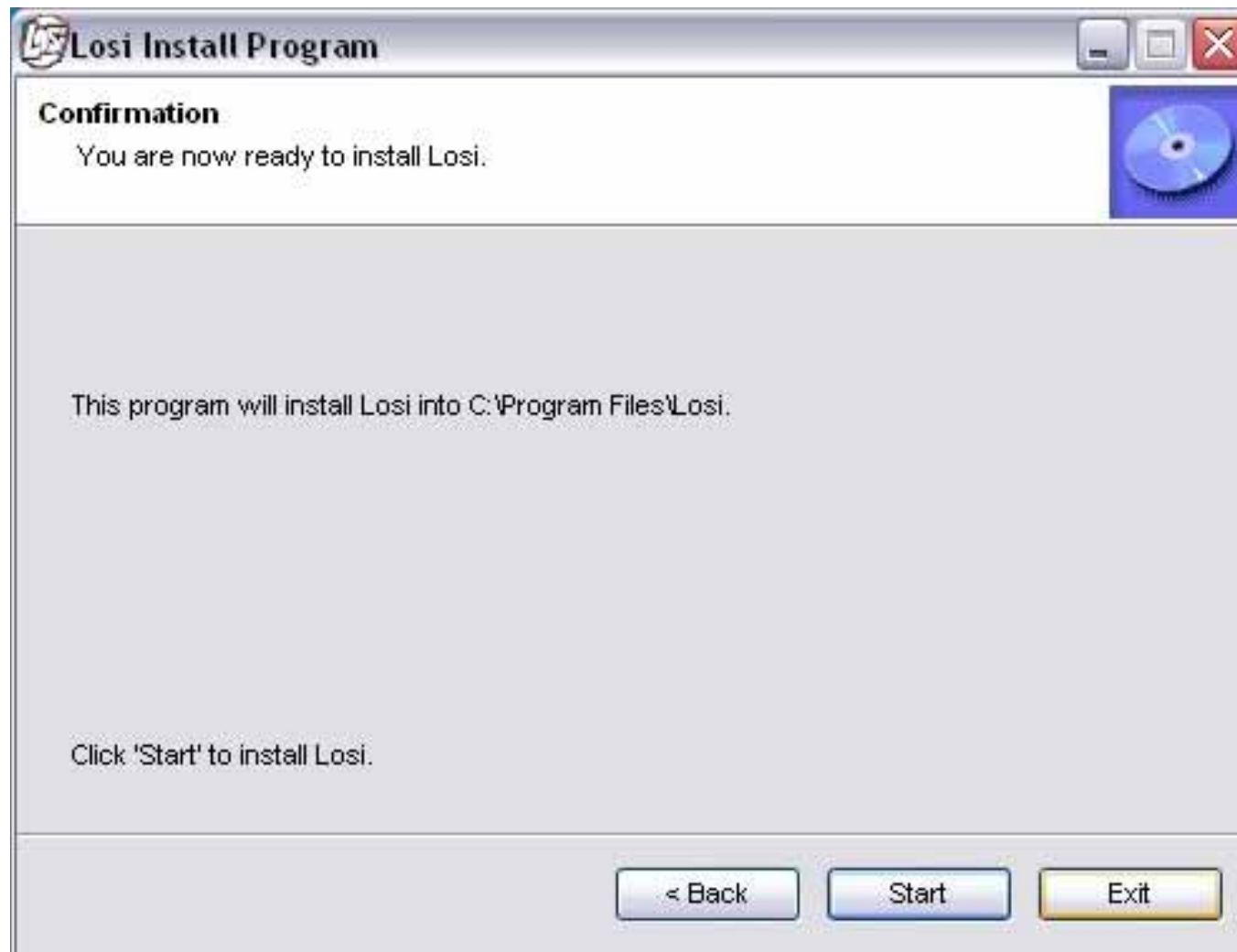
Select and click on the Losi Setup.exe program icon. (You will now see the panel expected in step 1 above.)

3. The following should now be presented. You can change the default directory if desired, we recommend using this default.

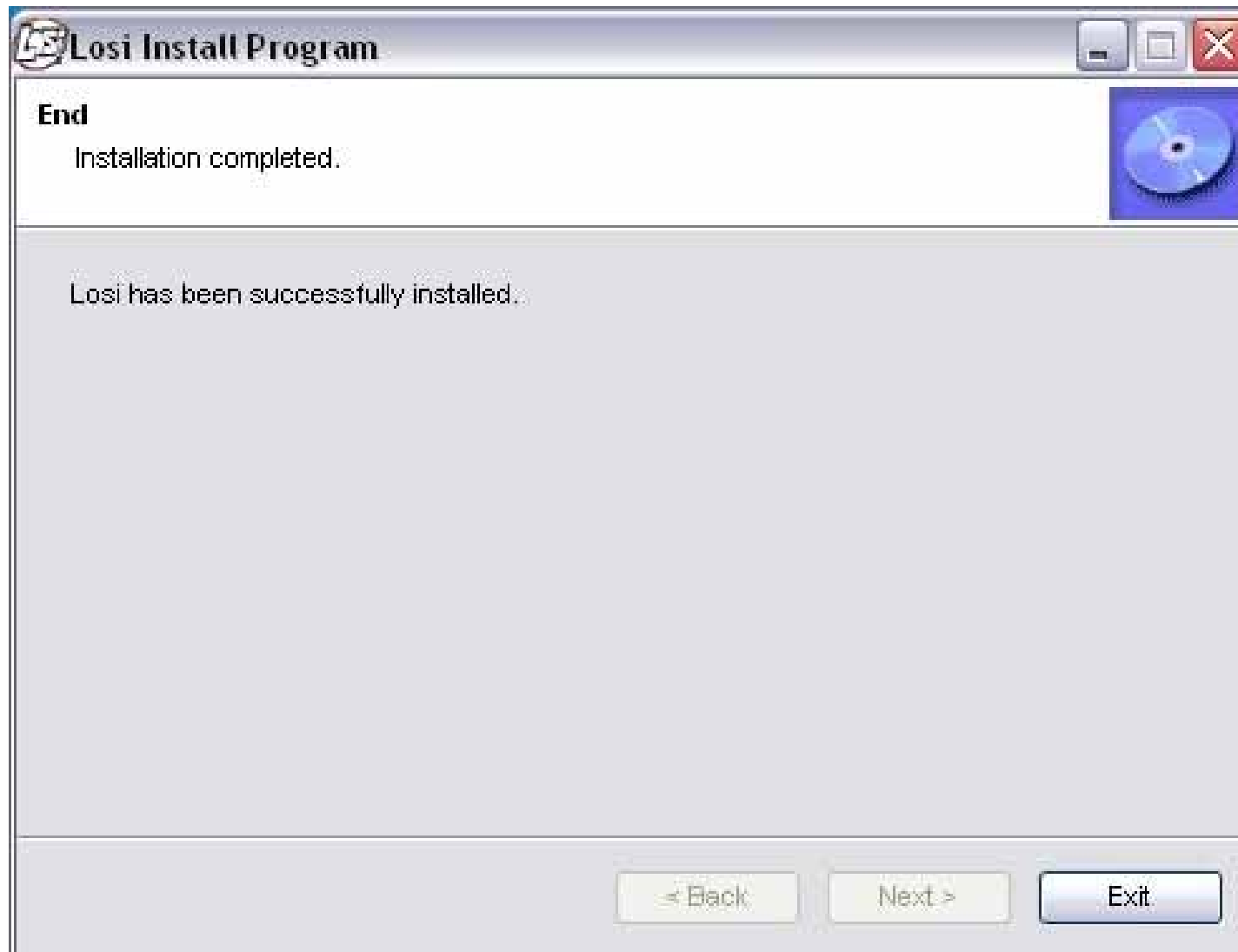
When ready select the Next button. If you wish to cancel, select the Exit button.



4. The following should now be displayed and confirms the install location. When ready, select the Start button. If you wish to cancel, select the Exit button.



5. The following should now be presented, and confirms install was successful. Select the Exit button to finish.



6. Connect the USB cable to your Windows PC or Laptop computer.



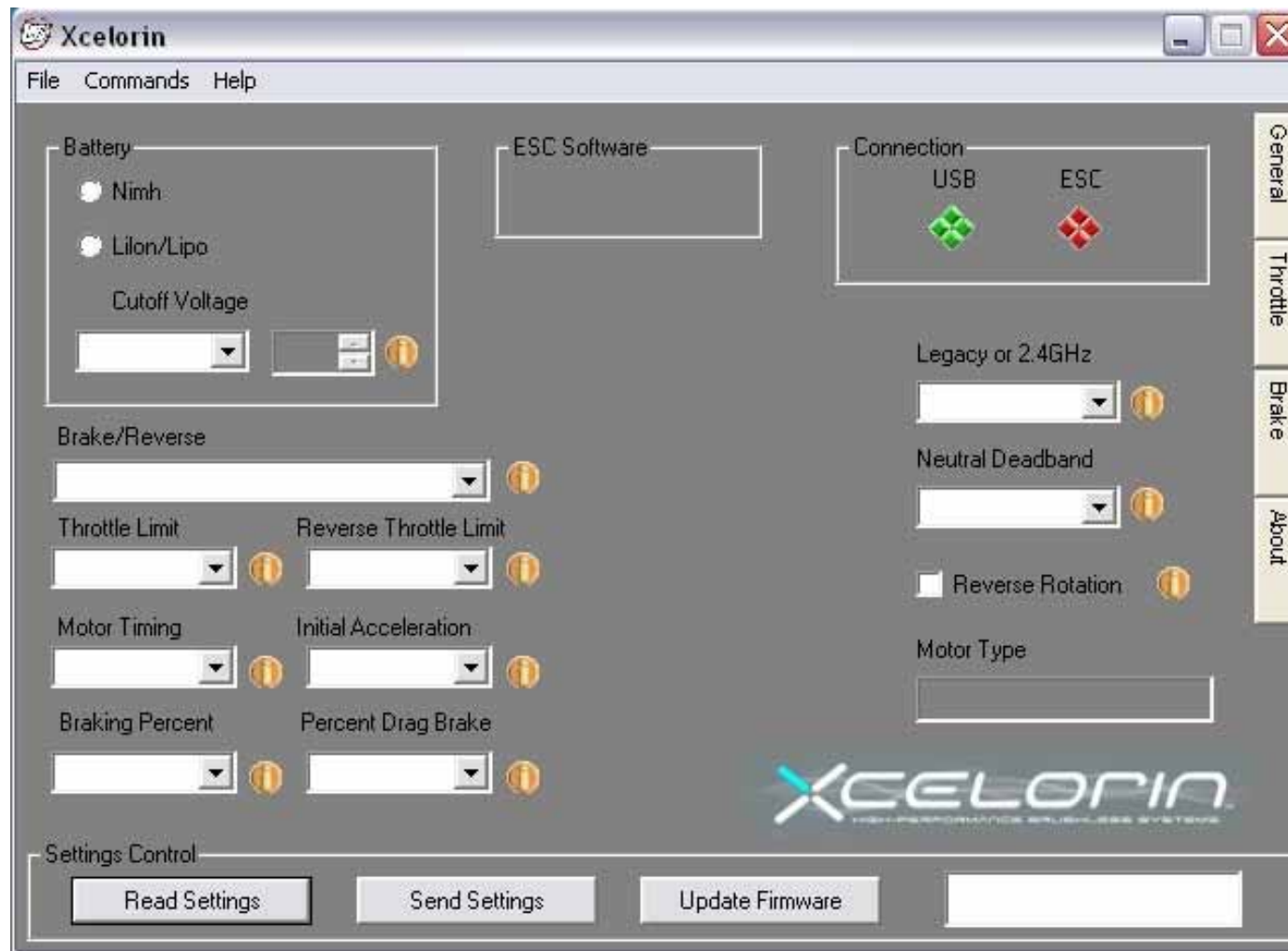
7. Connect the Xcelorin USB Adapter to the mini USB connector on the USB Cable.

You will be prompted to install the device drivers, they are both unsigned so select OK and continue. After a few moments, the USB adapter LED will turn from Red to Green.

If your Adapter LED remains Red, then disconnect the Adapter, wait a minute and then reconnect. If the Green LED does not come on, please reboot before calling Horizon support at 1 877-504-0233.

Note: If you have Windows 2000, you will be required to reboot before the USB Adaptor will connect and the small LED on the adapter turns from Red to Green.

8. With the Xcelorin USB Adapter LED now green, you are ready to start the Xcelorin Software. Locate and select the Losi icon on your desktop. Notice in the Connection box the USB is Green and the ESC is still Red.



9. You are ready to connect the Adapter to the ESC, using the Signal Wire.

WARNING:

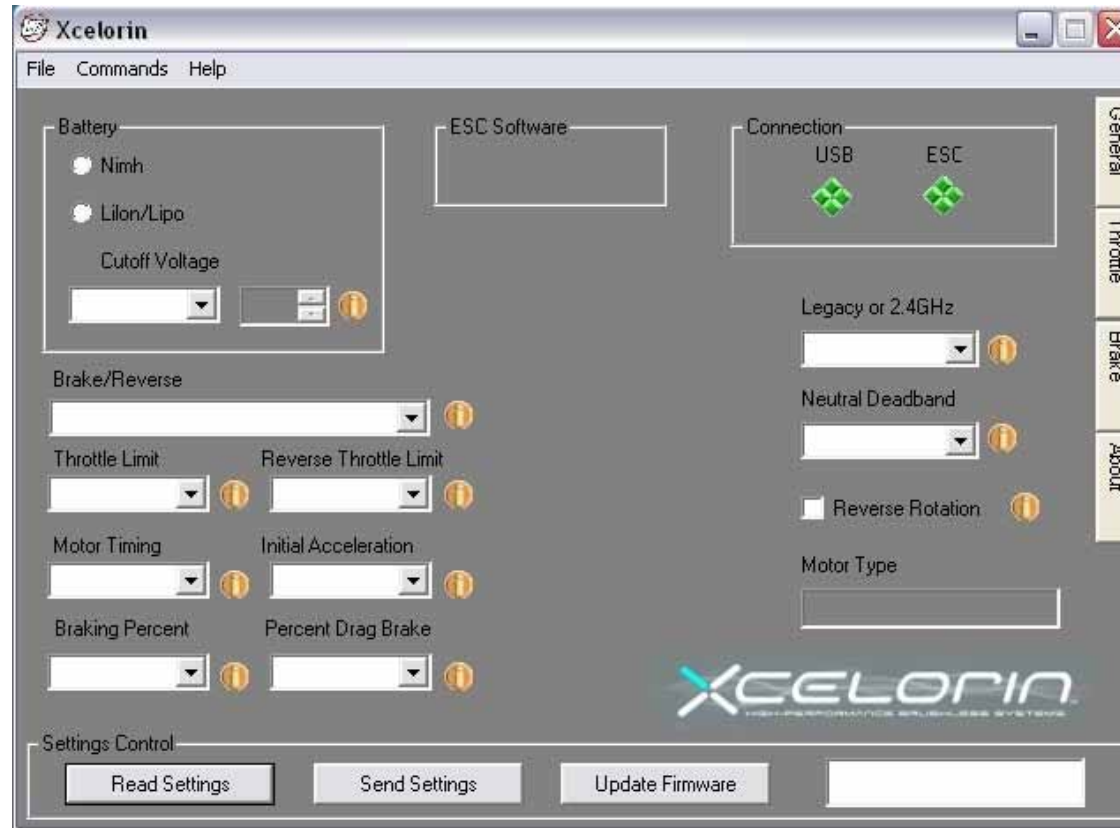
Disconnect the battery from the ESC before connecting the Xcelorin USB adapter to the speed control.

Failure to do so may result in DAMAGE TO YOUR COMPUTER

Please note the label on the USB Adaptor, there are 3 color bars each marked and indicating how to connect the Receiver wire to the adapter.




10. With the ESC connected to the USB Adapter, the Xcelorin Software Connection status icons should now both be GREEN.



The Losi Xcelorin software is now installed and ready for use.

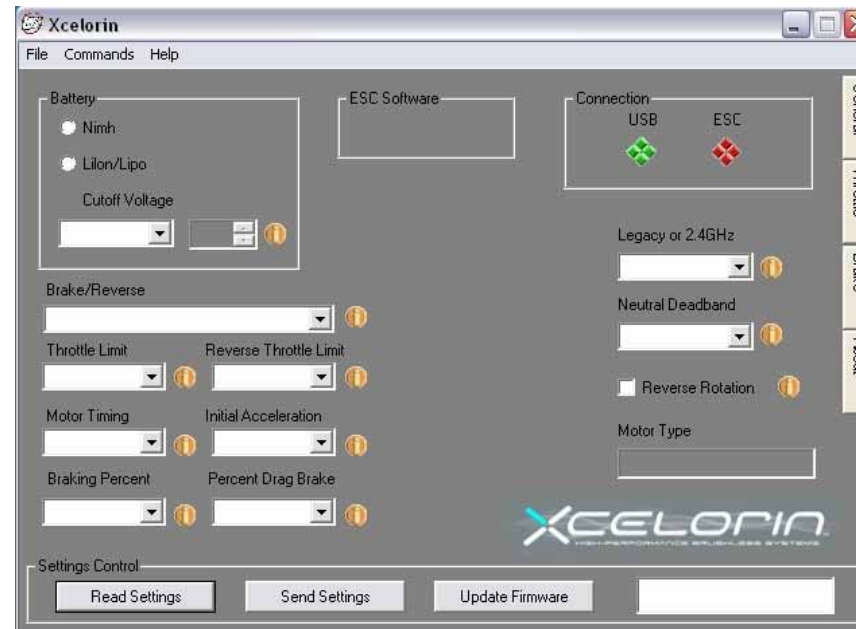
Please refer to the next section and field specific help.

Xcelorin Software Overview

Using this you will find it quite easy to configure your new speed control. On the main panel, you will notice this button  , if you click on this the specific help for that function will display.

Take a moment to review the selectable functions, and read the specific help text for each to become familiar with them. To make configuration changes to a function, select the setting you want, and from the drop down menu select your new choice or option. When you are satisfied and finished with this configuration, click the “SEND Settings” button located on the bottom (off center) of each tabbed page.

Note the four tabs down the right hand side, **General**, **Throttle**, **Brake** and **About**.



General Tab: Here you will find the following configuration settings:

Battery Type and Cutoff Voltage, Brake/Reverse, Motor Timing, Initial Acceleration, Percent Drag Brake, ESC operating mode, Dead band adjustment, Braking Percentage, Throttle Limit, Reverse Throttle Limit and Motor Rotation. All changes are done at your own risk.

Throttle Tab: Only recommended for more experienced Electronic Speed Control users. You can remap the throttle profile from the default linear line. Changes are done at your own risk.

Brake Tab: Only recommended for more experienced Electronic Speed Control users as well. You can remap the brake profile from the default linear line. Changes are done at your

own risk.

About Tab: Here you will see the Setup software version installed, and date of last update. This will be helpful information should you have questions or support concerns.

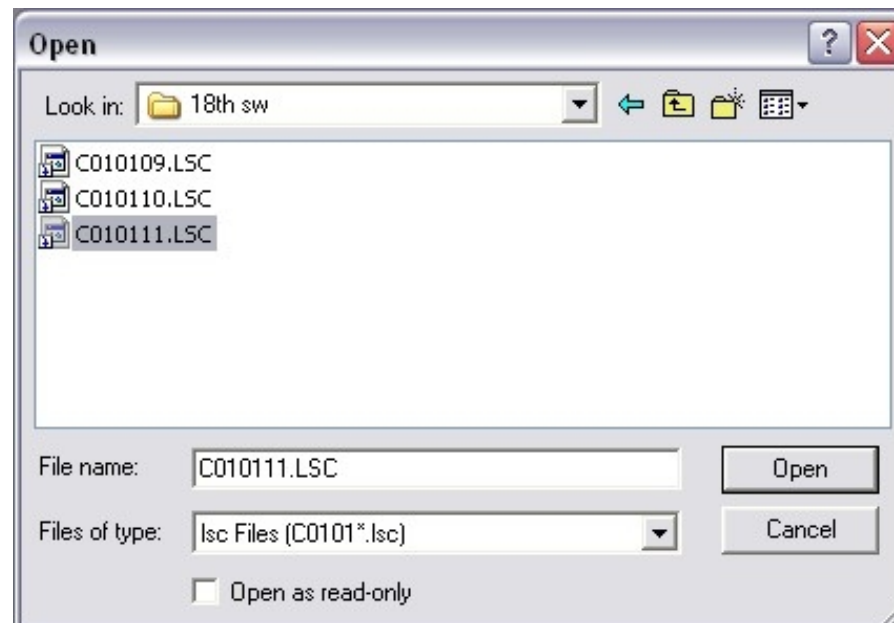
Connection: This section is displayed on every Tab. There are two icons; one for the USB connection, the other indicates the Electronic Speed Control connection. They are RED in color when disconnected and GREEN on connection.

Note: Without an understanding of a specific function and reason, it is not recommended that you make changes to the “default” configuration. There have been defaults selected as a direct result of our testing, which was used to establish these settings. Changing of the configuration will be at your own risk.

Read Settings: Use of this button will read the current Electronic Speed Control (ESC) configuration and present it on the current tabbed page only.

Send Setting: Use of this button will send (write) the current selected configuration to the ESC for the current tabbed page only.

Upgrade Firmware: Use of this button will begin the firmware upgrade process. The following pop up will be displayed, and you need to select the location of the firmware update file. You may cancel this process here without any effect to the ESC firmware.



After finding and selecting the file, this confirmation screen will then display. You may still cancel at this time without any effect to the ESC firmware.



If you select OK, the progress status percentage of the upgrade will be displayed in the lower right. Please do not unplug your computer **or** the ESC while the upgrade is in progress or damage to the ESC may result.

If no problems were encountered, OK will be displayed and the configuration redisplayed. You are finished with the upgrade and you can re-configure the ESC or end the program.

If a problem is encountered and the upgrade fails, simply restart the upgrade process again. If there should be another failed upgrade, then end all other programs on your computer and possibly re-download the file from the Losi website.

If the problem persists, then please call us at Losi/Horizon Product Support – 1 877 504 0233.

Updating ESC Firmware

Description: By providing you this ability to upgrade your firmware, the Xcelorin ESC will provide you with the benefits of future enhancements or quickly allow you to realize a software fix. Within a short period, you can upgrade your ESC firmware rather than packaging your ESC and sending it in for upgrade or repair. When you update the software, you are literally getting a new and improved ESC.

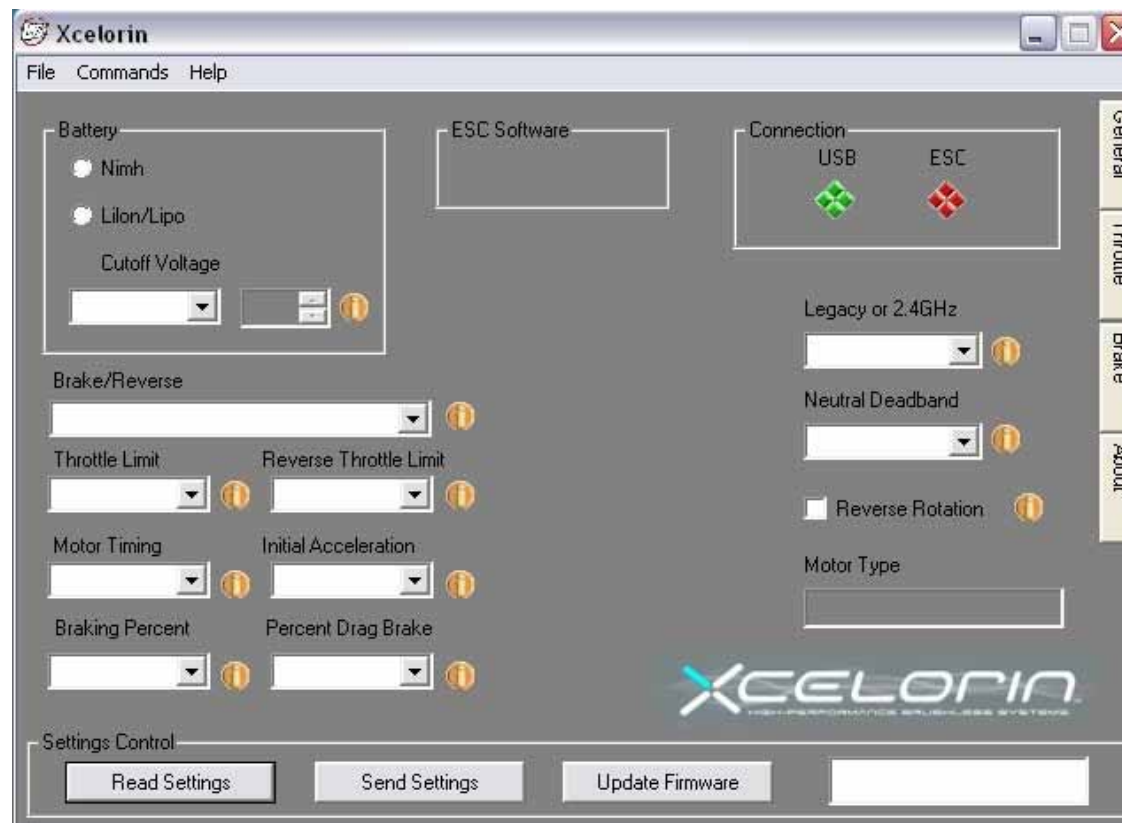
We have the ability to offer NEW configuration parameters, introduce finer adjustments and many more items with this capability.

Current Software: grayed out, shows the software currently on the controller.

Xcelorin ESC Model is indicated by the first character in the Software Level.

C0101 XX .LSC	- 18 th Xcelorin
D0101 XX .LSC	- 10 th Xcelorin Sensored
E0101 XX .LSC	- 10 th Xcelorin SensorLess
F0101 XX .LSC	- Reserved
G0101 XX .LSC	- Reserved

Note: **XX** denotes the incremental release level number



General TAB information

Battery Type –Select NiMH, or Lithium-Ion / Lithium Polymer batteries

Cutoff Voltage – This is a critical option to understand and used to protect Lithium or M1 batteries from being over-discharged, which will shorten the life, cause damage to the battery, or even result in Fire or Personal Injury.

When using **NiMH batteries** you do not need to set a cutoff voltage to protect the batteries. NiMH batteries typically stop operating your vehicle before any damage occurs. If you are using more than 6-cell NiMH batteries, you must adjust the cutoff voltage, for example if you are using an 8-cell pack of NiMH batteries you would use a cutoff of 5.6V volts ($8 \times 0.7V = 5.6V$). If you are using fewer cells of NiMH batteries, a cutoff voltage of 4.0V will provide power for your radio system to operate and reduce the chance of losing control.

- **No Cutoff** The choice for racing used along with quality NiMH battery packs.
- **Customize Voltage Cutoff** (for NiMH Batteries) you can select a starting cutoff voltage of 4, 5, 6, 9 or 12 volts. Then using the up/down to the right of the voltage you can increase the voltage stepping up 0.1V between the selectable settings. Following the above example for an 8-cell NiMH battery, you would select 5.0V and then increase 6 steps up to 5.6V.

DO NOT USE the above setting with any type of Lithium battery pack

When using any **Lithium or M1 (A123) batteries**, they must not be discharged to less than 3.0V per cell.

- **No Cutoff** The choice is not available and NOT recommended when using any type of Lithium battery.
- **Customize Voltage Cutoff** (for Lithium Batteries) after selecting the number of cells (2 or 3) the default voltage is displayed. For example, you select a 2S or 2-cell battery; the default cutoff voltage will be 6.0V. You may raise this to protect your expensive batteries in 0.1V increments up to 7.0V. For 3S or 3-cell, the default cutoff is 9.0V and you may increase this up to 10.5V.

Brake / Reverse – This is only to determine if reverse is to be enabled or not. You will find in racing, most tracks will not allow racing with reverse enabled.

- **Forward w/o Reverse** This is a Race setting - Reverse is disabled.
- **Forward with pause then Reverse: (DEFAULT)** General bashing around (FUN) or racing if reverse is allowed for the event. The Electronic Speed Control requires 2 seconds of continuous neutral from the transmitter prior to allowing reverse to operate.

Throttle Limit – Use this to limit the power available using forward throttle. The lower the percent the less forward throttle speed will be available.

(Default)

- | | | | |
|--------------|-----------------------|--------------|----------------------|
| • 0% | 100% of forward speed | • 50% | 50% of forward speed |
| • 10% | 90% of forward speed | • 60% | 40% of forward speed |
| • 20% | 80% of forward speed | • 70% | 30% of forward speed |
| • 30% | 70% of forward speed | • 80% | 20% of forward speed |
| • 40% | 60% of forward speed | • 90% | 10% of forward speed |

Reverse Throttle Limit - Use this to limit the power available using reverse throttle. The lower the percent or level the less speed will be available in reverse.

- | | | | |
|------------------|----------------------|---------------|-----------------------|
| • 10% | 10% of reverse speed | • 60% | 60% of reverse speed |
| • 20% | 20% of reverse speed | • 70% | 70% of reverse speed |
| • 30% | 30% of reverse speed | • 80% | 80% of reverse speed |
| • 40% | 40% of reverse speed | • 90% | 90% of reverse speed |
| (Default) | | | |
| • 50% | 50% of reverse speed | • 100% | 100% of reverse speed |

Motor Timing - This option affects the power band and efficiency (run time) of an electric motor. The default is "Normal" and is a good starting point to deliver power and provide good run time.

Low Provides **maximum** efficiency with less power. Higher timing produces significantly more power but at the expense of efficiency (less run time) and typically the motor will generate more heat. Each brushless motor will respond to timing differently. Good for running around on paved, or harder surfaces, and racing with high Kv rated or low-turn motors

Very Low Provides power for running through soft surfaces, having fun and longer run time.

Normal (Default) Good mix of power and efficiency using any motor.

High More power than efficiency so run time will reduce, and you should be monitoring motor heat. The higher Kv or lower turn motors will generate heat quickly using this setting. A safe high temperature range is 165F to 180F (74° - 82° Celsius); going higher may damage your motor.

Very High This is maximum power and must be used with **caution**.

Any motor has the potential to over-heat in this setting. Frequently check the motor temperature and make sure you're not operating higher than 165° and 180° Fahrenheit (74° - 82° Celsius), which may damage your motor, or damage your Electronic Speed Control (ESC).

Initial Acceleration - Use this to limit the initial power that is sent to the motor when starting from a complete stop.

Using the LOW option, the vehicle will launch very slowly and provide the longest run times. When using the HIGH choice, you will have wheel-spinning acceleration at the cost of run time. This is also very tough on the batteries as the amperage draw can be very high. If your vehicle cuts out, hesitates or loses radio control, you should consider setting this at a lower value.

Low Using this option will provide longer run times and is easiest on the batteries. It is a good choice for beginners.

Medium Medium requires more from your batteries, and is good for low traction surfaces.

High This option will provide full acceleration and requires stout batteries to supply the load required in this setting.

CAUTION: You may experience what seems like the motor cutting off, a hesitation or possible brief radio loss using this setting.

Braking Percent - Gives you the ability to have full control over the amount of brake your vehicle will have.

NOTE: Selecting the advanced function “BRAKE CURVE” and using this method to adjust the feel of the desired brake strength will override the “Braking Percent” parameter.

- **10%** Effect will be 10% of full brakes
- **20%** Effect will be 20% of full brakes
- **30%** Effect will be 30% of full brakes
- **40%** Effect will be 40% of full brakes
- **50%** Effect will be 50% of full brakes.
- **60%** Effect will be 60% of full brakes.
- **70%** Effect will be 70% of full brakes.
- **80%** Effect will be 80% of full brakes.

Percent Drag Brake – The drag brake function provides the driver a set percentage of brake when you have the transmitter resting in neutral. This will create the “feel” of a brushed motor.

Drag brake is used in racing to slow a vehicle as you let off approaching a corner versus the driver having to push the brake at every corner.

Try working with this to get a sense of how you might use this for your track.

If you are running on a high traction track with tight corners, a stronger setting should work best.

If you are running in an open area, you will find a smaller percentage will result in better control.

If you are running in dusty or slippery surfaces, you will more than likely want to use the lowest option.

- 0%
- 4%
- 8% (Default)
- 10%
- 12%
- 15%
- 20%
- 25%
- 30%

Legacy or 2.4GHz – This setting is intended to reflect what type of Radio System you are using, i.e. Transmitter and Receiver.

Default is **LEGACY** because there are still many of the traditional 27MHz, 40MHz or 75MHz systems in use.

If you use a 2.4GHz system, then you can select this setting.

The Electronic Speed Control internal switching rate is increased with the 2.4GHz selection and may cause interference with Legacy Radio Systems.

Neutral Deadband – This setting adjusts the amount of “Deadband” off neutral on the throttle trigger. This is in Milli-Seconds (MS) and is the amount of neutral when you pull the trigger.

The smaller the value the less “Deadband” or movement is required off-center for the ESC to begin throttle functions.

Using a higher value for this setting will provide a wider Deadband.

- 2
- 3 (Default)
- 4
- 5
- 6

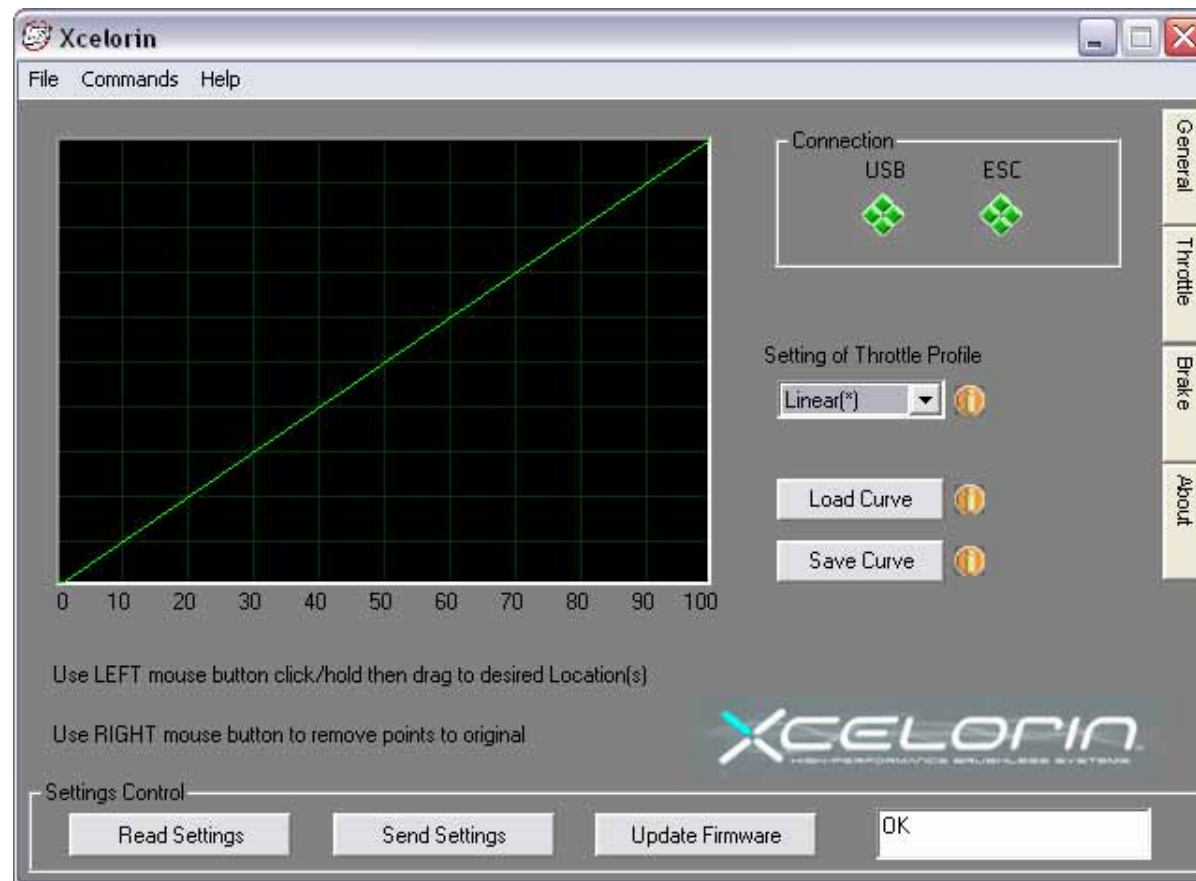
Reverse Rotation – If you would like to change the direction of the motor without changing any wiring, then select or de-select this box.

This will be useful for applications where removing the motor wiring is impractical or difficult.

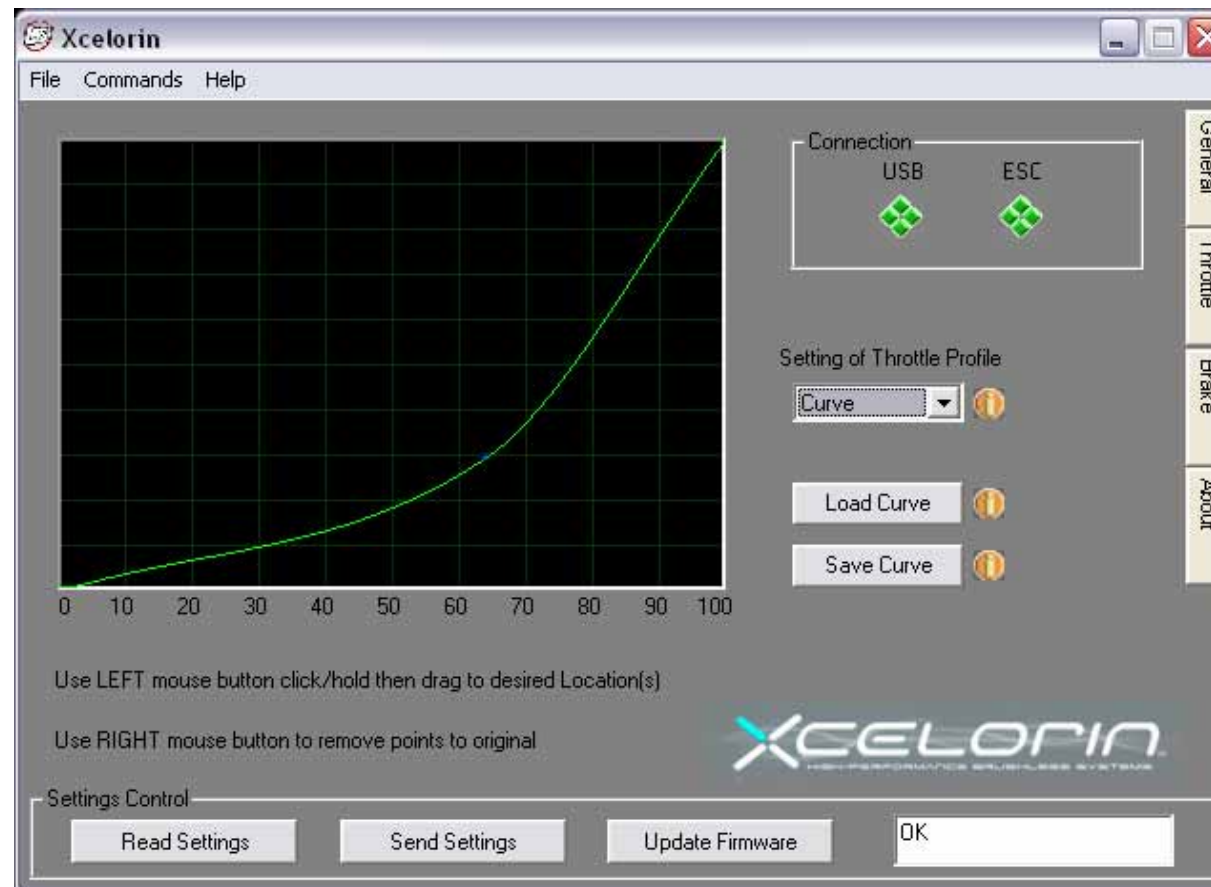
Throttle TAB information

Setting Throttle Profile – You can select either Linear (Default) or Curve. Using Curve will activate changes you may have made to the left for the throttle profile.

Using the Left Mouse Button, you may click to select a point on the throttle line and drag it into the desired position. Generally, movement to the upper left will cause accelerated throttle action, and movement to the lower right will slow (or delay) the throttle action.



Below is an example of a slow ramp up to full throttle versus the above linear graph



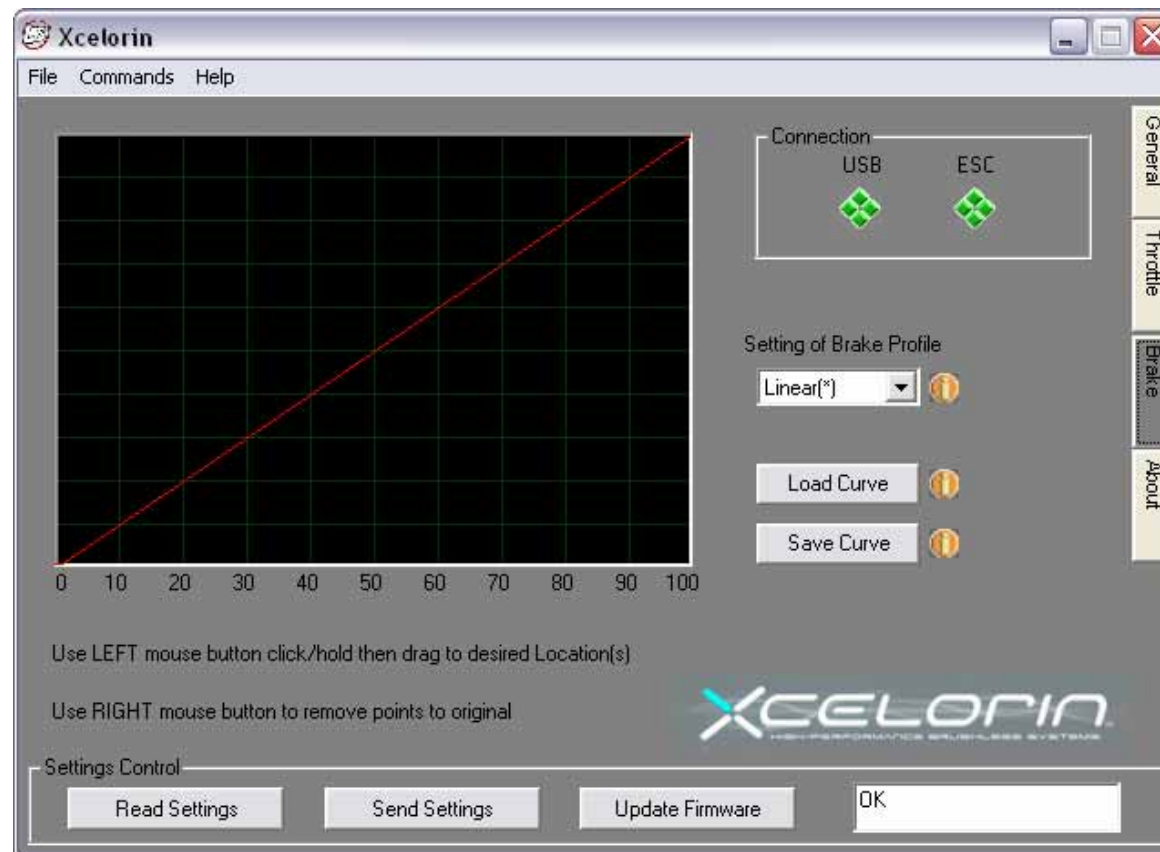
Below is an example of an accelerated ramp up to full throttle



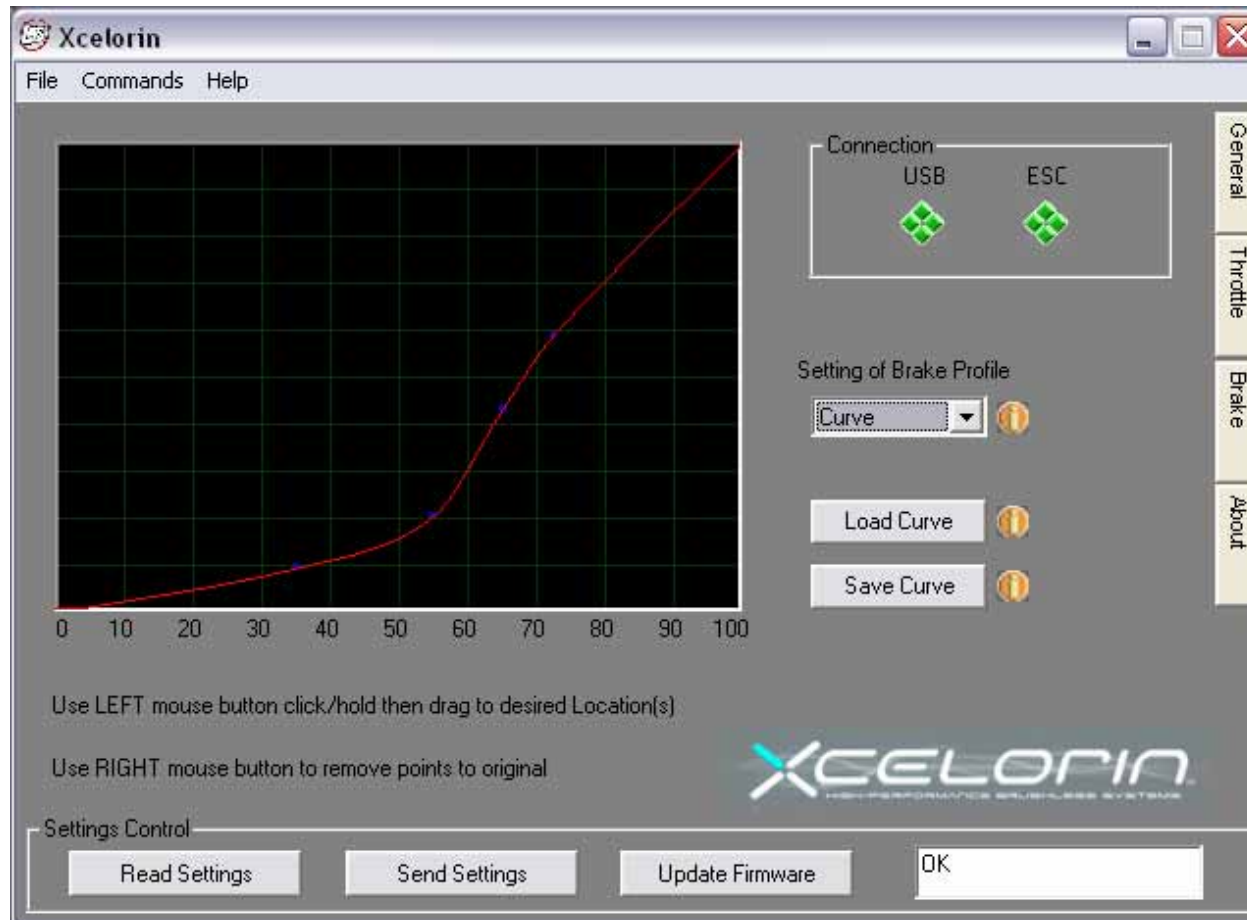
Brake TAB information

Setting Brake Profile – You can select either Linear (Default) or Curve. Using Curve will activate changes you may have made to the left for the throttle profile.

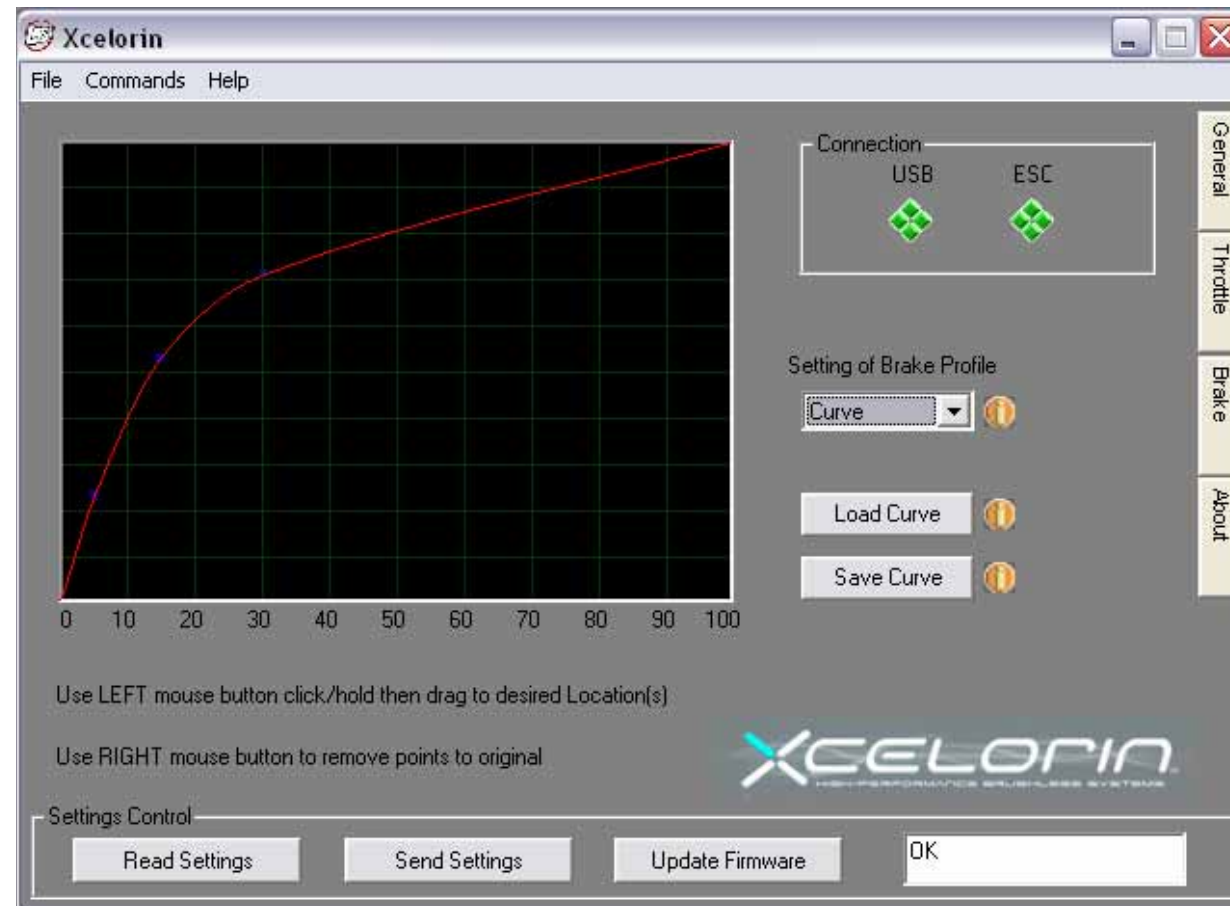
Using the Left Mouse Button, you may click to select a point on the throttle line and drag it into the desired position. Generally, movement to the upper left will cause accelerated braking action, and movement to the lower right will slow (or delay) the braking action.



Below is an example of a gradual increase in braking versus the above linear graph



Below is an example of increase of braking action then leveling to full brake



Xcelorin Sensorless Brushless ESC Specifications

- Forward: Y
- Reverse: Y
- Brake: Y
- Continuous Maximum Current: 25A
- Input Connector Types: Losi Mini vehicle power connector
- Output Connector Types: 2mm gold-plated bullet connectors
- Momentary Peak Current: 35A (5 seconds)
- Dimensions (WxLxH): 1.16 x 1.54 x 0.9 in (29.5 x 39 x 23mm)
- Weight: 0.9 oz (28g)
- BEC Voltage: 5.0V / 2A
- Optimized for Spektrum and Traditional radio systems
- Overload Protection: Y

Xcelorin Replacement Parts

LOSB9350	Heat sink 18th esc	\$9.99
LOSB9360	Plastic Replacement case 18th	\$5.99
LOSB9371	Capacitor 18th 220mf	\$4.99
LOSB9380	Software CD USB Cable/Connector replacement	\$28.49
LOSB9377	Advance Quick Programming Card 18th/10th	\$12.49
LOSB9614	EC3 Charge Connector, Male (2)	\$2.99
LOSB9615	EC3 Charge Connector, Female (2)	\$2.99

Warranty Period

Exclusive Warranty- Horizon Hobby, Inc., (Horizon) warrants that the Products purchased (the "Product") will be free from defects in materials and workmanship at the date of purchase by the Purchaser.

Limited Warranty

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

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

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

Damage Limits:

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

any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability.

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

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

Safety Precautions:

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

Questions, Assistance, and Repairs:

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

Inspection or Repairs

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

receipt must also be included for warranty consideration. Be sure your name, address, and RMA number are clearly written on the outside of the shipping carton.

Warranty Inspection and Repairs

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

Non-Warranty Repairs

Should your repair not be covered by warranty the repair will be completed and payment will be required without notification or estimate of the expense unless the expense exceeds 50% of the retail purchase cost. By submitting the item for repair you are agreeing to payment of the repair without notification. Repair estimates are available upon request. You must include this request with your repair. Non-warranty repair estimates will be billed a minimum of ½ hour of labor. In addition you will be billed for return freight. Please advise us of your preferred method of payment. Horizon accepts money orders and cashiers checks, as well as Visa, MasterCard, American Express, and Discover cards. If you choose to pay by credit card,

please include your credit card number and expiration date. Any repair left unpaid or unclaimed after 90 days will be considered abandoned and will be disposed of accordingly. **Please note: non-warranty repair is only available on electronics and model engines.**

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

**Horizon Service Center
4105 Fieldstone Road
Champaign, Illinois 61822**

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

**Horizon Product Support
4105 Fieldstone Road
Champaign, Illinois 61822**

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