NovaLink™

INSTRUCTION MANUAL

Version 1.2

8/23/2010

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PRODUCT OVERVIEW

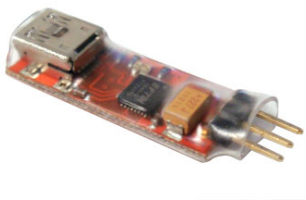
The NovaLink™ provides users with expanded programming adjustability. It comprises a unique module that easily plugs into the speed control and an included USB cord. Using the integrated software disk, customers can fine tune the ESC's multiple parameters by inputting the desired values or using the user-friendly graphic controls. Additionally, each personalized set of parameters can be stored on a PC to recall and use again later. These custom-made parameter sets can, also, be shared with other drivers. The NovaLink will never be outdated due to the easy-to-download software updates available to users on Novak's Web site. The NovaLink is compatible with Windows® XP™, Vista™, and 7™ computer-operating platforms.

PROGRAMMABLE PROFILES (KINETIC)
The NovaLink offers expanded adjustability on some of the Kinetic and Kinetic 1S's parameters. These profiles can only be adjusted through the NovaLink software

- Fine-tune adjustment for Minimum Brake, Drag Brake, Dead Band and Minimum Drive profiles (these profiles can be minutely adjusted among the preset values featured on the ESC)
- Personalization of the Throttle and Brake Curves
- Fine-tune adjustment for the LiPo/LiFe Cut-Off Voltage value
- Independent Drag Brake toggle
- Graphical view of ESC and motor temperature sampling
- Retrieval of transmitter endpoint values
- Fine-tune adjustment for RPM Select, Applied Timing and Boost Delay
- Ability to store and share settings; a secondary profile can be downloaded onto the ESC from the Novak website or fellow driver (the driver's main profile can still be adjusted via the speed control's on-board programming)
- Ability to update the ESC's firmware in the field

ITEMS INCLUDED

1. NovaLink USB Adaptor Module
2. USB Cable
3. NovaLink Software Disk



MINIMUM SYSTEM REQUIREMENTS

Please ensure that the computer you plan to install NovaLink on meets the following minimum requirements

Operating System	Windows® XP™, Vista™ 32-bit, 7™ 32-bit
Memory	512 RAM
CPU	1 GHz Processor
Disk	100 MB Disk
Graphics	VGA Card (800x600 minimum resolution recommended)

The NovaLink uses a period (.) as the standard decimal separator. This software will not run if a comma (,) is used instead. *(Some European countries use the comma as the standard decimal separator, whereas the US and English countries use the period).*

PRECAUTIONS

Check for Firmware Updates!
It is important to make sure you have the latest ESC firmware. (Refer to the "**ESC Firmware Upgrade**" section of this manual).

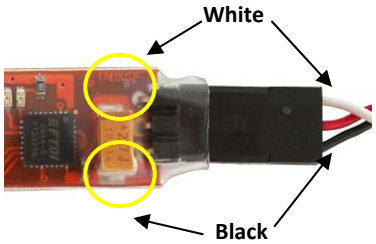
Check for Software Updates!
It is important to make sure you have the latest NovaLink software updates. (Refer to the "**Downloading Software Updates**" section of this manual).

Always Unplug the ESC Fan Before Running NovaLink or Firmware Update!
Please remember to always unplug the ESC fan before using NovaLink or ESC Firmware Upgrade. Leaving the fan plugged in will result in excess current draw that may disable the USB port and electrical noise generated by the fan may interfere with communication.

Water and Electronics Don't Mix!
Never allow water, moisture or other foreign materials to get inside the speed controller or the NovaLink. Water damage will void the product warranty!

Do NOT put the NovaLink pins close to other metal objects!
Putting the metal pins against another metal object can result in shorting the NovaLink circuit. This damage is not covered under the product's warranty.

Plug the ESC into the NovaLink Correctly and Carefully!
The metal pins on the NovaLink can be damaged easily if the ESC is not plugged into the Novalink carefully. The pins are marked with "White" and "Black" labels to aid in connecting your ESC correctly. Make sure to match the labels on the NovaLink module with the color of the wires on the ESC as shown in the image to the right.



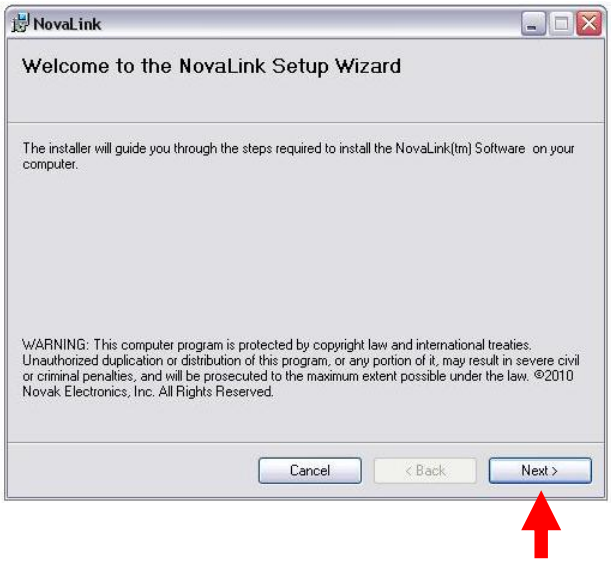
SOFTWARE INSTALLATION

1. Insert the NovaLink CD
2. Click **Start** -> **My Computer** (or  -> **Computer**)
3. Double-click the **NovaLink** icon
4. Double-click the **Drivers** folder
5. Install the drivers
    a. **Windows XP**: double-click the file "**NovaLink_Drivers**"
    b. **Windows Vista & 7:** right-click "**NovaLink_Drivers**" and click "**Run as Administrator**"
        i. A black command prompt will pop up during installation
6. Once the black command prompt disappears, Plug the NovaLink into the USB

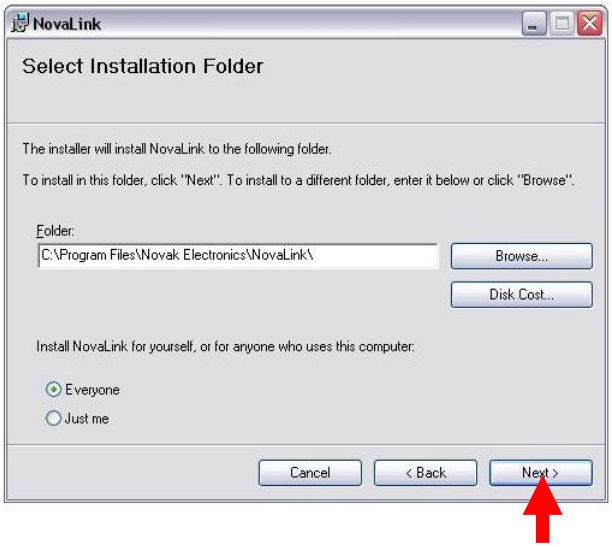
It is important that you plug in the NovaLink USB Adaptor Module **after** the black command prompt disappears to ensure your driver is installed correctly.

7. Return back to the NovaLink Setup folder by clicking the "Back" button
8. Double-click the **Installer** folder
9. Install NovaLink by double-clicking on the **Setup.exe** file

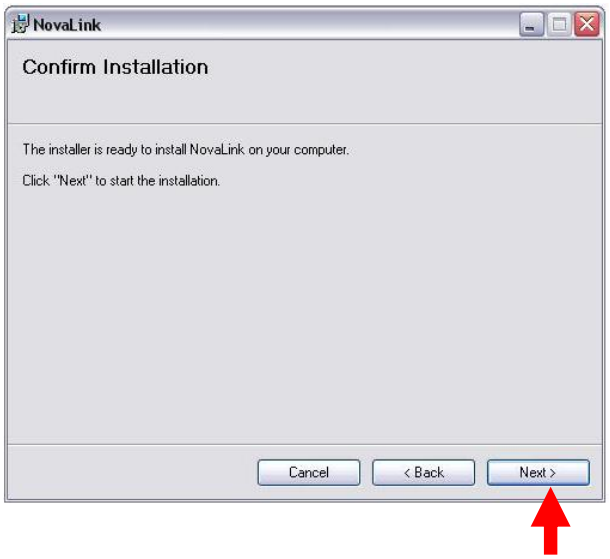
Click "Next" to begin the NovaLink Setup Wizard



The default installation folder is "C:\Program Files\Novak Electronics\NovaLink\". To change the installation folder, type in the folder path or click "Browse" to select a folder



Click "Next" to continue with the installation



Click "Next" to begin installation

Software Registration

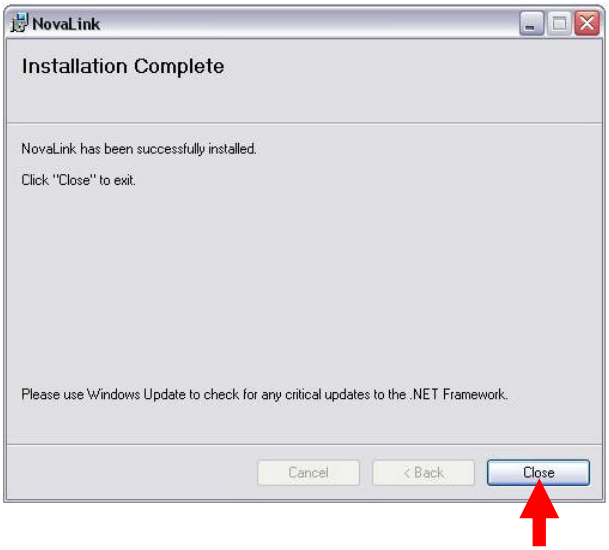
After installation, you can register your software by clicking "**Register Now**" or if you plan to skip registration, click "**Next**".

The registration form can be found by navigating to

Start -> All Programs -> Novak Electronics.

Registering your NovaLink will ensure that you receive e-mails from Novak when new versions of the software or firmware are available.

Once the installation is complete, click “Close” to exit the installation wizard



NOVALINK INSTRUCTIONS

Startup

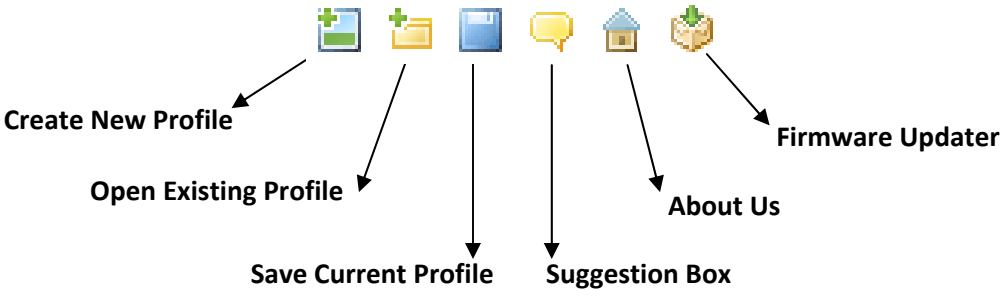
Always unplug the ESC fan before running NovaLink or the ESC Firmware Upgrade! (refer to **Precautions** for details)

1. Make sure to have your USB cable, NovaLink USB Adaptor, and ESC ready
2. Plug the USB cable into your computer's USB port
3. Plug the NovaLink adaptor into the USB cable

NOTE: Make sure to plug in your NovaLink Adaptor before launching the NovaLink program

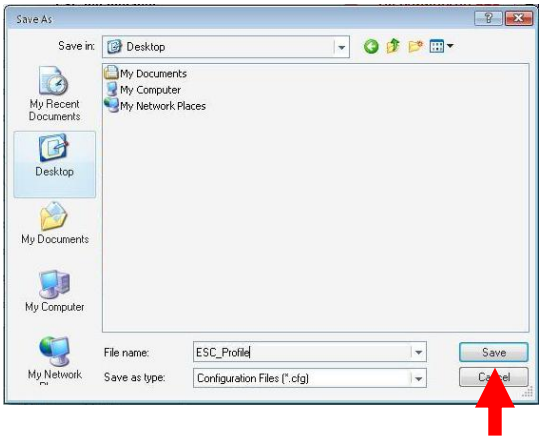
4. Unplug the ESC fan
5. Start the NovaLink program
6. If you are ready to upload and configure your ESC settings, refer to the **Uploading /Updating a Profile** section

MENU ICONS



Creating & Saving a Profile

1. Click the **Create New Profile** icon on the menu bar
2. Adjust settings (refer to "**NovaLink Parameter Definitions**")
3. Click the **Save Current Profile** icon on the menu bar
4. Choose a location to save the current profile
5. Type in next to **File Name** the name you would like to name this profile
6. Click **Save** (all parameters on both the "Settings" and "Advanced" tabs are saved)



NOTE: You do NOT need to have your ESC connected to create and save a profile

Uploading / Updating a Profile

1. Plug your ESC into the NovaLink
   NOTE: It is important to plug your ESC into the NovaLink carefully by matching the colors of the wire to the labels provided on the NovaLink (See Precautions for details)
2. Wait until "**Connected**" is shown on the top right corner of the interface
3. Adjust settings *(refer to "**NovaLink Parameter Definitions**")*
4. Click **Update** to update your ESC's settings (your ESC will not be updated when you press **Save**)
   (Your NovaLink interface will disconnect and reconnect your ESC during this process)
   a. Do NOT disconnect your ESC while it is updating *(refer to **Disconnecting Your ESC**)*

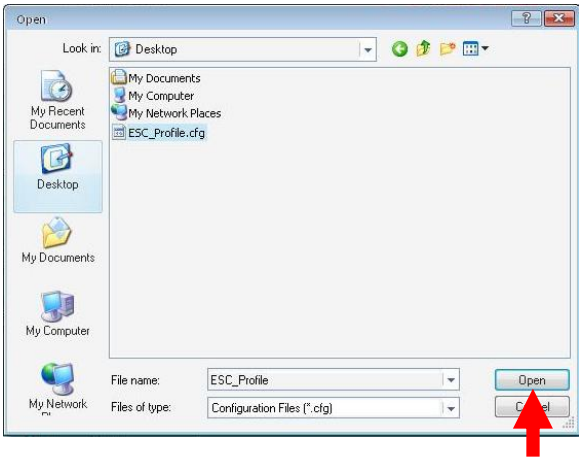
5. When the NovaLink screen re-appears, the updated profile has been successfully saved t the ESC

Resetting to Default Settings

1. Click **Reset** in the top right corner of the interface
2. Resetting your profile will change all your parameters back to its default values
3. If you plan on using these defaults for your ESC, do not forget to update your ESC (refer to "**Uploading/Updating a Profile**")

Sharing Profiles

NovaLink allows users to share profiles by providing a feature to open existing profiles. After receiving files from other users, you can then upload them onto NovaLink to view the parameters and use them on your own ESC.



1. Click the **Open Exiting Profile** icon
2. Select the profile you would like to open (.cfg)
3. Click **Open**

Disconnecting Your ESC

1. Click **Disconnect** in the top right corner of the interface
2. Remove your ESC when Disconnected is shown

or

1. Close the program
2. Remove your ESC

Downloading Software Updates

Please visit http://www.teamnovak.com/products/novalink/ regularly for software updates. If you have registered your NovaLink, we will notify you by e-mail when updates are available.

ESC FIRMWARE UPGRADE

It is important to keep your ESC firmware up to date. Visit www.teamnovak.com to check for new ESC firmware upgrades. If your ESC firmware is ready for an upgrade, please follow these instructions on how to upload the new firmware file and update your ESC:

1. Visit www.teamnovak.com to download firmware file
2. Navigate to the NovaLink folder (default is **Start** -> **My Computer** (or **Computer**) -> **C: Drive** -> **Program Files** -> **Novak Electronics** -> **NovaLink**)
3. Place the downloaded firmware file into the NovaLink folder
4. Unplug your ESC from the NovaLink (if attached)

Note: make sure your ESC fan is unplugged

5. Start **NovaLink**
6. Click the **Firmware Updater** icon
7. The NovaLink Firmware Updater will now be launched
8. Wait until application is finished loading
9. When "**Please plug in your speed controller…**" is shown, plug in your ESC

10. Your ESC will now begin to update. When "**ESC is now updated**" is shown, you may exit the application and unplug your ESC

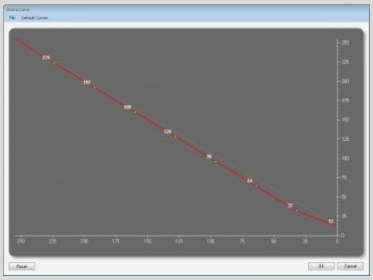
Do **NOT** disconnect your ESC from the NovaLink while the firmware is updating. Your ESC will not be able to function if this occurs. Restart the Firmware Updater and allow your ESC to fully update if your ESC disconnects during the firmware update.
(Refer to "**Troubleshooting**" for details)

NOVALINK PARAMETER DEFINITIONS

Settings Tab

Brake Curve

- The Brake Curve represents the ESC brake's response to the transmitter trigger input.
- The default Brake Curve is Linear. Choosing the Expo/Custom curve provides a less responsive (more forgiving) low-end braking that can be more controllable.
- By selecting the "Modify" button, the exponential curve will be displayed on a separate screen. It can be modified by grabbing any of the points along the curve and dragging them to their desired positions



- There are several default brake curves that can be selected and applied to your speed control. These defaults are located in the "Default Curves" drop down menu located in the upper left area of the Brake Curve screen.

Note: The Brake Frequency cannot be adjusted when a custom curve is selected.

Brake End Point

- Brake End Point is the percentage of the transmitter trigger's brake throw at which the ESC's brakes will reach 100% braking power.
- This setting is measured as a percentage of the full transmitters trigger throw in the brake direction. Ten preset selections are available in the drop down menu.
- Decreasing the Brake End Point setting reduces the distance the transmitter's trigger is required to move for full brakes to be applied by the speed control. In addition, the end points of the Brake Curve will move to this setting, resulting in full braking for the rest of the trigger throw.

Note: At high timing settings, we recommend 100% Brake End Point.

Brake Frequency

- Brake Frequency is the rate at which the information is being sent from the ESC to the motor (how many times per second the motor is being cycled on and off to control its brakes).
- This setting controls how the speed control's brakes respond to the transmitters trigger input in the full brake direction.
- This setting is measured in kHz. Ten preset selections are available in the drop down menu.

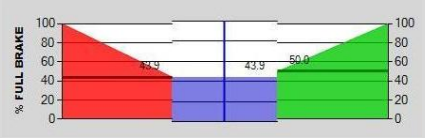
- Increasing the Brake Frequency will require more initial trigger movement to obtain a given amount of brake. This will make the brakes feel smoother. This is also useful for light vehicles as they will slow more controllably under initial braking.

Current Limit

- The Novak-developed Electronic Power Control™ circuitry and software senses the amount of current passing through the speed control. It adjusts the motor output so the current throughput is kept at a preset value.
- There are ten setting selections. The default setting is "1" which is OFF. Setting "2" restricts the least amount of current. Setting "10" restricts the most amount of current.
- Increasing the Current Limit setting reduces the maximum allowable current that can pass through the ESC. This can be useful for reducing the speed control and motor temperatures. It can also be useful for limiting wheel slip on tracks with low bite.

Dead Band

- Dead Band is the trigger space between Minimum Brake and Minimum Drive, with neutral in the middle.
- This setting is measured as a percentage of full throttle. Ten preset selections are available in the drop down menu. Custom values can be entered in increments of 0.1%*
- Raising the Dead Band setting increases the amount of free play, or distance you must move your transmitters trigger before forward drive or braking activates. This setting is useful if your transmitters trigger does not center well or the trigger pot is worn.
- The width of the blue section in the chart below represents the Dead Band.



** You must select "Enter" for the software to recognize the custom value.*

Drag Brake

- Drag Brake is the amount of brake applied while the transmitter is at neutral. It is commonly known as "coast brakes."
- This setting is measured as a percentage of full brakes. Twelve preset selections are available in the drop down menu. Custom values can be entered in increments of 0.1%*
- Increasing the Drag Brake setting applies a higher level of braking during neutral. The amount of Drag Brake applied is a personal preference, and adjusting it can be useful to accommodate different tracks.

Note: The Drag Brake value cannot be set higher than Minimum Brake value unless the Independent Drag Brake setting is "On".
** You must select "Enter" for the software to recognize the custom value.*

Drive Frequency

- This setting controls how the speed controls throttle (or forward drive) responds to the transmitters trigger input. Drive Frequency is the frequency at which the information is being sent from the ESC to the motor (how many times per second the motor is being cycled on and off to control its speed). Changing the Drive Frequency setting can be ua valuable tuning asset for different types of motor and track conditions.
- This setting is measured in kHz. Ten preset selections are available in the drop down menu.
- Increasing the Drive Frequency setting will require more initial trigger movement to obtain a given amount of forward drive. This will make the throttle feel smoother. The setting is also useful for light vehicles as they will accelerate more controllably under initial drive.

ESC Temp Protection

- The speed control has built-in Thermal Overload Circuitry to protect the ESC from damage resulting from excessive temperatures. If the ESC starts to overheat, this sophisticated circuitry will turn off the electronic motor timing advancement. If the ESC's temperature continues to rise, the circuitry drops the ESC's power output to 25% allowing you to safely maneuver your vehicle off of the track.
- There are two settings in the ESC Temperature Protection. Selecting "On" (default and highly recommended) enables the Thermal Overload Circuitry. Selecting "Off", disables the circuitry.

Note: Damage resulting from the ESC overheating is not covered under the products warranty.

DISABLING THIS FEATURE IS NOT RECOMMENDED.

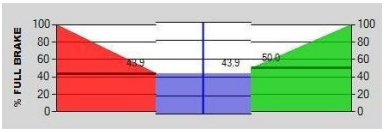
Independent Drag Brakes

- This feature allows the speed control to have the Drag Brake value either linked to the Minimum Brake setting or independently adjusted.
- There are two settings with Independent Drag Brakes. Selecting "Off" (default) will tie the Minimum Brake to the Drag Brake value if Drag Brakes are set to a value higher than Minimum Brake. Selecting "On" will allow the Drag Brake and Minimum Brake settings to be independently adjusted.

Minimum Brake

- Minimum Brake is the amount of brake applied with the first pulse of transmitter throttle information.
- This setting is measured as a percentage of full brakes. Twelve preset selections are available in the drop down menu. Custom values can entered in increments of 0.1%*
- Increasing the Minimum Brake setting starts the braking at a stronger/higher level. This is useful for heavier vehicles, minimizing the amount of trigger throw required before effective braking is applied. Minimum Brake can also be increased in high traction conditions when more braking is needed quicker.

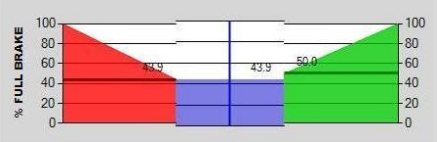
- Minimum Brake is featured in red in the chart below. You can control the Minimum Brake value graphically by grabbing the bold horizontal line in the red section with your cursor and dragging it up or down. This will also adjust the Drag Brake value if the Independent Drag Brake feature is set to "Off".



** You must press "Enter" for the software to recognize the custom value.*

Minimum Drive

- Minimum Drive is the amount of forward drive applied with the first pulse of transmitter throttle information.
- This setting is measured as a percentage of full throttles. There are Ten preset selections in the drop down menu. Custom values can be entered in increments of 0.1%*
- Increasing the Minimum Drive setting starts the forward drive at a stronger/higher level, causing the vehicle to take off more aggressively from neutral. This is useful in compensating heavier vehicles, minimizing the amount of trigger throw required before effective drive is applied. Minimum Drive may need to be reduced to compensate for low traction conditions.
- Minimum Drive is featured in green in the chart below. You can control the Minimum Drive value graphically by grabbing the bold horizontal line in the green section with your cursor and dragging it up or down.



** You must select "Enter" for the software to recognize the custom value.*

Motor Rotation

- This feature allows you to change the rotational direction of the motors output/pinion shaft.
- There are two settings: CCW (counter-clockwise) and CW (clockwise). CCW is standard in most vehicles and is the default setting.
- For optimal performance, you should use the correct rotation setting for the motor instead of reversing the transmitters channel throw.

Note: Advanced timing is not available in clockwise rotation.

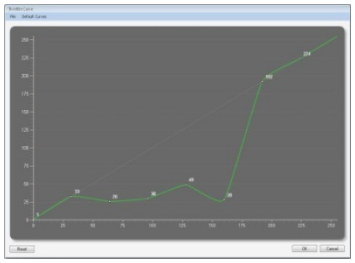
Reverse

- Changing this feature activates or deactivates the speed controls reverse functionality.
- There are two settings. Selecting "Off" (default) will disable the reverse function and the ESC will have only forward and brakes. Selecting "On" will enable reverse in addition to forward and brakes. To use reverse, simply push the trigger in the braking direction a second time.

Throttle Curve

- The Throttle Curve represents the ESC throttle (or forward drive) response to the transmitter trigger input.

- The default Throttle Curve is Linear. Choosing the Expo/Custom curve provides a less responsive (more forgiving) acceleration, and can make the vehicle more drivable or controllable at the bottom end.



- By selecting the "Modify" button, the exponential curve will be displayed on a separate screen. It can be modified by grabbing any of the points along the curve and dragging them to their desired positions.

- There are several default throttle curves that can be selected and applied to your speed control. These defaults are located in the "Default Curves" drop down menu located in the upper left area of the Throttle Curve screen.

Note: The Drive Frequency cannot be adjusted when a custom curve is selected.

Voltage Cut-Off

- The Voltage Cut-Off setting enables or disables the speed controls Smart-Stop Circuitry. It also allows adjustment of the voltage cut-off point based on the type of batteries used in the vehicles main battery pack. The Novak Smart-Stop Circuitry monitors battery voltage and folds back power output to the motor when a critical voltage threshold is reached for either Li-Po or Li-Fe cells. Cutting off the power at the critical threshold protects these batteries from being over-discharged and damaged.

- This setting is measured in volts and is adjustable in increments of 0.1 volts by selecting the up or down arrows.

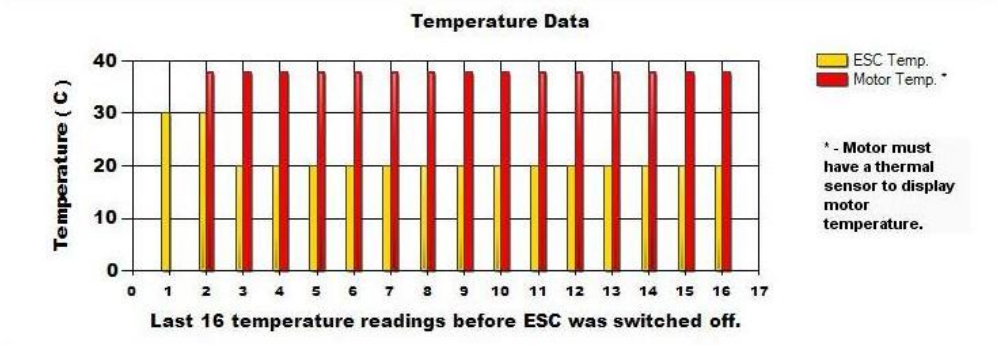
- Recommended voltage cut-off values:
  - LiPo Packs: 3.2 volts (1S); 6.3 volts (2S)
  - LiFe Packs: 2.4 volts (1S); 4.8 volts (2S)
  - NiMH / NiCd Packs: Disable feature by selecting "Off"

WARNING: ALWAYS USE VOLTAGE CUT-OFF WITH LiPo AND LiFe BATTERY PACKS. IF CUT-OFF VOLTATGE IS SET TOO LOW OR TURNED OFF AND BATTERIES ARE ALLOWED TO DISCHARGE BELOW THE CELLS CRITICAL VOLTAGE, BATTERIES WILL BE DAMAGED.

Note: This feature is not accessible when the speed control is disconnected.

Advanced Tab

NovaLink offers a visual temperature data graph that records the motor and ESC temperatures. The temperatures are recorded 16 times over a span of 3 minutes and then rerecorded again every 3 minutes thereafter. The graph displays the last 3 minutes worth of temperature readings before your ESC was switched off.



Boost Delay

- The Boost Delay is the duration of time after the transmitter's trigger reaches the full throttle position, before the ESC's Boost Mode is activated.
- A value from 100 to 500ms can be entered in increments of 1 millisecond.
- The Boost Mode must be activated before a value can be entered.

Boost Mode

- The Boost Mode, when activated, applies the maximum possible electronic motor timing advancement at full throttle. This provides even higher top speeds.
- The Boost Mode can be activated at any Timing Level.
- Special attention to gearing must be paid when experimenting with timing changes. Start with a very small pinion size and check ESC and motor temperature multiple times throughout your initial runs.

WARNING: USE EXTREME CAUTION WHEN ACTIVATING BOOST MODE AS THIS MAY RESULT IN EXCESSIVE HEATING OF THE ESC AND/OR MOTOR AND CAUSE EXTREMELY HIGH SPEEDS THAT CAN RESULT IN AN UNCONTROLLABLE VEHICLE. CHECK TEMPERATURES OFTEN.

RPM Select

Timing Set Point

- Timing Set Point is the RPM trip point at which Dynamic Timing Advance starts advancing the motor timing.
- Values from 1,150 to 20,000 RPM can be entered in increments of 1 RPM.
- The Timing Set Point value must be less than the Maximum Timing RPM value.
- The value shown initially in the field is the ESC's current value if the ESC is connected to the NovaLink

Maximum Timing RPM

- Maximum Timing RPM is the motor RPM at which the full amount of Dynamic Timing Advancement starts application. This full amount of timing will be applied at all RPMs above this point. Dynamic Timing Advance is added in incremental steps between the Timing Set Point RPM and the Maximum Timing RPM.
- Values from 2,000 to 35,000 RPM can be entered in increments of 1 RPM.
- In order to attain maximum timing advancement, this setting must be below the maximum RPM.
- The Maximum Timing RPM value should be at least 2,000 (1S) or 4,000 (2S) RPM higher than the Timing Set Point.
- The value shown initially in the field is the ESC's current value if the ESC is connected to the NovaLink

Timing Level

- Timing Level is the maximum degree of Dynamic Timing Advance™ applied to the motor.
- Increasing the setting will increase the maximum amount of electronic motor timing that is applied to the motor throughout the throttle band. Using a higher timing setting will result in more overall motor RPM, and more current and heating.
- Special attention to gearing must be applied when experimenting with timing changes. Start with a VERY small pinion size and check ESC and motor temperatures at multiple times throughout initial runs.
- Values from 0° (OFF) to 55° can be entered in increments of 1 degree.

WARNING: USE EXTREME CAUTION WHEN APPLYING DYNAMIC TIMING ADVANCE AS THIS MAY RESULT IN EXCESSIVE HEATING OF THE ESC AND/OR MOTOR AND CAUSE EXTREMELY HIGH SPEEDS THAT CAN RESULT IN AN UNCONTROLLABLE VEHICLE. DAMAGE IS NOT COVERED UNDER WARRANTY. CHECK TEMPERATURE LEVELS AND NEVER START AT HIGH TIMING LEVELS.

Timing RPM Defaults

- There are several default settings available, based on motor turn and number of cells in the main battery pack. Selecting one of these defaults will enter the recommended starting RPM for both the Timing Set Point and the Maximum Timing Point. These values can be fine-tuned by entering custom RPM values in the text boxes.
- Selecting one of these default settings is optional.

COMMENTS & SUGGESTIONS

Team Novak welcomes all suggestions and comments! Feel free to send us any suggestions or bugs you may have encountered through our **Suggestions** form.

1. Start **NovaLink**
2. Click the **Suggestions Box** icon
3. Enter any suggestions, comments, or bugs into the text field
4. Click **Send**

TROUBLESHOOTING

ESC Disconnected During Firmware Update

1. Close the NovaLink Firmware Updater
2. Plug your ESC into the NovaLink Adaptor
3. Start the NovaLink Firmware Updater from the NovaLink program
4. Make sure your ESC fully updates

NovaLink Not Displaying Properly on Windows 7

1. -> **Control Panel** -> **Display**
2. Change the setting to "**Smaller-100%**"
3. Click **Apply**

NovaLink Firmware Updater Displays Error Message

If the Firmware Updater displays a popup saying "**File does not exist. Make sure image is in the C:\Program Files\Novak Electronics\NovaLink folder**," you need to download and save the firmware file into the NovaLink folder. Refer to **"ESC Firmware Upgrade"** for instructions on how to save the firmware file.

PRODUCT WARRANTY

The NovaLink PC Interface software is guaranteed to be free from defects in materials or workmanship for a period of 120 days from the original date of purchase (verified by dated, itemized sales receipt). Warranty does not cover incorrect installation, components worn by use, damage to the circuit board or from excessive force or tampering with the internal electronics, exposing electronics to water, moisture, or any other foreign material, allowing exposed wiring to short-circuit, or any damage caused by a crash, flood, or other natural disaster.

Because Novak Electronics, Inc. has no control over the connection and use of the NovaLink Interface and software or any other related electronics, no liability may be assumed, nor will be accepted, for any damage resulting from the use of this product. Every Novak NovaLink PC Interface is thoroughly tested before leaving our facility and is, therefore, considered operational.

By the act of connecting/operating the NovaLink PC Interface, user accepts all resulting liability. In no case shall our liability exceed the product's original cost. We reserve the right to modify warranty provisions without notice.

This product is not intended for use by children under 14 years of age without the strict supervision of an adult. Use of this product in an uncontrolled manner may result in physical damage or injuries—take extra care when operating any remote control vehicle.

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