Orion Reflash System for Navistar

User's Guide

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WARNING!

This software allows the End User to make unrestricted modifications to the vehicle's Engine Control Module and/or Injection Driver Module (Engine Controls Systems). Given the age and mileage of the majority of these vehicles, it simply is not possible for our engineers to anticipate the condition or reliability of the vehicle being programmed, nor is it possible to anticipate the selections made by the End User.

It is the responsibility of the End User to understand the risks the effects of any changes made to the Engine Control Systems. It is possible that the End User may make selections, including changes to parameters that contain specific limiters, that would push the vehicle past the point of failure to engine or transmission components. Also, incompatible changes to certain vehicle parameters may render the vehicle non-functional, requiring the Engine Control Module to be recovered/restored.

USE AT YOUR OWN RISK!

By using this software, you, the End User, agree not to hold Power Hungry Performance responsible for any damage caused to the vehicle, including the engine, transmission, driveline, electronic controls or any other part of the vehicle as a result of using this software. You also agree not to hold Power Hungry Performance responsible any damage caused by the vehicle as a result of any catastrophic failure of the engine, transmission, driveline, electronic controls or any other part of the vehicle as a result of using this software.

If you have any concern whatsoever about your ability to safely tune or configure your vehicle, please return the complete software/hardware package to the place of purchase for a full refund.

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Introduction

Congratulations on your purchase of the Orion Reflash System for Navistar®! You are about to take the reins of your vehicle's Engine Control Systems and unleash the performance that these vehicles are capable of.

Navistar® has a long history of creating reliable, quality commercial vehicles and has been a leader in the medium duty market for decades. With applications including School Buses, Tow Trucks, Box Trucks, and many others, these vehicles are plentiful and relatively inexpensive to acquire.

However, the downside to many fleet vehicles is that they are often tuned very conservatively. While this helped to reduce overall maintenance costs of the fleet, it leaves many of these vehicles struggling to get out of their own way. A large percentage of Navistar® equipped vehicles were optioned with a 175 HP rating, with only a small handful being rated at 195 HP or higher. Because of this, many owners are looking to newer, more powerful (and more expensive) vehicles, when the vehicles they already have would work fine if the power output could just be increased a little bit.

This is where we come in!

Power Hungry Performance has a long history of tuning the Ford Power Stroke Diesel. With nearly 25 years of experience tuning the Ford Power Stroke Diesel, we are the market leader in 7.3L and 6.0L tuning. And, because of the many similarities in Engine Control Systems, Power Hungry Performance has provided tuning for the 1994 to 1997 Navistar® platform since 2000 with great success. However, for a long time there has been a need to allow for updates and modifications to the 1998 and later "Diamond Logic" control systems. The complex nature of these systems, coupled with a highly proprietary nature of the communications structure, has left this market basically untouched for over 20 years.

But now, that has changed!

The Orion Reflash System for Navistar® has been developed to help improve the performance, drivability, and economy of the 1998 - 2006 model year vehicles, including the 3000 Series (School Busses) and the 4000/5000 Series (Single Cab and Crew Cab Trucks). With power increases approaching as much as 100 HP over a stock configuration[†], you will be able to realize the performance, acceleration, fuel economy you need.

Building off our decades of tuning experience and familiarity with the 7.3L platform, our engineers have developed tuning for the T444e-fitted vehicles that rivals the performance of its Ford F-Series cousin. But it doesn't end there. Due to the similarities in engine management and HEUI Injection, we are also able to provide tuning for the DT466, DT530, and DT570 applications as well, achieving similar gains in performance and economy.

So plug in, retune, and achieve the performance that these vehicles are capable of.

Power Hungry Performance - The power is there… Now unleash it!

[†]Overall performance gains will vary based on the current Engine Family Rating as well as the configuration of the drivetrain components, including fuel injector volume and turbo sizing. Certain applications may not realize the same gains as others, and should not be considered to be a limitation of the tuning.

Chapter 1

What's in the Box?

The Orion Reflash System hardware comes configured for the later 9 Pin Deutsch OBD connector. Depending on which kit you have purchased, you may or may not also have the 6 Pin to 9 Pin OBD adapter. Some Late 1997 or Early 1998 models will require this adapter. You should also have a USB A to USB B cable to connect the device your laptop.

Section 1 - The Setup

Installing the Orion Reflash Software - Software installation is a quick and easy process. The software can be downloaded from:

http://orionsetup.gopowerhungry.com

Once downloaded, run the installation.

Follow the on-screen prompts to complete the installation. For convenience, a shortcut to the Orion Reflash System for Navistar® Software will be placed on your desktop.

Installing the Orion Reflash USB Driver - Go to the [Start] menu, scroll down to the Power Hungry Performance program group, expand the Orion program group, and then expand the USB Drivers group. Please select the appropriate processor (32 Bit or 64 Bit) and the appropriate Operating System (Windows XP, Vista, 7, 8, 8.1, or 10) to install the drivers for. If you have a newer computer, you will most likely use the 64 Bit - Windows 10 driver installer.

If you are unsure about this step, please contact Power Hungry Performance for assistance.

Section 2 - The Hardware

Connecting the Orion Reflash Hardware to the Computer - The Orion Reflash hardware is proudly manufactured in the U.S. by Power Hungry Performance. This hardware interface allows the Orion software to communicate with the vehicle's Engine and Injection modules. This hardware is specifically designed to work with the Orion software and will not function with any other diagnostic tools or software.

The Orion hardware comes with a standard USB Type B port, so connecting it to your PC or Laptop is as simple as plugging in the USB cable. If the USB drivers have already been installed, the computer will automatically detect the device and complete the driver pairing.

If you should lose or damage the included USB cable, you can purchase one from any electronics store. Just ask for a standard USB Type A to USB Type B cable.

Connecting the Orion Reflash Hardware to the Vehicle - The Orion Reflash hardware comes with a late model, 9 Pin Deutsch style plug to connect to the vehicle's Diagnostic connector. To connect the hardware to the vehicle, simply insert the round connector into the vehicle's Diagnostic port and then rotate the locking ring until the plug is fully seated.

The location of the diagnostic connector will vary from vehicle to vehicle, but will always within reach from the driver's seat.

On most 3000 Series vehicles (school buses), the OBD connector will be located under the dash and to the right of the steering column. If the vehicle has a folding door, it may be located near the actuator handle.

On most 4000/5000 Series vehicles (trucks), the OBD connector will be located under the dash in the driver's side kick panel.

NOTE: Depending on the model year, the vehicle's Diagnostic connector may be of the early 6 Pin style or the late 9 Pin style. Power Hungry Performance has both cable versions available, so make sure that you order the correct hardware version for your vehicle.

For dealers programming multiple vehicles with a single device, we recommend ordering the 9 Pin version of the hardware and purchasing a 6 Pin to 9 Pin adapter. This will help to provide coverage for both types with a single hardware solution. These 6 Pin to 9 Pin adapters are available from Power Hungry for an additional cost, or they can be purchased online through a number of different outlets including Amazon.

Chapter 2

Using the Orion Reflash Software and Hardware to Reflash the ECM.

Once you have the Orion Reflash Software and USB Drivers installed, the next steps would be to connect to the vehicle, retrieve the vehicle information, and then reflash the ECM with a modified calibration to access the custom power levels.

Because of the way the modified calibrations must be matched to the vehicle, we will need to process your request in 2 steps: The first step is to retrieve the vehicle in formation and provide that to Power Hungry Performance. The second step will be to program the vehicle with the calibration provided to you by Power Hungry Performance. In the sections below, we'll follow this process one step at a time so that you can be up and running as quickly as possible.

It is important to understand that while we normally expect to process your request and have a modified calibration completed and available to you within a couple hours, it may take up to 48 hours to receive a modified calibration for your vehicle. This will depend on when your vehicle information was received. If the information was received outside of our normal business hours (Mon thru Fri, 9:00 AM to 5 PM ET, excluding holidays), your modified calibration will be processed as early as possible on the next business day.

NOTE: Please do not call the After Hours Emergency Line requesting a status update on your order. This is not considered an emergency and the individual on call will not have any information regarding your order status. If you wish to check on the status of your calibrations, please call during normal business hours.

With that out of the way, let's get started!

Section 1 - Connecting the Orion Reflash Hardware

> **Before You Connect -** In order to retrieve the vehicle information, you'll first need to connect the hardware to the vehicle and the laptop. While there really isn't any incorrect way to connect the hardware between the vehicle and the laptop, the preferred sequence would be as follows:
>
> 1. Make sure the key is currently in the [Off] position.
> 2. Connect the Orion Reflash hardware to the vehicle Diagnostic Port.
> 3. Connect the USB Cable to the Orion Reflash hardware USB Port.
> 4. Connect the USB Cable to the USB Port on the laptop.
>
> **3000 Series OBD Connector Location -** On most 3000 Series vehicles (school buses), the OBD connector will be located under the dash and to the right of the steering column.
>
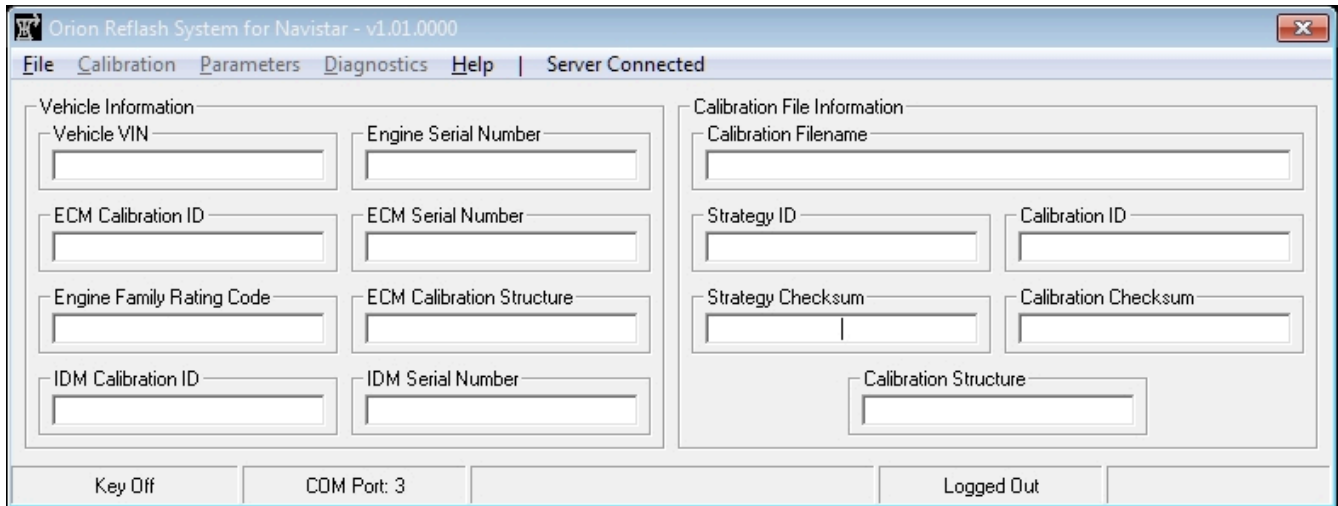> **4000/5000 Series OBD Connector Location -** On most 4000/5000 Series vehicles (trucks), the OBD connector will be located under the dash in the driver's side kick panel.
>
> Once the hardware is connected, you can then proceed with Orion Reflash application.

Section 2 - Running the Orion Reflash Software

Opening the Orion Reflash Application - Double-Click the Orion Reflash System shortcut to start the application. Once the application is open, you should see the following window:

The status bar at the bottom of the window should indicate that the Orion hardware is connected (in this case to "COM Port: 3") and also indicate the key position. If the status bar should display "No Cable Detected" and "COM Port: None", then the software is not detecting the Orion Hardware properly. Please check the Troubleshooting section to correct this issue.

At this point, the software is ready to communicate with the vehicle. To proceed, turn the key to the [On] position, but DO NOT START the vehicle. The Orion software will begin requesting information from the vehicle. Part of the way through this identification process, you will be prompted to cycle the ignition key. Please follow the prompts on the screen to allow the software to complete the identification of the vehicle.

First Time Connecting to a Vehicle - The first time you connect to a vehicle, the Orion software will read and store an original, unmodified copy of the vehicle's Optional Parameters for safekeeping. This is extremely important as the Parameters will be erased whenever the ECM is reflashed and if they aren't stored properly, then you will not be able to properly recover the ECM if you should experience an error during the reprogramming operation.

Storing the Vehicle Information Files - Once the Parameters are read, you will be asked for a location in which to save the file. We recommend that you use the following default folder:

C:\Power Hungry\Orion Reflash System for Navistar\Parameters\

This is so that we can easily locate the Parameter file should it be necessary. It is also recommended to you do not change the generated default filename as this includes both the Module Serial Number as well as the Time Stamp of the file.

NOTE: The software also reads the Parameters before each programming operation. This is to ensure that the latest values (including any modifications) are restored after the operation.

Along with the Optional Parameters, the software will store a text file containing a list of specific information that we will need in order to compile your calibration.

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Section 3 - Submitting Your Vehicle Information Files

E-Mailing the Vehicle Information - Once the initial identification process has completed and the required Parameter and Vehicle Information files have been stored to your computer, you will need to e-mail these files to **orion@gopowerhungry.com** so that we be able to process the modified calibration for your vehicle. The required files will look like this:
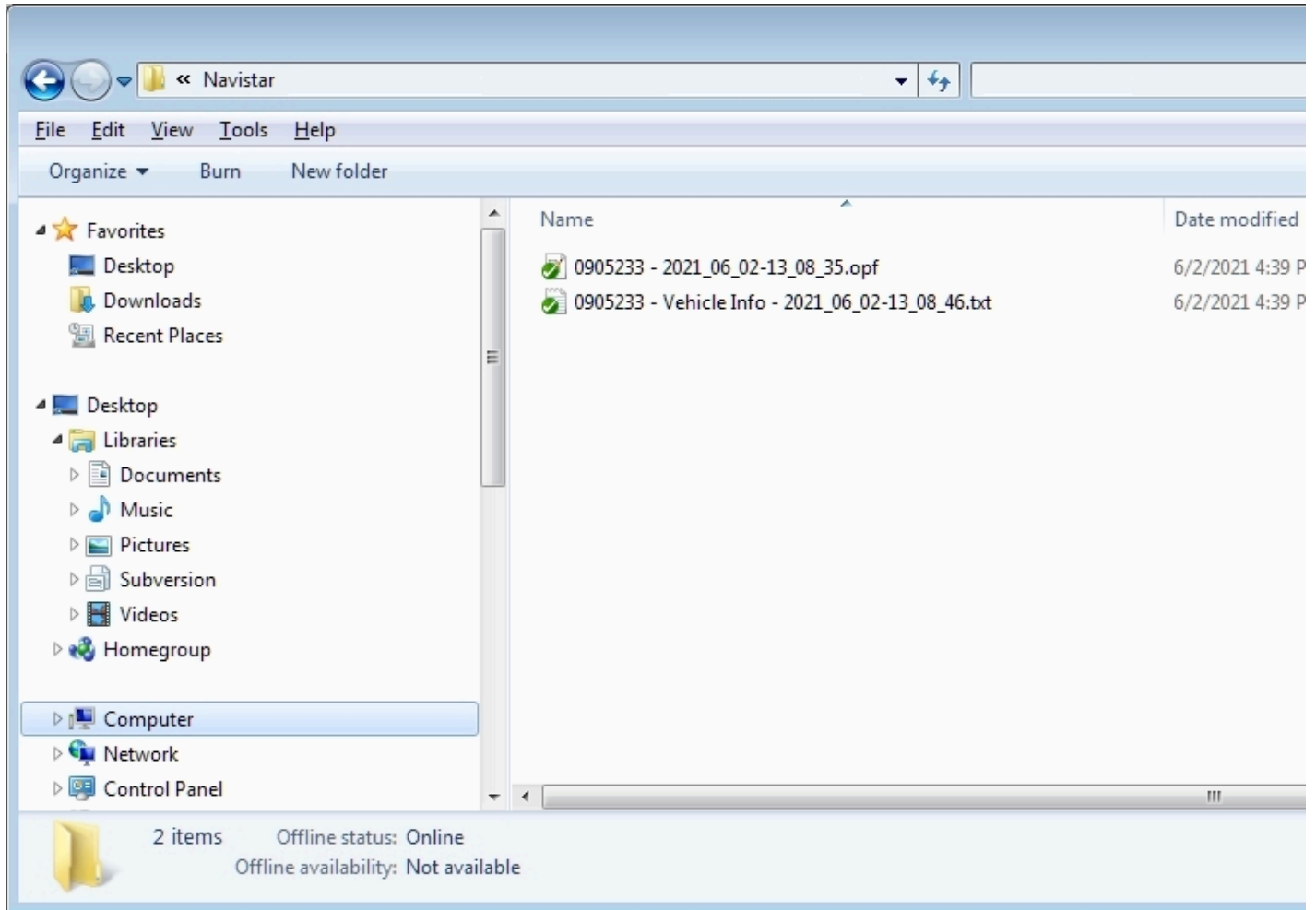
Once we have received the files, we normally expect to process your request and have a modified calibration available to you within a couple hours. However, please be aware that it may take up to 48 hours for you to receive a modified calibration for your vehicle. This will depend on when your vehicle information was received. If the information was received outside of our normal business hours (Mon thru Fri, 9:00 AM to 5 PM ET, excluding holidays), your modified calibration will be processed as early as possible on the next business day.

Section 4 - Using the Modified Calibration File

Saving the Modified Calibration File - After you have received the e-mail containing your modified calibration file, you will need to save the calibration file to your computer. In order to help keep things better organized, we recommend storing the calibration on your in the same folder that your Parameter file was located. This will usually be located at:

C:\Power Hungry\Orion Reflash System for Navistar\Parameters\

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It's not specifically required to use this folder, so long as you know where the files have been stored so that they can be easily accessed in the future. It can be very frustrating when you need to locate a file and you can't remember where it was stored. Keeping the Calibration and the Parameter files in the same folder helps to keep things organized and accessible.

Now that the file has been saved, you can reconnect the laptop to the vehicle and reinitialize the communications by turning the key on. Please follow the prompt regarding cycling the key until the main display shows all the vehicle information. It will look similar to this:

NOTE: Once the information has been read, the key must remain in the [On] position unless you are either instructed to cycle the key or you have fully completed a programming session.

In this example, we can see the VIN, Engine Serial Number, Calibration, ECM Serial Number, and in this case where the vehicle is a 2006, the IDM Calibration and Serial Number. For 1998 to 2004, the IDM information will be blank as these modules do not exist.

Opening the Modified Calibration File - Select the [File] menu, and then select [Open Calibration]. This will display the "Open Calibration File" dialog. Browse to the folder in which the modified calibration file was stored during the previous steps.

Select the modified calibration file and then click the [Open] button. The file will open and the calibration information will then populate the remaining information panels in the window.

You'll notice in the screenshot that the Strategy Checksum shows "Matched" while the Calibration Checksum shows to be "Modified". This helps to indicate which sections of the memory need to be reflashed (programmed) by the Orion software.

You'll also notice that both the Strategy Checksum and Calibration Checksum are highlighted green. This means that the checksum in the file matches the checksum generated by the software. This helps to ensure that the calibration file was not corrupted during transfer.

Understanding the Checksum - Just to help understand what a checksum is, it is a value generated by an algorithm that will mathematically calculate all of the data in order to ensure that it is valid. This value is stored in the file and then used as a reference by both the Orion software as well as the vehicle's ECM to ensure that the data is not corrupted in any way.

When the checksums of either the Strategy or Calibration show "Modified", the Orion software will automatically target that specific section for programming. If either section should show "Matched", then that section is identical and will be skipped. This is to help speed up the programming process by not reflashing a section that has identical data. While it won't hurt to reflash a "Matched" section, it could greatly extend the programming time for no reason.

Now that we have the modified calibration loaded, let's write it to the ECM.

Section 5 - Writing the Calibration to the ECM

Vehicle Preparation - With the modified calibration loaded, you are now ready to reflash the ECM. Before doing so, please make sure of the following:

1. The battery on the laptop is either fully charged or plugged in. We don't want the laptop to shut down during the programming process. While the ECM can be recovered in the event of a failure, it's relatively inconvenient.
2. Make sure that the ambient temperate if above 40º F (4.5º C). The Flash Memory doesn't program well in cold conditions. If the ambient temperature is too low, make sure to run the vehicle for at least 15 minutes to allow the ECM to reach an acceptable temperature.
3. Do not walk away from the vehicle during programming. At certain points in the process you will be required to cycle the key in order for the programming to continue.

Disabling External Modules (ABS, TCM) - In order for the software to correctly program the ECM, it must have exclusive access to the vehicle communications bus. This means that any other devices that communicate on the same data bus must be disabled.

In most cases, this will include the ABS (Anti-Lock Brake System) Module and on Allison Transmission equipped vehicles, this can also include the TCM (Transmission Control Module). These modules are disabled by removing the appropriate fuses for those systems to power them down.

We understand that this may be a little inconvenient, but it is absolutely necessary. Due to the rudimentary nature of the communications protocol on these vehicles, this is the only way to ensure accurate and efficient communications between the ECM and the Laptop during programming.

To help determine which modules are communicating and will need to be disabled:

1. Connect the Orion hardware and laptop to the vehicle.
2. Open the Orion software and allow the software to ID the vehicle.
3. Go to the [Diagnostics] menu and select [List Active Nodes].

The Active Nodes dialog will open and display any currently active modules that are communicating on the vehicle's communications bus.
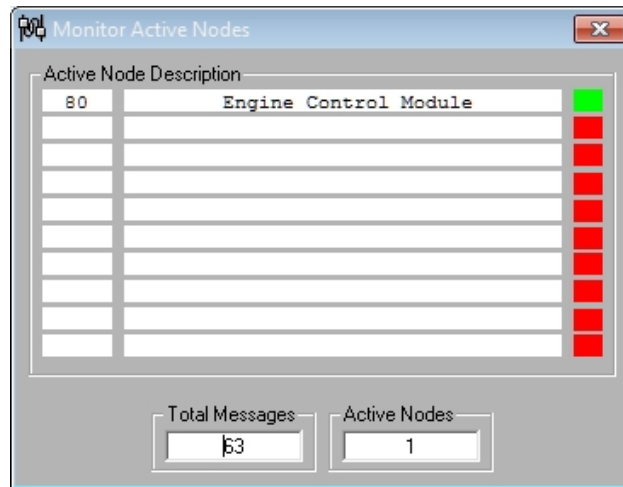
In this example, only the Engine Control Module is displayed as active and is green.

On most vehicles, an ABS Module will also be displayed as active. In order to disable this, you will need to access the vehicle's fuse box and remove the fuse to the ABS module. Locations for this fuse box will vary from vehicle to vehicle. For example, on most 3000 series vehicles, the fuse box is often located in the chassis electrical access panel below the driver's side window. On 4000/5000 series vehicles, the fuse box will often be located under the hood just above the driver's side fender well.

On some Allison Transmission equipped vehicles, there will also be a TCM that is displayed as an active module and will need to be disabled. Again, the fuse for this will vary from vehicle to vehicle. On front engine applications, this may be in the electrical access panel or in the under-hood fuse box. On rear engine application (pusher configurations), this is often located in the rear drivetrain fuse panel located near the engine.

Keep in mind that vehicle configurations vary greatly depending on the body builder and we always recommend consulting your Owner's manual to locate the correct fuses. However, we are working to provide a convenient reference to fuse locations, which is located here:

http://forum.gopowerhungry.com/forum/showthread.php?t=9931

When disconnecting fuses to disable a module, it may help to have a second person watch the laptop to verify that the correct fuse(s) have been removed. When the correct fuse is located for a particular module, that node in the software will turn from green to red and then will disappear from the list after a few seconds. Continue this process until the Engine Control Module is the only remaining active module in the list.

Once all additional modules have been disabled, you may exit the Active Nodes window.

Starting the Programming Process - To begin, select the [Calibration] menu and then select [Write Calibration to Module]. This will begin the process of reflashing the ECM.
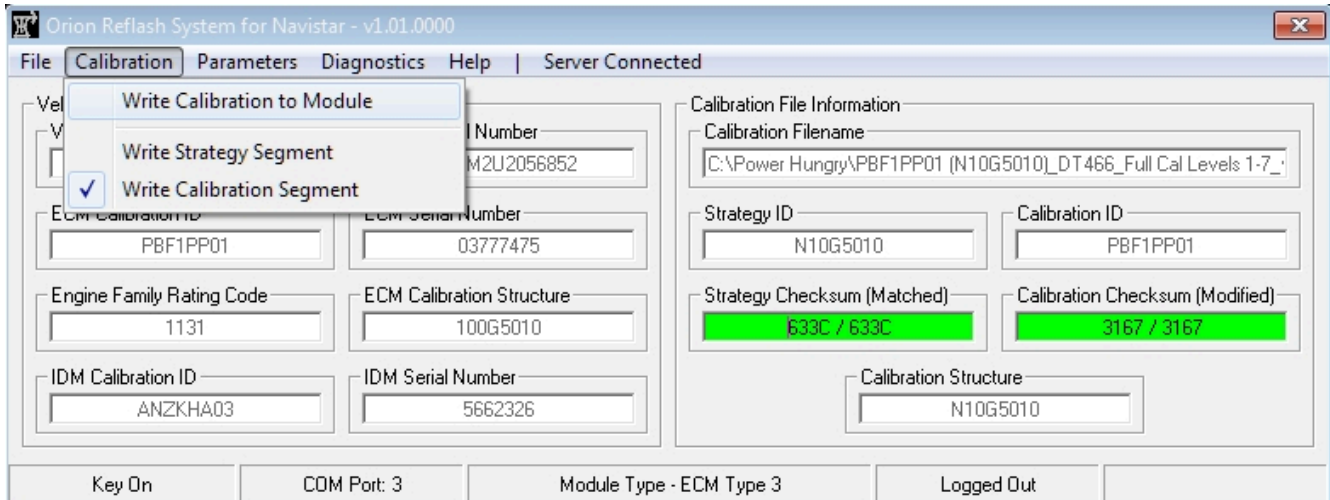
The programming process will begin by reading the current Parameters. This is to ensure that any existing modifications to the parameters are restored after the reflash process has completed.
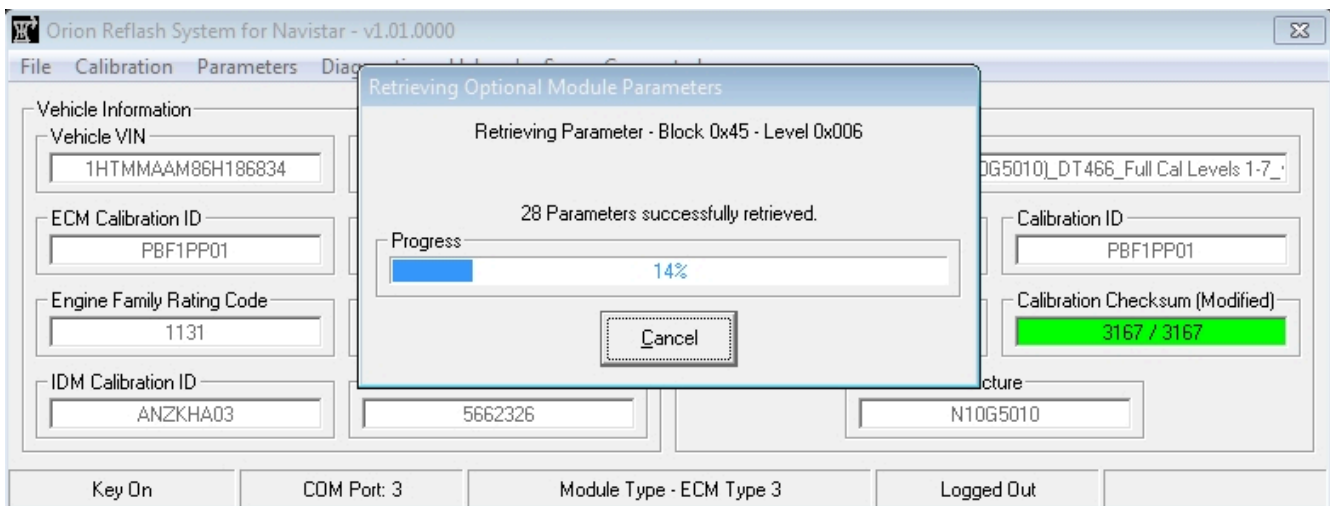
After the Parameters have been read and stored, the Orion software will erase the Flash Memory in the ECM and begin writing the calibration.
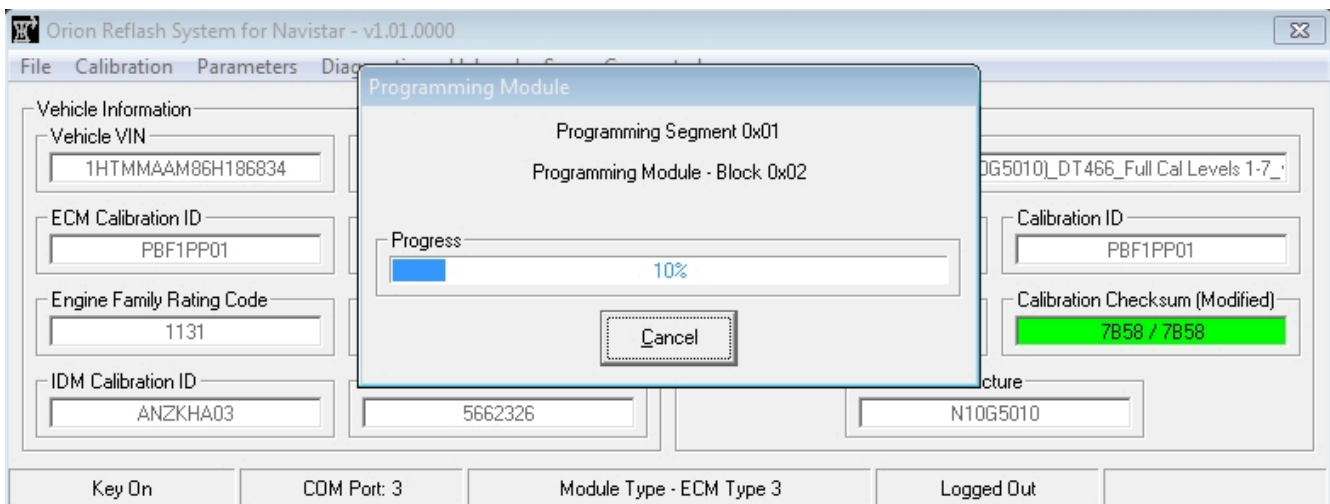
NOTE: It is important that this process continue uninterrupted until it has fully completed or the ECM will be left in a non-operational state. This will result in requiring a recovery process to restore the ECM to an operational state.

Programming Complete - Upon the completion of programming the ECM's Flash Memory, the Orion software will prompt you to cycle the key so that the ECM can reset and restart.

With the ECM reset and the key returned to the [On] position, the Orion software will restore the Parameters which were retrieved at the beginning of the programming operation. Once completed, you will be prompted to cycle the key again in order to finalize the settings and then once more to reload the vehicle identification information.

At this point the programming is complete. You may now perform other operations such as updating the desired Power Level, or modifying the Optional Parameters.

If you are finished, you may turn the key off, close the Orion application, and disconnect the hardware.

Chapter 3

Changing the Power Level and Optional Parameters.

Once you have programmed the ECM with the modified calibration, you will be able to select from 7 different power levels. These levels range from 175 HP to 300 HP and can be selected and changed in just a matter of seconds. The ability to change the power level quickly is extremely helpful when you are changing the load of the vehicle or changing your driving environment.

You will also have the ability to go into the Optional Parameters utility and change various settings related to how the ECM interfaces with the vehicle. Such options as Speed Limit, Cruise Control, Tire Size, Gear Ratio, Automatic Shutdown, and many others can be modified with this utility.

Note: Because of the sometimes unpredictable nature of Engine Control Systems and their related communications, it is strongly recommended that any changes to the ECM be done in a location were it would not be a tremendous inconvenience should a communications failure occur. It is always best to perform any programming or option adjustments either at home or other facility that is familiar and has good internet access. Rest stops, parking lots, or other remote locations are not recommended and modifications should be avoided at such locations.

Section 1 - Changing the Power Level

Vehicle Preparation - Under most circumstances when running lightly loaded, the higher horsepower levels tend to provide better drivability and fuel economy. As your load increases or the terrain becomes more aggressive, it is recommended to turn down the power level in order to keep both EGTs (Exhaust Gas Temperatures) as well as coolant temperatures within a manageable range.

Excessive EGTs during a long pull up a grade can cause damage to the exhaust valves as well as the turbo. Reducing the power level can help provide a safer operational range while still providing an increase in pulling power.

Many of these vehicle applications do not provide any sort of a monitor or gauge for exhaust gas temperatures. Therefore it is strongly recommended that you install a Pyrometer to monitor EGTs if you are planning to utilize the 250 HP or higher power levels. This allows for the ability to self govern the engine output should the EGTs start to climb above a safe range.

During heavy operation, we recommend keeping the EGTs under 1150º F for sustained periods of time, such as when pulling on long grades. This will help ensure the reliability of the turbo and exhaust valves. For light operation, it is possible to see temperatures as high as 1250º F for very brief periods (10 to 15 seconds) without any concern for damage to the turbo. However, we highly recommend keeping these periods as short as possible to prevent any possible damage.

Aside from high exhaust temperatures, another specific are of concern will be the functionality of the cooling system. As these vehicles age (many with well over 200,000 miles on them), the cooling systems (engine water jackets, radiator, water pump, coolant) can suffer degradation in the ability to discharge heat. It is highly recommended that you evaluate the

capability of the cooling system. If necessary, you should completely flush the engine and radiator to make sure that any sediment, rust, scale, or corrosion is eliminated. This may included removing the radiator and having it cleaned out and repainted by a competent radiator shop. This will greatly improve the capacity of the cooling system to discharge heat and allow the engine to run safely at higher horsepower levels.

By continuing forward and modifying the power level, you acknowledge the limitations described above and agree not to hold Power Hungry Performance, its employees, or it's distributors responsible for any damage arising from the use of power levels that are rated higher than the factory power level.

Connecting to the Vehicle - You will begin by connecting the Orion Reflash hardware to both the vehicle and the laptop. Once connected, open the Orion Reflash software and turn the key to the [On] position. Be sure to cycle the key when prompted. The software will connect to the vehicle and then display the current vehicle information.

Changing the Power Level - To change the power level, select the [Parameters] menu, and then select [Change Power Level]. This will open up the "Select Power Level" dialog.
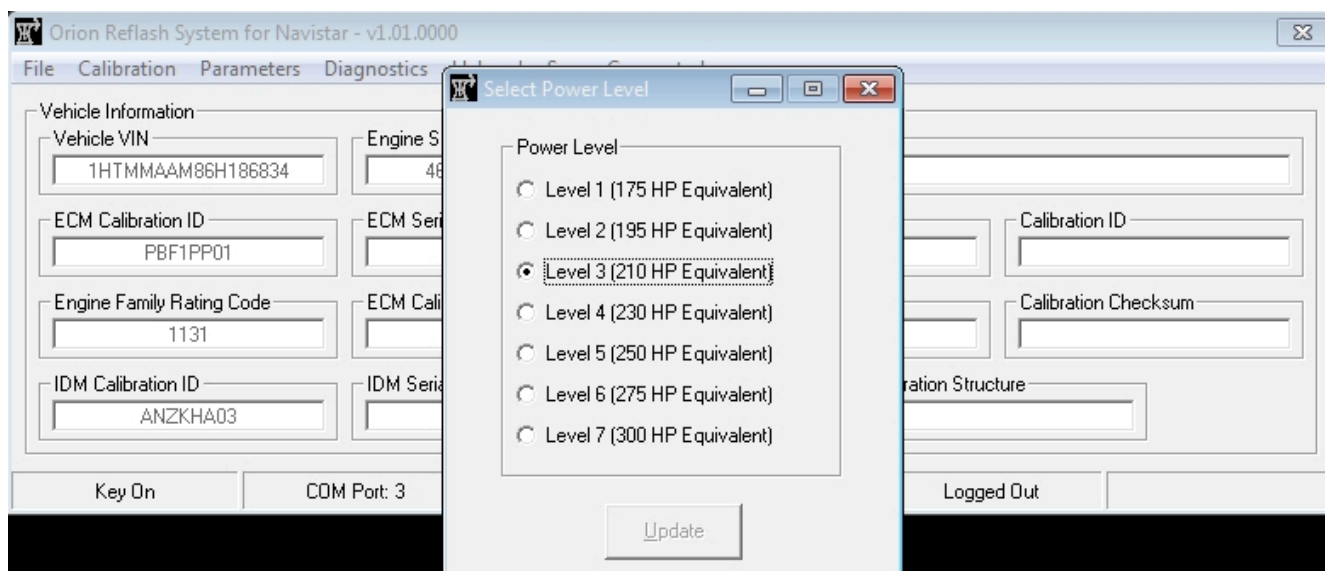
Click on the desired power level and then click on [Update]. The software will write this setting to the ECM and then you will be prompted to cycle the key so that the ECM can reset and restart with the new setting.

Once the software has returned to the main information window, you can turn the key to the [Off] position and disconnect the Orion Reflash hardware.

Section 2 - Changing the Optional Parameters

Vehicle Preparation - Changing certain vehicle parameters can allow the vehicle to operate outside of the design capabilities of the vehicle. This includes modifications to the Vehicle Speed Limit, Engine Rev Limit, and other parameters. It is the responsibility of the customer to operate their vehicle in a manner that is safe, to not make any modifications to the vehicle parameters that would allow it to operate in an unsafe manner, and to ensure that vehicle is mechanically capable of sustaining the desired modifications.

By continuing forward and modifying the vehicle parameters, you acknowledge the warnings described above and agree not to hold Power Hungry Performance, its employees, or its distributors responsible for any damage or incidents, up to and including an accident or loss of life, arising from the modification of the vehicle parameters.

Connecting to the Vehicle - You will begin by connecting the Orion Reflash hardware to both the vehicle and the laptop. Once connected, open the Orion Reflash software and turn the key to the [On] position. Be sure to cycle the key when prompted. The software will connect to the vehicle and then display the current vehicle information.

Once communications is established with the vehicle, select the [Parameters] menu, and then select the [View/Modify Parameters] option to open the Parameter Update Utility window.

Reading the Optional Parameters - The modification of the Optional Parameters requires that the original parameters be read directly from the PCM to ensure that only the current parameters being utilized by the PCM will be modified. This helps to avoid any parameter conflicts when updating.

To read the current parameters, select the [Parameters] menu option and then select the [Read Parameters] option. The software will then read out the current Optional Parameters and populate the values in the Parameter Utility. Once the parameters have been read, the dialog will be populated and you can then begin making any desired changes.
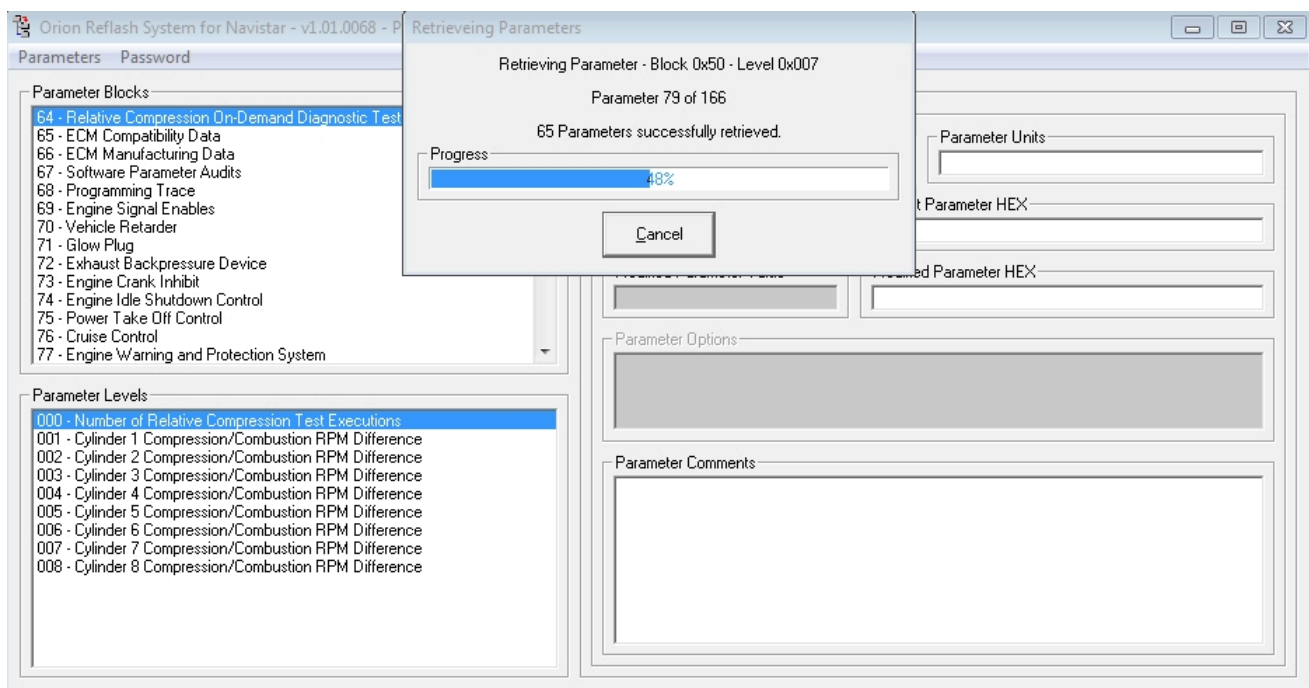
Saving the Optional Parameters - After reading the Optional Parameters, you have the option of saving them to a Parameter File for future reference.

To save the current parameters, select the [Parameters] menu option and then select [Save Parameter File]. In the Save Parameters dialog, enter the file name and path to save to.

Loading the Optional Parameters - You have the option of reloading a set of parameters that have been previously saved into a Parameter File.

To load a Parameter File, first you will need to read the current parameters from the ECM so the software will have a current reference base. Next, select the [Parameters] menu option and then select [Load Parameter File].

Once the Parameter File is loaded, you can edit them further or simply write them into to the ECM as they were stored.

Changing the Optional Parameters - The Optional Parameters are used to help customize an ECM to a particular application. This includes installed hardware and other preferences such as vehicle speed limiter, tire size, gear ratio, and many other custom options.

The Optional Parameters are separated into different groups, called Parameter Blocks. Some of these blocks contain items that are utilized for informational purposes only and are "Read Only", or in other words they are not modifiable. The remaining blocks contain modifiable parameters organized in groups to help customize the vehicle's operational characteristics.

The Parameter Blocks are subsequently broken down into sub-items which are referred to as Parameter Levels. These are the individual items that will be modified by the customer. Most of these parameters deal with specific vehicle configuration options and do not need to be modified. Others are used to control user preferences or hardware configurations.

Common Parameters to be modified are:

- Vehicle Speed Limiter Enable (Block 79, Level 000)
  This is used to disable the Speed Limiter of the vehicle.

- Vehicle Speed Limiter Speed (Block 79, Level 002)
  This is used to control the top speed of the vehicle.

- Low Idle Speed (Block 82, Level 002)
  This sets the Base Idle speed of the engine.

- High Idle Speed (Block 82, Level 003)
  This sets the Rev Limiter of the engine.

- Tire Size in Revs per Mile (Block 80, Level 001)
  This is the tire size in Revs per Mile of the rear tires.

- High Rear Axle Ratio (Block 80, Level 003)
  For single speed axles, this is the Gear ratio of the differential. For 2 speed axles, you will also need to use the Low Rear Axle Ratio.

- High Axle Ratio Pulses Per Mile (Block 80, Level 006)
  This value is calculated as Tire Size x High Axle Ratio x Tailshaft Tooth Count. If you change gear ratios or tire size, you must also adjust this value.

- Transmission Top Gear Ratio (Block 80, Level 004)
  This is set to match the top gear of the transmission. In many of the vehicles with an Allison Transmission, the 6th gear may be locked out. If these gears are unlocked, then this needs to be modified to reflect the new top gear ratio.

NOTE: If you are not absolutely certain about what a particular Optional Parameter does or do not have a specific reason to change it, we strongly recommend that you leave it alone. Modifying certain parameters, especially communications configuration parameters, can possibly lead to the vehicle becoming disabled and unable to start.

Some of the parameters will be a simple disable/enable selection. Some will have a number of desired menu items to select from. Others parameters will require an input value.
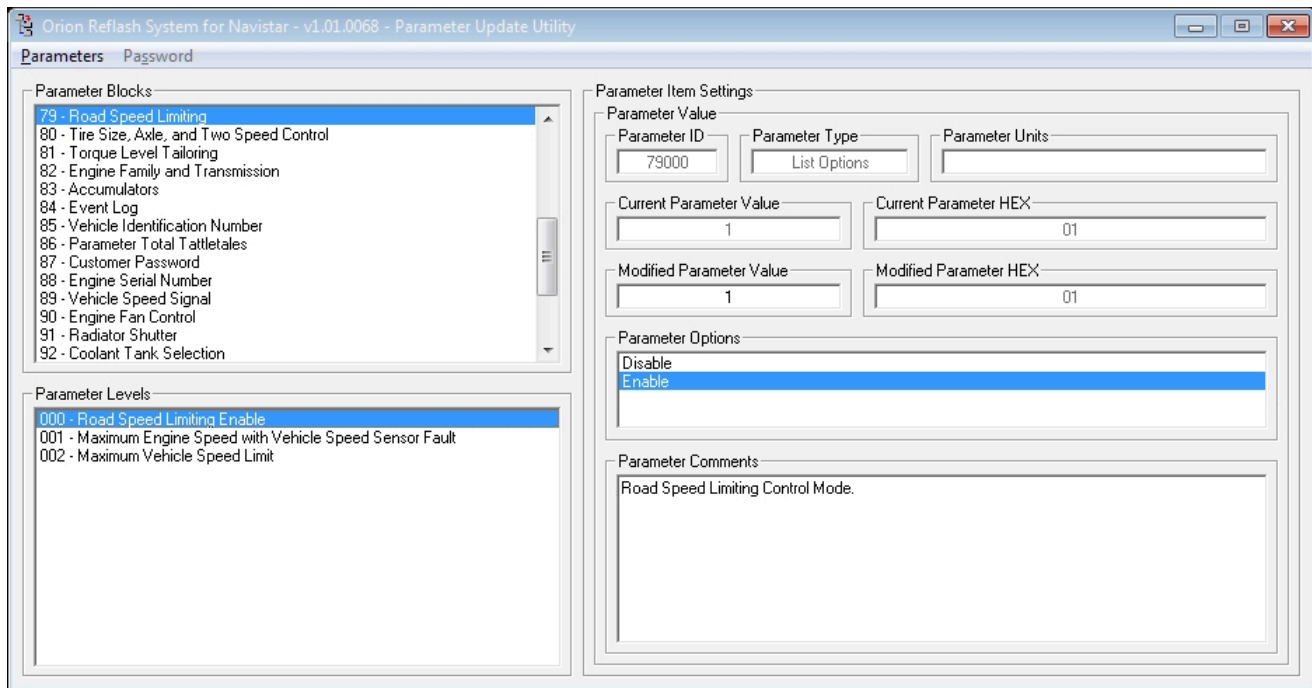
To change a parameter, select the corresponding Parameter Block, the desired Parameter Level, and then make the necessary changes to the parameter using either the Modified Parameter Value or the Parameter Options Menu (where applicable).

NOTE: While the parameters may be editable, you will only be able to write them to the ECM once the ECM has been programmed with a Power Hungry Performance calibration.

Writing the Optional Parameters - Once you have selected and modified all the desired parameters, you can then program them into the ECM. To begin the update, select the [Parameters] menu option and then select the [Write Parameters] option. The software will write only the modified parameters into the ECM.

Once the update is complete, you may close the Parameter Update window to return back to the main Orion window. You will be asked to cycle the ignition key so the ECM can internally update the parameters.

NOTE: If you should you accidentally or incorrectly modify a parameter and the vehicle will not start, it is possible to reload the original parameters using the parameter file that was saved during the first connection with the vehicle. This will restore all the original parameters back into the ECM and should restore vehicle functionality.

You may now turn the key off, close the Orion application, and disconnect the hardware.

We hope that you have found this manual to be helpful and informative. Performance tuning is our passion and we really enjoy sharing that passion with others members of the automotive performance community.

Please be sure to visit our Power Hungry Performance Forum at:

http://forum.gopowerhungry.com

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If you have any other questions or comments, please feel free to contact us directly at:

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