



**Orion Reflash System for Navistar  
1994-1997 VPM System User's Guide**



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# **WARNING!**

This software allows the End User to make unrestricted modifications to the Vehicle Personality Module (VPM). 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 Vehicle Personality 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 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 VPM 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 VPM System for Navistar® and Hydra Chip for Navistar® have been developed to help provide improved performance, diagnostics and allow the modification of the Vehicle Parameters of the 1994 - 1997 model year vehicles, including the 3000 Series (School Busses) and the 4000 Series (Single Cab and Crew Cab Trucks). With the Hydra Chip for Navistar® providing 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 and DT530 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 VPM 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 VPM 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 VPM System for Navistar® Software will be placed on your desktop.

**Installing the Orion VPM 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 SiLabs 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 VPM Hardware to the Computer** - The Orion VPM 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 VPM Hardware to the Vehicle** - The Orion VPM 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 be 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 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.

That covers what's included with the Orion package. Now we'll move on to software.

# Chapter 2

## Using the Orion VPM Software and Hardware.

Once you have the Orion VPM Software and USB Drivers installed, the next steps would be to connect to the vehicle.

**Note:** Because of the sometimes unpredictable nature of Engine Control Systems and their related communications, it is strongly recommended that any changes to the VPM be done in a location where it would not be a tremendous inconvenience should a communications failure occur. It is always best to perform any 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 - Connecting the Orion VPM 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 hardware to the vehicle Diagnostic Port.
3. Connect the USB Cable to the Orion hardware USB Port.
4. Connect the USB Cable to the USB Port on the laptop.

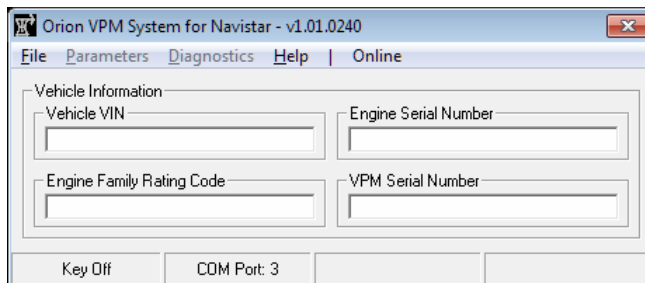
**3000 Series OBD Connector Location** - On most 3000 Series vehicles (school buses), the OBD connector will be located under the dash and to the right of the steering column.

**4000 Series OBD Connector Location** - On most 4000 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 VPM application.

### Section 2 - Running the Orion VPM Software

**Opening the Orion VPM Application** - Double-Click the Orion VPM 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.

### Section 3 - Saving a copy of the original Vehicle Parameters

**Storing the Original Vehicle Parameters** - Before you make any changes to the vehicle, it is strongly recommended that you save an original copy of the Vehicle Parameters. This is the help in resolving any issues where the VPM may become corrupted or where the vehicle is not functioning correctly due to an improper parameter setting.

To save the original vehicle parameters, select the [Parameters] menu, and then select [View/Modify Parameters]. This will open the Parameter Update Utility window.

To read the current parameters, select the [Parameters] menu, and then select [Read Parameters] to begin the read process.

Once the parameters are read, you can then select a location in which to save the original to a file. Select the [Parameters] menu, and then select [Save Parameters] to store the data to your computer. We recommend that you use the following default folder:

<C:\Power Hungry\Orion VPM System for Navistar\Parameters>

We also recommended that you do not change the generated default filename.

### Section 4 - Loading a copy of the original Vehicle Parameters

**Loading the Vehicle Parameters** - You have the option of loading 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]. Then select the filename you would like to load.

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

### Section 5 - Modifying the Vehicle Parameters

**DISCLAIMER** - 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.

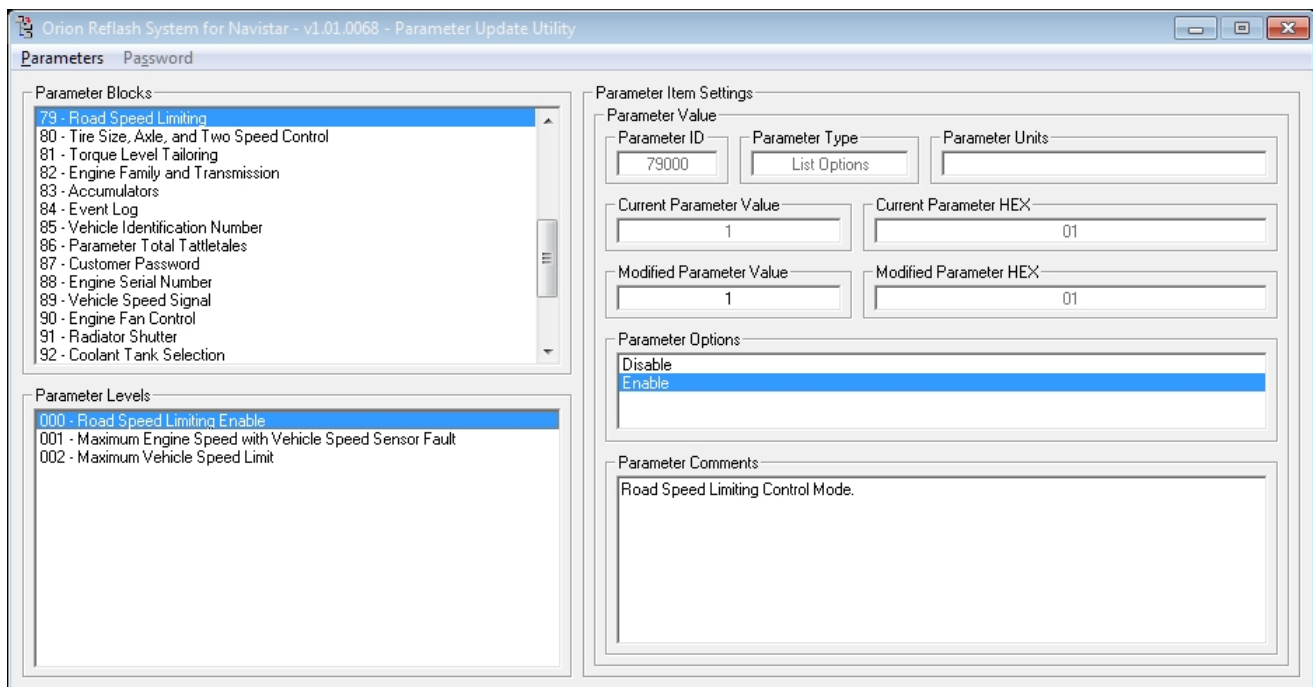
Modifying the vehicle parameters will allow you to change various settings related to how the VPM interfaces with the vehicle. Such options as Speed Limit, Cruise Control, Tire Size, Gear Ratio, Automatic Shutdown, and many others can be modified with this utility.

**Changing the Vehicle Parameters** - The Vehicle 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 Vehicle 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.

The window below provides an example of how the Vehicle Parameters are broken down into small groups of items. It is usually pretty easy to locate the desired parameters. However, if you have any questions, please contact Power Hungry Performance for assistance.



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 Final Rev Limiter of the engine.
- Rated Engine Speed (Block 82, Level 004)  
This sets the usable RPM Range 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 Vehicle 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).

**Writing the Vehicle Parameters** - Once you have selected and modified all the desired parameters, you can then program them into the VPM. 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 VPM.



Once the update is complete, you may close the Parameter Update window to return back to the main Orion VPM window.

**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 originally saved in **Section 3**. 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 VPM 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 Minotaur Tuners Forum at:

<http://forum.gopowerhungry.com>

This is a place where everyone from casual drivers to performance enthusiasts can ask questions, share tuning ideas, discuss successful and unsuccessful modifications, and learn new tips and tricks.

You can also visit our group on Facebook at:

<https://www.facebook.com/groups/minotaurtuners/>

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

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