GEN4 PRO XTREME BigComm Pro NOS User Manual

www.**BigStuffTPM**.com

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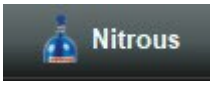
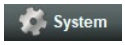
HOW TO USE THE BIGCOMM PRO CONFIGURATION & CALIBRATION TOOL BAR NITROUS MENU AND SUBMENU



The GEN4 Nitrous option will give open the ability to run Nitrous on your engine combination. The Nitrous option will enable both of the Nitrous progressive solenoid or staged solenoid('s) control.

The nitrous progressive and staged can be used simultaneously for the utmost in nitrous control. The staged nitrous option will enable up to 6 stages of additional Nitrous. All of the additional fuel will be provided through the on-board fuel injectors which is a considered a Dry Nitrous system. If a Wet Nitrous configuration is required, contact BigStuffTPM for additional configuration help.

The GEN4 ECU fuel map strategy can be configured by either a VE or LBS/HR configuration. This can be found in the System 

Menu under Hardware Configuration. These two types of fuel delivery methods are completely different and you will need to plan ahead before you start to work on your Nitrous configuration.

If this is a street or street/strip application most fuel map strategy's will be VE(Volumetric Efficiency) based. This means that a MAP (Manifold Pressure Sensor) will be used along with engine RPM to deliver the fuel/spark control of the engine.

When the nitrous is enabled whether PWM or staged the fuel delivery and spark retard will work off the base fuel and spark maps in the BigStuffTPM calibration. It is best to get the engine running as best as possible whether in a naturally aspirated or boosted configuration first before running the nitrous on the engine.

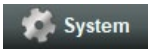
When first enabling any of these features you must cycle the ignition for the changes to take effect on the initial setup. Once the calibration has the sections enabled you can make real time calibration adjustments as the NOS features have been activated.

If this is an all-out race engine application or a motor that makes very little manifold vacuum the preferred method may be an LBS/HR configuration. The fuel delivery method in this case will be a true fuel LBS/HR number in the fuel map versus TPS% (Throttle Position Sensor).

BigStuffTPM has invested the time and has developed true calibrations for running either a 160LB/HR or 210LB/HR fuel injector with a 43psi base fuel pressure.

This means that in the fuel map when dialing in the base fuel table if you have cells with a 300 number in them the calibration will deliver that exact fuel delivery number requested, IE 300LBS/HR.

This is especially important as most high horsepower nitrous systems are flowed using a LBS/HR rating on the fuel side. This will save many hours of dialing in the fueling as we have created modeling to get you very close to where you should be.

It is important to note that in the System 

Menu under the Operating Configuration section you must enter the fuel injector rating value as an LBS/HR and the specific gravity of the fuel must be entered as well.

This is because to calculate a true pound per hour value we need to know the density of the fuel being delivered as this will change depending on the fuel type.

When nitrous is being added to any engine it is usually advisable depending on the NOS horsepower shot to go down in a spark plug heat range.

This will all depend on how much nitrous you intend to spray. Check with your nitrous manufacture or tuner for more information on this.

It also advisable to be aware if you are running a ignition system running a distributor based application, you only have so much of an ignition timing window.

If you are running a distributor-based application and you have the distributor phased for full timing of let's say 30° but when the nitrous is on and spraying you pull 20° that will leave you with only 10* of total ignition timing.

If the rotor is not phased properly, you may get an engine misfire as the ignition will be firing on the wrong cylinder. It is important to be phased in such a way that this does not happen so no engine damage can occur IE phase the rotor at 10° so there is no misfire under full power.

Consequently, if you are phased for such a low timing number you may not be able to achieve the 30* of spark advance needed at idle or part throttle applications.

If you are running one of our COP applications this does not become a critical as we can go down to -10° and up to 50° of ignition advance without any phasing issues.

PROTIP
ALWAYS perform a dry run on the engine and verify ignition timing being retarded and NOS enrichment fuel is being delivered ***BEFORE*** running the engine under Nitrous for the first time. This is to verify the calibration is correct and ready to run as desired.

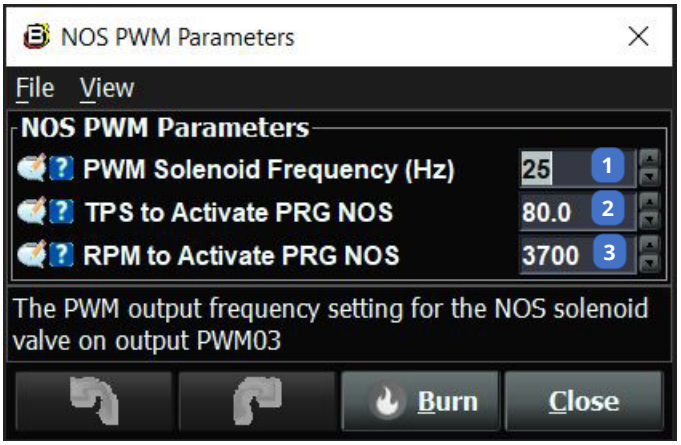
• VE FUEL DELIVERY BASED NITROUS CONTROL

In this section we will cover how to add nitrous to your naturally aspirated or boosted combo when using the VE Fuel Map Strategy. First and foremost, get the engine base tune dialed in so that as we add the nitrous, we can add the proper additional amount of fuel and spark retard based on how much will be sprayed.

• NOS PROGRESSIVE CONTROL

We will first start with configuring the NOS Progressive Controls. The NOS progressive controls will use the on-board fuel injectors to deliver the fuel, spark retard based on the current spark table and uses a solid-state relay to control the nitrous solenoid

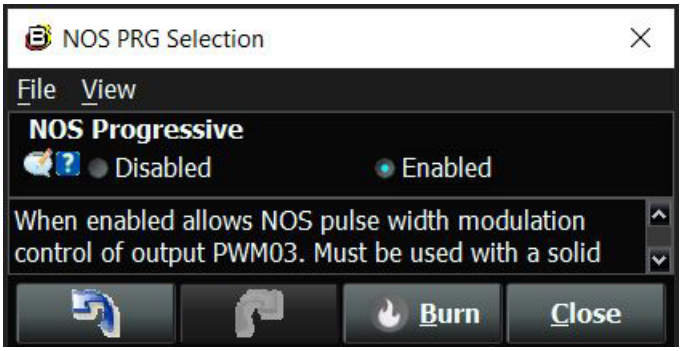
The nitrous solenoid output can be found on Header 2 Pin L1 and we use the PWM03 output. This is a ground signal and will be used to adjust the PWM signal going to the nitrous solenoid. To purchase the solid-state relay and NOS wiring harness, please contact BigStuffTPM.



First, under the NOS Menu you will see the NOS PRG Selection and you will enable the NOS progressive to start the configuration of the PWM NOS controls.

With the NOS Progressive enabled, you will now see the following sections available under the NOS menu.

This section is used to configure the PWM solenoid frequency and the TPS and engine RPM to activate the progressive nitrous.



(1) PWM Soleniod Frequency (HZ) – The PWM output frequency setting for the NOS solenoid valve on output PWM03.

(2) TPS to Activate PRG NOS – The TPS% setting to allow the NOS progressive table to function.

(3) The RPM setting to allow the NOS progressive table to function

The other important step here is that the Boost Input must see 12vdc to enable the NOS PWM as well. The boost input is located on the main engine harness and is a 4-way connector marked boost. You will use Pin A which is yellow wire, and this is a 12vdc input. Without the boost connector seeing 12vdc the nitrous will not activate properly!

Now that the PWM nitrous is enabled we will configure the NOS solenoid, fuel and spark tables under the NOS menu.

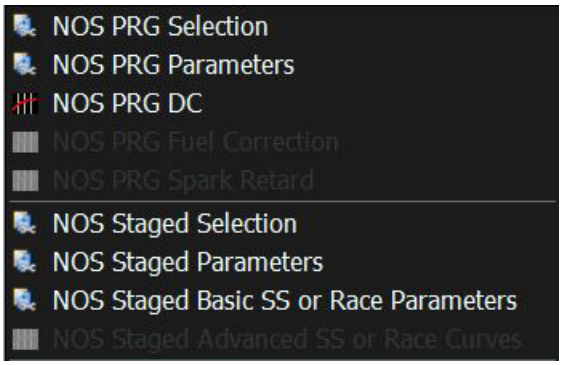
When the NOS PWM is activated, all you may see under the NOS menu depending on your configuration is a NOS PRG DC table.

This Is the NOS SSR output to the solenoid and will be the minimum allowed to run when the NOS Progressive is enabled.

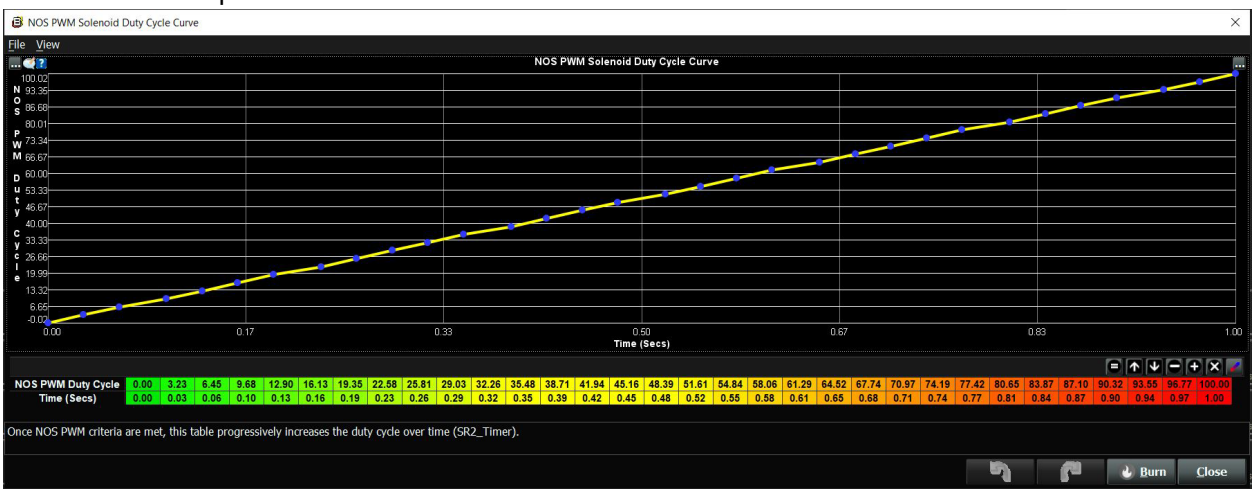
The fuel and spark retard tables are optional, and we will cover how to enable those tables for use.

The NOS Staged Selection may be displayed as well and confirm that in the NOS Staged Selection section it is disabled for now.

First click on the NOS PRG DC curve under the NOS Menu.

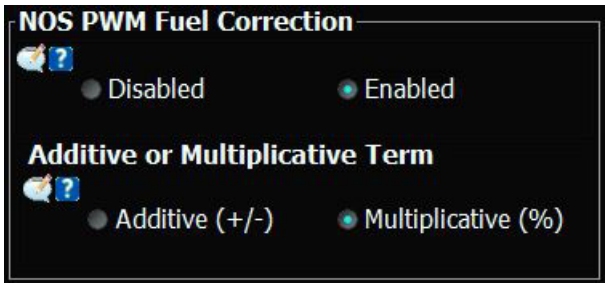


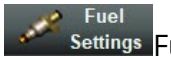
This will now expose the NOS PRG DC Curve:



This table is used to configure over how much time the NOS solenoid is to be pulsed until wide open. This table works off of the SR2 timer and the SR2 timer will only start when the Boost switch has a 12vdc input, the TPS% and ENGINE RPM thresholds are reached and the 3-step has been released. As you can see the table is configured so that at 0 seconds, we have 0% duty cycle and at 1 second, we have 100% duty cycle to the Nitrous solenoid SSR relay. This table can be adjusted in any configuration required based on the user.

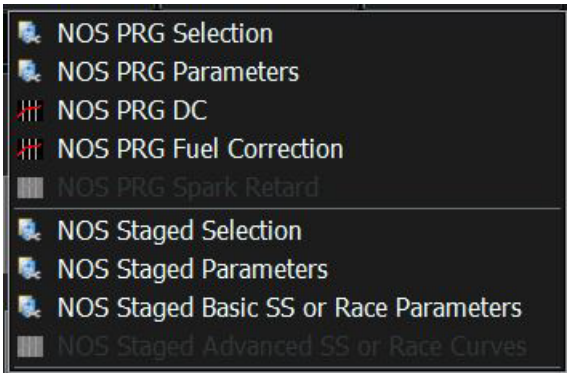
Below the NOS PRG DC section in the NOS Menu, you may see the fuel and spark retard tables greyed out. These tables need to be enabled the fuel and spark modifier sections under the Fuel Settings and Spark Menu.



First navigate the to the 

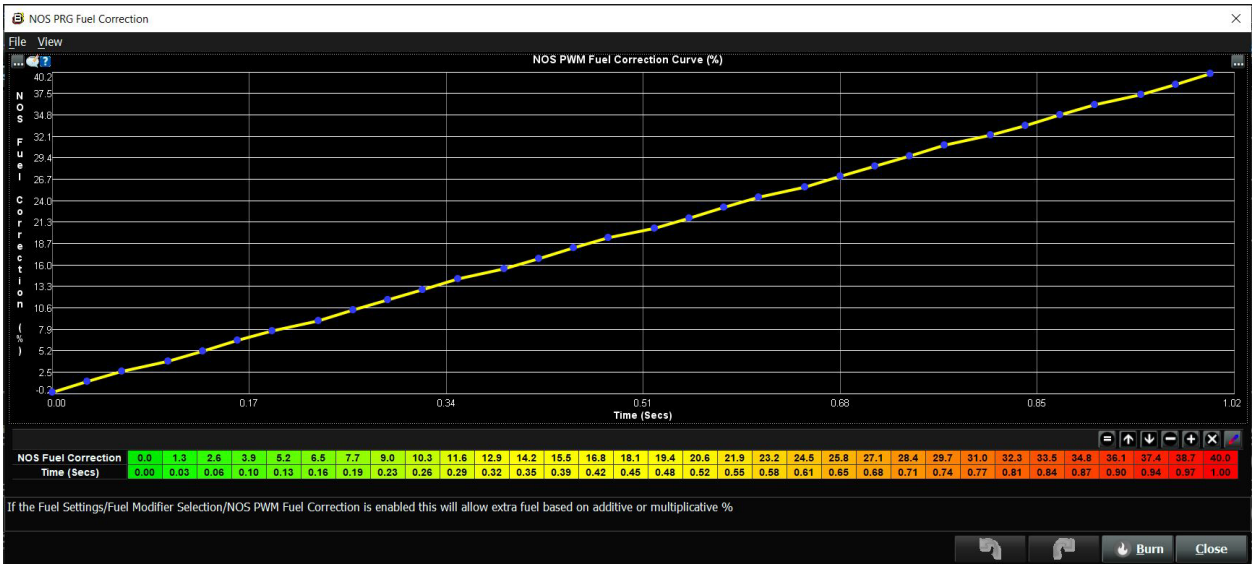
Fuel Settings Menu and go to the fuel modifiers selection section. Click on the NOS PWM Fuel Correction and this will enable the fuel tables as seen below:

With this fuel correction enable you now have the choice to add the NOS fuel based on an additive term(+/-) or multiplicative term(%) This table will now be exposed under the NOS Menu as seen here:



With this curve enabled you can now adjust how much fuel will be added based on a percentage or lbs/hr depending on how you selected the fuel delivery method in the fuel modifiers section.

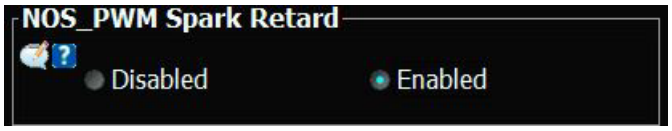
You will see that the time until full fuel delivery matches the NOS PRG DC Table so that they fuel delivery coincides with the NOS solenoid control. It is ALWAYS better to start a little rich on the air fuel ratio and bring the fueling back to fine tune the NOS air fuel ratio.



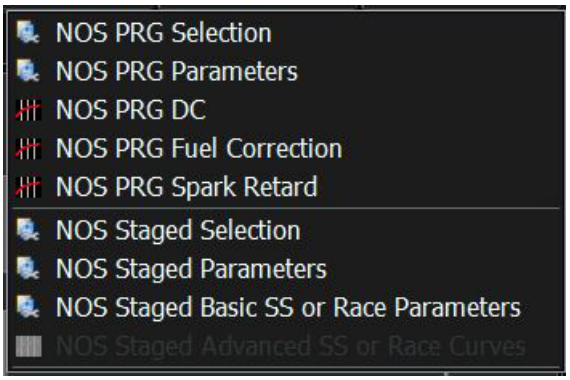
Now that we have enabled the fuel adder to the NOS PWM shot let's add the spark retard table.

Navigate to the

Ignition Settings



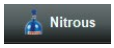
Menu and click on the Spark Modifier Selection section and enable the NOW_PWM Spark Retard as shown.
Now we can navigate back to the NOS Menu and we will see that the NOS PRG Spark Retard Table is now exposed as show.



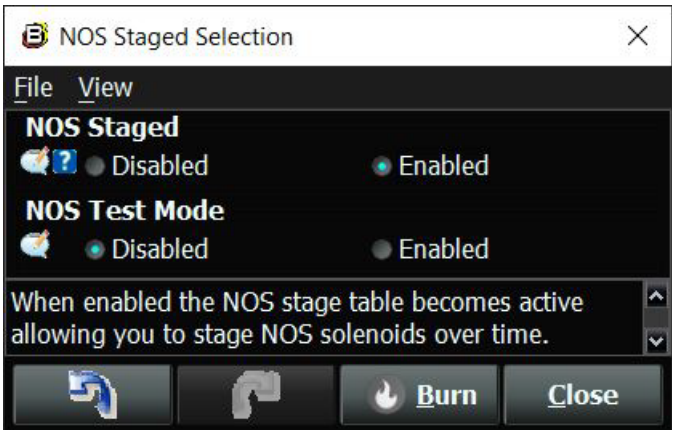
With this curve enabled you can now adjust how much spark will be retarded. You will see that the time until full spark retard is achieved matches the NOS PRG DC Table so that the fuel and spark curves coincide with the NOS solenoid control. It is ALWAYS better to start with more spark retard out and gradually add more timing back in to finalize the tuneup.

• NOS STAGED CONTROL

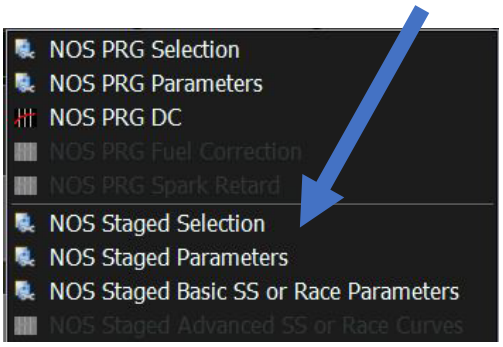
The NOS Staged control is for activating Nitrous solenoids over time to deliver the requested nitrous amount. The staged control can be used in conjunction with the NOS PWM control but in this example, we will only be running the NOS Staged Control.

First in the 

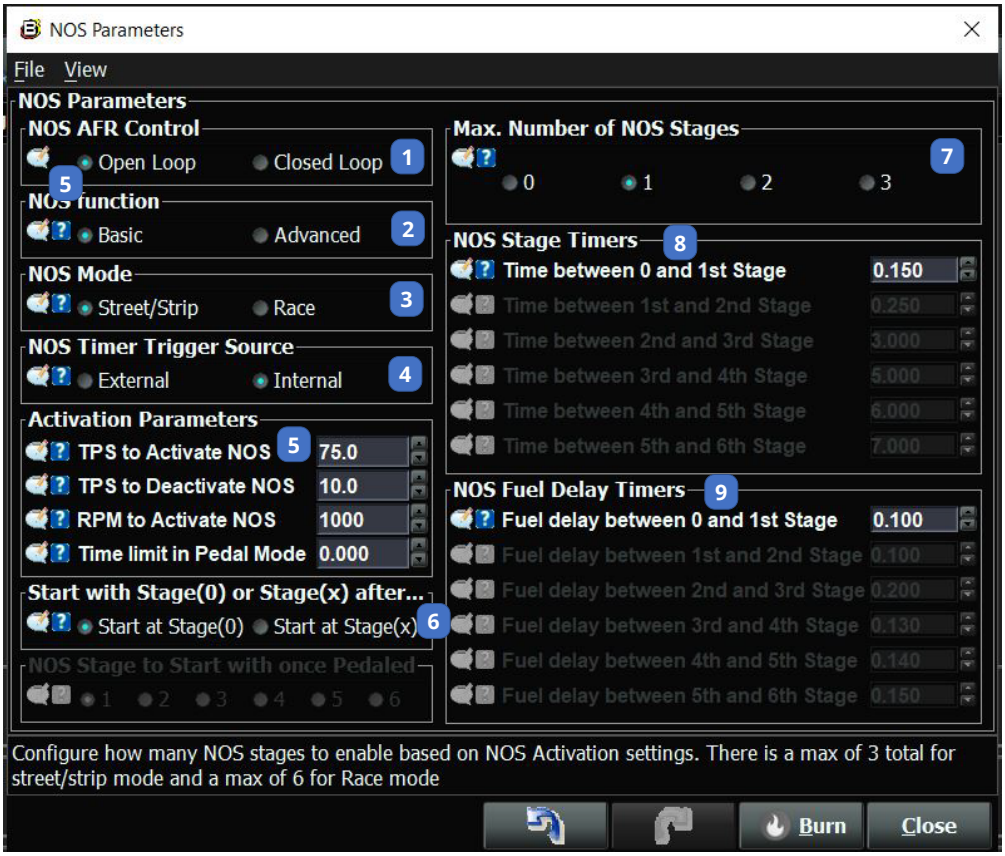
NOS Menu under the NOS Staged Selection enable this feature. NOS Test Mode is not available as of this instructions release.



With the NOS Staged control activated you will now see the NOS Staged Parameters and NOS Staged Basic SS or Race Parameters.



The first table to configure is the NOS Stage Parameters Section:



(1) NOS AFR Control – When this option is turned on in closed loop once the Nitrous is activated the air fuel ratio will be allowed to be corrected based on the AFR positive or negative correction settings in the AFR Menu. When in open loop, there will be no positive or negative correction allowed.

(2) NOS Function – Allows you to choose between Basic or Advanced NOS tables. Basic allows you to input a single fuel term (lbs/hr) value and a single spark value (Note: in S/S mode its a retard and in Race mode, it's the absolute timing) when each stage is activated. When Advanced is chosen the Advanced tables are enabled in which you enter your target fuel term (lbs/hr) and the absolute spark timing over engine rpm. This will be explained in further detail below.

(3) NOS Mode - Street/Strip NOS mode will allow up to 3 stages of NOS and is what's recommended for a street/strip vehicle. Race mode will allow up to 6 stages of NOS and can be activated from external digiset timers. This will be explained in detail below.

(4) NOS Timer Trigger Source – External trigger uses remote digiset timers, (disallows 4L60/80E transcontrol). Internal trigger uses ECU's internal timers, (allows 4L60/80E transcontrol).

(5) Activation Parameters

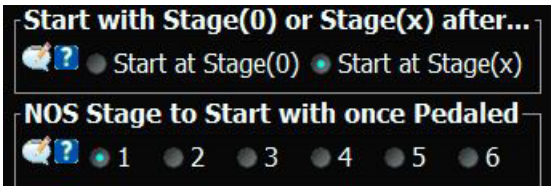
a. ***TPS to Activate NOS*** – Must exceed this TPS% to enable the nitrous

b. ***TPS to Deactivate NOS*** – When the TPS% drops below this value, the NOS is turned off and the NOS pedal timer starts.

c. ***RPM to Activate NOS*** – Must exceed this RPM to enable the nitrous

d. ***Time Limit in Pedal Mode*** – When the Pedal timer exceeds this value the NOS will be forced off, if the TPS% exceeds the activation threshold before it times out the nitrous will turn back on.

(6) Start with Stage (0) or Stage(x) after... - Can select which nitrous stage to start back with if the car was pedaled.
If this section is enabled as see below you can choose which Nitrous stage to start from after a pedal event.



(7) Max Number of NOS Stages – Configure how many NOS stages to enable based on NOS Activation settings. There is a max of 3 total for street/strip mode and a max of 6 for Race mode

(8) NOS Stage Timers – Once the NOS enabling criteria (TPS%, RPM, and Timer Enable) are satisfied, this is an initial delay before Stage 1 is activated.

(9) NOS Fuel Delay Timers – A fuel delay once the NOS Stage 1 solenoid is activated. Once expired, the NOS Stage 1 fuel enrichment occurs.

The MAX number of NOS Stages works in conjunction with the NOS Fuel Delay Timers. There is a fuel delay in place if your nitrous is being sprayed from a farther point than near the fuel injectors and to take up any NOS delivery delays once the system is activated.

• NOS STAGE (X) LAMBDA OFFSET

In the NOS function Basic Mode, there will be a Lambda offset that will be exposed under the NOS Menu. This is a lambda offset so that when the Nitrous is activated the lambda target will be adjusted to the new setpoint.

For example, if the motor is running in a naturally aspirated configuration the AFR Target could be 13.5AFR or .918 Lambda under wide open throttle. When the Nitrous is on and running you can lower the Nitrous AFR target to 12.5 or .850 lambda. You would plug in a .068 lambda in the NOS Stage (x) Lambda Offset as seen below:

In the AFR Menu under the O2 and EGT Parameters section you can display between Lambda and AFR in the Target O2 tables. Use this to toggle between the AFR and Lambda values to confirm what Lambda equals the AFR you are targeting. This is also helpful to configure other tables to confirm what AFR equals in Lambda.

• NOS STAGED INDIVIDUAL FUEL AND SPARK CURVES

Whenever the NOS Staged setup is being used the individual fuel and spark curves are activated under the NOS menu allowing complete individual cylinder control when using each stage. When configuring a stage of NOS for the first time you must go through each curve and configure the RPM range and fuel/spark settings. The fuel adder is percentage-based adder and the spark can either be added or advanced per cylinder.

See example ICF/ICS for when a 3-stage NOS setup is configured:

NOS Function and NOS Mode

The NOS Function settings and NOS Mode settings work together to provide how the NOS fuel enrichment, and spark retard are applied, and at what times the Nitrous is introduced.

The following combinations can be configured:

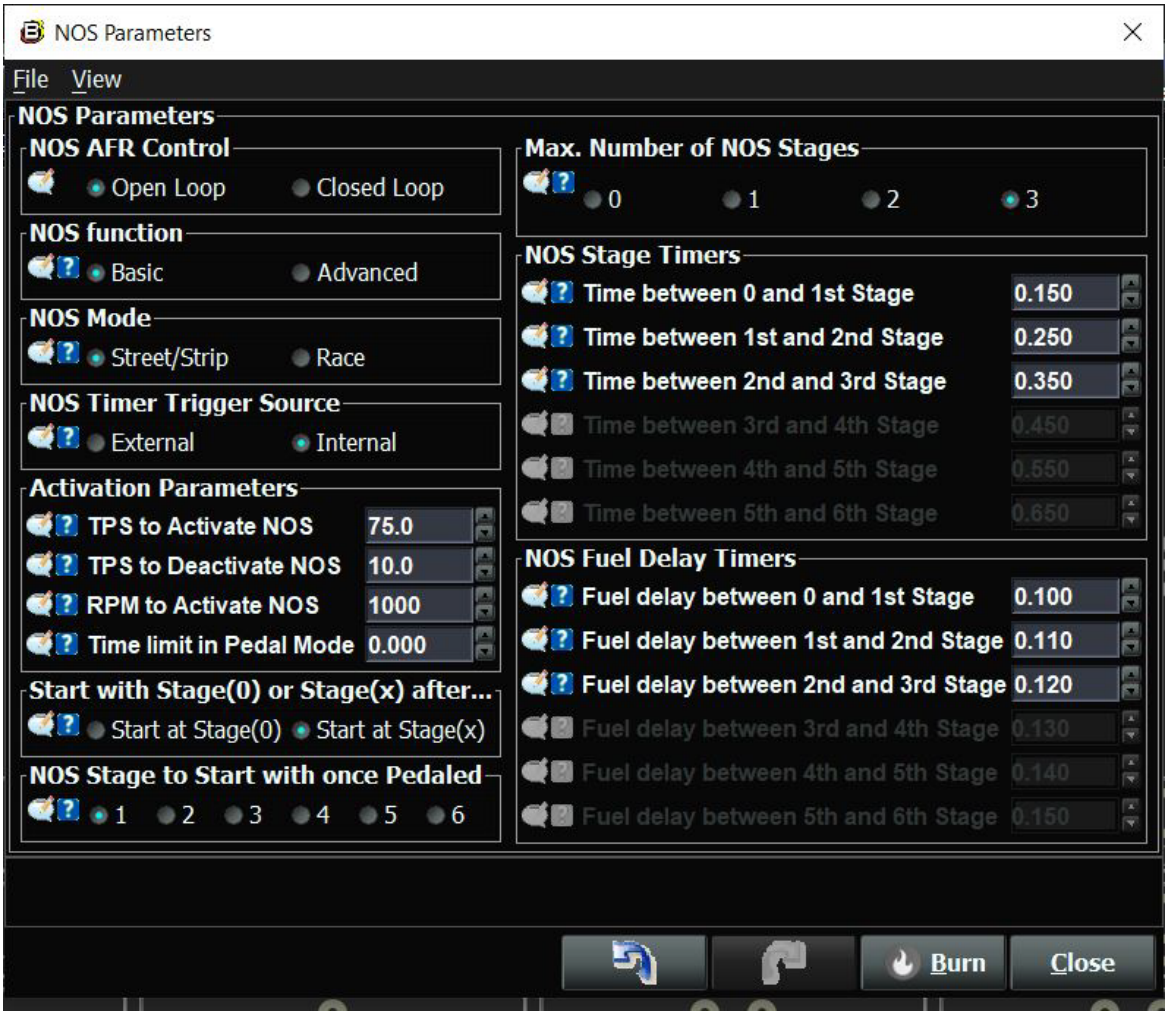
NOS Function = Basic
NOS Mode = Street Strip

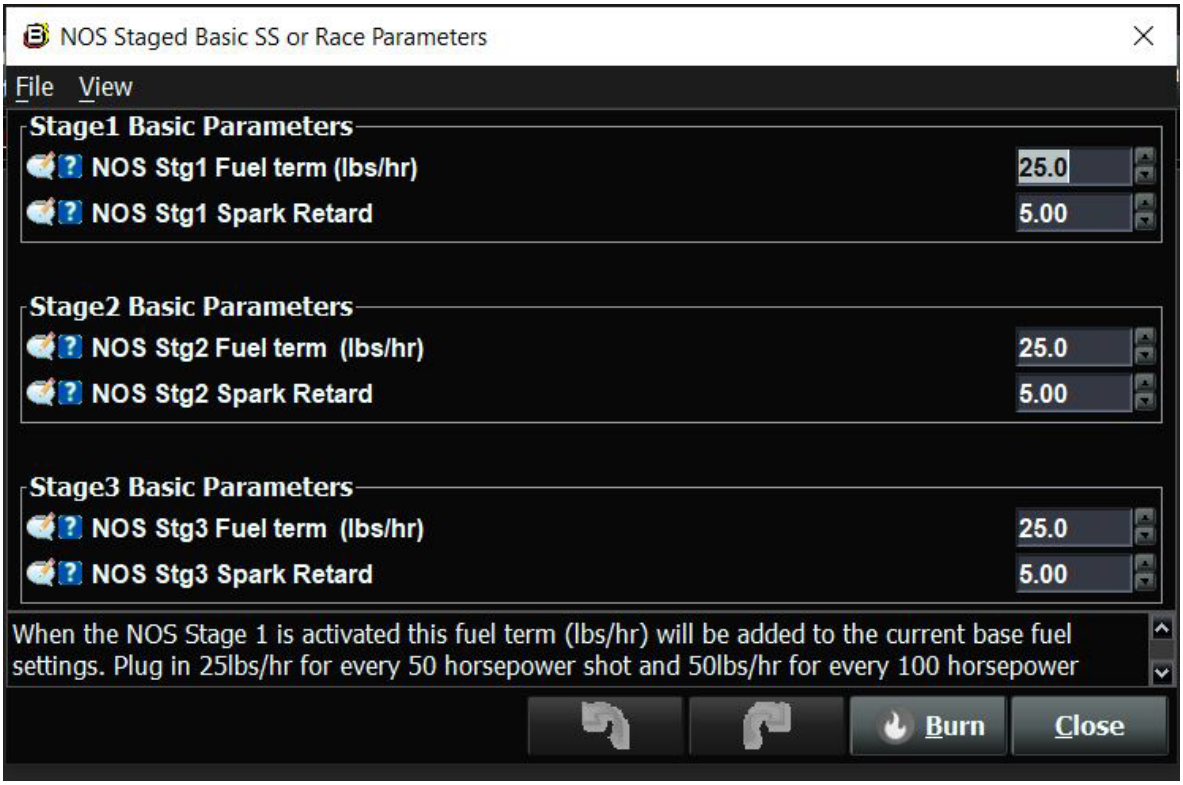
In this mode you can have up to 3 Stages of Nitrous and the fuel enrichment is a fixed fuel lbs/hr setting and the NOS Stage is a spark retard value based on the base spark map currently being used.

IMPORTANT When running multiple stages of Nitrous the time delays between the NOS stages ***MUST*** increment up for each NOS Stage in the NOS Stage Timers.

For example, if there is a 1 second time delay from 0 to 1st stage then you will need a 1.1 second or higher setting from the 1st to 2nd stage. If the NOS Stage Timer numbers do not increment up the timers will not work correctly.

The NOS Fuel delay timers work in conjunction with each NOS Stage enabling. Once the NOS stage has expired, the NOS Stage (x) fuel enrichment occurs.



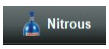


For this example, each Nitrous stage would add 25lbs/hr additional fuel added would be 15lbs/hr and 5° of spark retard per nitrous stage from the base spark map. These values should be configured based on the amount of nitrous being sprayed into the engine.

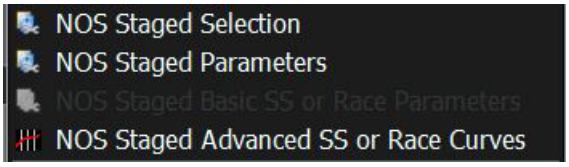
As you enable each Nitrous stage in this mode, each Nitrous stage will have its Lambda Offset exposed as well as each cylinder's individual NOS fuel and spark offsets.

IMPORTANT *Be sure to go through every table/curve and configure each individual cylinder fuel and spark table*.

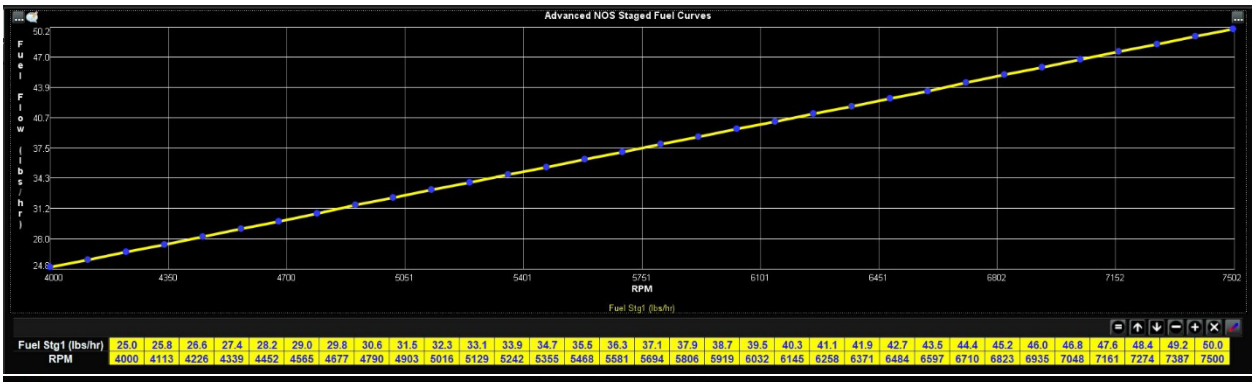
NOS Function = Advanced
NOS Mode = Street Strip

In this mode you can have up to 3 Stages of Nitrous and you enter your target fuel enrichment (lbs/hr) and the absolute spark timing over engine rpm. You will see that under the NOS Menu 

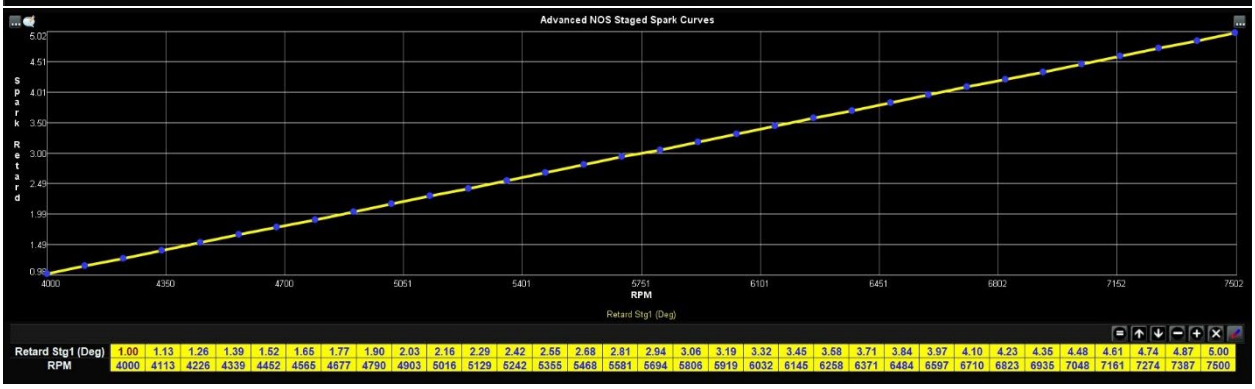
that the NOS Staged Advanced SS or Race Curves is now displayed as seen below.



See example NOS Stage 1 Fuel and Spark Retard Curves below:



Fuel Stg1 (lbs/hr)	25.0	25.8	26.6	27.4	28.2	29.0	29.8	30.6	31.5	32.3	33.1	33.9	34.7	35.5	36.3	37.1	37.9	38.7	39.5	40.3	41.1	41.9	42.7	43.5	44.4	45.2	46.0	46.8	47.6	48.4	49.2	50.0
RPM	4000	4113	4226	4339	4452	4565	4677	4790	4903	5016	5129	5242	5355	5468	5581	5694	5806	5919	6032	6145	6258	6371	6484	6597	6710	6823	6935	7048	7161	7274	7387	7500



Retard Stg1 (Deg)	1.00	1.13	1.26	1.39	1.52	1.65	1.77	1.90	2.03	2.16	2.29	2.42	2.55	2.68	2.81	2.94	3.06	3.19	3.32	3.45	3.58	3.71	3.84	3.97	4.10	4.23	4.35	4.48	4.61	4.74	4.87	5.00
RPM	4000	4113	4226	4339	4452	4565	4677	4790	4903	5016	5129	5242	5355	5468	5581	5694	5806	5919	6032	6145	6258	6371	6484	6597	6710	6823	6935	7048	7161	7274	7387	7500

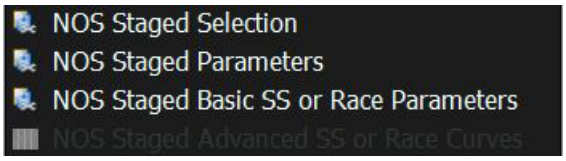
NOS Function = Basic
NOS Mode = Race

In NOS Function Basic Mode, you input a single fuel term (lbs/hr) value and a single spark retard value using a table. In NOS Mode Race up to 6 stages are activated and can be activated from external digiset timers if desired.

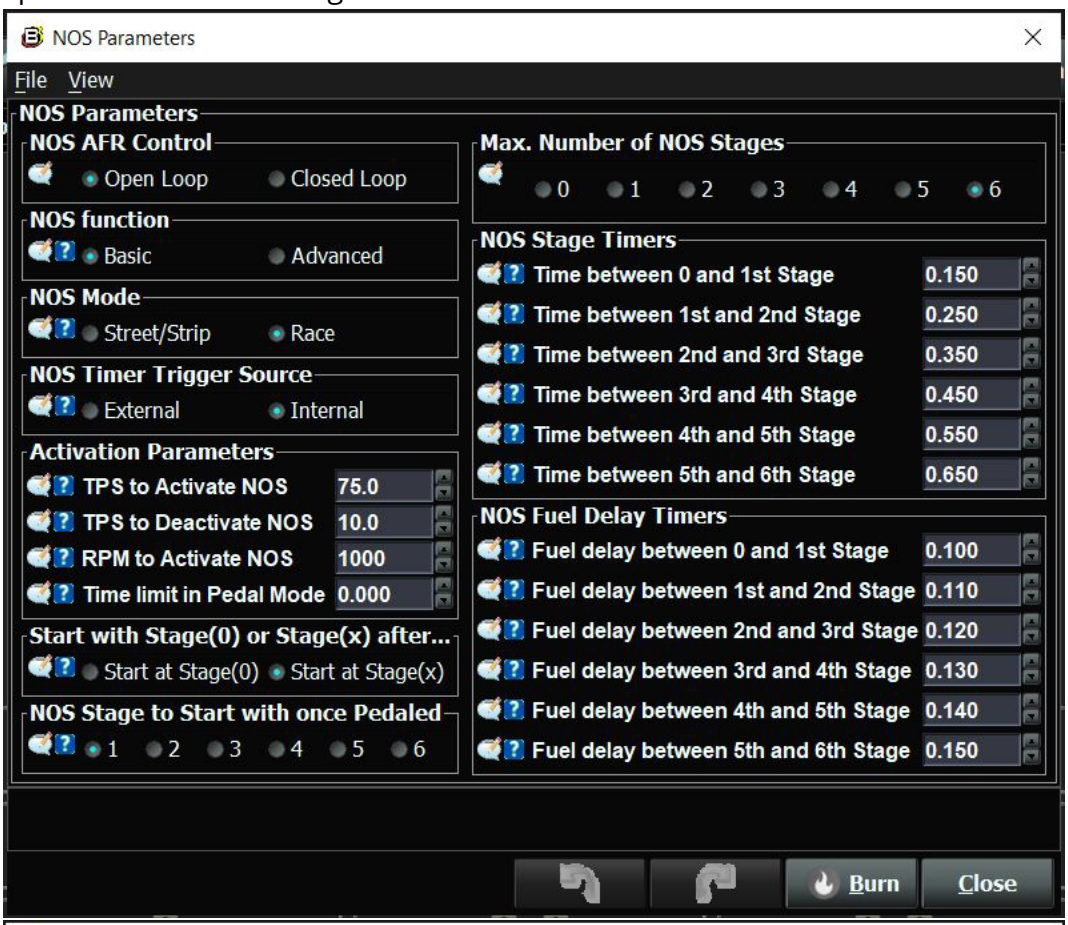
The NOS Staged Basic SS or Race Parameters will be displayed below in the NOS Menu. When the NOS Stage (x) is activated this fuel term (lbs/hr) will be added to the current base fuel settings.

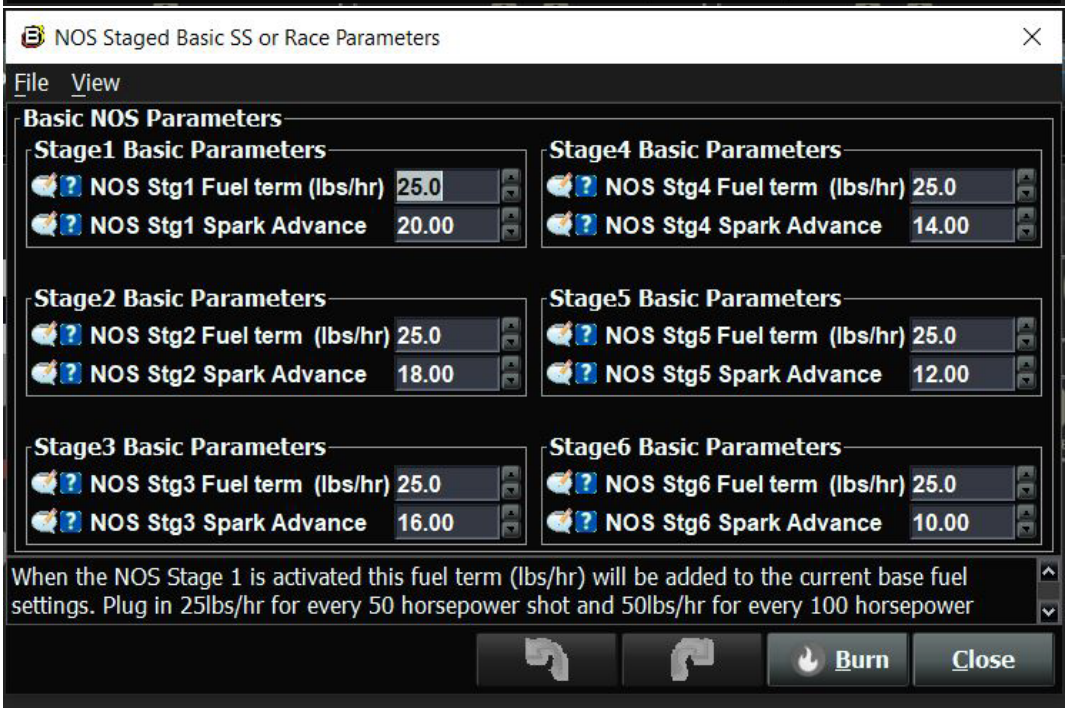
Plug in 25lbs/hr for every 50-horsepower shot and 50lbs/hr for every 100-horsepower shot. If running a 50-horsepower shot on each stage plug in 25lbs/hr for each stage.

If, after running the NOS, the AFR is a bit lean or rich, adjust the fuel add numbers in small steps to tighten up the AFR ratio. When the fuel is provided to each NOS stage is found in the NOS Parameters under NOS Fuel Delay Timers. Since we are in Race mode, this is the actual timing for NOS Stage 1.



Now the NOS Staged Basic SS or Race Parameters section has up to 6 NOS stage of fuel and spark modifiers to configure.

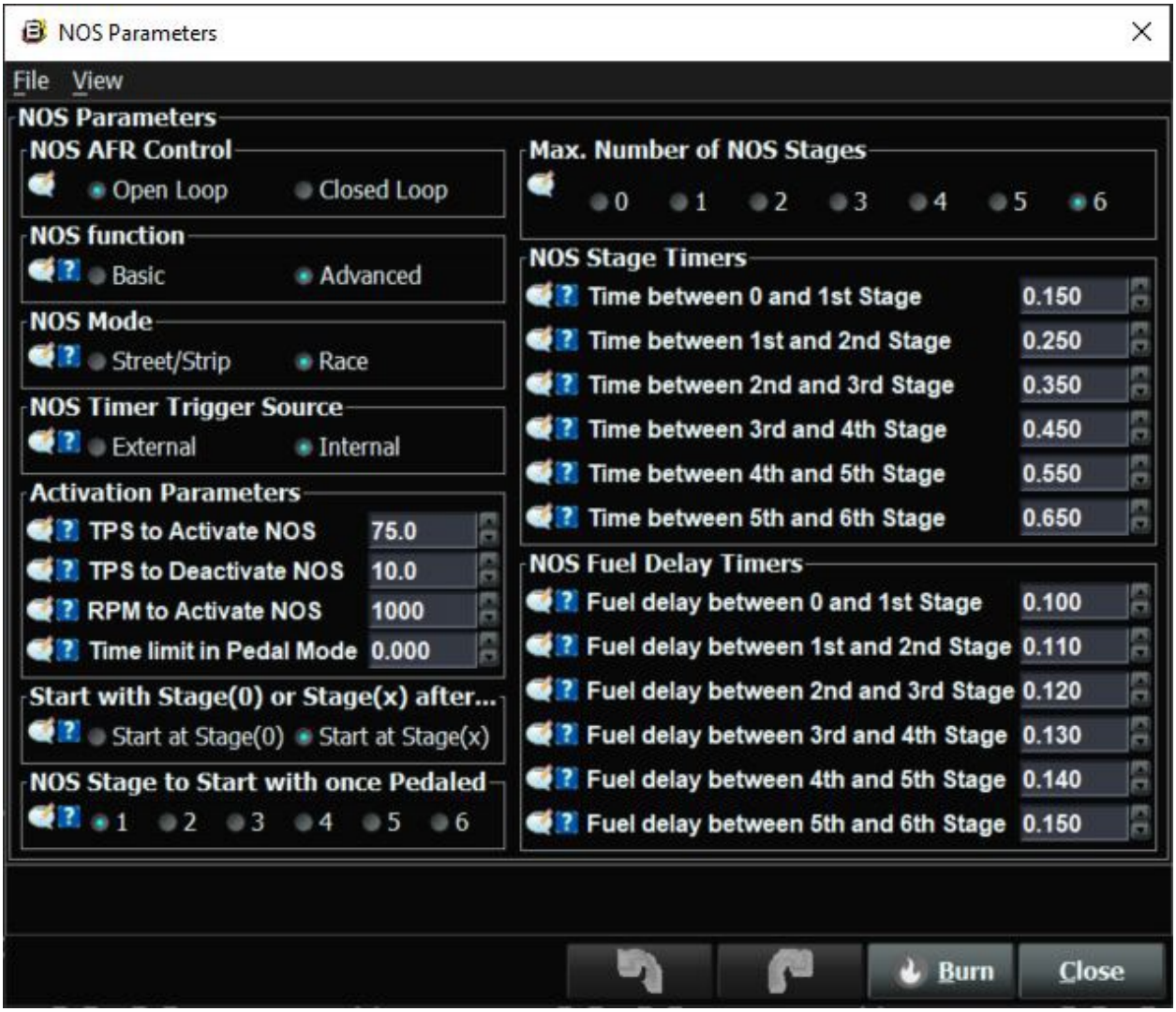




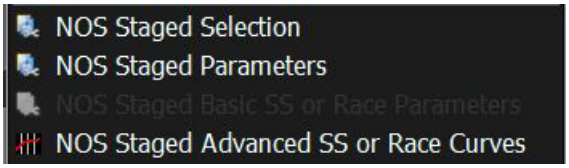
Function = Advanced
NOS Mode = Race

In this mode, you can have up to 6 Stages of Nitrous and you enter your target fuel enrichment (lbs/hr) and the absolute spark timing over engine rpm. Having the NOS function and mode configured this way will give you the most options when running the GEN4 Nitrous system.

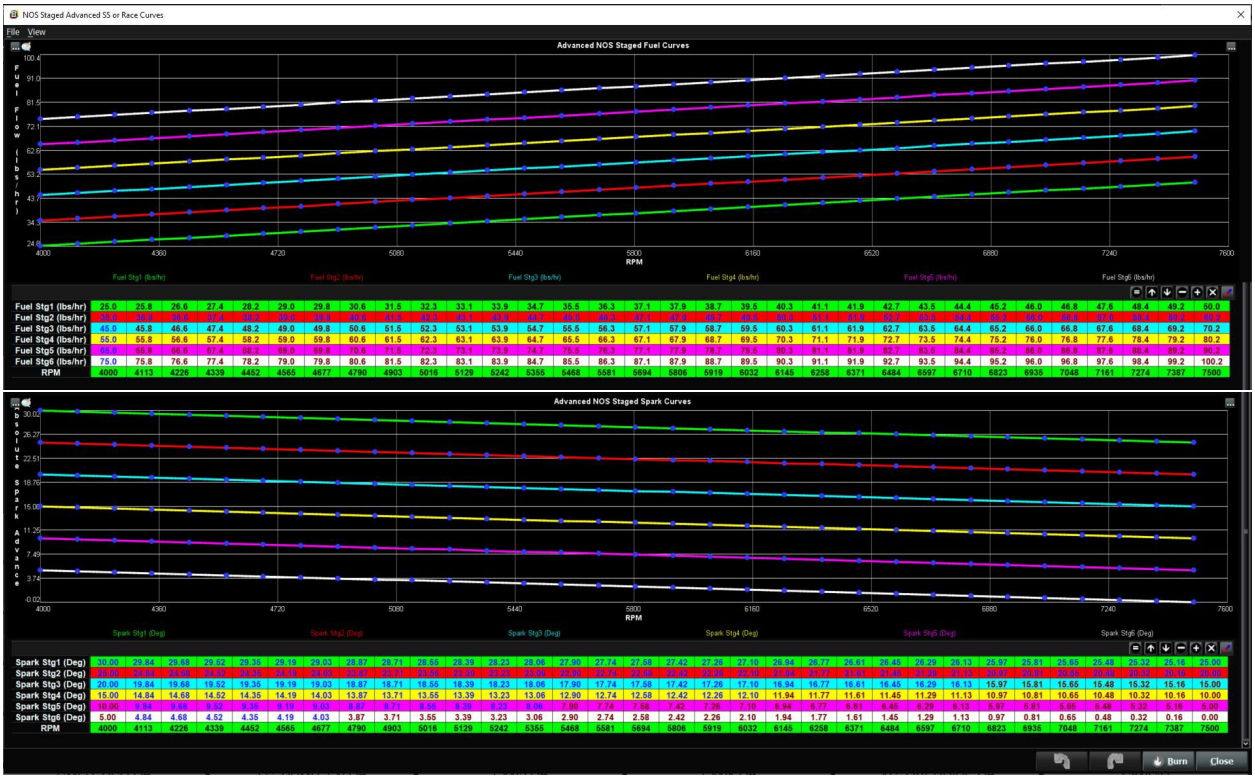
The NOS Parameters section will be displayed as follows:



When selected the NOS Menu will display the tables as this:

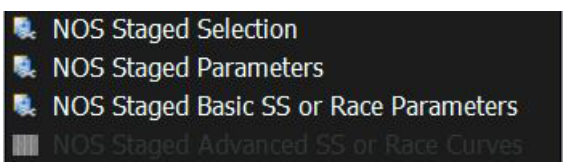


The example NOS Staged Advanced Fuel and Spark Curves are displayed below:

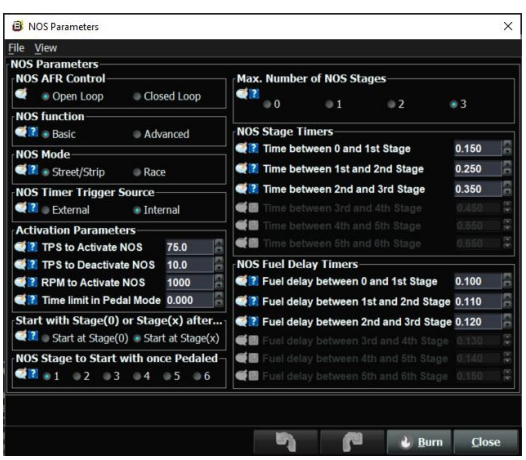


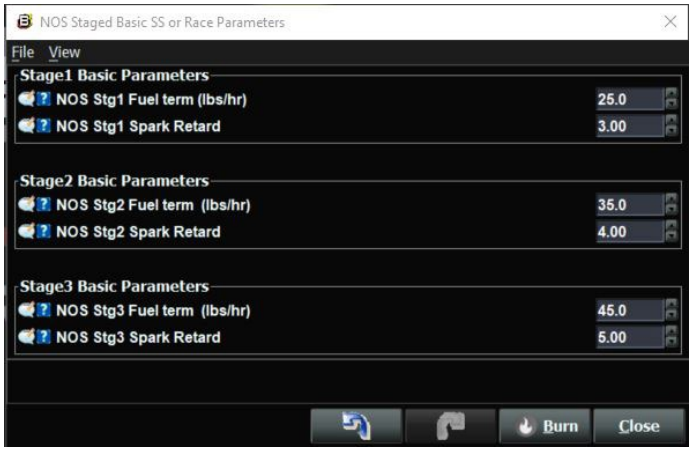
Now, let's go over a pass using the NOS Function Basic and NOS Mode Street/Strip.

When the Basic Mode is selected the NOS Staged Basic SS or Race Parameters table will be shown under the NOS Menu:



The NOS Tables will be configured as follows:





Using the above configuration, lets go through an example NOS Staged run and go over how all this works.

1. The car is on the starting line and the boost enable switch is on.

2. The 3-Step input sees 12v based on a user input and the throttle goes to WOT and the TPS% and Engine RPM values have been exceeded based on the TPS and Engine RPM to activate NOS.

3. The 3-Step input is released and the SR2 timer starts with the NOS stages starting to activate. The first nitrous stage turns on at .150 seconds of the SR2 timer activating and the fuel enrichment and spark retards based on how the NOS mode is configured will enable.

4. Based on the NOS Fuel Delay Timer for Stage 1 the fuel enrichment will start .100 AFTER the nitrous stage 1 has been activated. 25lbs/hr of fuel will be instantly added and 3* of timing will be pulled from the base spark map.

5. NOS Stage 2 activates at .250 and the fuel enrichment occurs .110 after the NOS stage activates. 35lbs/hr of fuel will be instantly added and 4* of timing will be pulled from the base spark map.

6. NOS Stage 3 activates at .350 and the fuel enrichment occurs .120 after the NOS stage activates. 45lbs/hr of fuel will be instantly added and 5* of timing will be pulled from the base spark map.

When the pass is complete, and the TPS% and RPM fall below the NOS activation parameters the NOS staged control is deactivated.

FREQUENTLY ASKED QUESTIONS

• What does working "On line" vs. "Off line" mean?

-Working "Off-line" = The BigStuffTPM ECU is not powered up (PC Only). Working "On-line" = The BigStuffTPM ECU is powered on, the communication is connected between the GEN4 ECU and a PC, and the two are communicating with each other

• Should I use the camshaft position input (cam sync) with my distributor based GEN4 system?

-Without the camshaft position input (cam input connector in the main wire harness) hooked up, the GEN4 system still provides sequential fuel injection and individual fuel control per cylinder, but injector phasing (where the fuel is injected) and individual spark control will not function.

• How can the GEN4 system provide sequential fuel injection and individual fuel control per cylinder without the cam camshaft position input hooked up?
-When the engine starts cranking over, the GEN4 ECU begins firing the injector drivers, assigned to each injector, in the firing order inputted into the software. What the GEN3 system cannot do without the cam camshaft position input hooked up is to determine where to inject fuel (the position in crankshaft degrees, relative to TDC, for each cylinder).

The Base Spark Table('s) are edited as soon in the BigstuffTPM GEN4 ECU Full Software Manual located on our website. Click on this link to navigate and download.

• At what injector duty cycle % are my injectors considered out of control, or static?
-Loss of injector control does not occur at 100% duty cycle, but at approximately 85% duty cycle. At 85% duty cycle the injectors are most likely not opening and closing in a controlled fashion.

-This condition is termed "static" (vs. dynamic) control. An example why this condition is undesirable is if the GEN4 ECU demands more fuel (demanding a larger pulse width) and the injector is already static. The only way to move more fuel through the injector would be to increase the fuel pressure. Increasing the fuel pressure at the 1/8th mile marker is not possible, so things go bad quickly.

-Also, teetering on and off at the static point is also undesirable. Lastly, running the injectors drivers static for long periods of time can damage them.

• How do I set up my ignition system with the GEN4 system?
-For more information on ignition system setups, beyond what is available in this manual, go to the How To/Help section on the BigStuffTPM website, and then Ignition System Setup Tutorial. The link is: http://bigstufftpm.com/pdf/Ignition%20Guide%20rev%201.2.pdf. There are nine (9) ignition system setups outlined. There is also information on the setting up the Ford TFI, GM HEI, GM Opti-spark & MSD8 ignition systems in the How To/Help section of the website.

• Where can I find wiring harness information on the BS3 power-train system and optional systems?
-Information on most of our wiring harnesses is available on our website at www.bigstufftpm.com.
-Go to the GEN4 section on the website and under the GEN4 PRO XTREME menu will be more information. The link is: http://bigstufftpm.com/gen4/

• My engine will not start. What should I check?
-Make sure the harness side header connectors, interfacing with the GEN4 ECU, are attached and tightened to no more than 15 – 20 inch lbs.
-Make sure the battery voltage is at, or above, 12V during cranking. Low battery voltage

conditions must be fixed before trying to start the engine. Battery voltage (especially during cranking) is even more important with coil-on-plug applications.

-Make sure you can see an RPM signal in the software or dash. While turning the engine over, you should see at least 100 – 150 RPM. If no RPM signal is present, check that the crank input (crank trigger or distributor) signal wire is connected to the red wire in the BS3 "Crank" connector. Swap the 2 wires and try again.

-For distributor ignition based applications, make sure the BS3 points wire is connected to the ignition system points input terminal/wire. Applying 12V directly to the BS3 points wire will immediately damage the GEN4 ECU!!
-For COP engines (LSx and other standalone COP engine) the cam input cannot occur at the same time as the crank input!!! If this is the case, the engine will not start. The cam synch pulse must occur before a crank pulse. Ideally, 10* before the crank pulse.
-For more information on ignition system setups, go to the How To/Help section on the BS3 website, then to Ignition System Setup Tutorial.
-With all coil-on-plug engines, make sure the coil ground eyelet is securely fastened to the cylinder head or engine block. No other grounds locations should be used.
-The ECU may be in Clear flood Mode. Make sure the TPS sensor reads near 1-2% when the throttle is closed and near 100% when fully opened. If it reads near 100% when closed, the ECU is in clear flood mode and is not injecting fuel. Swap TPS pins A & C in the TPS connector.
Make sure the crank sensor is connected.
-The LS1 Cam sensor connections are: **• A – Signal • B – Ground • C – 12V •**
The LS2 cam sensor connections must be (terminals A & C are swapped): **• A – 12V • B – Ground • C – Signal**

• My engine timing does seem right, what should I check.

-Make sure the firing order is correct.
-Both the BS3 GEN4 main wiring harness and the MSD ignition system must be connected directly to the battery!! If not, ground loop issues are likely to occur.
-Make sure your pulses per rev in the Operating Configuration table is correct for your application. For example, a four (4) magnet MSD crank trigger setup should have a value of 4.

• I can't get my LSx engine started.

-I'm using an LS2 sensor in the front of the engine.
-Swap pins A & C in the cam input connector around. My TPS sensor reads 100% when the throttle is closed and 0% when the throttle is fully opened. Swap the wires A & C in the TPS connector. The engine may not start since the ECU senses that the Clear flood Mode has been invoked

• If I am tuning in Alpha/N mode (Hardware Configuration, then Control Algorithm) can I use my 1 Bar MAP sensor for barometric compensation?

-Yes, the automatic barometric compensation is hard-coded in the ECU. Leave the MAP sensor vacuum port exposed to the atmosphere. Do not plug the MAP vacuum port to the intake

manifold.

• What do I need to do to make sure my 3 step works correctly?
-A clean 12VDC must be applied to Header 2 W1 meaning a relay with only 12vdc. Do not use the same 12VDC feeding the transbrake solenoid as flyback voltage from the transbrake releasing can damage the ECU!
-Confirm the 3 Step settings in the System Menu / RevLimiters are configured correctly. The TPS% On threshold must be higher than the Off threshold.

• I do not think my injectors are pulsing. What can I check?
-Make sure the BS3 and MSD systems are grounded directly to the battery.
-Plug a "noid" light into each injector position in the injector wire harness. Turn the engine over and see if the light pulses for each injector location.

• I do not think my COP coils are firing. What can I check?
-Make sure the BS3 main wire harness ground is wired directly to the battery.
-Make sure the coil ground wire is grounded to the engine block or cylinder head. No other ground location will work!

• Can I use a 5 Bar MAP sensor?
-Yes, choose 5 Bar MAP sensor in the System Menu / Pressure and Sensor Configuration section.
-Be sure to cycle the 12VDC ignition on the ECU and you will need to recalibrate the fuel/afr/spark tables on this or any MAP sensor change.
- Note: The 4 BAR MAP sensor sold by BigStuffTPM is good to 52 PSI.

• How do I know if my Bosch LSU4.9 WBO2 sensor is bad?
-First make sure the sensor to main wire harness connection is good.

• How can I check if my NTK WBO2 Methanol sensor is working?
-First check the control circuitry by disconnecting the sensor from the harness. Turn the ignition to the BS3 ECU on. With the engine off its best to move the O2 sensor out of the exhaust and have it hang in the air. Go online with the ECU and navigate to the Gauge Cluster tab and go to the NTKWBO2 tab on the bottom the screen. In the upper right hand corner of the page will be LB%O2 and RB%O2 readings. Go to the AFR Menu and click on the O2 and EGT Parameters section. In the lower right hand corner turn the "Perform NTKO2 WBO2 Air Cal" to "Yes". **WARNING**! Do not hold the O2 sensor as it will start to heat up and you can get severely burned. You will see the O2% readings start to update and after about 5 minutes you should be reading about 18%-22% on either sensor. If you do not read that more than likely the sensor is defective and needs to be replaced. Contact BigstuffTPM for more details at this point. If the sensor reads fine turn the Air Cal to "Off" and turn the ignition off. Wait for the sensor to cool down and reinstall in the exhaust and you are ready to go.

• What caused my O2 sensor to fail?

-Being dropped
-Running leaded fuel
-Running rich at idle

• Does the GEN4 ECU offer an auto-shift feature?
Yes, BigStuffTPM offers an optional transmission auto-shift feature. The system will shift up to five (5) speeds with independent shift RPM and Hysteresis points. Once the system is configured for the auto-shift feature, a wire from ECU Header 2 location, P2 must be run to the ground side of the relay.

• What dwell times should be used with the LS1 coils sold with my system?
With a 12V charging system from idle to approximately 4,000 RPM use about 3.0 milliseconds near idle and no more than about 4.0 milliseconds at approximately 4,000 RPM. From approximately 4,100 - Max RPM use no more than about 6 milliseconds of total dwell time at max RPM. With a 16V charging system from idle to approximately 4,000 RPM use about 2.0 milliseconds near idle and no more than about 3.0 milliseconds at approximately 4,000 RPM. From approximately 4,100 - Max RPM use no more than about 4.5 milliseconds of total dwell time at max RPM.

Datalogger acronyms

Point Definitions are displayed in alphabetical order and are the same for either laptop based datalogging or pulling the data from the on board SD card.

A

AC_BUMP_ON – Air Conditioning Engine RPM increase active condition
ACCEL_X – Accelerometer X Axis
ACCEL_Y – Accelerometer Y Axis
ACCEL_Z – Accelerometer Z Axis
ACCEL_ENG – Acceleration Engine value
ACT_IAC_POS – Current Idle Air Control Motor Position
AFR_TARGET – Air Fuel Ratio Target
AFR_L_BANK – Air Fuel Ratio Left Bank
AFR_R_BANK – Air Fuel Ratio Right Bank
AFR_CYL_1 – Air Fuel Ratio Cylinder 1
AFR_CYL_2 – Air Fuel Ratio Cylinder 2
AFR_CYL_3 – Air Fuel Ratio Cylinder 3
AFR_CYL_4 – Air Fuel Ratio Cylinder 4
AFR_CYL_5 – Air Fuel Ratio Cylinder 5
AFR_CYL_6 – Air Fuel Ratio Cylinder 6
AFR_CYL_7 – Air Fuel Ratio Cylinder 7
AFR_CYL_8 – Air Fuel Ratio Cylinder 8

B

BARO – Outside Barometric Pressure
BATTERY_VOLTAGE – Battery voltage
BC_SENSOR_ERROR – Boost Controller Sensor Input Error
BOOST_PSI – Intake Manifold Pressure
BOOST_CL_DC – GN Boost Controller Duty Cycle Output %
Boost_Inc PIDTerm – GN Boost Controller PID Increase %

C

CLT – Coolant Temperature
CORR_AIR – Fuel Percentage Air Temperature Correction
CORR_AFTST – Afterstart Fuel Percentage Correction
CORR_BARO – Barometric Fuel Percentage Correction
CORR_CLT – Coolant Warm Up Temperature Fuel Percentage Correction
CORR_E85 – E85 Fuel Percentage Correction
CORR_ES_PVFC – Extended Source Power Valve Fuel Correction Percentage
CORR_FP_COMP – Fuel Pressure Correction
CORR_PVF – Power Valve Fuel Correction
CORR_SLT – Start Line Fuel Percentage Correction

D

DAE_INPUT – DAE 12vdc Input true or false
DSRD_BOOST_MAP – Desired Boost Map
DSRD_SR2_MAP – Desired SR2 Map
DUTY_CYCLE_BOOST_INC – Boost Controller Duty Cycle Output Increase %
DUTY_CYCLE_BOOST_DEC – Boost Controller Duty Cycle Output Decrease %
DUTY_CYCLE_PWM07 – Duty Cycle Output Pulse Width Modulation 07
DUTY_CYCLE_PWM08 – Duty Cycle Output Pulse Width Modulation 08
DUTY_CYCLE_PWM09 – Duty Cycle Output Pulse Width Modulation 09
DUTY_CYCLE_NOS_PRG – Progressive Nitrous Duty Cycle Control Output Percentage
DUTY_CYCLE_CYL1 – Fuel Injector Duty Cycle Percentage Cylinder 1
DUTY_CYCLE_CYL2 – Fuel Injector Duty Cycle Percentage Cylinder 2
DUTY_CYCLE_CYL3 – Fuel Injector Duty Cycle Percentage Cylinder 3
DUTY_CYCLE_CYL4 – Fuel Injector Duty Cycle Percentage Cylinder 4
DUTY_CYCLE_CYL5 – Fuel Injector Duty Cycle Percentage Cylinder 5
DUTY_CYCLE_CYL6 – Fuel Injector Duty Cycle Percentage Cylinder 6
DUTY_CYCLE_CYL7 – Fuel Injector Duty Cycle Percentage Cylinder 7
DUTY_CYCLE_CYL8 – Fuel Injector Duty Cycle Percentage Cylinder 8
DUTY_CYCLE_FRCMTR – Duty Cycle Force Motor Output Percentage (Used with 4L60E/80E)

DUTY_CYCLE_TCC – Duty Cycle Torque Converter Clutch Output (Used with 4L60E/80E)
DWELL_TIME – Ignition Coil Dwell Time

E

E85_SPARK_OFFSET – E85 Spark Offset
ECM_RB_EC – NTK O2 Sensor Right Bank Error Code
ECU_SYNC – Current ECU Synchronization Status
EGT_CYL1 – Exhaust Gas Temperature Cylinder 1
EGT_CYL2 – Exhaust Gas Temperature Cylinder 2
EGT_CYL3 – Exhaust Gas Temperature Cylinder 3
EGT_CYL4 – Exhaust Gas Temperature Cylinder 4
EGT_CYL5 – Exhaust Gas Temperature Cylinder 5
EGT_CYL6 – Exhaust Gas Temperature Cylinder 6
EGT_CYL7 – Exhaust Gas Temperature Cylinder 7
EGT_CYL8 – Exhaust Gas Temperature Cylinder 8
ENG_STATE – Engine State (1-Engine Cranking, 4-Engine Running Steady, 5-Engine Accelerating, 6-Engine Decelerating, 7-Deceleration Fuel Cutoff)
EGT_SHUTDOWN_ACTIVE – Exhaust Gas Temperature Shutdown Active Condition
ETM_TORQ_STG – Engine Torque Management Torque Stage Current Value
ETM_DS_ENG_ERROR – ETM Driveshaft or Engine RPM Error
ETM_DS_ENG_DSRD – ETM Driveshaft or Engine RPM Desired

F

FP_SENSOR_ERROR – Fuel Pressure Sensor Input Error
FP_WARNING_ACTIVE – Fuel Pressure Warning Active Condition
FSL_TBL_INDEX – Fuel Spark Lambda current map enabled
FUEL_FLOW_CYL1 – Calculated Fuel flow in lbs/hr for Cylinder 1
FUEL_FLOW_CYL2 – Calculated Fuel flow in lbs/hr for Cylinder 2
FUEL_FLOW_CYL3 – Calculated Fuel flow in lbs/hr for Cylinder 3
FUEL_FLOW_CYL4 – Calculated Fuel flow in lbs/hr for Cylinder 4
FUEL_FLOW_CYL5 – Calculated Fuel flow in lbs/hr for Cylinder 5
FUEL_FLOW_CYL6 – Calculated Fuel flow in lbs/hr for Cylinder 6
FUEL_FLOW_CYL7 – Calculated Fuel flow in lbs/hr for Cylinder 7
FUEL_FLOW_CYL8 – Calculated Fuel flow in lbs/hr for Cylinder 8
FUEL_FLOW_TOTAL – Total Calculated Fuel Flow of cylinders 1-8 in lbs/hr

G

GEAR – Current Gear position calculated by engine rpm drop
GEN_BOOST_ADD – Generic Boost Tables Additional Boost Pressure
GEN_FUEL_LBSHR_ADD – Generic Fuel Lbs/hr adder

GEN_FUEL_MULT – Generic Fuel Multiplier Percentage Adder
GEN_LAMBDA_ADD – Generic Lambda Fuel Adder
GEN_LAMBDA_MULT – Generic Lambda Fuel Multiplier
GEN_SPK_ADV_ADD – Generic Spark Advance Adder
GS_ACCEL – Gear Speed Acceleration
GYRO_X – Gyrometer X Axis
GYRO_Y – Gyrometer Y Axis
GYRO_Z – Gyrometer Z Axis

H

HEAD_TEMP_RB – Head Temperature Right Bank. When in Pro Mod Mode located in the System->Hardware Configuration section this sensor is enabled for use. Pro Mod Mode sets the water and air sensors to 100* in the software so that they have no bearing on the overall VE fuel calculation. This is the GM Water Temperature Sensor.
HEAD_TEMP_LB – Head Temperature Left Bank. When in Pro Mod Mode located in the System->Hardware Configuration section this sensor is enabled for use. Pro Mod Mode sets the water and air sensors to 100* in the software so that they have no bearing on the overall VE fuel calculation. This is the GM Air Temperature Sensor.

I

IAT – Intake Air Temperature
ICF_CORR_CYL1 – Individual Cylinder Fuel Percentage Correction Cylinder 1
ICF_CORR_CYL2 – Individual Cylinder Fuel Percentage Correction Cylinder 2
ICF_CORR_CYL3 – Individual Cylinder Fuel Percentage Correction Cylinder 3
ICF_CORR_CYL4 – Individual Cylinder Fuel Percentage Correction Cylinder 4
ICF_CORR_CYL5 – Individual Cylinder Fuel Percentage Correction Cylinder 5
ICF_CORR_CYL6 – Individual Cylinder Fuel Percentage Correction Cylinder 6
ICF_CORR_CYL7 – Individual Cylinder Fuel Percentage Correction Cylinder 7
ICF_CORR_CYL8 – Individual Cylinder Fuel Percentage Correction Cylinder 8
ICS_CORR_CYL1 – Individual Cylinder Spark Correction Cylinder 1
ICS_CORR_CYL2 – Individual Cylinder Spark Correction Cylinder 2
ICS_CORR_CYL3 – Individual Cylinder Spark Correction Cylinder 3
ICS_CORR_CYL4 – Individual Cylinder Spark Correction Cylinder 4
ICS_CORR_CYL5 – Individual Cylinder Spark Correction Cylinder 5
ICS_CORR_CYL6 – Individual Cylinder Spark Correction Cylinder 6
ICS_CORR_CYL7 – Individual Cylinder Spark Correction Cylinder 7
ICS_CORR_CYL8 – Individual Cylinder Spark Correction Cylinder 8
INJ_GPW_AVE – Fuel Injector Gross Pulse Width Average
INJ_PHASE_ANGLE – Fuel Injector Injection Event Phase Angle
IOT – Fuel Injector Opening Tim

L

LAMBDA_CYL1 – Lambda Value Cylinder 1
LAMBDA_CYL2 – Lambda Value Cylinder 2
LAMBDA_CYL3 – Lambda Value Cylinder 3
LAMBDA_CYL4 – Lambda Value Cylinder 4
LAMBDA_CYL5 – Lambda Value Cylinder 5
LAMBDA_CYL6 – Lambda Value Cylinder 6
LAMBDA_CYL7 – Lambda Value Cylinder 7
LAMBDA_CYL8 – Lambda Value Cylinder 8
LAMBDA_L_BANK – Lambda Reading Left Bank
LAMBDA_R_BANK – Lambda Reading Right Bank
LAMBDA_TARGET – Lambda Reading Left Bank
LAMBDA_RB_UA – Lambda Right Bank NTK O2 Error Code
LASER_HEIGHT__AD5 – Laser Height Sensor Reading

M

MAP – Engine Intake Manifold Pressure
MPH – Miles Per Hour

N

NERNST_CYL1 – Resistance value of the Cylinder 1 Bosch O2 sensor. Normal value is around 300. **NERNST_CYL2** – Resistance value of the Cylinder 2 Bosch O2 sensor. Normal value is around 300.
NERNST_CYL3 – Resistance value of the Cylinder 3 Bosch O2 sensor. Normal value is around 300.
NERNST_CYL4 – Resistance value of the Cylinder 4 Bosch O2 sensor. Normal value is around 300.
NERNST_CYL5 – Resistance value of the Cylinder 5 Bosch O2 sensor. Normal value is around 300.
NERNST_CYL6 – Resistance value of the Cylinder 6 Bosch O2 sensor. Normal value is around 300.
NERNST_CYL7 – Resistance value of the Cylinder 7 Bosch O2 sensor. Normal value is around 300.
NERNST_CYL8 – Resistance value of the Cylinder 8 Bosch O2 sensor. Normal value is around 300.
NOS_STAGE – Current NOS Stage
NOS_BOOST_ENABLE – Nitrous or Boost Enable Arm Switch
NOS_TIMER – When activated is the Nitrous Run Time
NOS_ICS_CORR_CYL1 – Nitrous Individual Cylinder Spark Correction Cylinder 1
NOS_ICS_CORR_CYL2 – Nitrous Individual Cylinder Spark Correction Cylinder 2

NOS_ICS_CORR_CYL3 – Nitrous Individual Cylinder Spark Correction Cylinder 3
NOS_ICS_CORR_CYL4 – Nitrous Individual Cylinder Spark Correction Cylinder 4
NOS_ICS_CORR_CYL5 – Nitrous Individual Cylinder Spark Correction Cylinder 5
NOS_ICS_CORR_CYL6 – Nitrous Individual Cylinder Spark Correction Cylinder 6
NOS_ICS_CORR_CYL7 – Nitrous Individual Cylinder Spark Correction Cylinder 7
NOS_ICS_CORR_CYL8 – Nitrous Individual Cylinder Spark Correction Cylinder 8

O

O2_CORR_CYL1 – Closed Loop O2 AFR Fuel Correction Cylinder 1
O2_CORR_CYL2 – Closed Loop O2 AFR Fuel Correction Cylinder 2
O2_CORR_CYL3 – Closed Loop O2 AFR Fuel Correction Cylinder 3
O2_CORR_CYL4 – Closed Loop O2 AFR Fuel Correction Cylinder 4
O2_CORR_CYL5 – Closed Loop O2 AFR Fuel Correction Cylinder 5
O2_CORR_CYL6 – Closed Loop O2 AFR Fuel Correction Cylinder 6
O2_CORR_CYL7 – Closed Loop O2 AFR Fuel Correction Cylinder 7
O2_CORR_CYL8 – Closed Loop O2 AFR Fuel Correction Cylinder 8
O2_CORR_L_BANK – Closed Loop O2 AFR Fuel Correction Left Bank
O2_CORR_R_BANK – Closed Loop O2 AFR Fuel Correction Right Bank

P

PCT_ETHANOL – Percentage of Ethanol in fuel (Need sensor to read properly)
PEDAL_BIT_MODE – Pedal Bit Mode Current Condition
PCT_TCC_SLIP – Percentage of Torque Converter Clutch Slippage (Used with 4L60E/80E)
PRESS_FUEL – Fuel Pressure Reading
PRESS_OIL – Oil Pressure Reading
PRESS_TURBO – Turbocharger Pressure Reading
PRESS_WG – Wastegate Pressure Reading
PRESS_NOS – Nitrous Pressure Reading
PRESS_PV – Pan Vacuum Reading
PRESS_TL – Transmission Line Pressure Reading
PRESS_DSRD_WG – CO2 Desired Wastegate
PRNDL – Park / Reverse / Neutral / Drive / Low (Used with 4L60E/80E)

R

RACE_FUEL_LBS_HR – NOS Mode Race Fuel Lbs/hr fuel adder
REV_LIMITER – Current condition of any active rev limiters
RPM_ENGINE – Engine RPM
RPM_TSS1_LB – Turbocharger Shaft Speed RPM Left Bank
RPM_TSS2_RB – Turbocharger Shaft Speed RPM Right Bank
RPM_ABS_FW – RPM Front Wheel Speed Sensor

RPM_ABS_RW – RPM Rear Wheel Speed Sensor
RPM_TOSS – RPM Transmission Output Speed Sensor or Driveshaft Sensor
RPM_TISS – RPM Transmission Input Speed Sensor

S

SLT_MODE – Start Line Timing Mode Current Condition
SHOCK_RF__AD7 – Right Front Shock Reading
SHOCK_LF__AD8 – Left Front Shock Reading
SHOCK_RR__AD9 – Right Rear Shock Reading
SHOCK_LR__AD10 – Left Rear Shock Reading
SPK_ADV_BCP – Base Spark Advance
SPK_ADV_CYL1 – Spark Advance Cylinder 1
SPK_ADV_CYL2 – Spark Advance Cylinder 2
SPK_ADV_CYL3 – Spark Advance Cylinder 3
SPK_ADV_CYL4 – Spark Advance Cylinder 4
SPK_ADV_CYL5 – Spark Advance Cylinder 5
SPK_ADV_CYL6 – Spark Advance Cylinder 6
SPK_ADV_CYL7 – Spark Advance Cylinder 7
SPK_ADV_CYL8 – Spark Advance Cylinder 8
SR2_TIMER – Current Race time after the release of the three step
SR2_GEAR1_SPK_OFFSET – SR2 Gear 1 Spark Offset
SR2_DS_SPK_OFFSET – SR2 Driveshaft or Engine Spark Offset
SR2_DS_ERROR – SR2 Driveshaft or Engine RPM Error
SR2_DS_DSRD – SR2 Driveshaft or Engine RPM Desired
SS_SPK_NOS_RTD – Street Strip Nitrous Spark Retard
SS_NOS_FUEL_ADD – Street Strip Nitrous Fuel Adder
SS_NOS_LAMBDA_OFFSET – Street Strip Nitrous Lambda Target Offset

T

TPS – Throttle Position Sensor Percentage
TOT – Transmission Oil Temperature Reading
THREE_STEP_INPUT – Three Step Input 12vdc true or false
THREE_STEP_MODE – Three Step Active Condition
TRANS_GEAR_RATIO – Current Transmission Gear Ratio (Used with 4L60E/80E)
TSD_GEAR1_OFFSET – Touch Screen Dash Gear 1 Offset
TSD_SR2_DS_OFFSET – Touchscreen Dash SR2 Driveshaft or Engine RPM Offset
TSD_ETM_DS_OFFSET – Touchscreen Dash ETM Driveshaft or Engine RPM Offset
TWO_STEP_INPUT – Two Step Input 12vdc true or false
TWO_STEP_ACTIVE – Two Step Active Condition
TWO_STEP_MODE – Two Step Active Condition

V

VE -Volumetric Efficiency number calculated from the base fuel map

W

WHEEL SPIN – Calculated wheel speed based off differential from either the rear wheel speed sensor or driveshaft sensor compared to the front wheel speed sensor.

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