Holley V2 Software Update Overview

Holley has made many updates and improvements with the V2 software and firmware update for HP and Dominator ECU's. This document covers all of these changes. All users are highly recommended to thoroughly read and digest all of this information. These changes are covered by reviewing each specific Individual Configuration Files (ICF) as well as other specific areas such as datalogging.

FIRMWARE: V2 software (designated by software versions 2.1.0 and higher) and above MUST be used with firmware versions 510 and up.

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1.0 Installing Software

Software installation occurs as with previous versions. Auto-installation should occur once the disk is inserted, or when the installer program is executed. If there is a previous version of the Holley EFI software installed (version 1.5, etc.), and the V2 software is installed to the default directories, the previous software version executable WILL be overwritten. If you don't want this to occur, name/create another directory path when you install the V2 software. However, previous Global Folders, Datalogs, Configs will NOT be removed/overwritten. See "Opening/Saving Files" below on information regarding where new Global Folders, Data Logs, etc. will be stored.

Note: If your current ECU is using software version 1.3, you need to contact Holley tech at 1-270-781-9741.

2.0 Opening/Saving Files

There are new screens and navigations when opening and saving Global Folders. These make it easier to differentiate a Holley EFI Global Folder from a regular Windows directory.

The major change with the V2 software (to eliminate file permissions problems in previous software when saving files) when saving Global Folders, Data Logs, and all Configurations files, is they are saved to the "My Documents" area (under Documents\Holley\HEFI\). These files will NOT be located in the program files directory anymore. The same directories are installed here that were previously installed in the Program Files directory. Previous Global Folders, Datalogs, etc., can be copied/moved to this new location.

2.1 Opening a Global Folder

When you first open a Global Folder, you will see the following in **Figure 1**. Newly installed software will show the familiar "Base Cals" and "Custom Cals" directories. Directories will appear with a standard Windows icon. The "Location of Global Folder" shows the directory path at the top.

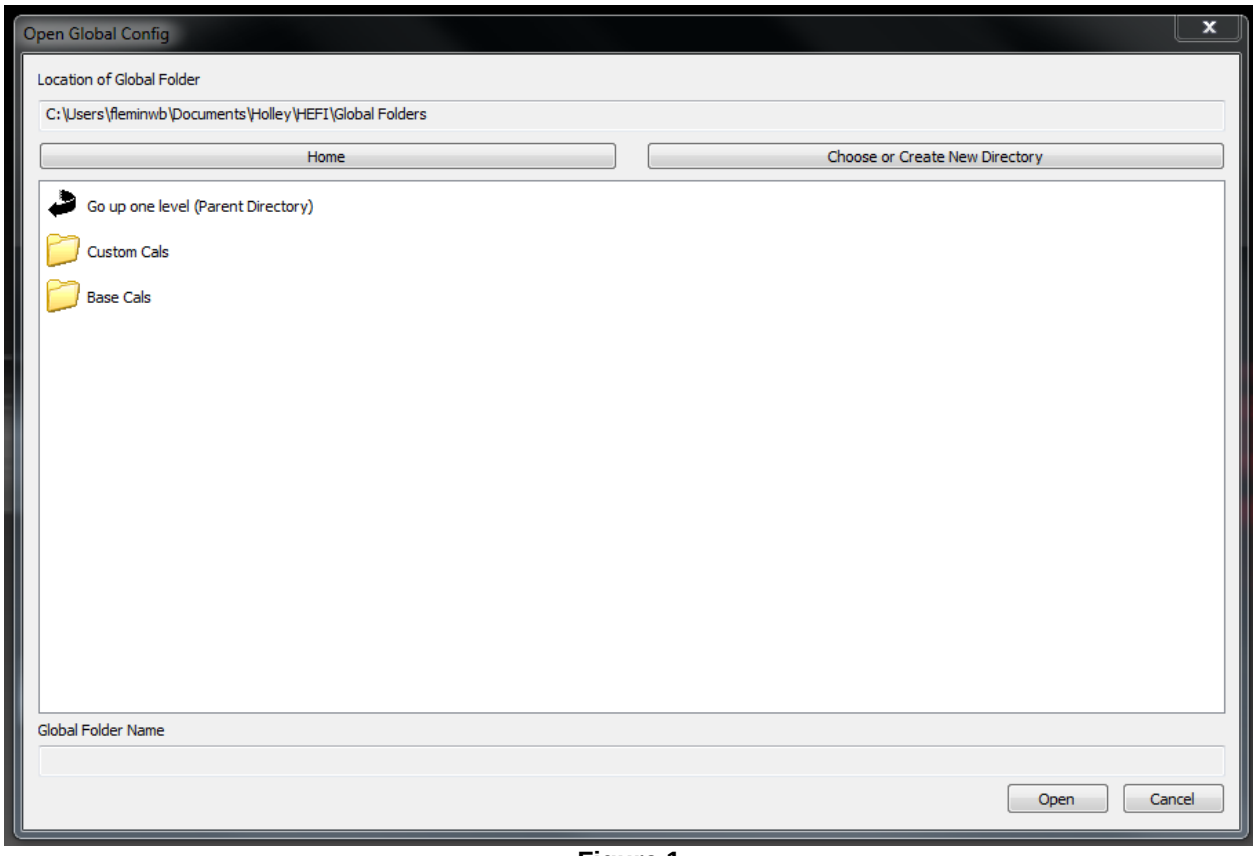

Figure 1

When you look in a directory that has Global Folders present, they will appear as a “Holley ECU” icon (**Figure 2**). To open a Global Folder, select it (which will then appear in the “Global Folder Name” area at the bottom, and select the “Open” button.

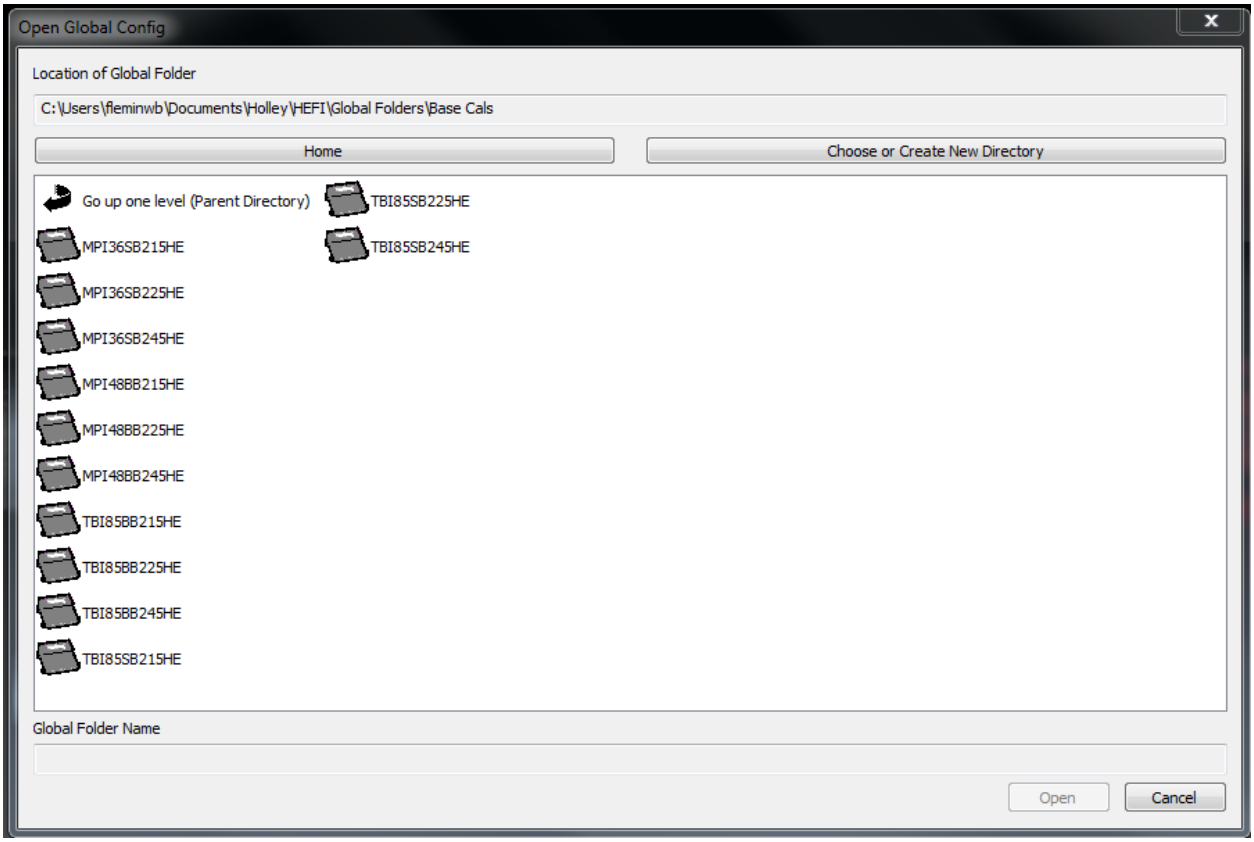

Figure 2

If you want to go up a directly level, select the “Go up one level (Parent Directory) selection. If you want to select an entirely new directory or drive when opening or saving, select the “Choose or Create New Directory” button. You will then see the window shown in **Figure 3**. This will allow you to browse to a different location.

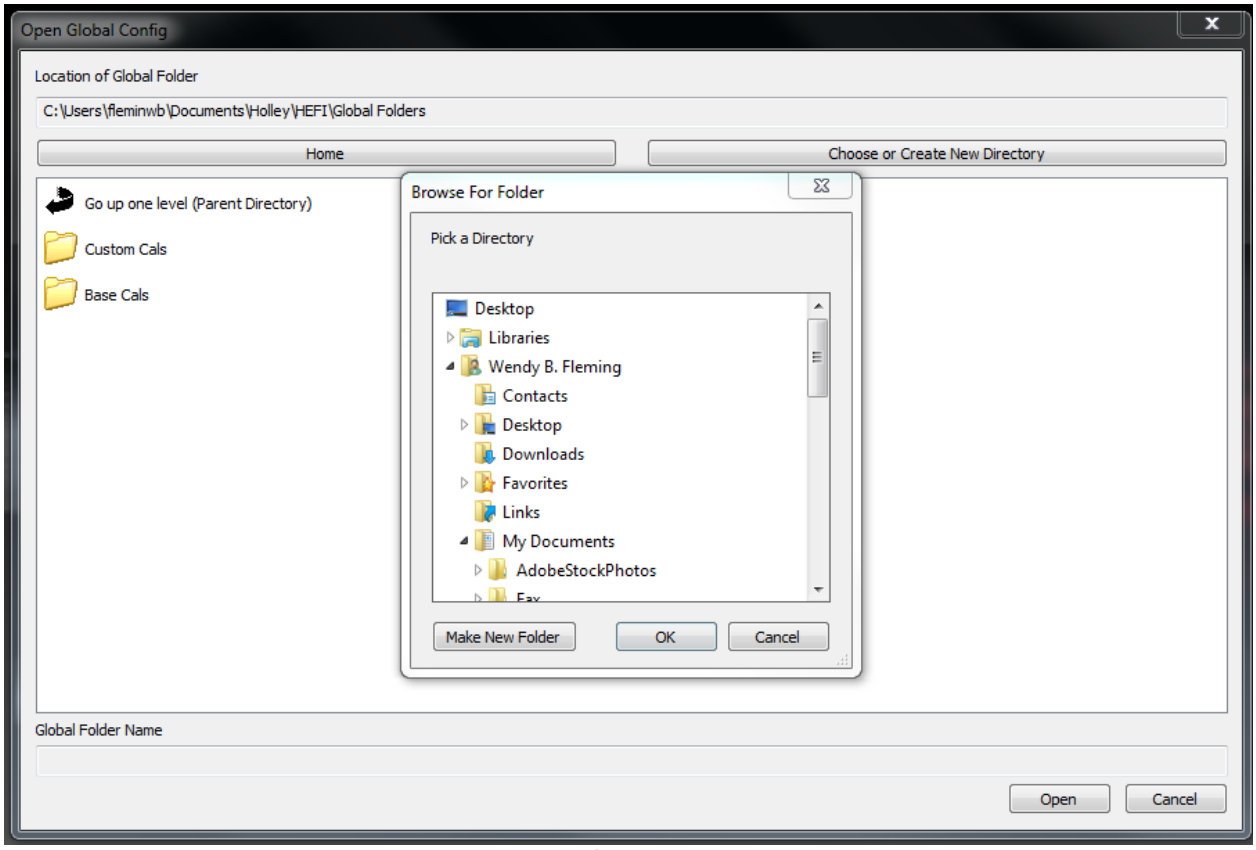

Figure 3

2.2 Saving a Global Folder

When you save a file, the same formatting is used as when you open one. The Global Folder name that is currently open in the software is automatically populated in the “Global Folder Name” at the bottom of the screen. You can change it if desired. To create a new directory, or navigate to another drive or directory, select the “Choose or Create New Directory” button. To go up one directory level, select the “Go up one level (Parent Directory)” button.

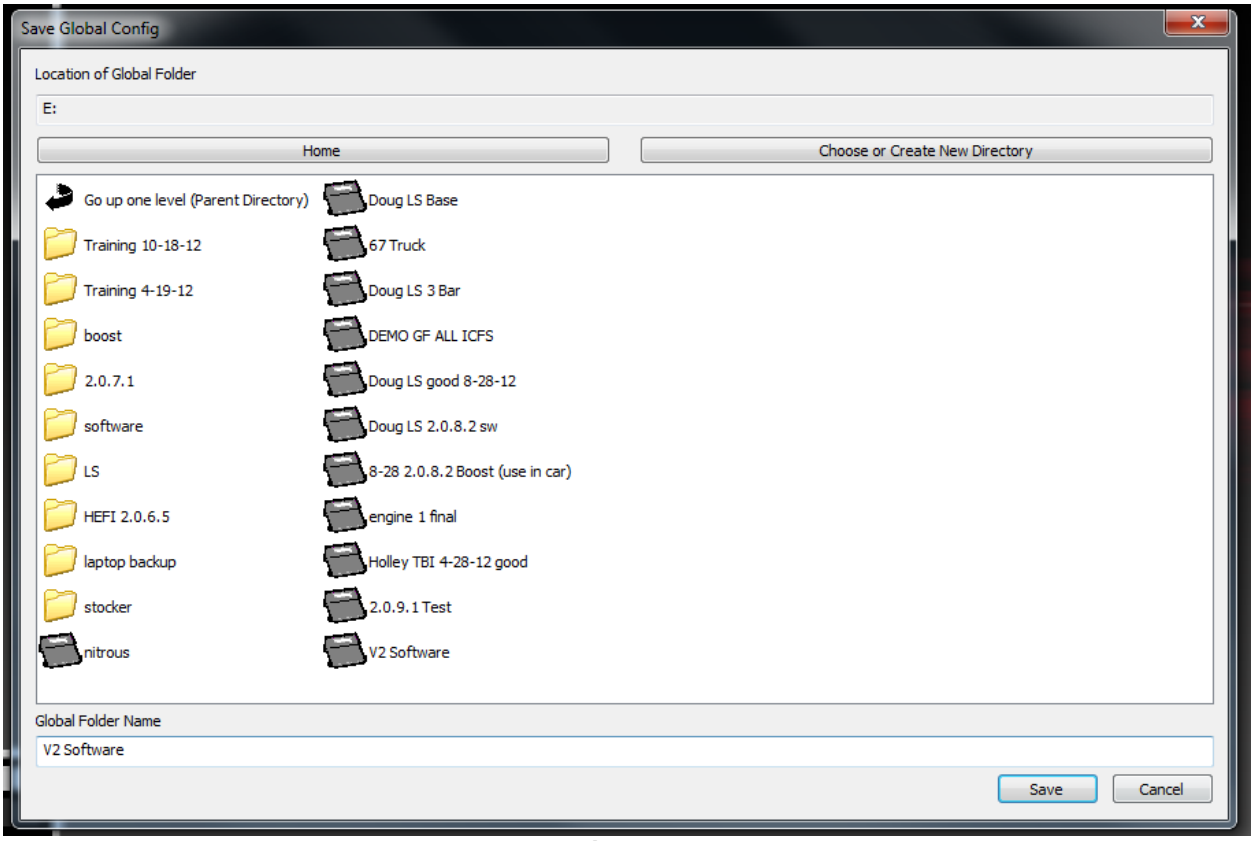

Figure 4

3.0 Preferences

There are two new options in the “Preferences” selection (found under “toolbox”). The first is the option to display the Y axis in many tables in PSIA instead of kPa. Select the checkbox if this is desired. The second allows for a logfile to automatically open after it is saved.

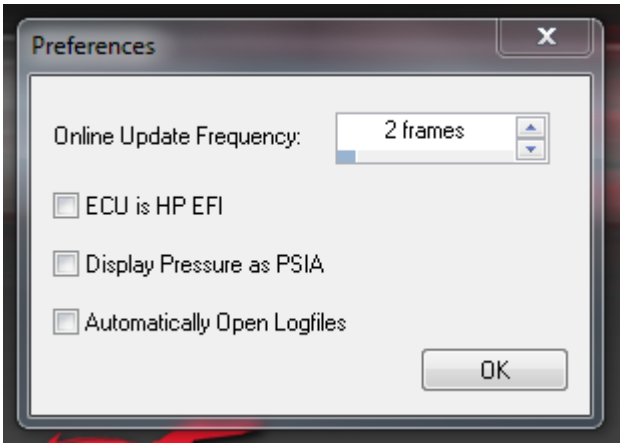

Figure 5

4.0 Fuel ICF

4.1 Base Fuel Table Changes

1) Volumetric Efficiency (VE) Conversion – The ability to view the “Base Fuel” table as a VE table is possible. When viewing the Base Fuel table, click on the “Conversion” box at the top. The base fuel table will then be shown as a VE table. This is very useful when doing a quick check as to the “legitimacy” of the base fuel calibration. At 100 kPa, above approximately 3000 RPM, values should typically read between 90-105% VE. If this is not the case, information may not be correct for the “Engine Displacement” or Injector Fuel Flow. If this information is correct, values below 90% typically mean the Base Fuel table is too lean, and values above would indicate too much fuel. The VE curve should be highest at peak torque, and less before and after that point. This conversion is available in both the Base Fuel Table, as well as the Graph.

   Alternately, the conversion button can be used to convert a VE table to a fuel flow table, if a VE based fueling strategy is used.

   NOTE: This is for viewing only, if you want to have the system operate and be tuned as a VE based fueling strategy, see #2 just below “Volumetric Efficiency (VE) Operation”.

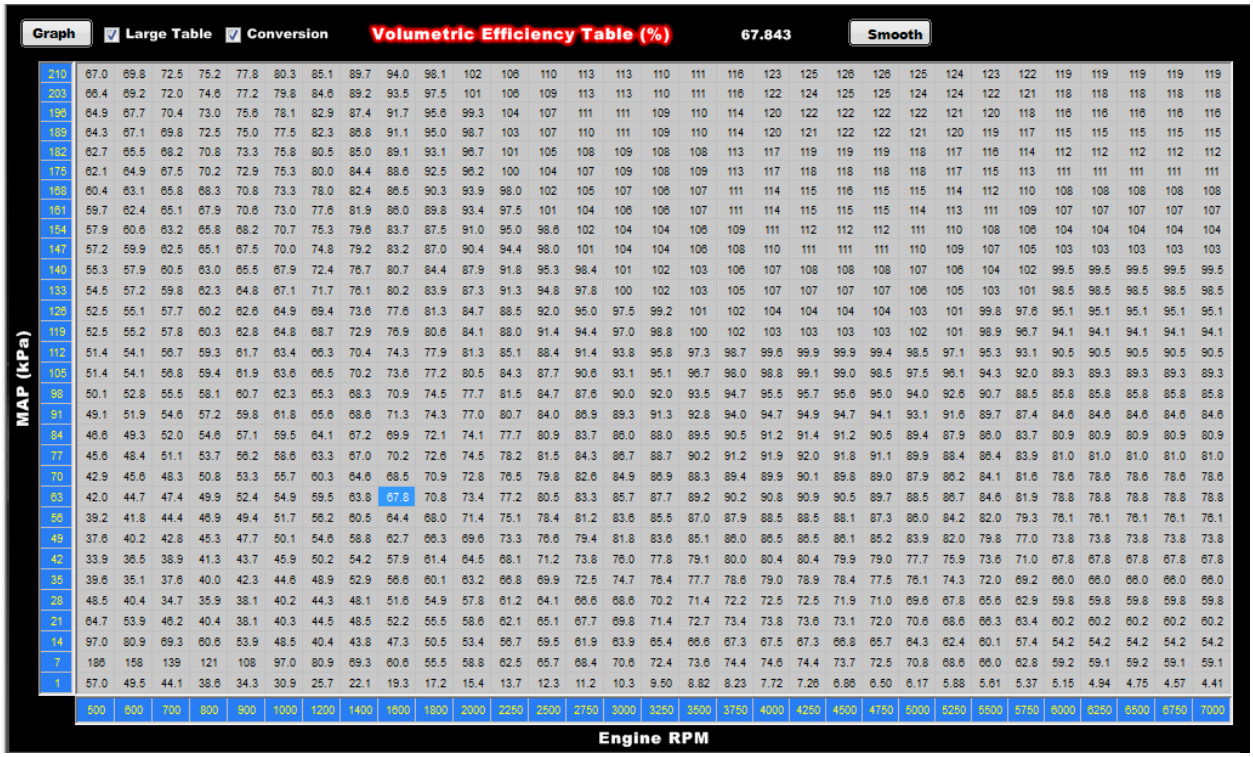

Figure 6

2) Volumetric Efficiency (VE) Operation – The option of a Volumetric Efficiency based tuning strategy is now optional. This changes the Base Fuel Table units from pounds/hour of fuel to VE%. VE fueling calculations are calculated from the following inputs:
   - Engine Displacement (NOTE: Make sure this is input properly in the Engine Parameters!!)
   - Target Air/Fuel Ratio
   - Engine Speed
   - MAP Sensor Value
   - Input from Air Temp Sensor/Air Temp Enrichment Table
   - Value from the Base Fuel Table (VE%)
   - Fuel Injector Size
   - Fuel System Pressure

   From this information, a fuel flow and consequent injector pulse width is determined by the ECU.

   Converting an existing Base Fuel Table that is in the units of lb./hr. to VE is a manual process that is simple to perform. To make this conversion, perform the following:

A) Make sure your Global Folder is saved.
B) Open two instances of the software and open the same Global Folder you are using. One will become the new VE Global Folder (we'll call that "Cal VE" in this example) and one will be used to copy and paste from (we'll call that "Cal" in this example). It is recommended to do a "save as" to the one file you will be changing to VE fueling after you open both to differentiate it easily.
C) In the "Cal VE" Global Folder, change the "Load Sensing" option in the Engine Parameters to "VE Based" (see section 6.1 in these instructions).
D) In the "Cal" Global Folder, open the Base Fuel Table and check the "Conversion" box as described in #1 (VE Conversion) above.
E) Copy and Paste the entire Base Fuel Table AND the RPM and Load X and Y axes from the "Cal" folder to the "Cal VE" folder.

The conversion is complete at this point.

Note the way the "air temperature" is handled with the way the VE fueling strategy is used. The calculation still uses the "Air Temperature Enrichment" table in calculations. If all values are "100%", fueling calculations are never modified based on this table/manifold air temperature. If a percentage multiplier is in the table that is greater or less than 100%, it is used for the fueling calculation based on the intake air temperature (multiplies the final fuel calculation by this percentage). Some VE calculations use the air temp to modify the pulse width as a "background" calculation whereas the user can do this via the air temperature enrichment table.

The intent of this feature is for it to be used by tuners more familiar/comfortable with VE tables or those wishing to enter a fuel table from another system that was VE based.

3) Smoothing – There is now a "Smoothing" button in the Base Fuel Table (located in the upper right). When the smoothing button is selected, it will perform a smoothing operation to all the cells that are selected. To smooth an area, grab and drag the cursor over the desired cells. Then push the smoothing button. You can push it more than once, and the cells will continue to be smoothed. If you push it too many times, you may lose some of the desired integrity of the map, so be conscious of what you are doing.

4) Minimum Value – As a note, the minimum allowable value has been lowered from 1.0 lb./hr. to 0.0.

4.2 Base Fuel Graph Changes

1) Volumetric Efficiency (VE) Conversion – The Base Fuel Graph, like the Base Fuel Table, also has an option for a "Conversion" checkbox, so that it can be viewed as a VE table.

4.3 Target Air Fuel Ratio Table

Target Air Fuel Ratio Table – With the V2 software, after you adjust the Target Air Fuel Ratio Table (TAFR), and move from that screen, you will be asked "The TAFR Values have changed, would you like the fuel map automatically adjusted?" See **Figure 7**. If you select "Yes", the affected area of the target fuel map will be offset based on the change in the air fuel ratios that were performed. If the TAFR table was richened by 10%, this would add 10% more fuel in that area. If a fuel map is well tuned, it is advised to select "Yes", as this should automatically update the base fuel table, eliminating the need for it to re-learn, or be tuned. If you are just creating a base calibration, you may decide to leave the Base Fuel Table alone at that time.

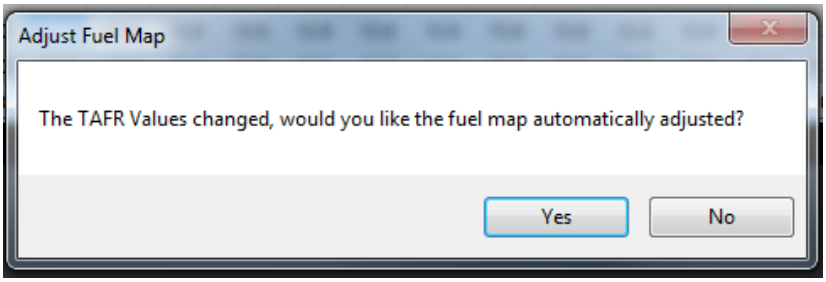

Figure 7

4.4 Acceleration Enrichment Tables/Fuel Modifiers

AE vs. TPS Rate of Change and AE vs. MAP Rate of Change - Acceleration Enrichment (AE) fuel is added when there is a change/movement in the TPS or MAP sensors. There has to be some minimum threshold of movement/Rate of Change (ROC) below which fuel is not added due to signal "noise". For a TPS, this might be vibration, or "very slow" movement of the throttle during which you would not want added fuel. For a MAP sensor, this might be MAP signal movement due to idle fluctuations. In previous Holley EFI software/firmware versions, this "blanking" level was fixed in the background. In V2 versions, the user is allowed to edit this parameter. These parameters are found in the Fuel ICF under "Fuel Modifiers" > "Fuel Control". See **Figure 8**. These values may need to be edited for AE vs. TPS, due to the use of very large throttle bodies, which may need more AE vs. TPS sensitivity. On the other hand, engines with large cams and idle vacuum fluctuations may need a larger MAP vs. AE value, due to MAP sensor fluctuations. The baseline values, that were hard-coded into previous software and hardware versions, were the following:
AE vs. TPS RoC Blanking: 15.0
AE vs. MAP RoC Blanking: 7.0

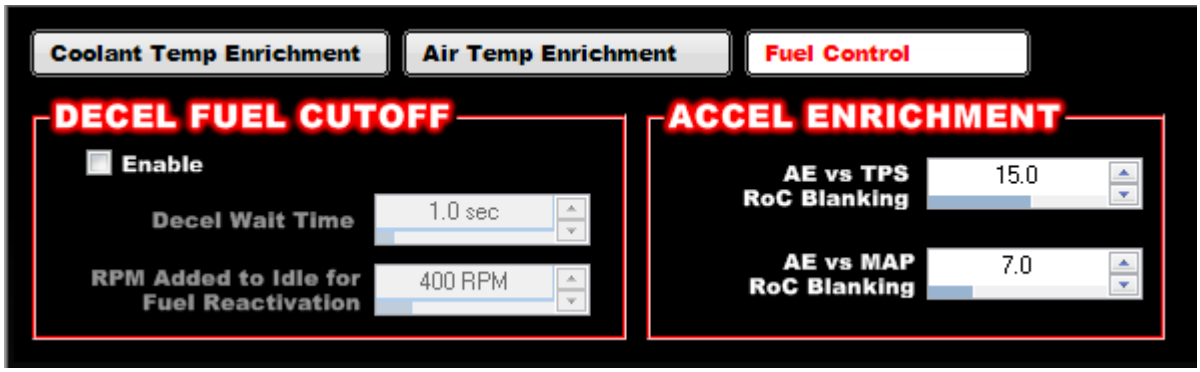

Figure 8

These values are moderately conservative and should work on most applications. However, some applications with large throttle bodies might prefer to use a lower AE vs. TPS RoC Blanking value. It is recommended to be very cautious when changing these values, as too low of a value will invoke unwanted added TPS vs. AE fuel, causing the engine to run sporadically, adding extra fuel when it is not needed. When lowering either value, it is beneficial to look at the data monitor and/or data logs at the "MAP RoC" and "TPS RoC" values, and see if there is unwanted activity with either.

NOTE: Due to this update, there has been a change in the software that forces the first value in the AE vs. TPS and AE vs. MAP tables to always be forced to zero. If you found the need to raise this first cell in previous software/firmware versions, you should attempt to lower the blanking values for that parameter as a method of tuning slow TPS or MAP movements.

NOTE: When you load/use the V2 software, it will automatically change the first AE vs. TPS and AE vs. MAP values to ZERO. It will also automatically populate the Blanking tables with the default values shown above.

4.5 Learn Table

When a "Transfer Learning to Base" operation is performed with the V2 software, a message appears with the option to smooth the fuel table with the learn values. This will perform a smoothing operation to the fuel map between the areas that have learning applied and those that don't. You typically always want to select the option to have the smoothing performed, as there is really no downside, and this helps reduce the need to manually smooth the Base Fuel Table, after the learning is transferred.

4.5 Alpha-N Idle Fuel

The nomenclature in this table has been edited, but none of the functionality has been changed. What used to be called “RPM Activation” is now called “Max Alpha-N RPM”. What used to be called “TPS Activation” is now called “Max Alpha-N TPS”. See **Figure 9**.

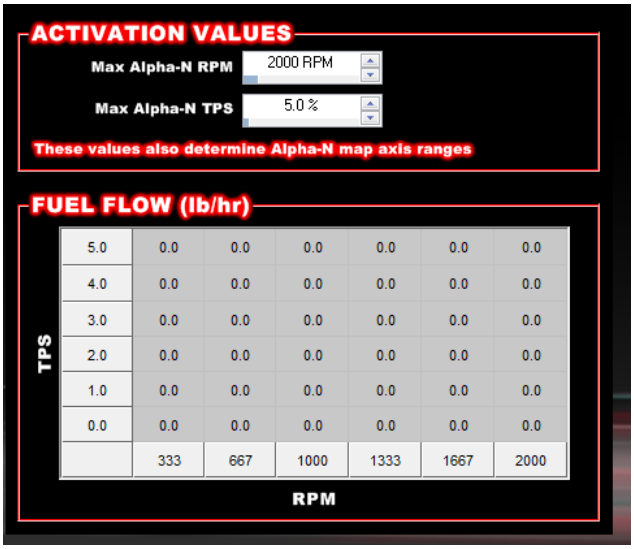

Figure 9

5.0 Sensor ICF

In each sensor in the “Sensor ICF”, there is a new “Offset” variable available for each sensor. If needed, these can be used to “offset” the calibration curve due to a minor drift or offset to a sensor. These should be defaulted to 0.00 and not affect previous calibrations.

Figure 10

6.0 System ICF

There are a variety of new features in the System ICF. They are described below.

6.1 VE Fueling Mode

V2 software provides the option of using a Volumetric Efficiency (VE) table for tuning. You must select "VE Based" in the "Load Sensing" selection. See section 4.1 for more information on tuning and setup. See **Figure 11**.

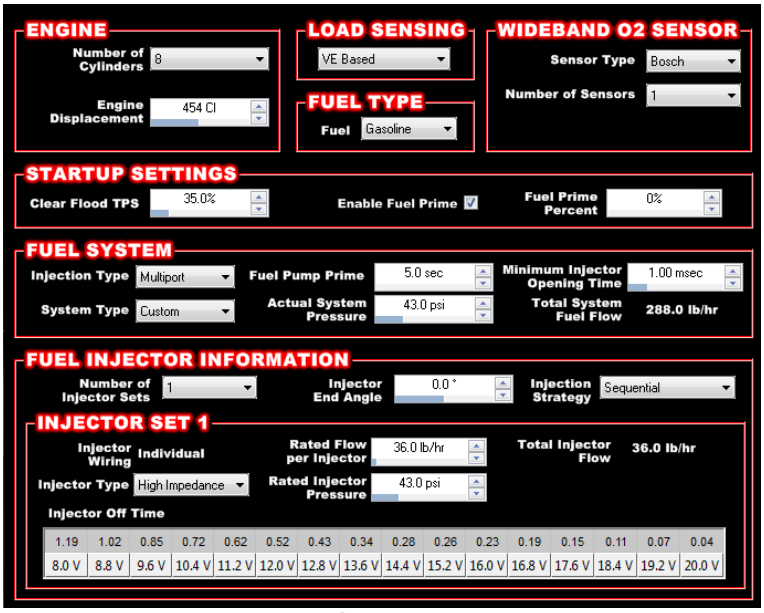

Figure 11

6.2 Fuel Prime

There is a new fuel priming "Quick Start" feature available for every type of system. For MPFI applications, the system will inject a single pulse of fuel, after the first crank pulse is detected. This will only re-occur after an engine starts. In other words, if you try to start an engine and it doesn't successfully fire, it will not keep adding this fuel - only the first time it sees a crank tooth, for that run event. For TBI applications, the system will inject a single pulse of fuel when the key turns on to wet the intake manifold. This will only re-occur, after an engine has started. If you cycle the ignition key multiple times, it will only perform the first prime.

This feature must be enabled, by selecting the "Enable Fuel Prime" checkbox located in the System ICF under System Parameters > Engine Parameters > Startup Settings. Once the "Enable Fuel Prime" box is checked, it will show the "Fuel Prime Percent" parameter. The "Fuel Prime Percent" is a multiplier that works off the "Cranking Fuel" Value in the Startup Enrichment table. The pulse width of the single shot of fuel prime fuel is based off the Cranking Fuel value (which is temperature based) and multiplied by the "Fuel Prime Percent". A starting value of 200% is usually a good point for MPFI engines and 50% for TBI applications, with a range of 40%-250% usually being an acceptable range. This can be adjusted as needed.

6.3 MPFI Injector Auto-Populate

A number of MPFI injectors have been added to the "System Type" dropdown in the Fuel System area. If selected, they will auto-populate the injector flows, system pressure, and Injector Off Time curves automatically.

6.4 Custom Ignition Types

Two new crank tooth types have been added in the Custom Ignition Parameters. These include a 36-1 and a 12-1 crank trigger wheel. They can be found when selecting an "Ignition Type" of "Custom". They are configured the same as the previous 60-2 type where the user programs a "TDC Tooth" number and can use the "Timing Offset" for minor adjustment.

6.5 "Quick Start" LSx Ignition Types

A new firmware feature that is rolled out with the V2 software is quicker crank and cam signal recognition on 58x and 24x GM LSx engines. Note that you need to use the "Fuel Prime" feature in section 6.2 to recognize the benefits. Also note that this different crank/cam signal is NOT used with "LSx 58 Tooth" and "LSx 24 Tooth" if selected in the "Custom"

ignition parameters. This is due to the fact that the camshaft sensor type or location may not be in the OEM location and problems can arise.

6.6 Basic I/O Timing Retards

The ignition timing retards in the Basic I/O (System Parameters > Basic I/O > Timing Retard) now have a time based option, in addition to the existing RPM based retards. Retard #1 has a fixed linear range from 0-5.00 seconds. Retard #2 has a fixed linear range of 0-8.00 seconds. If the time exceeds 5 or 8 seconds, the retard will remain at the final value.

If you need to have more resolution to the time axis, the retards in the nitrous ICF can be used.

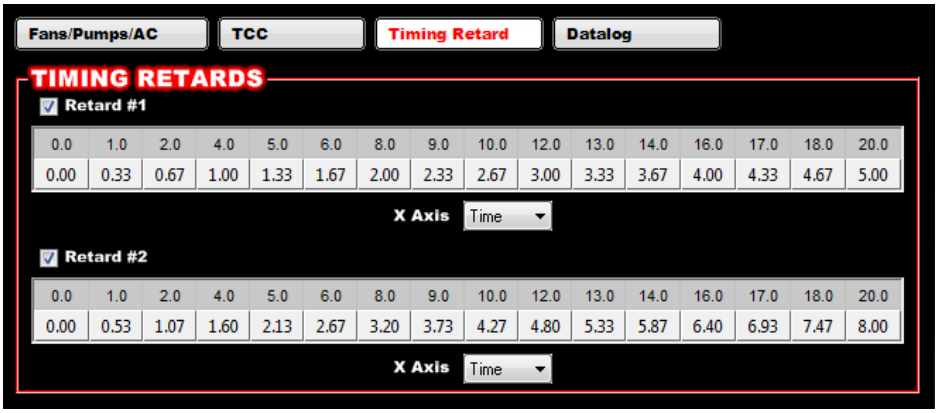

Figure 12

6.7 Diagnostic Channels

There is a new option to log various diagnostic channels in a datalog. These can be used by Holley Technical Services to help a customer diagnose various issues. They are split up into “Type 1” through “Type 10”. Type 1 contains information on crank and cam signal integrity and errors. It is recommended to keep this selected. Type 2 and 3 are for 02 sensor data. Types 4 through 10 will be used for future purposes.

Figure 13

7.0 Idle ICF

The are no updates to the Idle ICF.

8.0 Spark ICF

There are no updates to the spark ICF.

9.0 I/O ICF

The Input/Output ICF has several changes outlined below.

9.1 Internal Parameters

There are some parameters that are not formally displayed in the data monitor or data logger. Some of these could be beneficial when using certain features, performing troubleshooting, or doing some higher level tuning. These parameters are called “Internal Parameters”. They can be added if desired via the I/O ICF. To add these, perform the following:

1) Activate the I/O ICF
2) Enable any “Input” channel. Under the “Type”, select “Internal”. See **Figure 14**.

Figure 14

3) Select the “Configure” button.
4) Under “Source”, you can see a dropdown of all of the internal parameters available. Review and select the desired channel. Most are self-explanatory. Ones that are specific and beneficial to areas such as boost control or traction control are covered in their respective manuals.

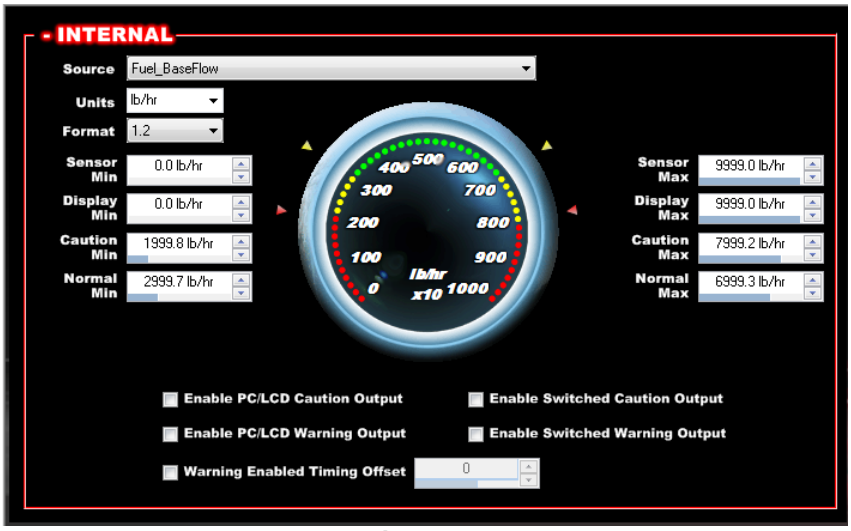

Figure 15

5) This I/O ICF channel can now be viewed in the Data Monitor, as well as in the data logs.

9.2 CAN 5V

The Input ICF contains a new Input “Type” in the dropdown called “CAN 5V”. This is not utilized at this time.

9.3 Time Variable

Changes have been made in the firmware to better utilize a “Time” variable. Previous versions had the Time variable based on the RTC (Real Time Clock). This didn’t allow for the Time variable to be very useful. V2 software and firmware allows for the time variable to be used as an axis on a PWM output table, for any desired use. The time axis on a PWM table can be activated at Time=0, when that output is triggered. **Figure 16** shows an example where an output can be active from the time it is activated, for 33.33 seconds, as well as only active above a MAP reading above 126 kPa. This can be useful for turning many devices on and off.

NOTE: Although “Time” is available in the “Sensor Input Trigger” dropdown, it is not recommended to use it. Use it only as an axis in a PWM output table.

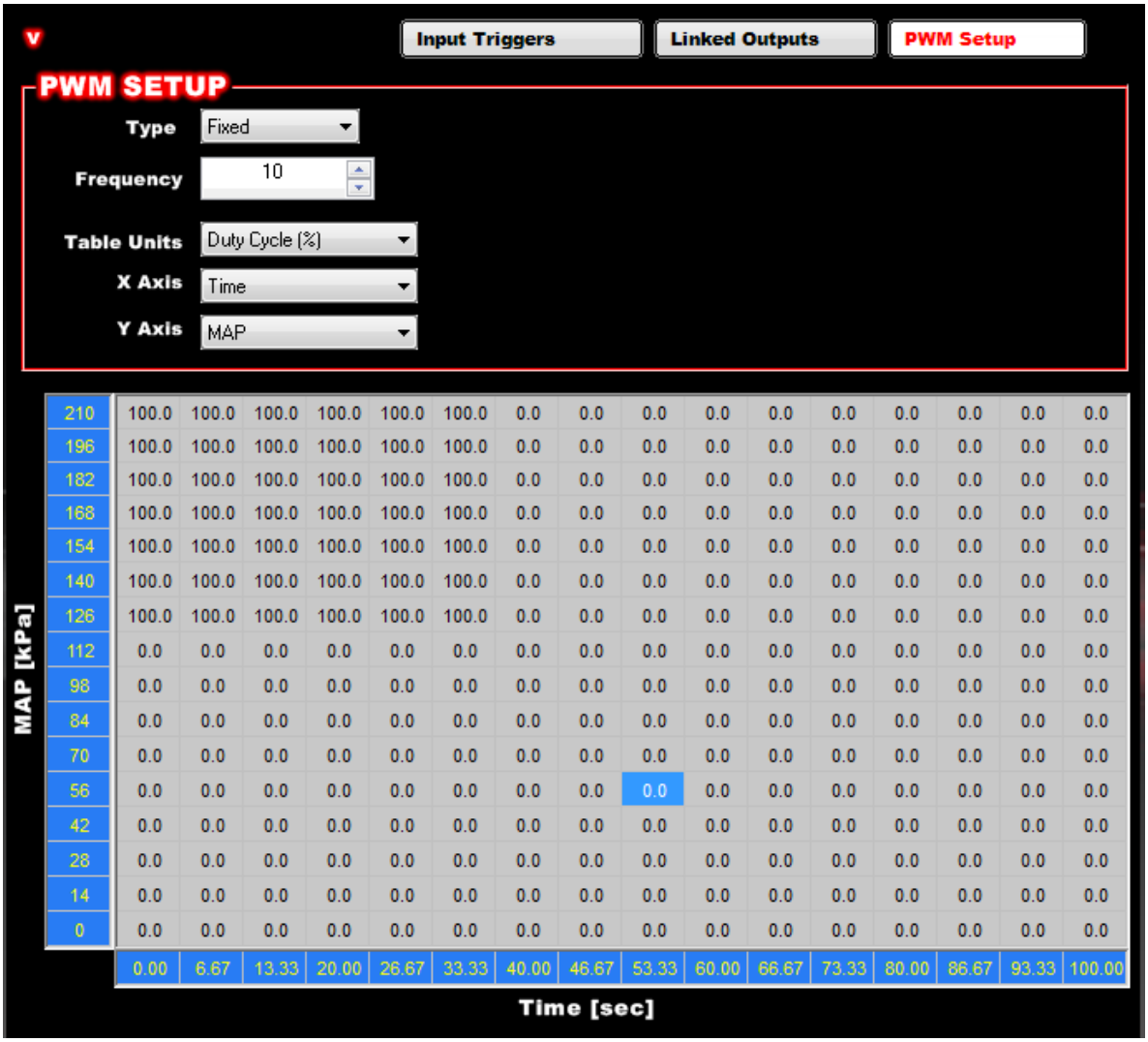

Figure 16

10.0 Boost Control ICF

The Boost Control feature is a brand new ICF, with full featured boost control for turbo and some supercharged applications. This area has its own dedicated instruction manual found in the help section of the software. The Boost ICF can be added the same as any other optional ICF.

11.0 Water/Meth ICF

There are no changes to the Water/Meth Injection software. V500 firmware has added a “filtering” to the “low reservoir warning” that stops false triggers from momentarily occurring. A low fluid condition must occur for a continuous five seconds before this output is activated.

12.0 Nitrous ICF

There is one change in the nitrous ICF. This is the addition of a “Timed Disable” feature that can be driven only off of “Input 3” on any of the four stages. The “Timed Disable” is designed to be utilized to turn off a stage for a programmed amount of time. A timed disable input can be a “momentary” or a “continuous” input. Once the input is triggered, the nitrous will turn off for the amount of time programmed via the “Reactivation Time” (available when “Timed Delay” is selected). It will then turn off after this time expires. It should be noted that if “Pause Enabled” is selected, the nitrous will turn on at the point during which it was disabled. If “Pause Enabled is NOT selected, the nitrous will revert back to its original starting value (Time = 0) when it turns back on. **Figure 17** shows an example when Input 3 is triggered, it will keep Stage one off for .50 seconds. One use of this feature would be to turn off a stage or stages of nitrous when a shift occurs.

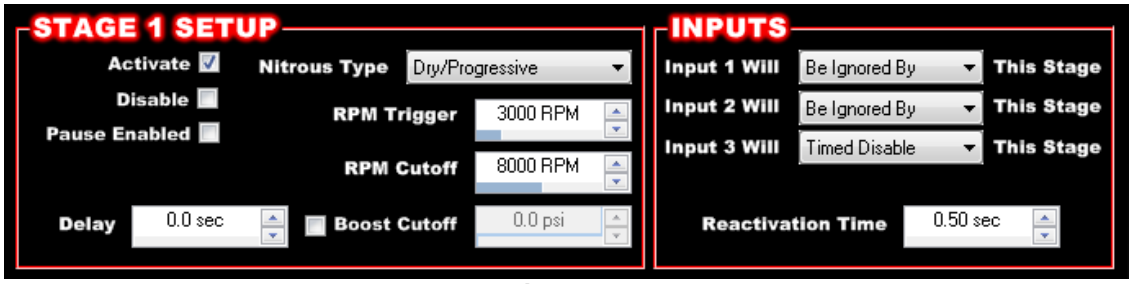

Figure 17

13.0 Transmission ICF

No changes.

14.0 Drive By Wire ICF

No changes.

15.0 Traction Control ICF

The Traction Control ICF is a brand new ICF intended for serious drag racing applications. It requires the use of a Davis Technologies Holley Traction Control Module and associated driveshaft speed signal hardware. The Davis box is utilized to detect tire slip and send that information to the Holley ECU. The Holley software is then user programmed to utilize a reduction in timing, nitrous, boost, or drive by wire power reduction to combat the spin. This ICF requires two “F” inputs and an option H or G input if a traction control enable/disable switch is desired. The traction control instructions are packed with the Davis Traction Control Module, designed specifically for Holley EFI. Contact Davis Technologies at 1-828-645-1505 for more information and purchase of this product.

The Traction Control ICF can be downloaded the same as all other optional ICF’s.

16.0 Datalogging

There are a multitude of improvements to the datalogger. They are described below. One change to note is that a “Data Log Config” file is now changed to a “.graph” file, instead of the previous “.dlc” format.

16.1 Channel Modifications

- **Filtering** – Each Channel can have "filtering" applied to smooth the data. To apply filtering to a specific channel, you must first have that channel selected to be graphed. Next, right mouse click on the right check box next to that channel and you will see the "Filter" option. Move over and select "None", or "Level 1", "Level 2", etc. The higher the number, the more filtering is performed. Note that these filtering options are applied and saved to the datalog config (.graph) file, so the filtering will be applied when the next datalog is opened. When a channel is filtered, there will be a "-F" next to it. See **Figure 18** and the "AFR Right" channel as an example.

- **Scaling** – Each channel can have the Y axis either auto-scaled or set to a fixed scale defined by the user. A fixed scale is needed when plotting something like 8 EGT's, where you want the same Y axis scaling for all 8 channels (vs. having them autoscale). To adjust the scaling of a specific channel, make sure that channel is graphed and right mouse click on the right check box (same as filtering). If "Autoscale" is desired, check next to that option. If user defined scaling is desired, make sure "Autoscale" is NOT checked, and select the "Minimum" and "Maximum" numbers with the mouse, and they can be defined.

- **Paneling** – Sometimes it is desirable to put different channels on different "Panels", which are just multiple views on the same logging screen – up to 5 can be used. To put different channels on different panels, make sure that channel is graphed and right mouse click on the right check box (same as Scaling and Filtering). Select the Panel number (1 through 5) you wish to view that channel on.

Figure 18

16.2 Properties/Notes

V2 software now has some predefined entry fields for datalogging notes. There is one for “General” notes, Drag Race data, Dyno data, weather conditions, and some chassis data. This area is found under “File” and “Properties” in the datalog viewer. See **Figure 19**.

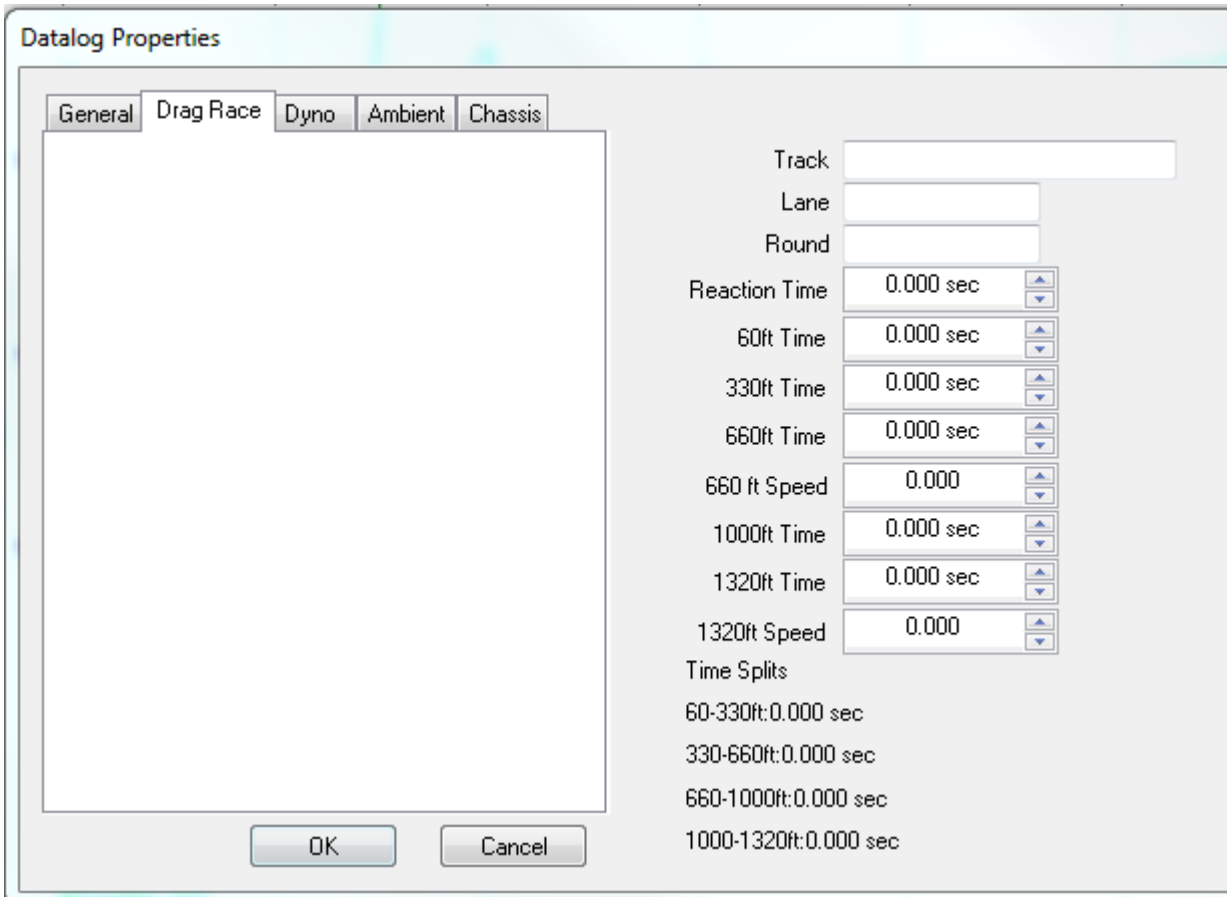

Figure 19

16.3 Internal Datalog Downloads

Multiple internal datalogs can now be downloaded or deleted at the same time. To select multiple logs, simply hold the Ctrl key down and select as many internal logs as you would like.

17.0 Sync Screen

When a “sync” is performed with the V2 software, the Global Folder name is shown in the “Global Info” area.

19.0 System Log

A “System Log” is a new type of internal datalog that can take a high speed/resolution log of the crank and cam sensor signals. This can be extremely helpful and effective when trying to diagnose crank or cam signal integrity issues. An example log is shown in **Figure 20**. The crank and cam data is shown in a “digital” manner as the ECU sees internally, meaning it is active (signal is at a level of “1”) or inactive (signal is at a level of “0”). If the signal is a hall-effect sensor, the SL crank and cam signals are indicative of the signal from the sensor (not actual voltage, but pattern). If the signal is from a magnetic/VR sensor, which puts out a sine wave form, the SL log indicates when the ECU is triggered, not the actual wave form or voltage level.

The SL log is used to view missing or extra crank or cam pulses and can view the cam and crank signal relative positions.

It also shows battery voltage, which is useful to see when an engine was cranking/starting (will show a drop in voltage). The Diag #1 and Diag #2 can be used by Holley Tech Service to further help.

Figure 20

20.0 Pin Map

The pin map has a new tab called “View Fixed”. See **Figure 21**. This is a quick way to see some of the fixed ground, 5 volt reference, and other inputs and outputs of the ECU connectors, which is helpful when wiring or troubleshooting.

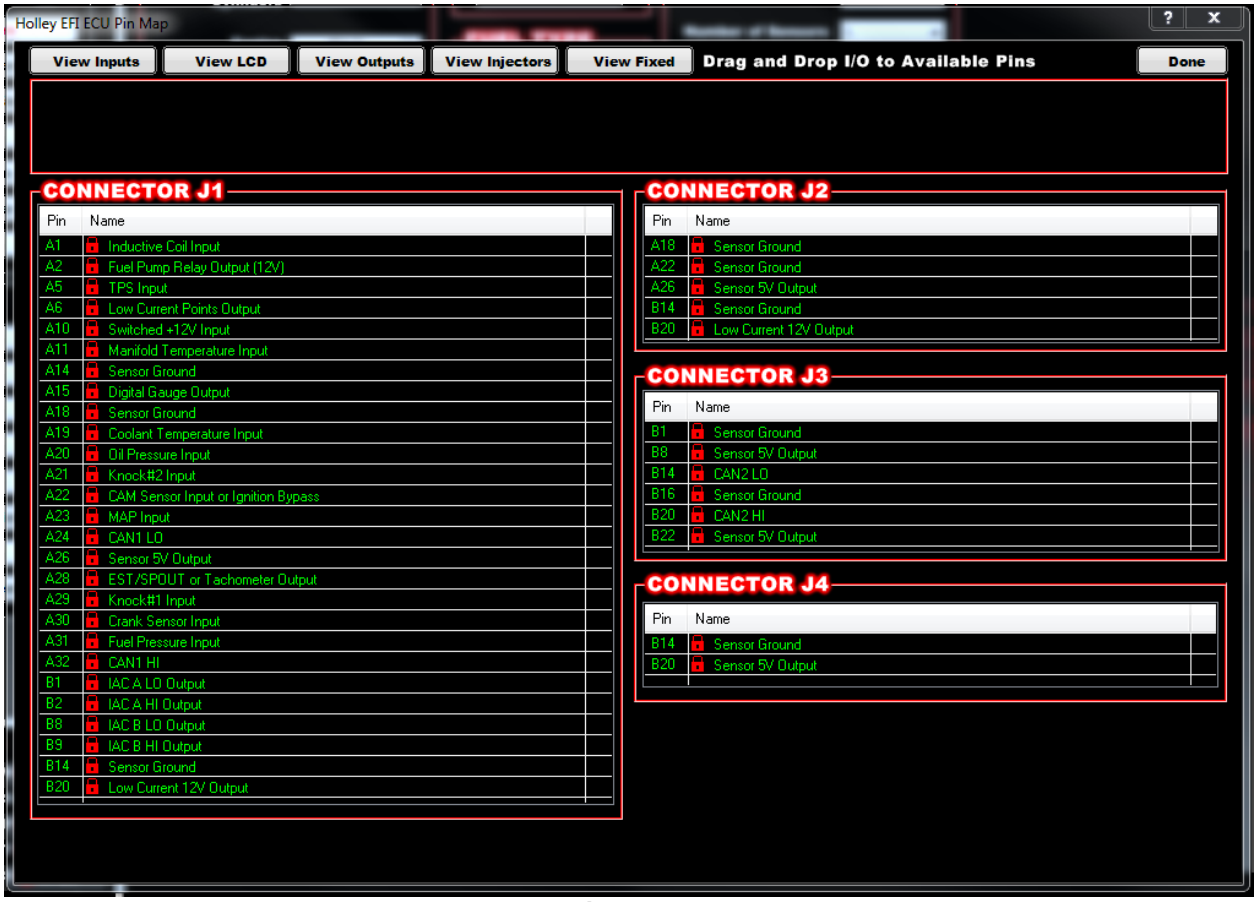

Figure 21

21.0 Gauge Panel

There is a new “Gauge Panel” Display available. It is only available when online. Select the small gauge icon at the top, right area of the screen. This will bring up **Figure 22**. There are four large gauges, four small gauges, and four full sets of “data monitor” type displays to show 40 channels of data. Each gauge channel is selectable, and the range fully editable. To change a gauge, double click it, and it will bring up a configuration screen (**Figure 23**). You select the channel, the name on the gauge, the numeric format, and the range. The four data monitors on the bottom share the same views as the single data monitor in the lower left of the regular PC software. Choose and edit these views the same as that single data monitor.

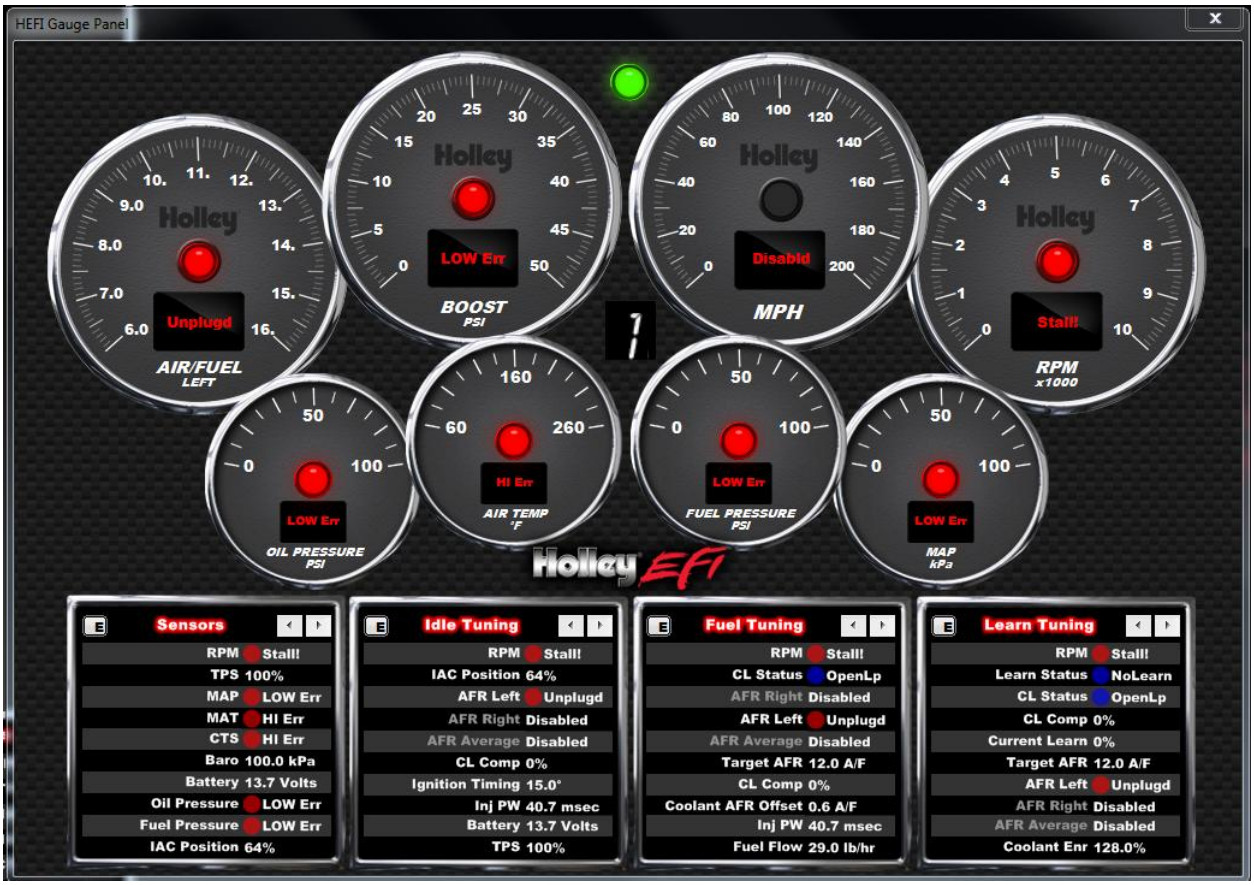

Figure 22

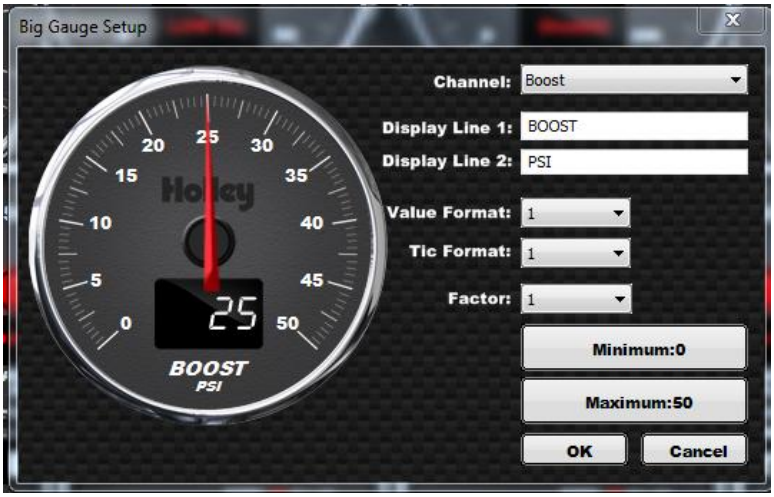

Figure 23

22.0 Strip Chart

The strip chart is a new feature that allows any channel to be viewed, real-time, while the ECU is on-line, in strip chart fashion. It shares the same “views” as the datalogger. The button at the top of the data allows either 1000 points of data to be graphed or 20 on the screen (giving much finer viewing resolution). About 28 seconds of data is retained that can be reviewed. The button at the top left can be used to “Pause” or “Play” data. See **Figure 24**.

The strip chart is very useful when looking for various anomalies real-time vs. looking just at the data monitor, or having to review a datalog.

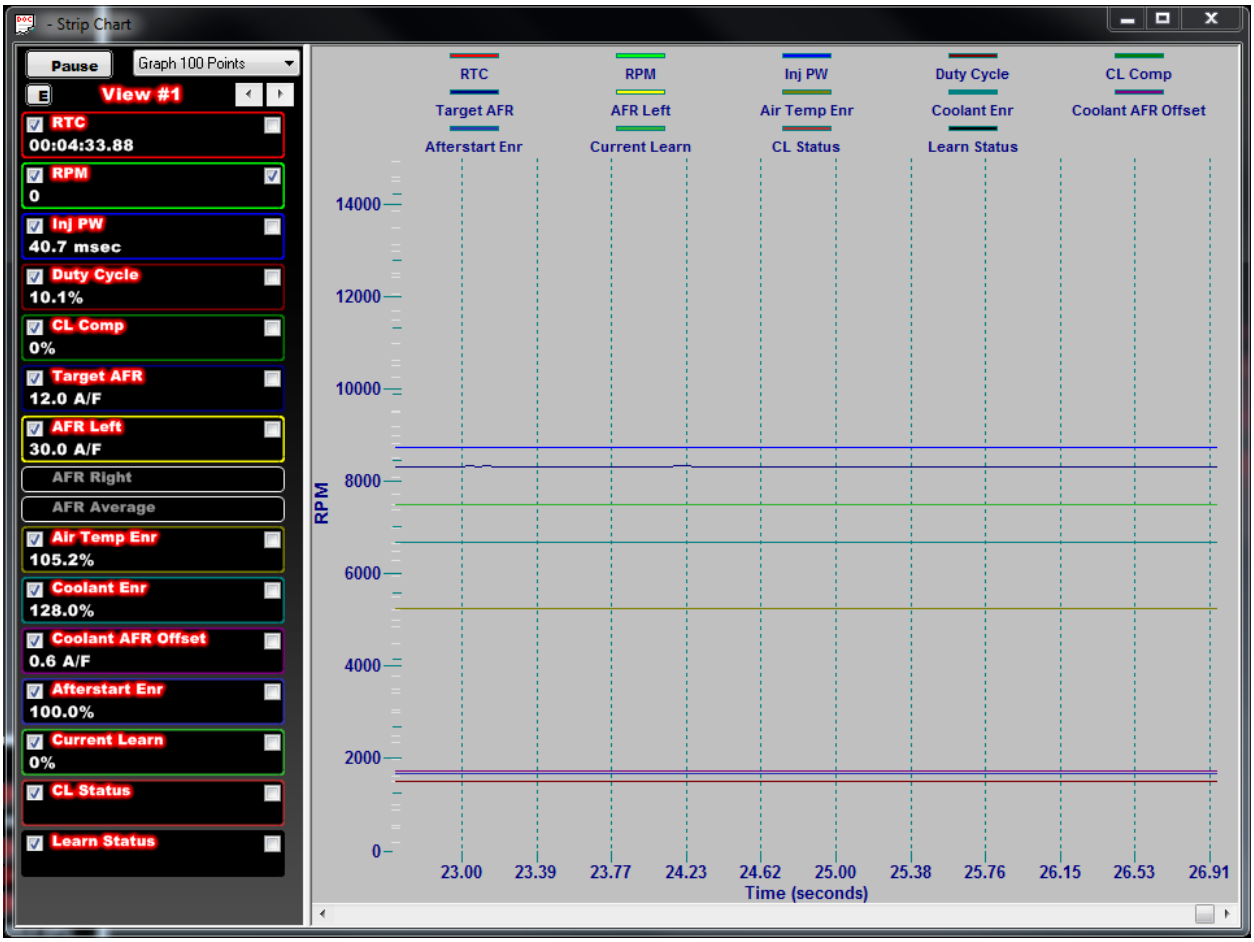

Figure 24

23.0 MISC

- The software will now “auto-detect” whether the ECU is a HP or a Dominator - previous software only auto-detected a HP ECU.
- If you get a message similar to “Value Too Low. The value is lower than allowed, Click Yes to use the minimum value”, when you enter an area, just click “Yes”. This is likely a new parameter you are not using previously, that needs to be changed from a non-zero value.