

Appendix 8 New Features in v4.1

The Dyno DataMite Analyzer has had many updates since this user manual was written for the original v3.2 for Windows. Here is a brief listing of some of the features released in Version 4.1.

First, we've added a new version of the Dyno DataMite Analyzer, the Enterprise Edition. So now we have 3 versions:

- Basic (simplest with fewest features).
- Professional (features most users would want and expect).
- Enterprise Edition (more advanced features that probably only 20%-30% of users would use).

Here's a list of the most notable features which have been added or changed. For a complete list of changes, check the readme.doc file on the website right below the demo program download option (with the spinning disk). Some of the features listed here apply to only the Professional or Enterprise Edition, and it will be noted. Anything which applies to the Professional "Pro" version also applies to the Enterprise Edition.

The website will have the most up-to-date information. This can be found under Support, then FAQs, then Dyno DataMite..., or Support, then User Manuals, or Programs, then Data Loggers, then either Dyno DataMite or Dyno DataMite – Enterprise Edition.

New Features

New, larger DataMite 4 is supported. Fig A8.1. This DataMite logger has:

- 4 RPM (frequency) channels
- 12 0-5 volt analog channels
- 10 thermocouple channels (if activated at additional cost)
- 3 weather channels
- 4 digital input channels to record on or off events
- 2 digital output channels to control lights, relays etc to activate things when a channel goes above or below a user defined limit for a certain amount of time.

The program now has more details about Vehicle Description for Chassis Dynos in Test Conds screen. The purpose is so you can deal with all changes between vehicles on this 1 screen. Previously you would change some items in the Test Conds screen, but then may have to change the Engine RPM calibration info in the DataMite specs screen if a vehicle had a different number of cylinders, or different type of ignition system. Pro and Enterprise versions only. Figs A8.2, A8.3, A8.4.

The program now has a simpler option for calculating Engine RPM from Dyno RPM for chassis dynos. Prior to this, you would enter a tire size, transmission ratio and final drive ratio to determine this relationship. You could also calculate one of these by entering the other 2 and entering or recording Engine RPM and Dyno RPM. Now you can just enter the relationship, like a Factor of 4, meaning the Engine RPM is 4 times as high as the dyno RPM. You can also measure this factor during a test on the Current Readings screen. Pro and Enterprise versions only. Fig A8.2.

The program has an option to copy or open an entire folder to an external drive. This can be very handy for copying files between different computers. Fig A8.5.

If you **right click** on the Open button in the Open File screen, you are presented with an option to 'Open as Master'. This lets you open a file as the Master DataMite specs and Master Dyno specs. This is what you want to do when you want to open a test file which has the proper DataMite and Dyno settings to be use for a new test. Fig A8.6.

Now when you click File, then Open from All Saved Tests, there is a new option to list files by date last accessed. This lets you more quickly find tests which you just ran or modified, which show up at the top of the list. Note: This may not be in the order that the tests were actually ran. For example, of you ran a test 2 years ago, but recently just opened it to look at it, or include on a graph, it will appear above tests that you ran just a few weeks ago. Pro and Enterprise versions only. Fig A8.6.

You can **right click** on a file name in the History Log and it gives you a list of options to Open, Mark Yes to Save, Mark Yes to Graph, and Remove from the History Log. Remove is the only way to remove a test from the History Log (but this does not erase the file. It still can be opened from "File", then "Open from All Saved Tests". Pro and Enterprise versions only. Fig A8.6.

The program now has options for adding an Engine Picture file to the test file. This file will be displayed on the main screen, and can be printed with graphs and reports. Typically this will be a picture of the customer's car or engine and is a nice selling point when selling dyno services. Enterprise Edition only. Fig A8.7.

The Company Logo (if you are using this feature) is now also shown on the main screen. Company Logo is a graphics .jpg file which you can specify in Preferences. Pro and Enterprise versions only. Fig A8.7.

Program now has a Dyno Example file of "Chassis w Coastdown" and a note that when you open this file, you should select the Enterprise Edition demo at 'program startup. This file shows the Enterprise Edition feature of the test type of "Meas Tq/HP from Accel/Decel" where the decel portion is used to estimate driveline losses, called "Coastdown" torque and HP. These losses are then added back to the measured torque and HP to come up with a "Total" torque and HP, which is a better estimate of flywheel torque and HP. All versions let you open this file, but only the Enterprise Edition lets you see "Coastdown" and "Total" torque and HP. Fig A8.14.

Program is now using a different communications protocol to allow using Com Ports up to 99 and also make communications more reliable on more types of computers.

Program has fixed a bug where occasionally the scroll bars in the grid on left side of the main screen could produce a 'flicker' and lock up the program.

Program now shows more appropriate inputs in the Engine Specs screen for 2 stroke engines. These changes are just for information purposes and are not used for any calculations. Pro and Enterprise versions only.

Program added checks to ensure only proper thermocouple 'Types' were allowed as calibrations for various channels. This helps prevent errors during setup.

The History Log now shows all columns. Prior to this you did not see some columns because that column had no effect at that time. For example, prior to this you did not see if a test was marked 'Yes' for graphing if you opened the History Log from the main screen. Pro and Enterprise versions only.

Program now has a Preference which allows to "Edit Out Very Low RPM Noise Spikes" to pay close attention to spikes which can occur when RPMs are being measured at VERY low RPM, like 100 RPM or less. This is typically when vehicles on chassis dynos are rolling at low speed. Pro and Enterprise versions only.

Program has expanded History Log columns to better fill screen. Pro and Enterprise versions only.

Some computers use the F1 key to bring up Help, so F1 can NOT be used for starting to record data. Therefore, we now allow the F7 key to also be used to start recording. Pressing either F1 or F7 will do the same thing. F2 is still used to stop recording.

The Large Labels on the main screen for displaying peak torque and peak HP are now better spaced out, and have the fonts correctly picked to display better. Also the large Font Peak Tq and HP display is now done slightly differently because on some operating systems, the background was shown in black and was not readable. Pro and Enterprise versions only.

The program now better labels the torque from a chassis dyno is torque at the engine flywheel, after the power losses through the driveline. Before it was labeled "rear wheel torque", now it is "flywheel torque (after losses)"

Starting and Running a Test

When starting a new test:

- You can now choose a recording frequency of 1/sec for recording for VERY long times, like 8 hrs or more. Pro and Enterprise versions only. Fig A8.17.
- The New Test Screen has been enlarged slightly so certain items like the "Type of Test" choices are more completely displayed.
- A new Example Dyno file has been added as a good template for a DataMite 4 for an absorber dyno, called "DataMite 4 Absorber w Fuel.CFG". This can be a good starting point for DataMite 4 users with an absorber (water brake) dyno.
- The program now lets you blank out the Engine Number when you start a new test. Pro and Enterprise versions only.

When using a recording switch:

- Now you can use a NO (normally open) switch to start and stop recording data. This is chosen under the "Reverse Logic" option under Recording Switch. If you purchase this hardware, paperwork describes this in detail. Pro and Enterprise versions only. Fig A8.8.
- Now the USB Switch for DataMite III and DataMite 4 can be held down for the entire test, so pressing and holding starts recording and then releasing stops recording. If you purchase this hardware, paperwork describes this in detail. Pro and Enterprise versions only. Fig A8.8.

New Dyno Controller:

- A new dyno controller is being developed which will automatically control the dyno speed and allow for smooth ramping up or down of the RPM during tests. It is being developed for both water brake and eddy current dynos, both engine only and chassis dynos. The controller will provide better consistency and test-to-test repeatability. Because the controller is not fully developed, only major points will be pointed out here. Detailed info will come with your controller hardware. Pro and Enterprise versions only. Fig A8.10.
- Added option to hold RPM constant (good for steady state tuning) or allowing RPM to vary slightly (good for manual control, accel, and decel testing). Added Ctrl-H (holding) and Ctrl-R (release hold) for controller options. Pro and Enterprise versions only. Fig A8.10.

During the test, or when using the Current Readings screen:

- There is now an option to allow the Engine RPM to be filtered to the same level as the Analog Filtering on the Current Readings screen. This can provide for smoother operation to the RPM gauges. Note: By adding filtering to the RPM gauges, the gauge readings are slightly delayed; the more the filtering, the more this delay. Fig A8.9.
- The program now has a 'Click here for info.' if no USB communications occurs in the Current Readings screen. This can explain options to restore communications. Fig A8.9.
- The program now warns if Power Volts too low when recording data with DataMite III and 4, which can cause some sensors (especially weather sensors) to read incorrectly. This typically happens when powered by the USB cable only. Fig A8.9.
- The program now better explains which gauge is missing some required info for a calculated output.
- HP and KW will now be displayed as Corr HP and Corr KW on the Current Readings screen, where they are corrected for weather conditions. Pro version Only.
- The program now gives more explanation when you have requested to use a recording switch, but there is no dyno switch hooked up.

After the test has been recorded:

- After a dyno test has been run, the program now more clearly explains your options for saving the test data, and suggests new file name if the next file name in sequence already exists. This should save steps after the test, and avoid confusion on your options for saving the results. Fig A8.11.
- When you start a new test, and the file name you have entered already exists, the program now finds the next test number in sequence and suggests it as the new file name. Fig A8.11.
- A Preference has been added to allow recovering old USB Dyno DataMite data for the *last* test recorded, either the date in memory (best way to do it) or recorded to a temporary data file (may have missing data). If you have shut down the program, then recovering from the temporary data file is the only option you have. You could use this feature should you have a problem saving test data, but then have fixed the problem. Now you have the option of trying to recover this test data. Fig A8.11.

- The program now allows for very short inertia dyno runs, and runs where the change in RPM was not very great on a percentage basis, say from 2500 to 3000 RPM. Previously the program would not call these valid dyno runs.

New Calculations and Outputs

Program now displays the engine inertia being calculated by program in the Engine Specs screen. It can also be entered directly on this same screen. This inertia is used to correct for engine inertia effects during accelerating and decelerating tests. You must also turn on this feature in Preferences, and set “Correct for Engine Inertia” to “Yes” in the Test Conds screen. Enterprise Edition only. Fig A8.12.

Program now has a Preference to allow user to enter an amount of chassis dyno losses to be applied to chassis dyno tests in the Test Conds screen. Enterprise Edition only. Fig A8.2.

Program has option to be able to adjust the A/F sensor calibration for the delay time it may take for the sensor to respond to a change in A/F. Enterprise Edition only. Fig A8.13.

If the test type is 'Meas TQ/HP from accel/decel' in Test Conds screen, then the dyno coastdown data in the Dyno specs screen are not used for any torque or HP related calculations. That is because these losses are included in the vehicle coastdown losses. There is a note to this effect in the Dyno Specs screen. Enterprise Edition only. Fig A8.14.

The program now has a feature where you can pick tests to be averaged together for graphing. This can provide for better data analysis and checking for real changes when a graph is based on 2 or more runs. Enterprise Edition only. Fig A8.15.

The program has new features for setting up the digital outputs for the DataMite 4. These digital outputs can be used for turning on or turning off various hardware, like power relays controlling fans, engine ignition to act as an engine safety or overspeed, etc. Because of the various options, detailed info will be included with your hardware for connecting to these digital outputs. . Pro and Enterprise versions only. Fig A8.16.

The program can now record OBD2 data via the Performance Trends OBD2 Link. This can greatly expand the data recording capabilities of the Dyno DataMite, to include data internal to the engine controller. This can be a great addition to most any chassis dyno working with street vehicles. Enterprise Edition only. Fig A8.17.

We have streamlined picking the calibrations for various sensors:

“Stainless Pres Sensor” is now a choice and you pick the range, from 25 to 10000 psi. Fig A8.18.

“A/F...” are now choices and you pick the range fuel type, from Gasoline, to E85, to Methanol, etc. Fig A8.18.

“Blowby” is now a choice and you pick the range, from 1 to 30 CFM. Fig A8.18.

The program now allows for 1, 3 and 5 cylinder 4 stroke engines, which produce a fractional pulses per revolution value, like 1.5 ignition pulses per revolution.

The program now allows for a Correction to be included in a calibration **table** to shift the calibration up or down slightly. Prior to this, the Correction was allowed for most **linear** calibrations, but not the non-linear **table** calibration. Fig A8.19.

Graphs and Reports

Program has added a new feature for letting a user specify a multiplier setting for graphs. Previously the options for letting the program pick the multipliers or to specify no multiplier. Fig A8.20.

Program now does not allow Coastdown Tq or HP to be multiplied by a factor when graphing. It is always x 1. This provides less confusing graphs when included with Corr. Tq or HP, and/or Total Corrected Tq or HP.

Program has made several additional enhancements to printing the header for graphs and reports. Fig A8.22.

The program now has a feature where you can pick tests to be averaged together for graphing. This can provide for better data analysis and checking for real changes when a graph is based on 2 or more runs. Enterprise Edition only. Fig A8.14.

Program has made some enhancements for allowing to specify RPM increment on graph screen. Fig A8.21.

Program now marks Report and Graph Channels with "(na)" if they are not currently marked as 'Used = Yes' in the DataMite Specs. Fig A8.21.

Program now allows Graph Titles up to 30 characters long. Previously this was 16 characters.

Program has added new Graph Line Thickness option under Format of 'Thin Plus' which is slightly thicker than Thin. Fig A8.21.

All graph line thickness are listed under Format, Line Style, Line Thickness to make it easier to understand. Fig A8.21.

Program has modified filtering routine for torque and/or HP graphed vs MPH or KPH so they look more similar to the filtering of an RPM graph.

Reports can do up to 9 columns now, allowing for up to 9 data types to be reported.

Program has added a "Clear All" button to the Data Type lists in the Graph and Report screens, to clear out all selected data types. Fig A8.21.

Program has modified the method of Filtering (smoothing) data so the effect would be about the same whether you recorded data at 25 or 100 samples per second.

Program has fixed a bug where occasionally the first data point in a graph could cause filtered data to look somewhat strange if it was not very similar to data points, 2, 3, 4, etc.

Program has fixed minor bug on Graph Screen where the box surrounding the labels on left could have a double line on right side.

Program has added some refinements to better allow dyno files with multiple runs to graph selected runs more easily.

Printing

Program now has enhanced printouts of the main screen to now include the Engine Picture and Company Logo if available. Pro and Enterprise Versions only. Fig A8.7.

Program now has added Print Options for reports for Including the Engine Picture and printing the Engine Picture small in portrait printouts (always printed small with landscape graphs because the room is available). Enterprise Edition only. Fig A8.22.

Program now allows you to shrink the height of the graph so you can more completely fit a certain format of graph on one sheet. Pro and Enterprise Versions only. Fig A8.22.

Program now has added several enhancements to printing graphs, so there are no broken outlines as in previous versions. Fig A8.22.

Program has fixed a bug which allows the printout of DataMite 4 configuration from DataMite Specs screen to look proper, without columns over-running each other.

Program has fixed bug where you could not easily Cancel out of printing from a .xps Windows Screen Printer.

Figure A8.1 New, Larger DataMite 4



Digital Inputs and Outputs Connector

GPS Connector for Vehicle Systems

10 Thermocouple Channels Possible

SD Memory Card for Vehicle Systems

Figure A8.2 Test Conditions for Chassis Dynos

Test Conditions/Options

Back Help

Type of Test: Type Meas Tq/HP from Dyno

Dyno Conditions: Water Temperature, deg F 240; Oil Temperature, deg F; Fuel sp.g.; Fuel 93

Chassis Dyno - Test Vehicle Settings: Description Fiat; Engine RPM Measure; Engine Pulses/Rev 4 Cylinder, 4 Stroke; Driveline Losses, % 12; Tq/HP results increased by this %

Save Open

Type Start Low RPM, release to high RPM; Max RPM 8000; Min RPM 1500

3 Ways to determine Engine RPM on Chassis Dyno: 1 Measure and 2 Calculate.

If Measure is selected, then the Engine RPM Calibration is shown here. If you change it here (by clicking on the "Clc" button), it will be loaded into the DataMite Specs screen and used for your testing.

You can enter an estimate of Driveline Losses, and this amount is added to your Chassis Dyno torque and HP numbers.

Preferences

Main Screen, Operation, Performance Est., Emailing, Graphing, Filing System, Printing

Calculations: Torque/HP # Decimals 2 (ex 431.14 HP); Torque/HP Output Ft Lbs and HP

Calculations (cont): Allow Correction in Calibration of Selected Recorded Channels Yes

Chassis Dyno - Allow for Losses Yes

Engine RPM is Calculated RPM Yes

Keep the 4 Preference Settings below set to NO unless told otherwise by Perf Trends.

Use Higher Resolution Dyno RPM Yes; Allow Engine RPM up to 60000 No; Config DataMite II for Engine PPR No; Using Divide by 2' IPU No

OK, Cancel, Help, Restart Showing Help Tips

Preference to allow for entering Driveline Losses on Test Conditions screen.

Test Conditions/Options

Back Help

Type of Test: Type Meas Tq/HP from Dyno

Test Room Weather Conditions: Method of Reading Weather Data; Obs. Barometer, "Hg 29.95; Air Temperature, deg F 68; Dew Point, deg F 59; Elevation, Feet 700; Density Altitude, ft 787; Dry Density Altitude, ft 1145

Correction Factor: Correct To Std Race Dyno 29.32/60 deg f; Correct for Eng Inertia Effects No

Absorber Dyno Test Specs: Type Start Low RPM, release to high RPM; Max RPM 8000; Min RPM 1500

Chassis Dyno - Test Vehicle Settings: Description Fiat; Engine RPM Calc Simple; Engine vs Dyno RPM Factor 4.54; Driveline Losses, % 12; Tq/HP results increased by this %

Save Open

If you have saved some Test Vehicle Settings (Save button on this screen), you can click on Description or the Open button to open up these settings and install them on this screen.

If you choose "Calc Simple" then you need only enter a "factor" to multiply the dyno RPM by to obtain Engine RPM (shown here as 4.54). See Figure A 8.4 for how this can be easily done from the Current Readings screen.

Test Conditions/Options

Back Help

Type of Test: Type Meas Tq/HP from Dyno

Test Room Weather Conditions: Method of Reading Weather Data; Obs. Barometer, "Hg 29.95; Air Temperature, deg F 68; Dew Point, deg F 59; Elevation, Feet 700; Density Altitude, ft 787; Dry Density Altitude, ft 1145

Correction Factor: Correct To Std Race Dyno 29.32/60 deg f; Correct for Eng Inertia Effects No

Absorber Dyno Test Specs: Type Start Low RPM, release to high RPM; Max RPM 8000; Min RPM 1500

Chassis Dyno - Test Vehicle Settings: Description Fiat; Engine RPM Calc Details; Drive Tire Radius 10.5; Trans. Gear Ratio 1.3; Final Drive Ratio 4.41; Driveline Losses, % 12; Tq/HP results increased by this %

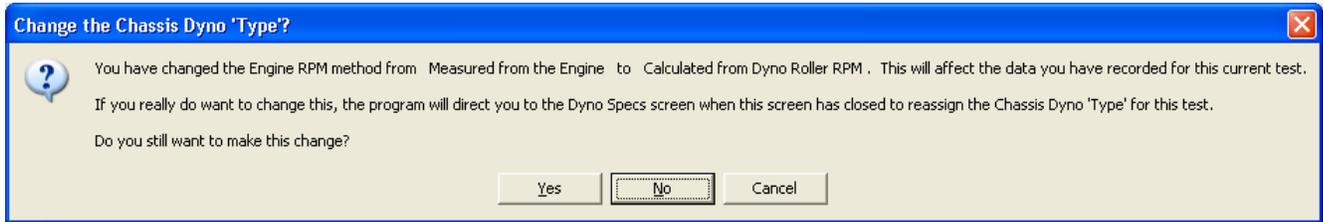
Save Open Meas.

Prior to v4.1, this was the only method available to calculate engine RPM from dyno RPM.

If no settings have been saved to this name, then just the name is picked from the list. Or you can type in some new name.

Figure A8.3 Test Conditions for Chassis Dynos, cont

If you make a change to the method of recording Engine RPM (calculate or measure) or change the Engine RPM calibration, these major changes must be saved to the Master Dyno and/or Master DataMite specs. You will be presented with some options as shown below. Typically you will answer Yes.



The program tells you that Master specs will be changed and what to expect.



In this case, the Master Dyno specs needed to be updated. When you close out the Test Conditions screen, the program automatically opens up the Dyno Specs screen, and automatically enters the needed change (Dyno Type = "Chs Dyno, no eng RPM" in lower left). When you close this screen, it asks if you want to save the changes as the Master. . Typically you will answer Yes.

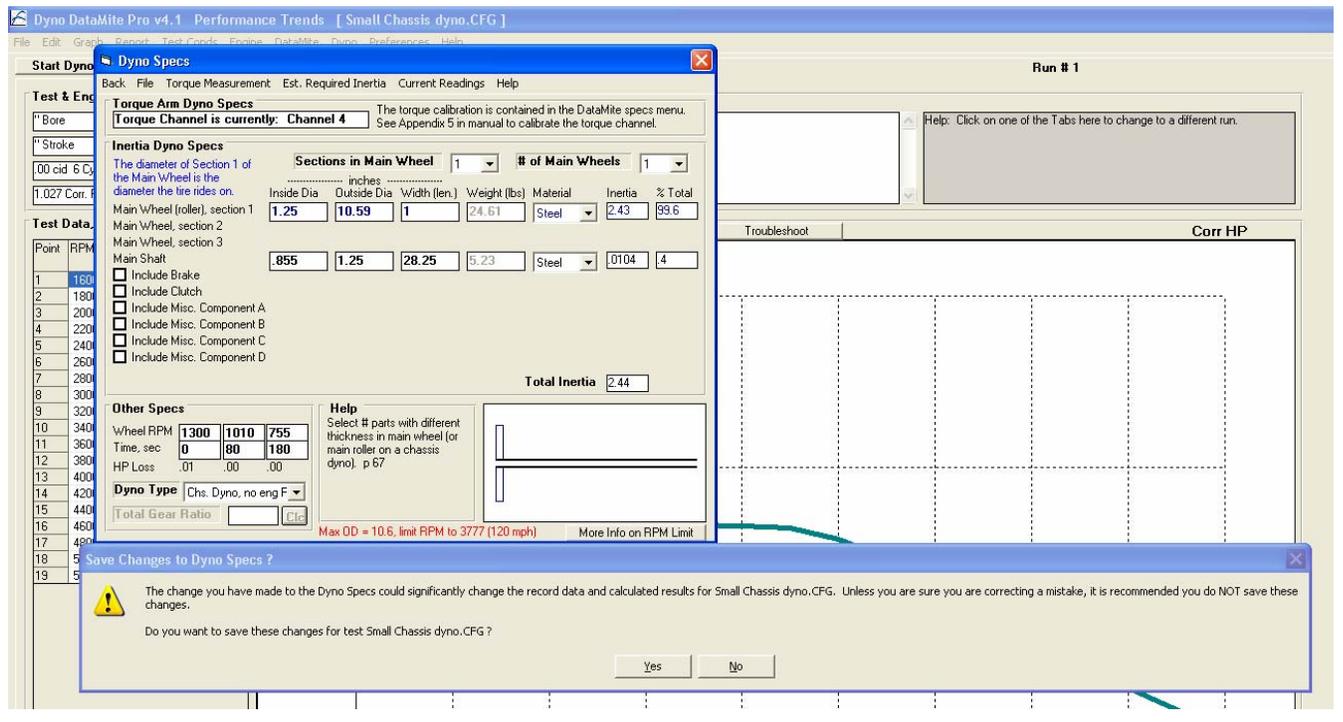
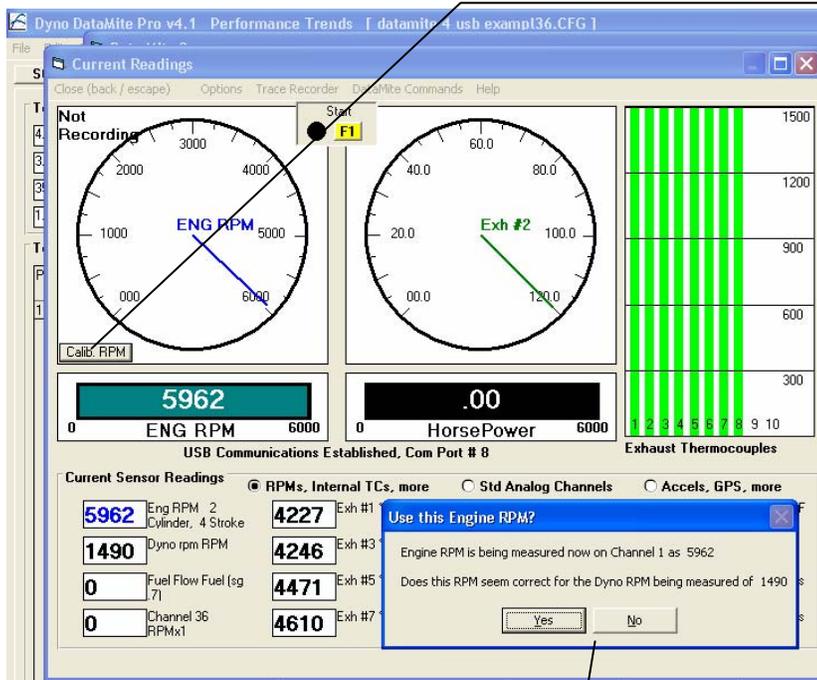


Figure A8.4 Test Conditions for Chassis Dynos, cont



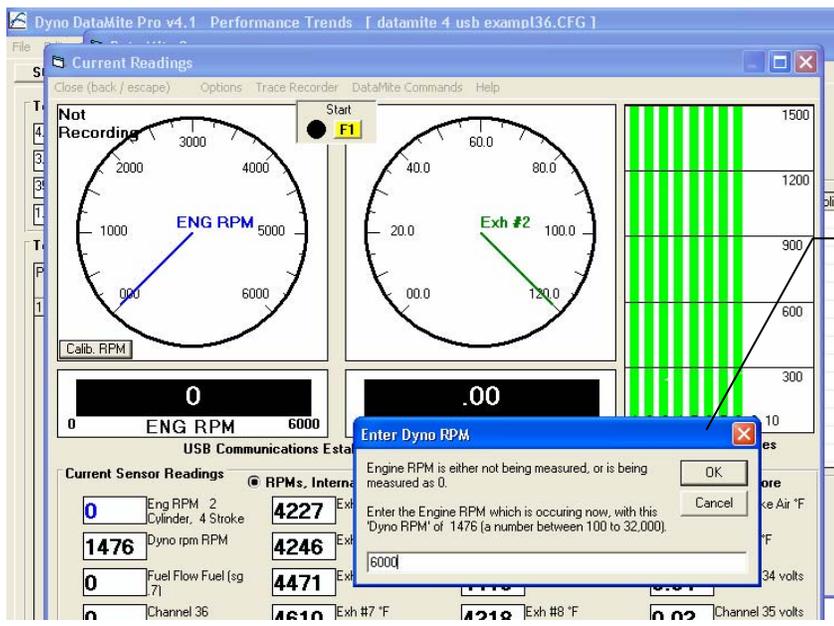
If you have selected to Calculate Engine RPM for Dyno RPM with the "simple" method, a "Calib RPM" button shows on the Current Readings screen.



If you click it, the program grabs an Engine RPM reading (if available) and Dyno RPM reading. The program asks if the Engine RPM reading should be used. For example, if low engine RPM is accurate, but high RPM is not (spikes or dropouts), you could do this calibration at lower, accurate Engine RPM and use the measured Engine RPM and answer Yes.

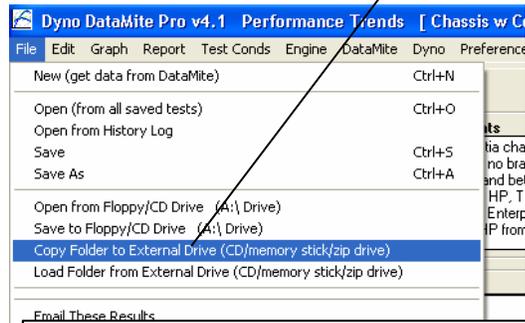
The program will do the math and present you with a new RPM Factor.

Answer Yes and it will be used for this and future tests.

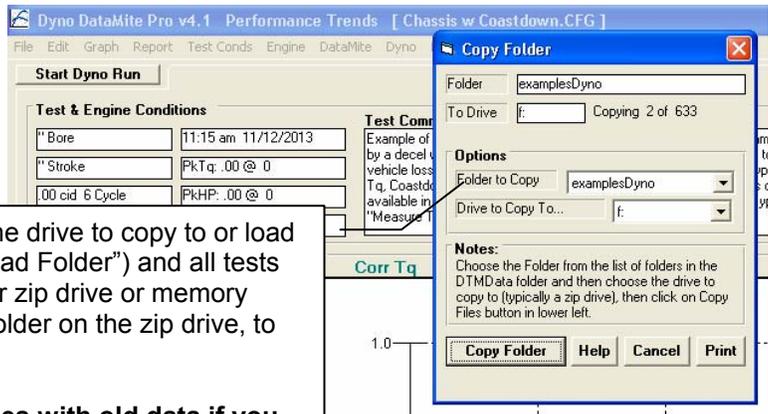


If no Engine RPM is being measured when you click on "Calib RPM", then the program will ask you to enter an Engine RPM. This could be obtained from the vehicle's tachometer reading, or perhaps some hand held tach.

Figure A8.5 Copy or Open Entire Folder



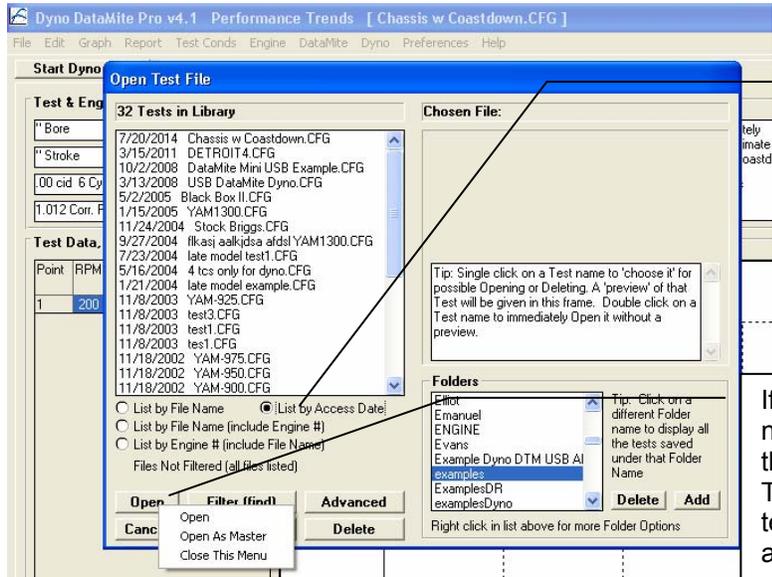
New Copy Folder and Load (Open) Folder Options, will easily transfer 1 or more test folders from the DTMDATA folder between different computers.



Choose the Folder to Copy (or load) and the drive to copy to or load from and click on the "Copy Folder" (or "Load Folder") and all tests in that folder are transferred to or from your zip drive or memory stick. (They are stored in the DTMDATA folder on the zip drive, to avoid conflicts with other data files.)

IMPORTANT: You can overwrite new files with old data if you are not careful. It is best to always Copy From your dyno computer and Load To your office or home computer.

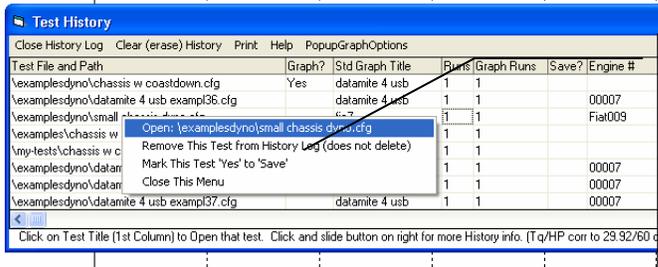
Figure A8.6 List Files by Access Date, Open as Master, and Right Clicking on History Log



A new option lets you list your test files by the last time the test's config file was accessed, which is typically the last time you opened the file, or graphed it.

This is NOT the Test Date, the date when the test was actually run. For that you have to use the Advanced button.

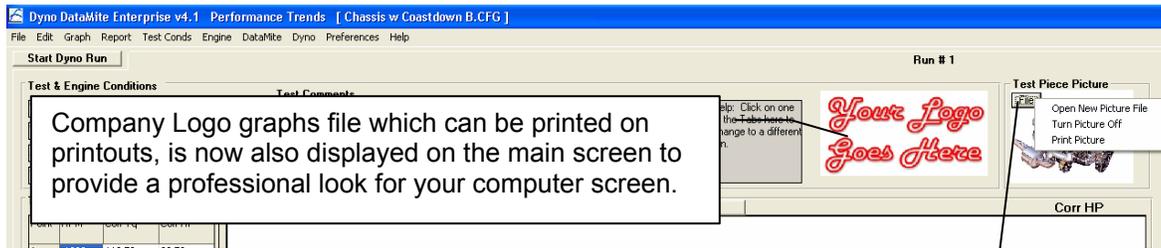
If you right click on Open after clicking a file name, you have the option to open this file as the Master DataMite and Master Dyno specs. This is quick way to open an old known good test and use its Dyno and DataMite settings as Masters, to configure you dyno as it was when that test was run.



If you right click a file name in the History Log, it gives several options, including Removing the file name from the History Log list.

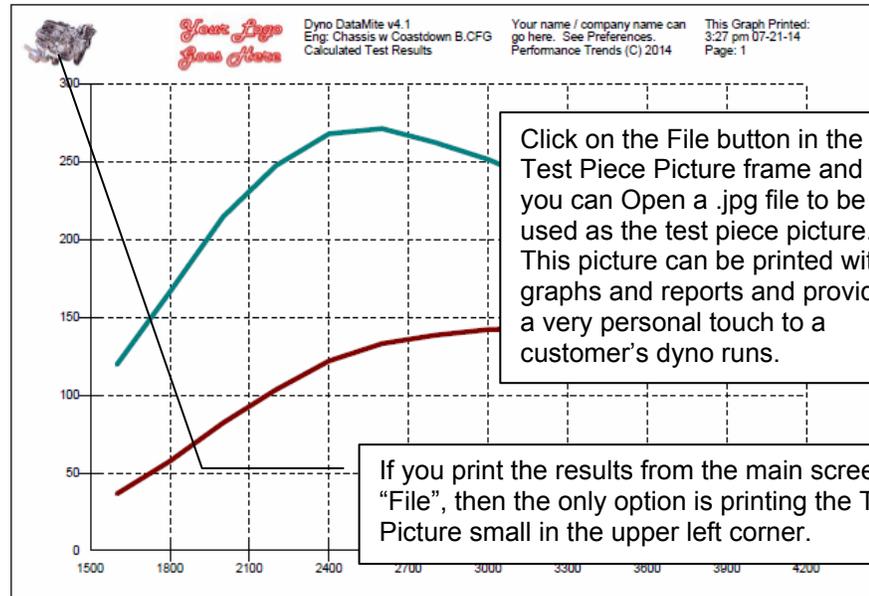
IMPORTANT: This "remove" does not erase the file. The file can still be accessed from "File", then "Open from all Saved Tests".

Figure A8.7 Engine Picture



Company Logo graphs file which can be printed on printouts, is now also displayed on the main screen to provide a professional look for your computer screen.

Tip: Click on one of the tabs to change to a different view.



Click on the File button in the Test Piece Picture frame and you can Open a .jpg file to be used as the test piece picture. This picture can be printed with graphs and reports and provides a very personal touch to a customer's dyno runs.

If you print the results from the main screen under "File", then the only option is printing the Test Piece Picture small in the upper left corner.

* Bore .00 cid 6 Cycle PkTq: 270.94 @ 2600 11:15 am 11/12/2013
 * Stroke 1.012 Corr. Factor PkHP: 143.73 @ 3400 Operator: Hans

Example of inertia chassis dyno run consisting of an accel followed immediately by a decel with no braking of the vehicle. This coastdown info is use to estimate vehicle losses and better estimate flywheel torque and HP as Data Types Coastdown Tq, Coastdown HP, Total Corr. Tq and Total Corr. HP. This feature is only available in the Enterprise Edition, which provides an additional test Type of "Measure Tq/HP from accel/decel".

Test Data, corr to 29.92 / 60 deg F dry air

RPM	Tq	HP	RPM	Tq	HP	RPM	Tq	HP
1600	119.50	36.58	2600	270.94 Pk	132.95	3600	208.96	141.85
1800	166.28	57.46	2800	262.22	138.45	3800	197.14	141.38
2000	214.33	82.05	3000	251.25	142.12	4000	185.76	140.24
2200	247.32	103.46	3200	236.99	142.94	4200	172.89	137.21
2400	267.80	121.87	3400	224.15	143.73 Pk			

If you print a graph from the "Graph" screen, with all the options, you can select to have the test piece picture printed larger, as shown here. See Figure A8.21 for more details.

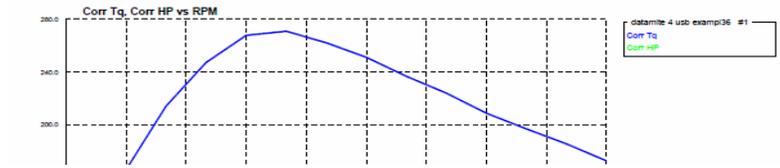
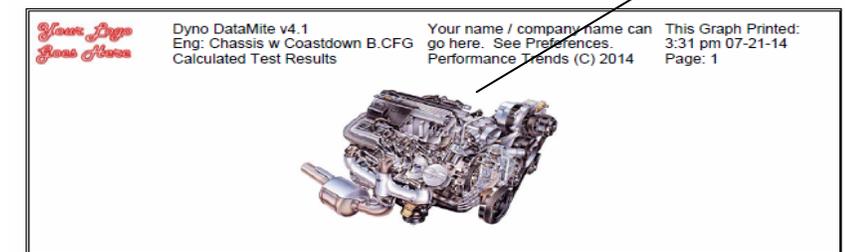
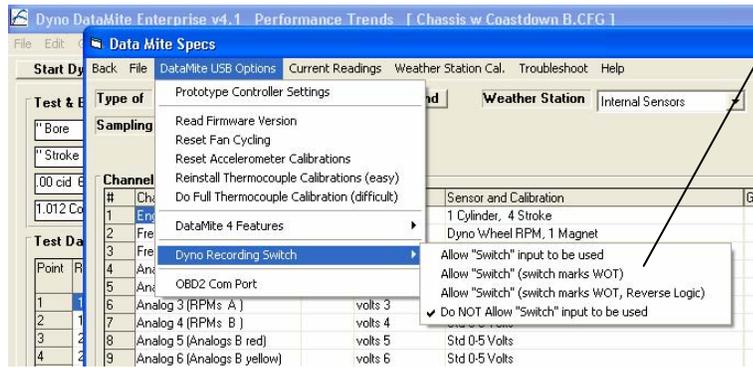
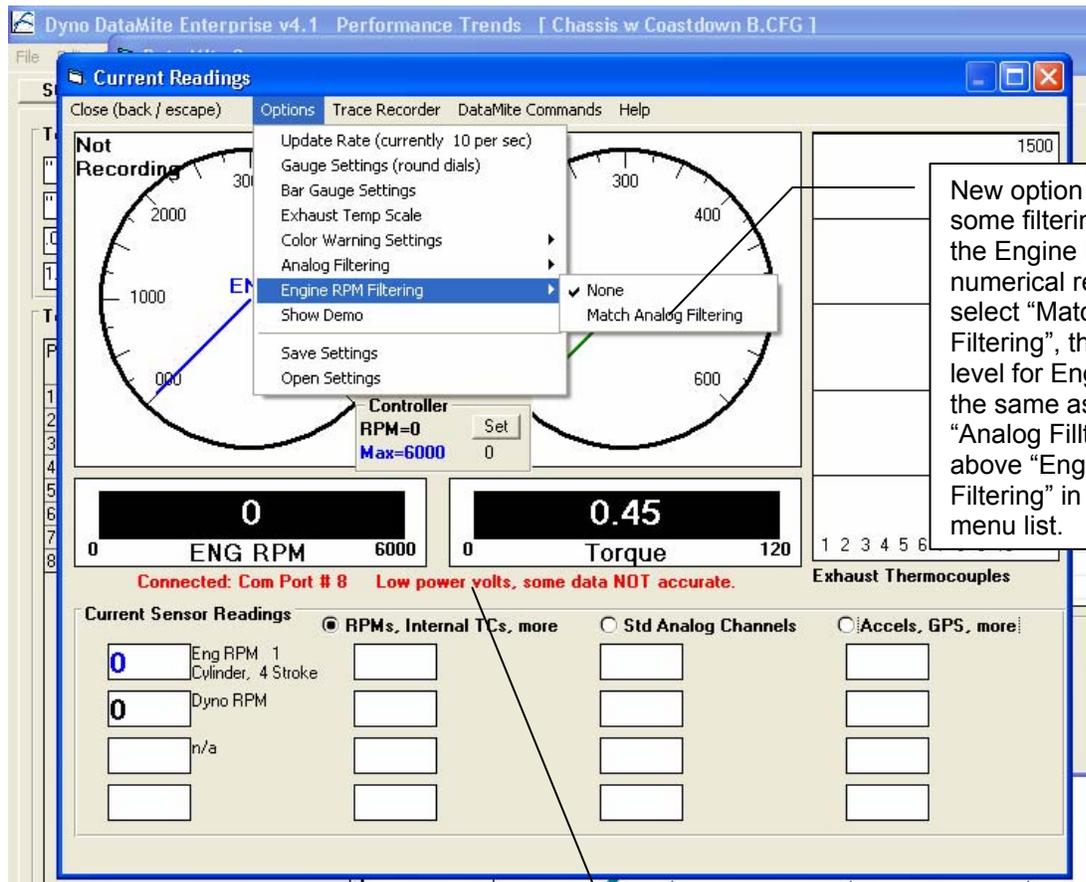


Figure A8.8 Recording Switch Options



Dyno Recording Switch Options. The info coming with your switch will explain these options in more detail.

Figure A8.9 New Features on Current Readings Screen



New option lets you put some filtering (smoothing) on the Engine RPM gauge or numerical reading. If you select "Match Analog Filtering", then the Filtering level for Engine RPM will be the same as you assign for "Analog Filtering" directly above "Engine RPM Filtering" in the drop down menu list.

Notes are provided here about potential problems. If you click on this note, you may be presented with more information.

Figure A8.10 Dyno Controller

Information sent with your controller will explain these options in more detail

Once you have set these settings, click the Tune button to send them to the controller.

Click here in DataMite Specs for the Controller Settings screen shown to the right.

After you choose the "Type" of control, click here for the program to load some good "starting point" settings.

Choose the "Type" of controller you have.

Notes:
Click the 'Defaults' button to load typical default values. Use 'Tune' button to check 'Higher Number Increases Load' and to see how fast the 'Ramp, count/mSec' setting moves the valve (the HIGHER the 'Ramp, count/mSec', the SLOWER the movement).

You must set your Dyno as an Absorber (brake) Dyno in the Dyno Specs screen. You must also assign 1 of the gauges to display HP as shown here. That is done under Options, then Gauge Settings.

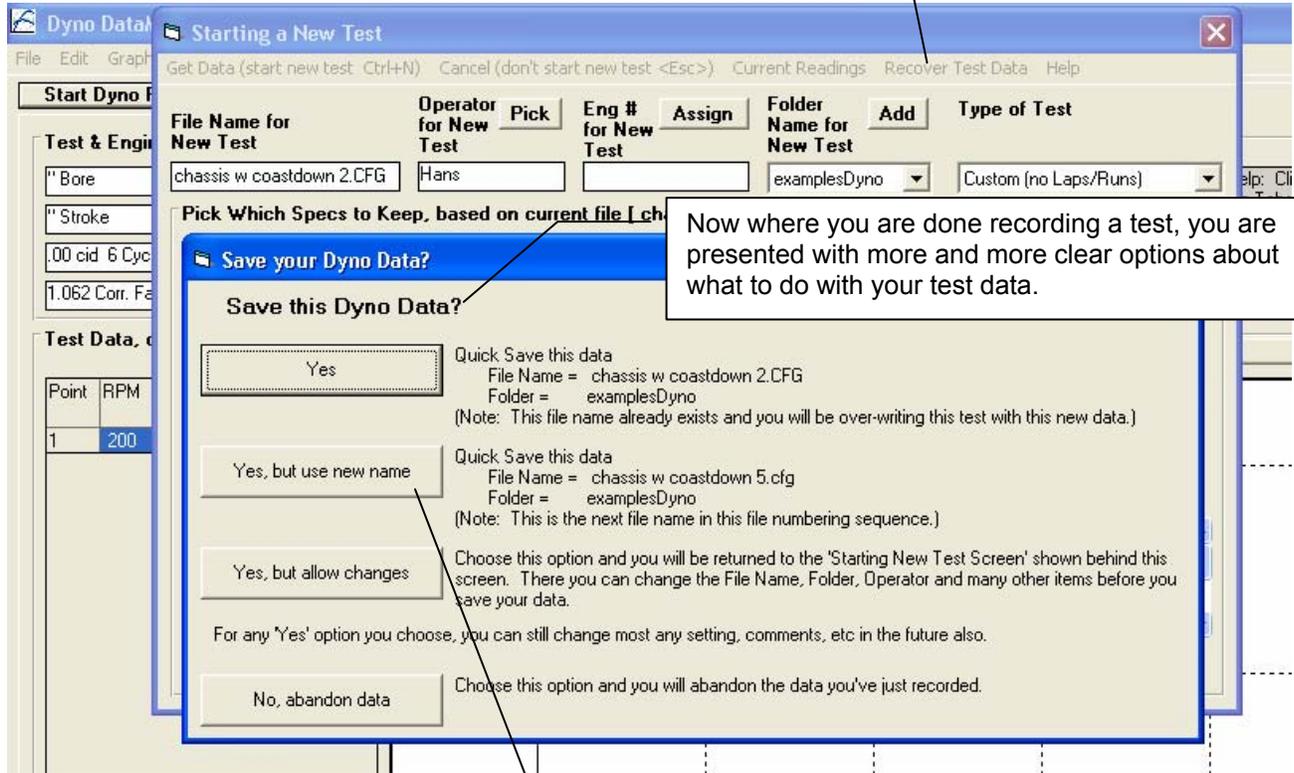
The "Set" button brings in the "integral" part of the controller, which works well when you are trying to hold RPM constant (not accelerating or decelerating). This is handy when you are trying to tune an engine at some constant MPH or RPM. This can also be done with Ctrl-H (hold) and Ctrl-R (release) commands.

With the Controller activated, you will see this panel between the gauges. It shows the current RPM the controller is controlling, and the Max RPM which tells the controller the test is over. For example, with these settings, when you press <F1>, the controller will let the engine RPM accelerate per the "Ramp Rate" specified until 6000 RPM is reached. Then the controller will ramp the RPM down and turn control back over to the manual dial knob. Since the controller is still prototype, things are likely to change since the writing of this manual. Carefully read the instructions which came with your controller.

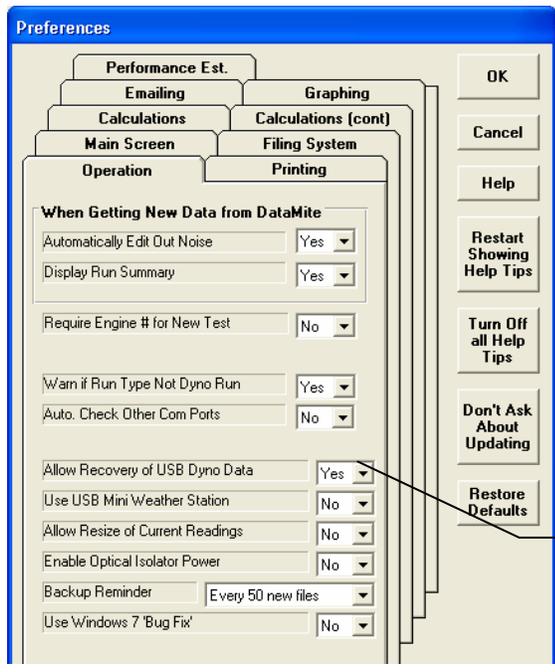
Current Sensor Readings	
3124	Eng RPM 1 Cylinder, 4 Stroke
822	Dyno RPM
	n/a

Figure A8.11 New Features After Recording a Test

If you turn this option On, you have an option to Recover Test Data should something go wrong or you make a mistake after recording a test. See the Preference screen below for turning this On.



Now where you are done recording a test, you are presented with more and more clear options about what to do with your test data.



The program now checks to see if your test numbering has gotten out of "sync". For example, say you've been naming tests Jeffs355-001, then Jeffs355-002, etc. You're currently at Jeffs355-044, but you opened up Jeffs355-031 to look at it and it is currently opened up on the main screen. If you run a test, the program thinks the next test would be Jeffs355-032 (one digit higher), but that test already exists. Now the program will recognize that and look for the next available name in the sequence and suggest, Jeffs355-045 and give you that option to use it with this button here.

If it looks like you are not overwriting a previous test and test number looks fine, this button will not appear.

The Recover Data feature is turned on here, and then click OK in upper right to keep this change.

Figure A8.12 Displaying Engine Inertia Value and Entering Engine Inertia Directly

Click on Engine for this screen.

Engine Inertia is used to correct the torque and HP when the engine is accelerating and/or decelerating. An accelerating engine makes less power than an engine setting at a steady RPM because some of the power must be used to accelerate the engine's own inertia.

Because this concept is complex and requires the user to know how it works, it must be turned ON in 2 places, in Preferences under "Calculations (cont)" tab and then also in Test Conds as "Correct for Engine Inertia Effects". Done properly, this can produce more repeatable and accurate results. **However, mistakes will make your results less repeatable and accurate.**

If you choose "Enter directly", the "Value" input becomes enabled and you can enter most any number you want. Shown here it is 5.67.

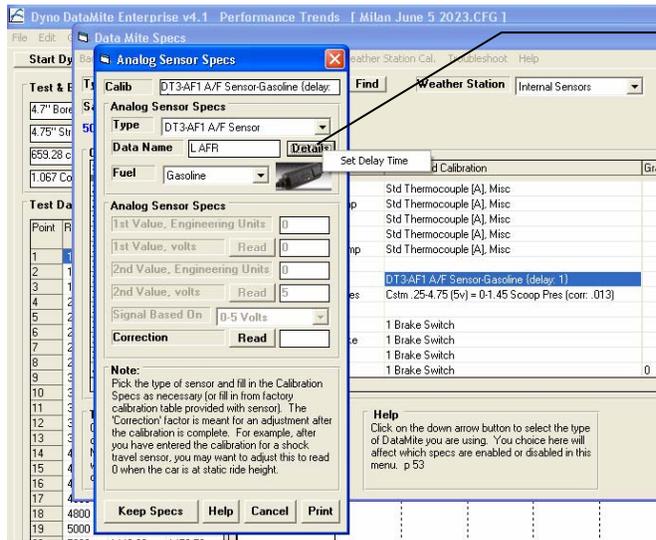
The units for English units are $lb \times ft^2$ (feet squared)

The units for Metric units are $Kg \times M^2$ (meter squared)

(For advanced users: Do not divide the weight by the acceleration of gravity. That is done within the program.)

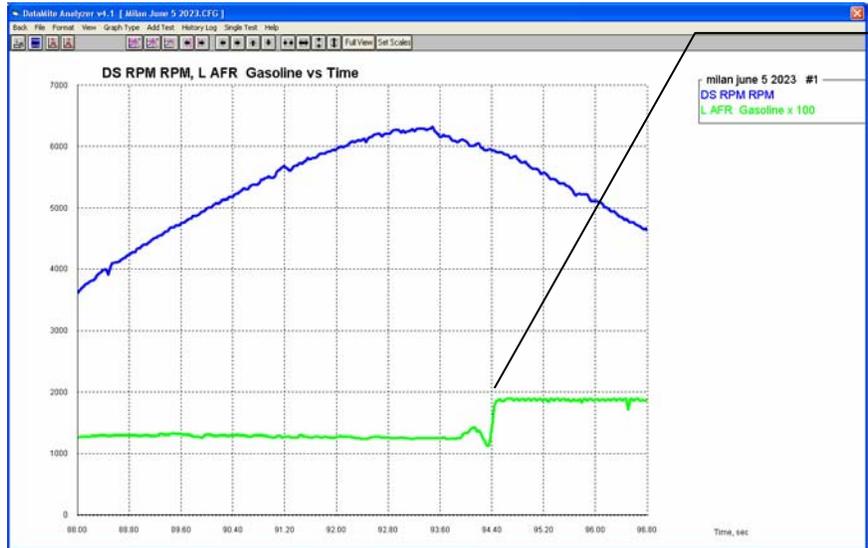
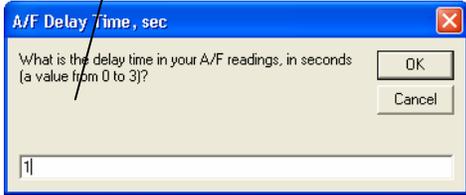
Choose your method of entering Engine Inertia. If you use "Estimate from (engine specifications) above", then you engine specs are used to estimate Engine Inertia. This Estimated value is shown directly above this setting as 3.475 for this case. Also, all entries which affect this Estimated Inertia are displayed in bright blue.

Figure A8.13 A/F Channel Time Delay



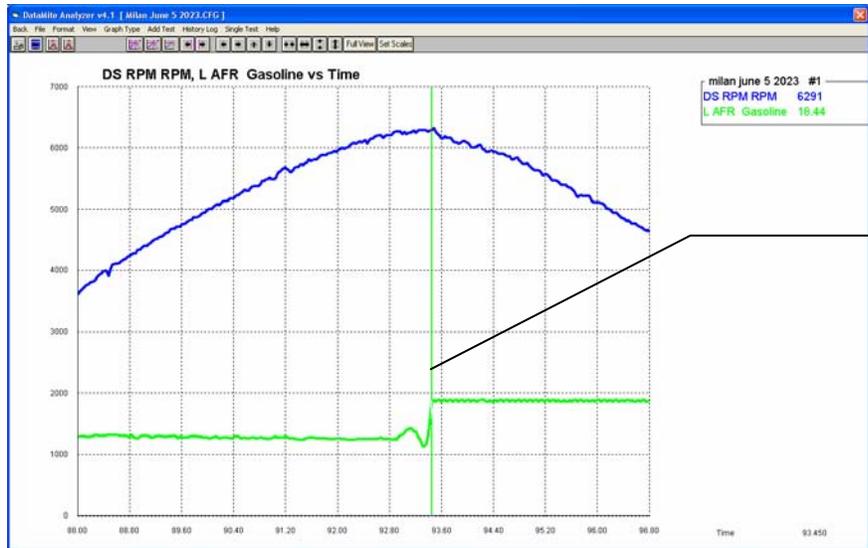
If you pick an A/F Sensor, this "Details" button will appear. Click on it and it gives you the single choice of "Set Delay Time". Click it and the screen below will appear where you can enter the Delay Time.

Enter the Delay Time in seconds, the amount of time it takes the sensor to "see" an A/F change.



The A/F sensor is the only sensor which will experience significant delay times. That is because this sensor can be several feet down the exhaust system, or several feet away via a hose to the Remote Sampler.

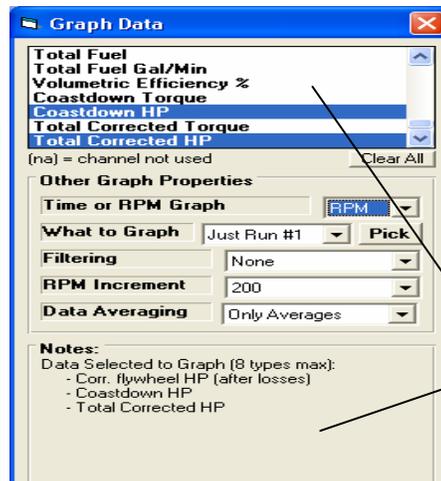
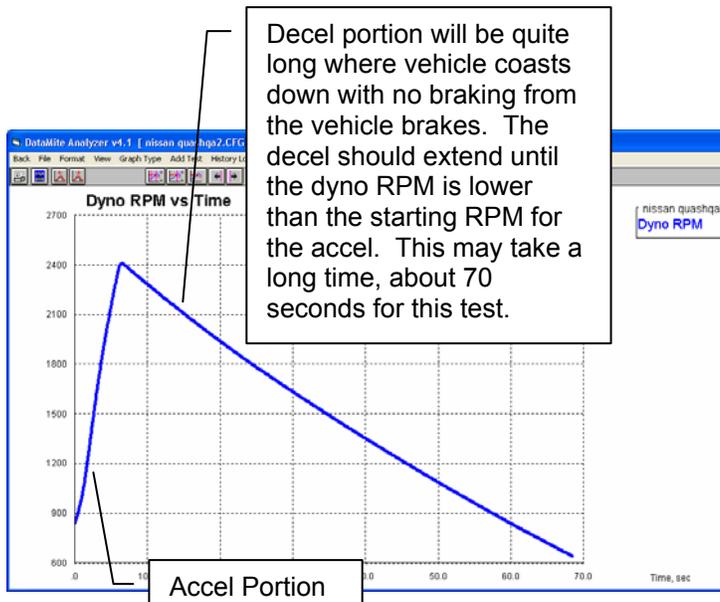
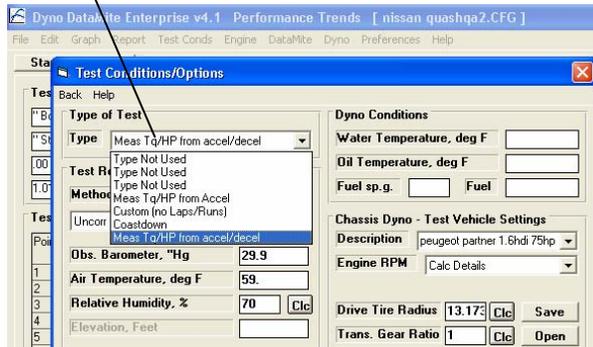
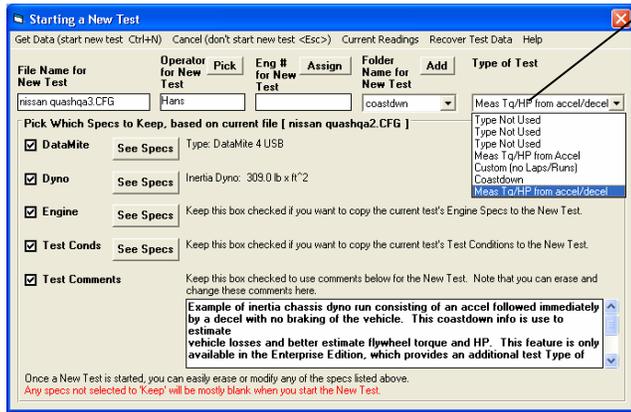
When you close the throttle and RPM starts to drop, the A/F change is not sensed until about 1 second later. This can cause errors in your analysis when data is graphed vs time (as shown here) or RPM, because the A/F you see at some particular time or RPM is actually occurring at some other time or RPM.



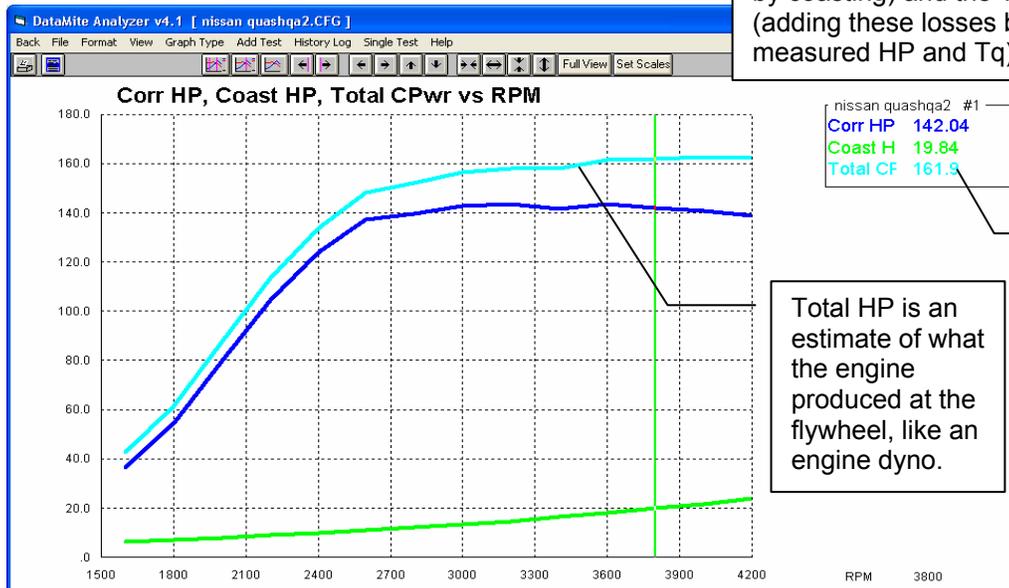
After the 1 second delay is applied, the A/F goes lean at the same time the throttle is closed and RPM starts to drop. This will provide for more accurate data analysis.

Figure A8.14 Measure Tq/HP from Accel/Decel

This "Type of Test" is available in the Enterprise Edition only.



You will have new data choices for graphs and reports of Coastdown HP and Tq (the driveline losses measured by coasting) and the Total HP and Tq (adding these losses back into the measured HP and Tq).

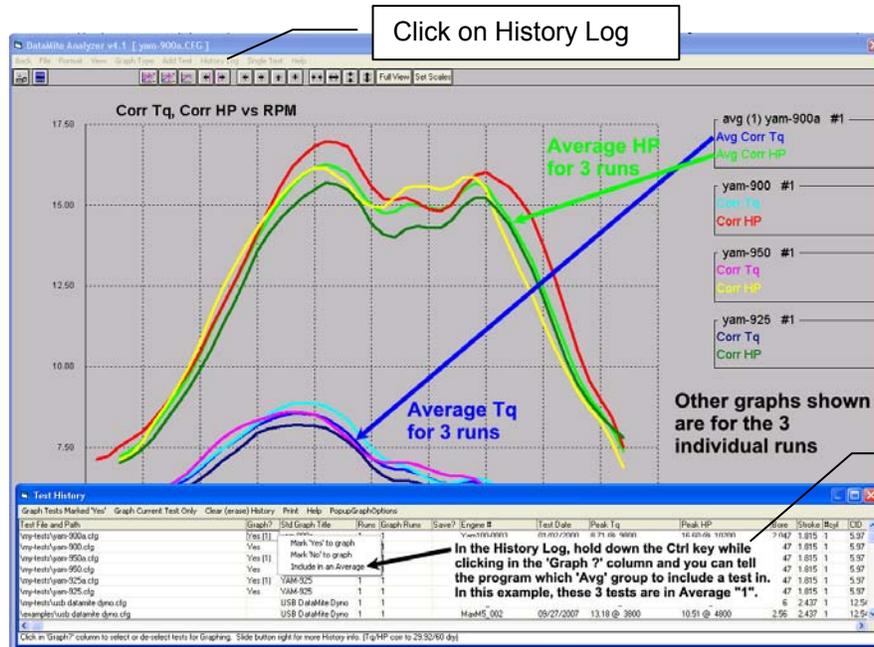


Total HP is an estimate of what the engine produced at the flywheel, like an engine dyno.

Here's the graph of Corr HP (what is normally displayed and was displayed in all previous versions), Coast HP (measured losses) and Total Corr HP (adding these 2 together).

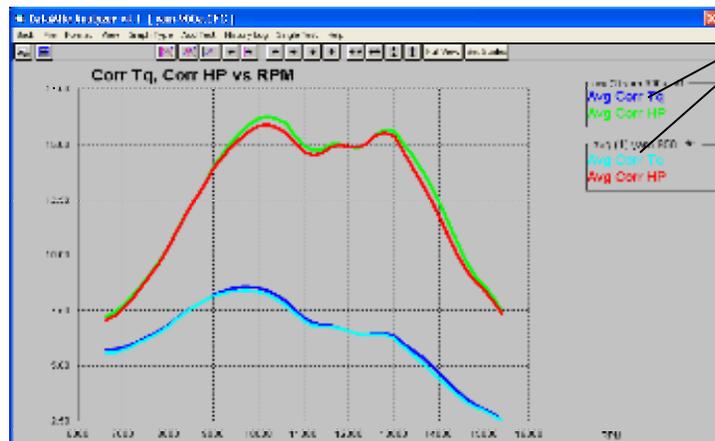
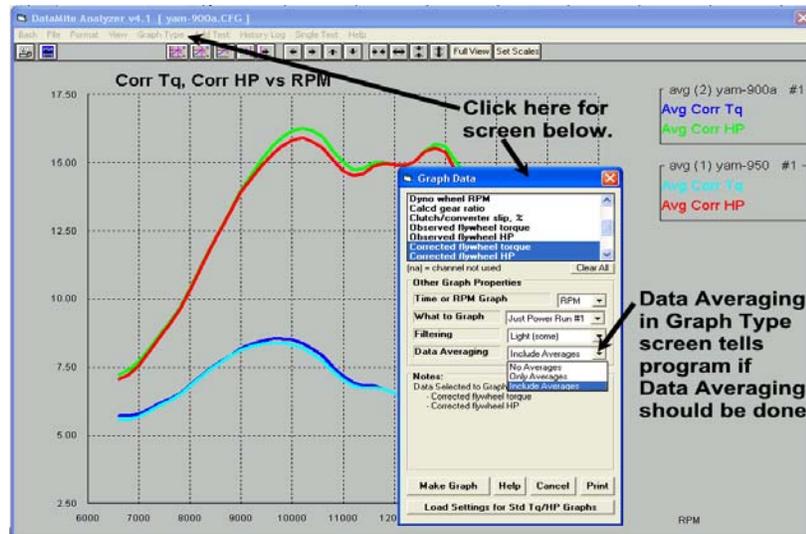
An FAQ under Support on the www.performancetrends.com website explains this in more detail.

Figure A8.15 Average Tests Together for Graphing



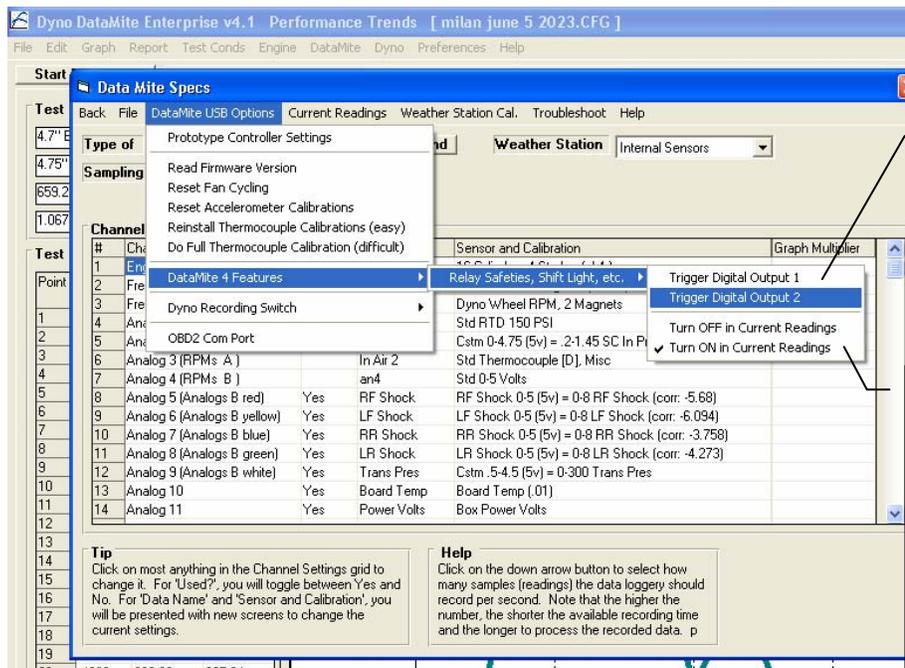
An FAQ (under Support) on the www.performancetrends.com website explains this process in more detail.

Choose options to mark a particular test to include in an average "group".



A graph showing only the averages for 2 different "groups", Group 2 and Group 1 shown as (2) and (1).

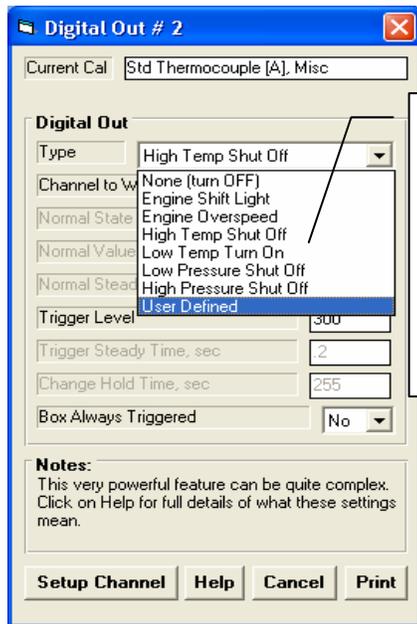
Figure A8.16 Setting Up Digital Outputs



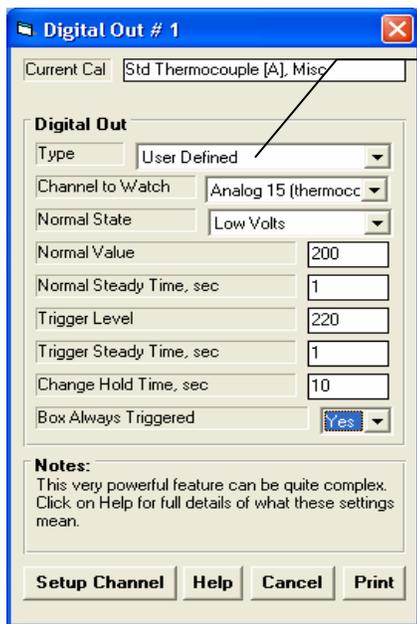
The instructions which come with your hardware will explain this feature in more detail.

Choose which digital channel you want to configure or turn Off. Then a screen like those shown below will be displayed.

If you choose No for "Box Always Triggered", then the logger will only perform the digital checks when it is communicating with the computer (Current Readings screen displayed). You can temporarily turn off this effect On or Off here also.



Several "built in" features are possible, plus User Defined which lets you do most anything.



This User Defined setup will watch the Thermocouple on Analog Channel 15 and keep the digital output voltage low. This temperature is normally 200 deg and must be less than 200 for 1 second to "arm" the system. If it now goes above 220 for 1 second, the digital output will go high for at least 10 seconds or until the temperature goes back below 200 deg.



Hardware shown here is a 20 amp relay with a relay driver. This could be used for turning a motor, fan, or ignition power On or Off.

Figure A8.17 Recording OBD2 Data and Slow Sample Rate

This can go as low as 1/sec for recording VERY long tests, up to 8 hrs or so.

An FAQ (under Support) on the www.performancetrends.com website explains this process in more detail.

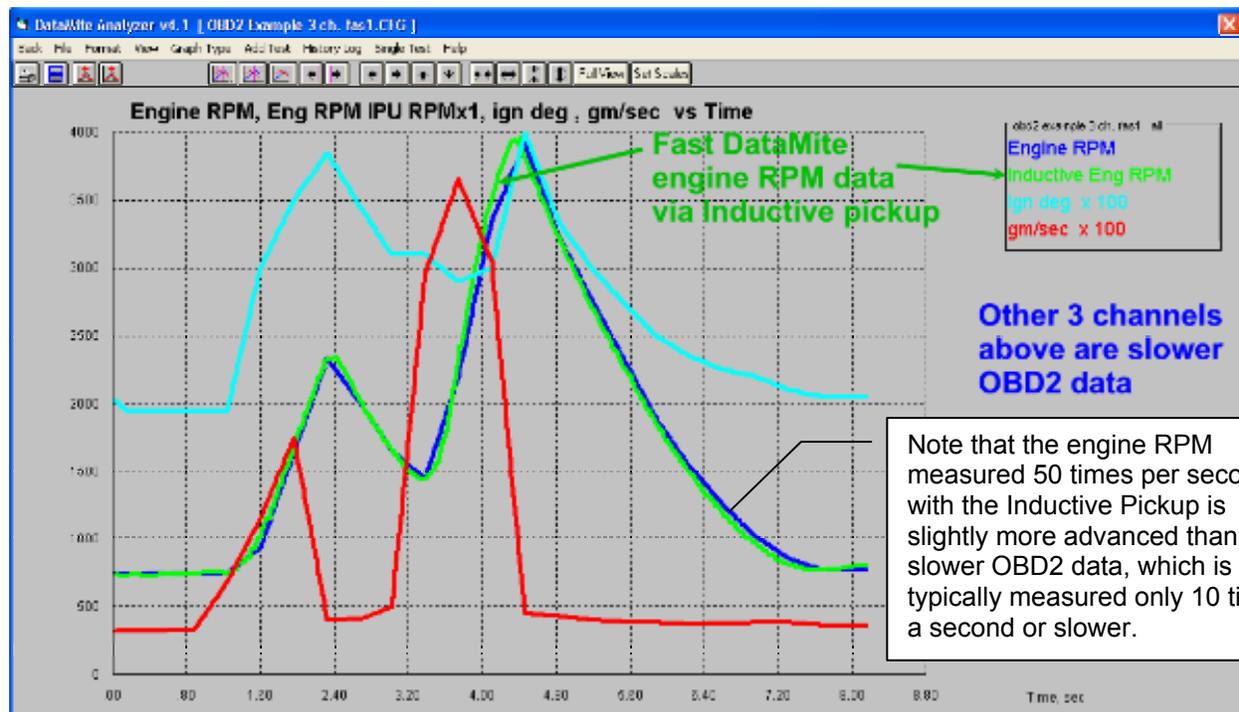
The screenshot shows the 'DataMite Specs' application. The 'Channel Settings' window contains a table with 14 channels. Channel 6 is highlighted, showing 'Analog 3 (RPMs A)' with 'Data Name' 'ign deg' and 'Sensor and Calibration' 'OBD2 - Ign Timing_14'. The 'Analog Sensor Specs' window is open for this channel, showing 'Type' 'OBD2 Data', 'Data Name' 'ign deg', and 'Data' 'Ign Timing_14'. A dropdown menu is open showing various OBD2 parameters like 'Speed KPH_13', 'Int Air Deg F_15', etc.

#	Channel	Used?	Data Name	Sensor and Calibration
1	Engine RPM	Yes	Engine RPM	OBD2 Eng. RPM
2	Frequency 2	Yes	Eng RPM IPU	Other RPM, 1 Magnet
3	Frequency 3		DS RPM	Driveshaft RPM, 2 Magn
4	Analog 1 (Analog A green)	Yes	Trans Pres	Cstm, 5-4.5 (5v) = 0-30
5	Analog 2 (Analog A white)	Yes	ign deg	OBD2 - Ign Timing_14
6	Analog 3 (RPMs A)		In Air 2	Std Thermocouple (D
7	Analog 4 (RPMs B)		an4	Std 0.5 Volts
8	Analog 5 (Analog B red)		gm/sec	OBD2 - Mass Air gm/s
9	Analog 6 (Analog B yellow)	Yes	LF Shock	LF Shock 0-5 (5v) = 0
10	Analog 7 (Analog B blue)	Yes	RR Shock	RR Shock 0-5 (5v) = 0
11	Analog 8 (Analog B green)	Yes	LR Shock	LR Shock 0-5 (5v) = 0
12	Analog 9 (Analog B white)	Yes	Trans Pres	Cstm, 5-4.5 (5v) = 0-30
13	Analog 10	Yes	Board Temp	Board Temp (.01)
14	Analog 11	Yes	Power Volts	Box Power Volts

Choose OBD2 Data and the Data dropdown appears. There you can pick the OBD2 data you wish to record for this channel.



Examples of various types of OBD2 data, Engine RPM, Ignition Timing and Fuel Flow in gm/sec. (Note: It is important to remember that OBD2 data is what the ECU "thinks" is happening, but may not be what is **actually** happening.)



Note that the engine RPM measured 50 times per second with the Inductive Pickup is slightly more advanced than the slower OBD2 data, which is typically measured only 10 times a second or slower.

Figure A8.18 New, Simpler Choices for Sensor Calibrations

A/F Sensor Options

If you select an A/F sensor Type, then Fuel types are displayed, letting you choose how AF will be displayed, including the generic "Lambda" richness ratio.

Stainless (steel) Pressure Sensor Options

Select Stainless Pres Sensor and then just type in the max pressure rating of the sensor, from 25 to 10,000.

Blowby Sensor Options

Select Blowby Sensor and then just type in the CFM rating of the sensor, from 1 to 30 CFM.

Figure A8.19 Shift Table Calibration

	Volts	Data	Volts	Data
A	0	0	F	5
B	1	4	G	
C	2	7	H	
D	3	9	I	
E	4	10	J	

Prior to this version, if you used a Custom Calibration Table, there was no way to make a small "re-zero" type adjustment. Now, if you turn on this feature in Preferences (under Calculations tab called "Allow Correction...") you can type in a correction to add to the table calibration. For example, if you are reading 0.2 when you should be reading zero, enter a correction of -.2 (minus) so that .2 will be subtracted from the readings.

If there is already an existing Correction, you will have to compensate for that also.

Because of the complexity of a Table calibration, the "Read" button option is now possible to obtain a Correction.

Figure A8.20 Specifying Graph Multipliers

After you make changes to Inputs, be sure to click this Keep button. Then you can select another Data channel to make more multiplier changes.

Click in this column in the DataMite specs for the Graph Multiplier screen shown.

Click on this Help button for a more detailed explanation of how this feature works.

R AFR is x 100 and L AFR is x 10. Ideally, both would be the same.

If the program picks the multipliers, it may not make the best picks. Here the Left and Right A/F sensors have different multipliers, perhaps because Left A/F was just slightly higher (leaner) at some point. This makes it difficult to do a good analysis of the results.

Both AFRs are x 100 now

Choose Preset by User and you can set the multipliers as shown above.

Click "Assign Preset Multipliers" and the program will display a screen as shown above. Here you can change multipliers for calculated channels not available in the DataMite specs screen, like BSFC, Corr Tq, etc.

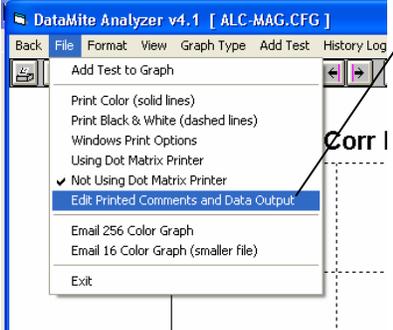
With both AFRs at x100, you can easily see they are nearly the same.

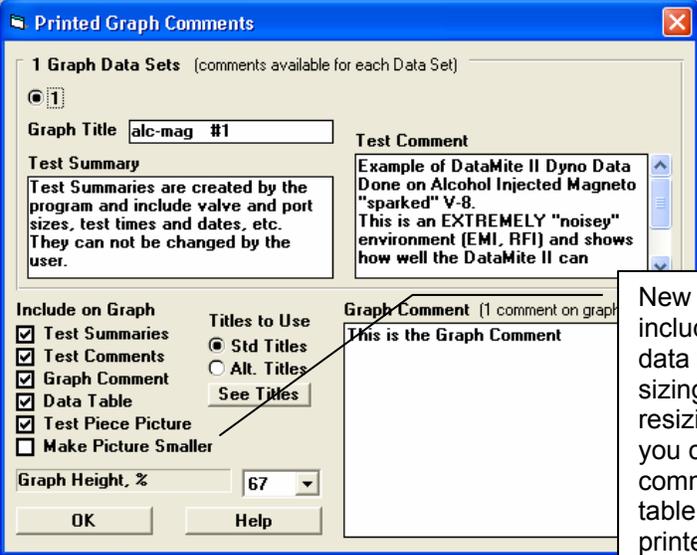
Figure A8.21 Showing New Line Thickness Option, Specifying RPM Increments on Graph, Showing Unavailable Channels Marked “na”, and Clear All Button

The figure consists of two screenshots from the DataMite Analyzer software. The top screenshot shows the 'Format' menu with the 'Line Thickness' sub-menu open, displaying options: Thin, Thin 'Plus', Thick (selected), Thicker, and Thickest. A callout box points to this menu, stating: "Line thickness now organized better, and new option of 'Thin 'Plus' ' (slightly thicker than Thin) is available." The bottom screenshot shows the 'Graph Data' dialog box. It features a list of channels: SC Out (na), Tran Temp (na), Oil Temp (na), Eng Cool (na), SC In Temp (na), KiloWatts (na), and L AFR. A 'Clear All' button is located below the list. Below the channel list are 'Other Graph Properties' including: 'Time or RPM Graph' set to 'RPM', 'What to Graph' set to 'Just Run #1', 'Filtering' set to 'None', 'RPM Increment' set to '200', and 'Data Averaging' set to 'No Averages'. A callout box points to the 'RPM Increment' dropdown, stating: "Channels which are Not Available (like GPS channels on a dyno system, or a sensor channel not marked 'Yes' for 'Used' in the DataMite specs) are marked '(na)'." Another callout points to the 'Clear All' button, stating: "Clear All button lets you de-select all channels from the channel list above." A third callout points to the 'Data Averaging' dropdown, stating: "You can select the RPM Increment for the graph. Prior to this it was always 50 RPM increments, or a preference let you change it to match whatever you were using on the Main Screen graph." A fourth callout points to the 'Data Averaging' dropdown, stating: "Here you can select how you want to graph Averages, as described in Figure A8.15." The dialog box also includes 'Notes' (Data Selected to Graph: - DS RPM, - R AFR, - L AFR) and buttons for 'Make Graph', 'Help', 'Cancel', 'Print', and 'Load Settings for Std Tq/HP Graphs'.

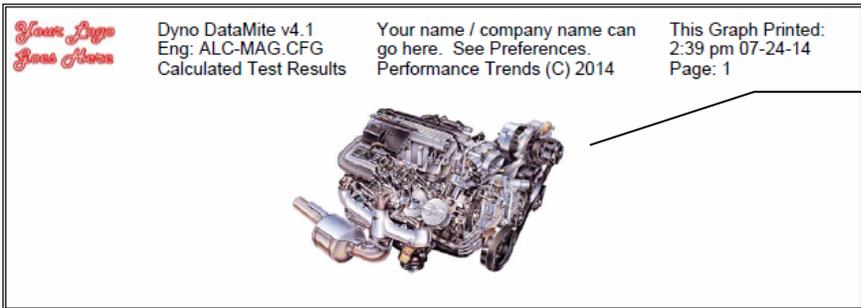
Figure A8.22 New Graph Printout Options

Click here to bring up the screen of Print Options shown to the right.





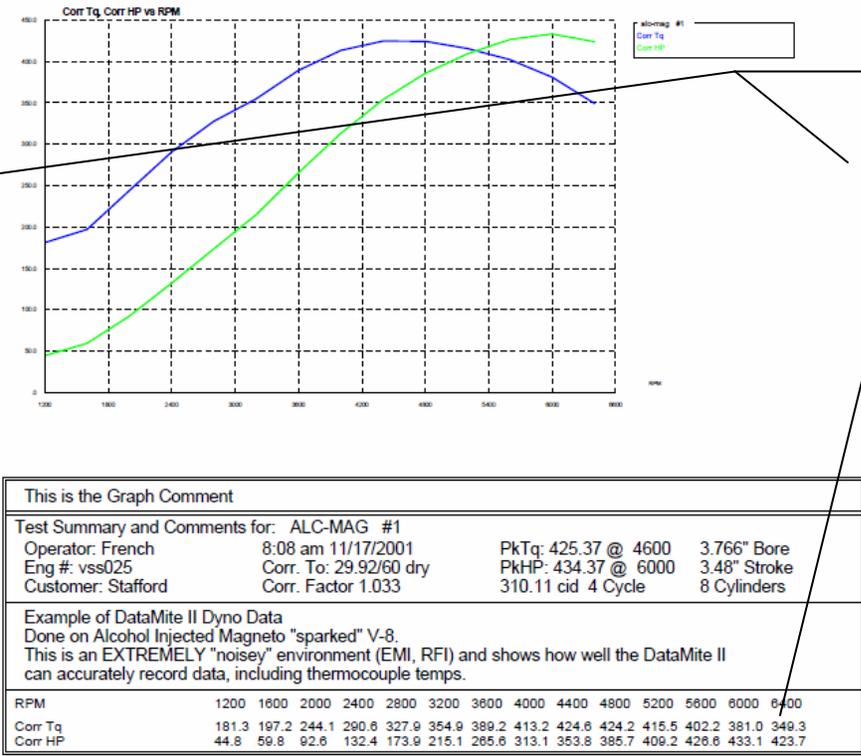
New print options for including graphics, data table, and sizing the graph. By resizing the graph, you can get a graph, comments, data table, etc to be printed on 1 sheet.



Dyno DataMite v4.1
Eng: ALC-MAG.CFG
Calculated Test Results

Your name / company name can go here. See Preferences.
Performance Trends (C) 2014

This Graph Printed:
2:39 pm 07-24-14
Page: 1



Corr Tq, Corr HP vs RPM

This is the Graph Comment														
Test Summary and Comments for: ALC-MAG #1														
Operator: French	8:08 am 11/17/2001	PkTq: 425.37 @ 4600	3.766" Bore											
Eng #: vss025	Corr. To: 29.92/60 dry	PkHP: 434.37 @ 6000	3.48" Stroke											
Customer: Stafford	Corr. Factor 1.033	310.11 cid 4 Cycle	8 Cylinders											
RPM	1200	1800	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6400
Corr Tq	181.3	197.2	244.1	290.6	327.9	354.9	389.2	413.2	424.6	424.2	415.5	402.2	381.0	349.3
Corr HP	44.8	59.8	92.6	132.4	173.9	215.1	265.6	313.1	353.8	385.7	409.2	426.6	433.1	423.7

Test Piece picture is printed large if you select to print in Portrait mode in the Windows Printer Setup.

Borders are now NOT printed to the left or right of the graph. In previous versions there could be broken lines here depending on the particular printer.

Data Table gives the numeric values of what is graphed. If you have lots of data points (like a graph in 50 RPM increments), this data will be printed VERY small. Then it is best to increase the RPM increment to something larger, like 400 RPM increments used here.

