

# Appendix 5: New Features in Version 3.2

Here is a brief listing of some of the features new in Version 3.2:

- Program is now a 32 bit version, fully compatible with newer operating systems, starting with Windows, 95, then 98, Me, XP, and 2000. This also allows you to use much longer, more descriptive file names for saving vehicles, suspensions and engines. It is also more compatible with newer printers.
- The program is now designed for 600 x 800 or higher resolution screens. Screen colors are also more compatible with Windows XP.
- The graph screen is now larger, and generally fills the entire screen.
- There is now a separate “Examples” folder for example engine files provided by Performance Trends. New engines which you save will be saved to a separate folder.
- File commands to save a vehicle file to a floppy disk, or open a vehicle file from a floppy disk. This allows easy transfer of files from one computer to another.
- You can now choose to list engine files alphabetically (as normally done) or by saved date, with the most recently saved files listed first. This should make it easier to find recent files more quickly.
- New Example Engines have been added, like Crate Engines.
- The user’s manual is now available from inside the program by clicking on Help at the top of the main screen, then Display User’s Manual. The manual is in a high quality PDF format
- The Performance Trends website is now available from inside the program by clicking on Help at the top of the main screen, then Performance Trends on the Web.
- Several features have been added to make the process of picking example components, calculating performance, making comparison graphs faster. Once an example has been selected on an input specification has been changed, the <F5> key lets you progress toward calculating performance and making a graph. Then the <Esc> key backs you up to the same point as where you started. This is explained in more detail below.
- The program now remembers the point where you picked an example component, so if you choose to pick another, it will default to the last component chosen.
- The ‘Flow Efficiency’ of the ports can now be calculated from up to 3 flow/lift points.
- The calculation accuracy has been “tweaked”. Most evident changes are:
  - Low RPM torque is higher for some engine combos.

- Spark knock simulation is improved for more realistic trade-offs between knock, octane and power loss from spark retard.
- The required spark advance for a particular engine has been improved.
- Revised the BSAC calculation to be more consistent with fuel flow (not change so significantly with weather conditions as done in earlier v3.0).
- Very Rich gas as fuel option to help to reduce detonation.
- On program shut down, the program now asks if you want your changes saved to the “Library Copy” of the file you are working with.
- Several features have been added to the graphs, including:
  - The Graph cursor now interpolates between points. This means that if one power curve has results at 2000, 2400 and 2800 RPM, and another has results at 2000, 2500 and 3000, the cursor will read both curves at all RPM points you ran, 2000, 2400, 2500, 2800 and 3000.
  - TDC and BDC labels are now displayed on the Valve Lift graphs. If you are using a cursor, the cursor value is also given as, say “24 deg ABDC”.
  - You can now print graphs in color or B&W with various styles of dashed lines.
  - A Preference lets you turn off the Graph always AutoScaling a new graph. This means that if you have found a set of scales you like, the program will maintain them.
- The powerful ‘Optimize’ feature at the main screen lets you try thousands of combinations of critical engine specs to find the best combo automatically.
- Hundreds of new example parts have been added, including the entire Crane Cams Catalog, Brodix, AFR, Edelbrock, World Products, Dart and TFS heads, more Import parts, motorcycle parts and kart parts, and more.
- New Printing options for reports, including different Font Sizes and omitting the “Starting Point

Figure A1 Calculation Menu for Flow Efficiency

Calc Valve Flow Effcy, %	
Calc Valve Flow Effcy, %	48.0
<b>Flow Test Data</b>	
Test Pressure, "Water	28
# Valves/Cylinder	2
Valve Diameter, in	1.460
Valve Lift Tested, in	.3
Flow Obtained, CFM	220
Use More Points?	2 more ▾
Valve Lift Tested, in	.4
Flow Obtained, CFM	260
Valve Lift Tested, in	.5
Flow Obtained, CFM	280
<b>Notes:</b> Enter flow data for 2 1.460" diameter Intake valves at a valve lift from .200" to .550" .	
Use Calc Value	Help Cancel Print

Suggestions” for cam and runner dimensions (in Preferences). “Starting Point Suggestions” are now done much better through the “Optimize” feature.

- New Printing options for graphs, including “Dot Matrix Printer Adjustment”, Width adjustments and more (in Preferences).
- Version 3.0 let you send a power curve to a vehicle program to be loaded and run in that vehicle. Version 3.2 lets you do that also. However, that process requires several key strokes and time. Version 3.2 lets you “Auto-Link” with a vehicle program of your choosing. Auto-Link runs every power curve you produce through a vehicle program, and produces a summary of the results. Now you can instantly see how a cam change, head swap, more nitrous will affect ET or circle track Lap Times. At the time of printing this manual, Auto-Link was only available for the Drag Racing Analyzer v3.2 and Circle Track Analyzer v3.2.

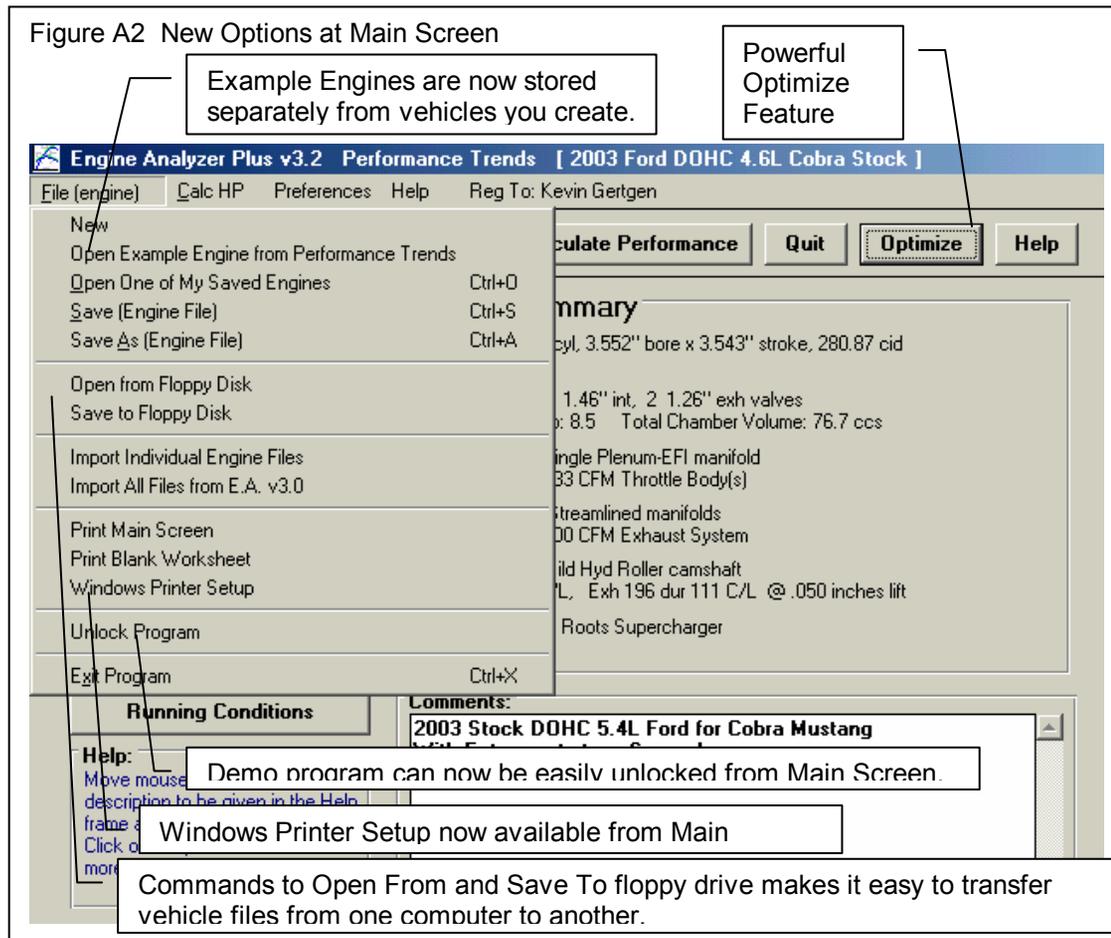


Figure A3 Optimize Screen to Have Program Try Hundreds of Combinations Automatically to Find the Best One

1) Click on "Optimize" to open this screen

2) Choose which engine specs you want to Adjust to find the best combo. The more you choose, the better the final combo but the longer it takes.

3) Choose what you want optimized. Averages are calculated for entire RPM range set in Calculation Conditions on Main Screen

4) Set what Idle Vacuum is required, the more vacuum, the more "streetable" the final combo.

5) Click here to start the process.

6) If the process is taking too long, click Cancel and "de-select" some of the engine specs to adjust.

7) When finished you can click here to keep the Adjusted specs. Otherwise, click on Cancel to close out.

Notes:

- All other specs during the Optimize process are at the current settings in the individual Component menus.
- Average Torque and HP are calculated for the entire RPM range you have set in the Calculate Performance Conditions menu. If you want to optimize the Average Torque or HP from just 5000 to 7000 RPM, set this range in the Calculate Performance Conditions menu before Optimizing.

Figure A4 <F5> and <Esc> Keys for Quicker Calculations and Graphs

Follow steps 1-8

1) Pick an example part, then press the <F5> key to return to component menu.

Part Name	Material	Sub Profile	Valve Train	Center Line	Dist	Subs Lift	Subs Lash	Stroke	Stroke Ratio
Crane 36112 H-262.2	000	Atty#9	PuSha imp	107	204	2847	na	1.6	2003 Crane Cal. 1962UP Fuel V @ 221-302 val @ ICEPT 1962L
Crane 36112 H-262.2	000	Atty#9	PuSha imp	117	214	2627	na	1.6	2003 Crane Cal. 1962UP Fuel V @ 221-302 val @ ICEPT 1962L
Crane 36112 H-262.2	000	Atty#9	PuSha imp	109	210	285	na	1.6	2003 Crane Cal. 1962UP Fuel V @ 221-302 val @ ICEPT 1962L
Crane 36112 H-262.2	000	Atty#9	PuSha imp	109	210	285	na	1.6	2003 Crane Cal. 1962UP Fuel V @ 221-302 val @ ICEPT 1962L
Crane 36112 H-262.2	000	Atty#9	PuSha imp	107	214	2627	na	1.6	2003 Crane Cal. 1962UP Fuel V @ 221-302 val @ ICEPT 1962L
Crane 36112 H-262.2	000	Atty#9	PuSha imp	117	228	2028	na	1.6	2003 Crane Cal. 1962UP Fuel V @ 221-302 val @ ICEPT 1962L
Crane 36112 H-262.2	000	Atty#9	PuSha imp	107	214	2627	na	1.6	2003 Crane Cal. 1962UP Fuel V @ 221-302 val @ ICEPT 1962L
Crane 36112 H-262.2	000	Atty#9	PuSha imp	117	228	2028	na	1.6	2003 Crane Cal. 1962UP Fuel V @ 221-302 val @ ICEPT 1962L
Crane 36112 H-262.2	000	Atty#9	PuSha imp	114	226	216	na	1.6	2003 Crane Cal. 1962UP Fuel V @ 221-302 val @ ICEPT 1962L
Crane 36112 H-262.2	000	Atty#9	PuSha imp	112	196	278	na	1.6	2003 Crane Cal. 1962UP Fuel V @ 221-302 val @ ICEPT 1962L
Crane 36112 H-262.2	000	Atty#9	PuSha imp	112	206	284	na	1.6	2003 Crane Cal. 1962UP Fuel V @ 221-302 val @ ICEPT 1962L
Crane 36112 H-262.2	000	Atty#9	PuSha imp	103	226	305	na	1.6	2003 Crane Cal. 1962UP Fuel V @ 221-302 val @ ICEPT 1962L
Crane 36112 H-262.2	000	Atty#9	PuSha imp	113	226	305	na	1.6	2003 Crane Cal. 1962UP Fuel V @ 221-302 val @ ICEPT 1962L
Crane 36112 H-262.2	000	Atty#9	PuSha imp	103	226	305	na	1.6	2003 Crane Cal. 1962UP Fuel V @ 221-302 val @ ICEPT 1962L
Crane 36112 H-262.2	000	Atty#9	PuSha imp	103	226	305	na	1.6	2003 Crane Cal. 1962UP Fuel V @ 221-302 val @ ICEPT 1962L
Crane 36112 H-262.2	000	Atty#9	PuSha imp	113	226	305	na	1.6	2003 Crane Cal. 1962UP Fuel V @ 221-302 val @ ICEPT 1962L

2) Press <F5> from component menu to immediately calculate performance.

**Cam/Valve Train**

General Cam Specs

Notes: 2003 Crane Cal. 1962UP Fuel V @ 221-302 val @ ICEPT 1962L

Type: Ex Crane 36112 Powermax 2021

Lift for Rating Events: .050 inches

Valve Train: Pushrod w RockArm (improv...)

Intake

Centerline, deg ATDC: 104

Duration @ .050": 190

Opening @ .050": -9

Closing @ .050": 19

Max Lobe Lift, in: .260

Lash at Valve, in: .004

Rocker Arm Ratio: 1.6

Exhaust

Centerline, deg BTDC: 114

Duration @ .050": 198

Opening @ .050": 33

Closing @ .050": -15

Max Lobe Lift, in: .270

Lash at Valve, in: .007

Rocker Arm Ratio: 1.6

Calculated Cam Specs

Lobe Separation: 109.0

Intake Exhaust

Print Piston-Valve Clearance

8) You will see your previously picked Example highlighted, so you can pick the next one in series, if you wish.

7) Press <Esc> to return to the Examples screen

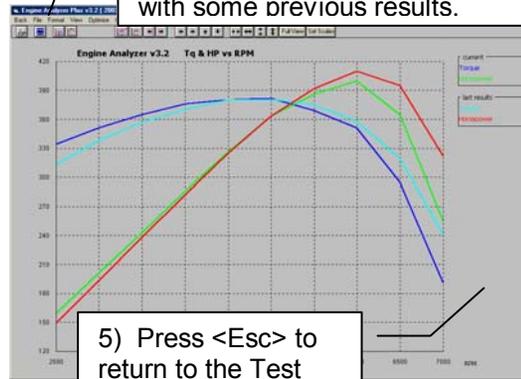
3) Press <F5> from here to make a graph.

Engine Analyzer v3.2 Performance Trends 2003 Ford DIHC 4.6L Cobra Stock

	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000
Break Tq	334	351	365	376	380	382	369	351	295	191
Break HP	159	201	243	286	326	363	386	400	365	255
Est P/rev	1.4	2.0	2.6	3.4	4.1	4.8	5.4	5.9	6.2	6.5
Boost	5.7	6.6	7.4	8.1	8.5	8.9	9.1	8.6	7.8	7.5
Vol Eff %	133.3	136.6	138.5	139.7	140.4	139.8	137.0	132.9	123.7	109.9
Actual CR	296	361	426	490	554	612	659	697	703	673
Fuel Flow	183	129	148	170	192	213	229	242	244	234
A/F Min Qal	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
BSFC	646	625	608	594	591	585	583	605	609	517
BSAC	8.165	7.906	7.692	7.518	7.470	7.598	7.497	7.648	8.462	11.595
Fraction HP	46	59	73	88	105	124	143	162	183	216
Match B	176	212	247	282	318	353	388	423	459	494
Piston Spd	1476	1772	2067	2362	2657	2953	3248	3543	3838	4134
Piston Gs	488	588	681	764	833	894	953	1011	1068	1124
Overlap BVE	7.9	6.8	5.9	5.2	4.5	4.0	3.3	2.5	1.4	.6
Val Ang/val	105	126	147	168	189	210	231	252	274	295
Inj timing/val	1	4	8	1.2	1.7	2.1	2.3	2.4	2.3	2.1
In R									0.0	0.0
Ex A									294	274
Ex L									7	
Span									29	30

6) Press <Esc> to return to the Component screen

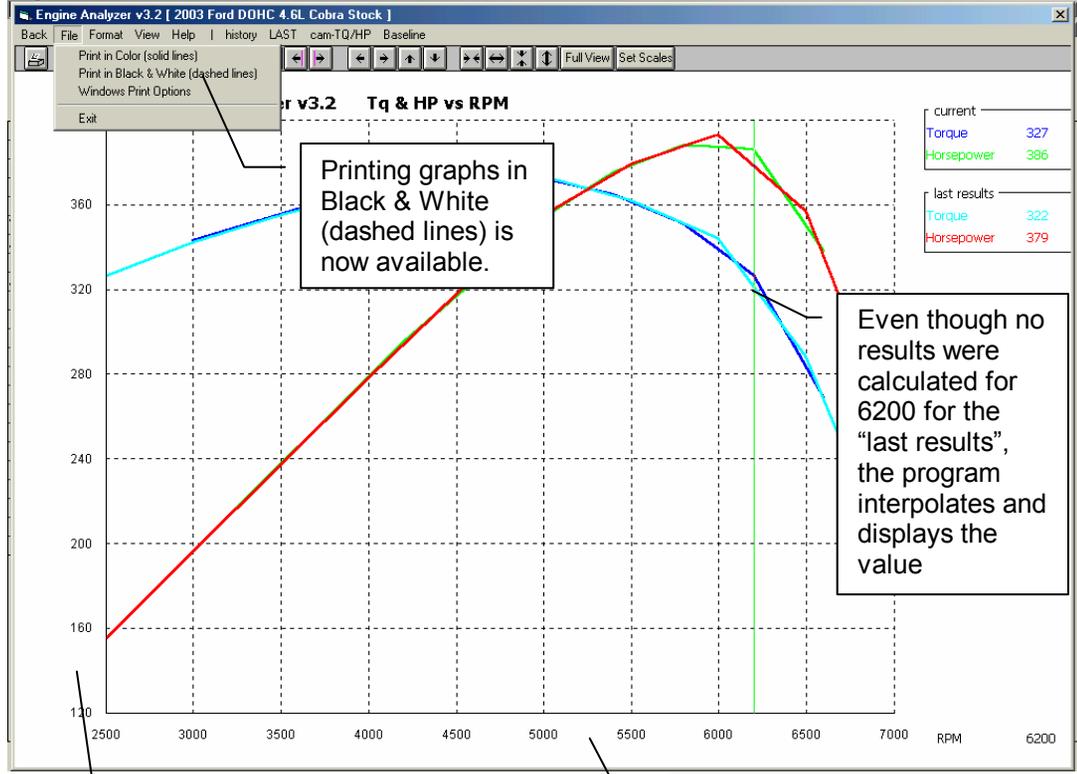
4) At the graph screen you can compare the current results with some previous results.



5) Press <Esc> to return to the Test Results screen

Note: You can just start at step 2, change a component spec setting, press <F5> twice to get a graph, then press <Esc> twice to return to the component menu to make another change. You may want to adjust Preference and Graph settings to make this process more streamlined.

Figure A5 New Graph Features



A Preference lets you choose to Not have a new graph always Autoscaled. (must be in Experienced user mode).

Graph now fills your computer screen for most any screen resolution.

For Valve Lift graphs, the cursor location now includes location before or after TDC or BDC.

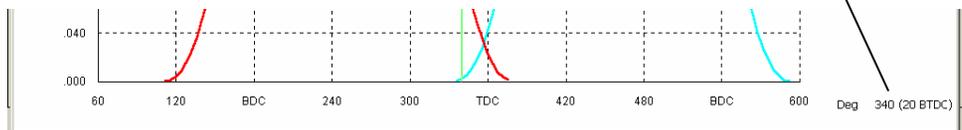


Figure A6 List Vehicle Files by Date Last Changed in Open File Screen

Note longer, more descriptive file names.

6 Ex. Engines in Library

4/7/2003	Stock Ford European 2.0L
4/7/2003	Porsche 944 2.5L
4/7/2003	Fiat Spyder 2.0L
4/3/2003	VW 2081 cc Turbo
4/3/2003	VW 1629 cc Turbo Drag Motor
4/2/2003	1986 Suzuki GSX-R 1100

Chosen File: VW 1629 cc Turbo Drag

Preview:

Bore: 3.543    Int Valve: 1.575  
Stroke: 2.519    Exh Valve: 1.397  
CID: 99.3    CFM Rating: 296  
C.R.: 8    Int Dur: 264

1629 cc Air Cooled VW 4 cylinder DRAG RACE ENGINE  
CAM IS A NOVAK GK 304 deg X .400 LIFT  
HEADS ARE PAUTER W/40 X 35.5mm VALVES  
CARB40 WEBER SIDE DRAFT CR IS 8.0

List Alphabetically  
 List by Date Last Changed (most recent first)

Show Only Files which contain this phrase: Show All Files

Open Delete Cancel Help Advanced

You can display files which only have certain words in the name, like "Chev" or "Import"

New Option to List Files by Date Last Changed, which lists the files you most recently worked with first.

Figure A7 New Help Options

Engine Analyzer Plus v3.2 Performance Trends [ 2003 Ford DOHC 4.6L Cobra

File (engine) Calc HP Preferences Help Reg To: Kevin Gertgen

Engine Library Save Engine

Engine Specs

Short Block

Head(s)

Intake System

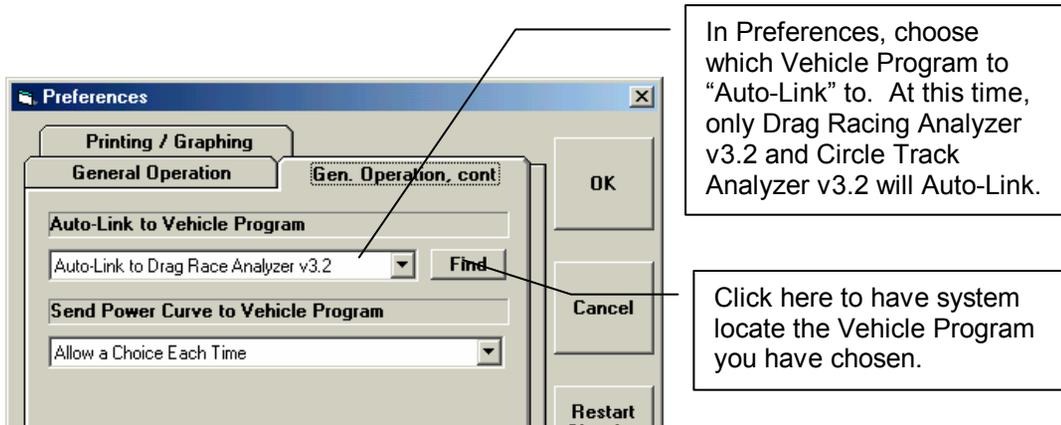
Exhaust System

Help on Main Screen Options  
Introduction to Basic Windows Commands  
About Engine Analyzer  
Display User Manual (with v3.2 Supplement)  
Display v3.2 Supplement  
Display Readme.doc File  
Performance Trends on the Web  
Other Performance Trends Products  
Engine Analyzer 'Plus' Features

User Specified: 400 CFM Exhaust System

New Help Options available by clicking on Help at top of Main Screen.

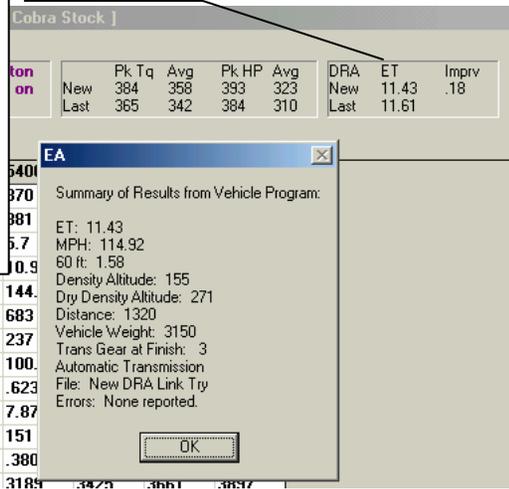
Figure A8 Auto-Linking to a Vehicle Program (Drag Racing Analyzer v3.2 shown here)



The results of the New (current) Engine Power Curve coupled with the Vehicle File in the Vehicle Program produces these results. The "Last" results are for the previous Engine Power Curve coupled with the same vehicle.

Click on these results to get a summary of the New vehicle results as shown here.

	147.6	148.8	149.8	150.4	149.8	148.1	144.1
<b>Vol Eff %</b>	147.6	148.8	149.8	150.4	149.8	148.1	144.1
<b>Actual CFM</b>	391	446	501	555	605	649	683
<b>Fuel Flow</b>	136	155	174	193	210	225	237
<b>A/F Mix Qal</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<b>BSFC</b>	.662	.648	.636	.628	.626	.620	.623
<b>BSAC</b>	8.377	8.197	8.048	7.940	7.922	7.837	7.87
<b>Friction HP</b>	65	77	91	105	120	136	151
<b>Mach #</b>	.211	.239	.267	.296	.324	.352	.380
<b>Piston Snd</b>	1772	2008	2244	2480	2716	2953	3189



You do not need to start the vehicle program; the Engine Analyze will do it automatically. The vehicle file being used is the last vehicle you were working with when you shut down the vehicle program (the vehicle that would be opened when you start the vehicle program).

A 2-3 second time delay is built in the Engine Analyzer to ensure reliable communications when doing Auto-Link. You will not be able to click on Back to return to the Main Screen before this delay is over. You may also notice the progress bar from the Vehicle Program momentarily appear on the screen, indicating the vehicle program is running.