Sending Shock Data to DataMite to Calculate Forces

The Performance Trends Shock Dyno Plus software has features to send shock data or shock+spring data (like from coil overs) to the Road Race/Circle Track DataMite software. There you can combine this up to shock travel data from shock sensors and calculate 1) Shock Force 2) Spring Force 3) Total Shock + Spring Force

We often get the question "Can I put load cells on my coil overs and measure these loads on the track?" It can be done, but load cell bolts or "pancake" load cells to do this are quite expensive and somewhat difficult to mount. A far easier way to "estimate" these loads is by using shock travel sensors. If you know how the shock and spring are moving and the spring rate and a shock dyno curve for the shock, the force for both the shock and spring can be calculated.

Well, to make this job even easier, we've added some features to both of these programs to export from one and import to the other, as described below.

If you have an appropriate Shock Dyno Plus version, you can click on the 'Send' option and be presented with the 4 corners of the car. For each corner you can select which shock or coil over's data to send, or choose "None" for that particular corner. You may have to open other Shock Dyno files, do the Send and select different corners of the car for sending shock data for different shocks.

As shown in the picture, the Export Data will copy this data to the computer's clipboard. This is the same process as doing a Windows Ctrl-C or a Copy process. Therefore, do not do a copy or paste command before you go to your Road Race/Circle Track DataMite program to import this data.

Now open your Road Race / Circle Track DataMite program and click on Vehicle to open the Vehicle Specs screen. At the top of this screen, click on Shocks/Springs. At this screen, click on the Load from Shock Dyno option to begin importing the data.

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Click on these 4 different option buttons to view the different settings for all 4 corners of the car.

If you do not have Performance Trends' Shock Dyno software, you can just manually enter data from your shock dyno tests, and info about your springs into this screen.
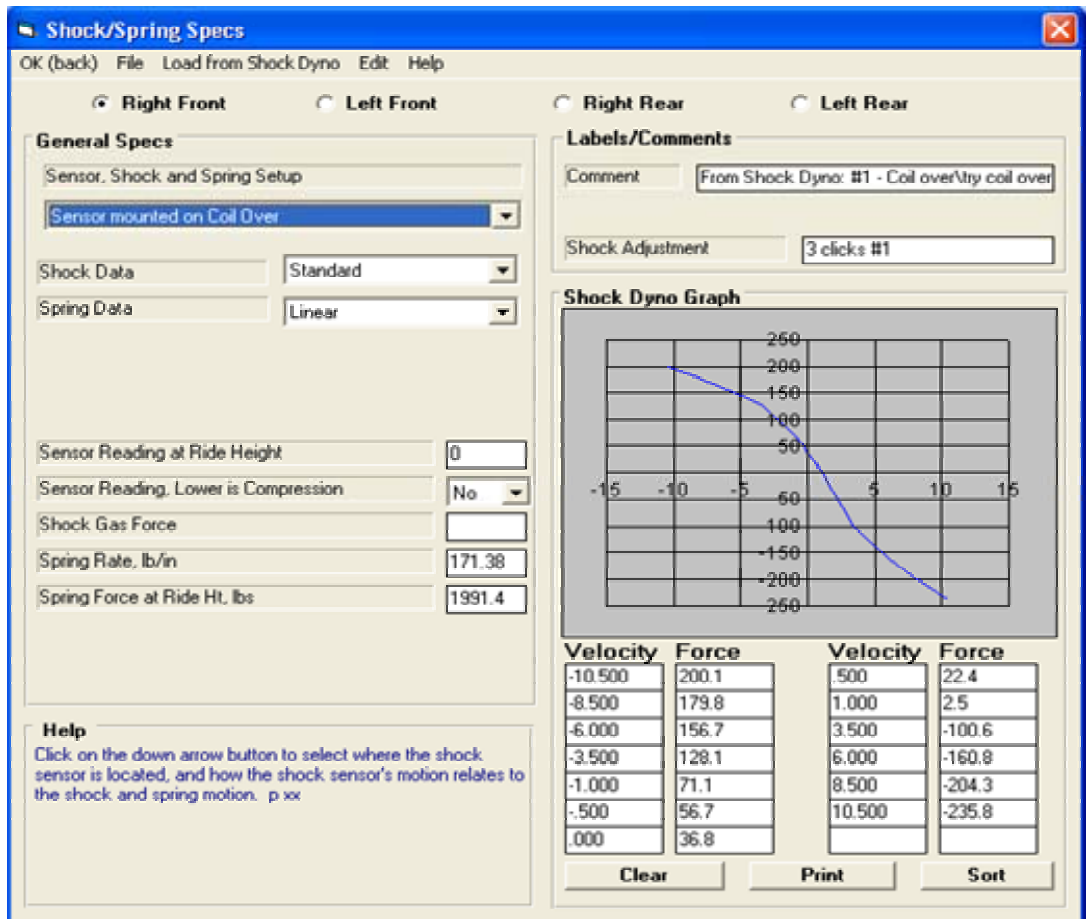
If the clipboard still has the Shock Dyno data, it will present you with a new screen. Here you can see a summary of the data, which the DataMite will understand. If the data has spring data also, like the shocks are part of a coil over pack, you will also have spots for telling the program what the installed height is for each coil over.

For example, say on the shock dyno, the distance from the center of each mounting ball joint *when the spring is fully extended* is determined to be 18.4 inches. This coil over has been compressed down to 10 inches with the car at ride height. That means the coil over spring has been compressed 8.4". In this scenario, you would enter 10" as the installed height for that corner of the car.
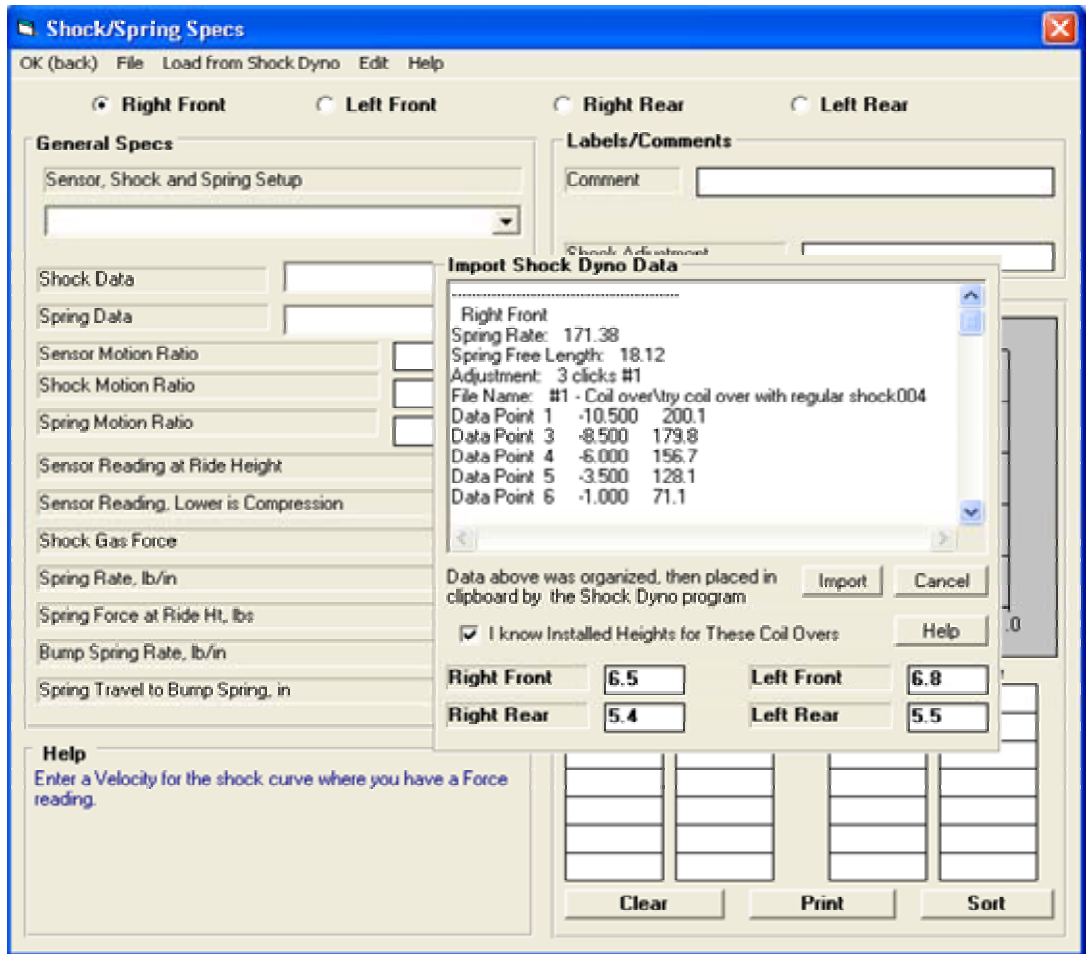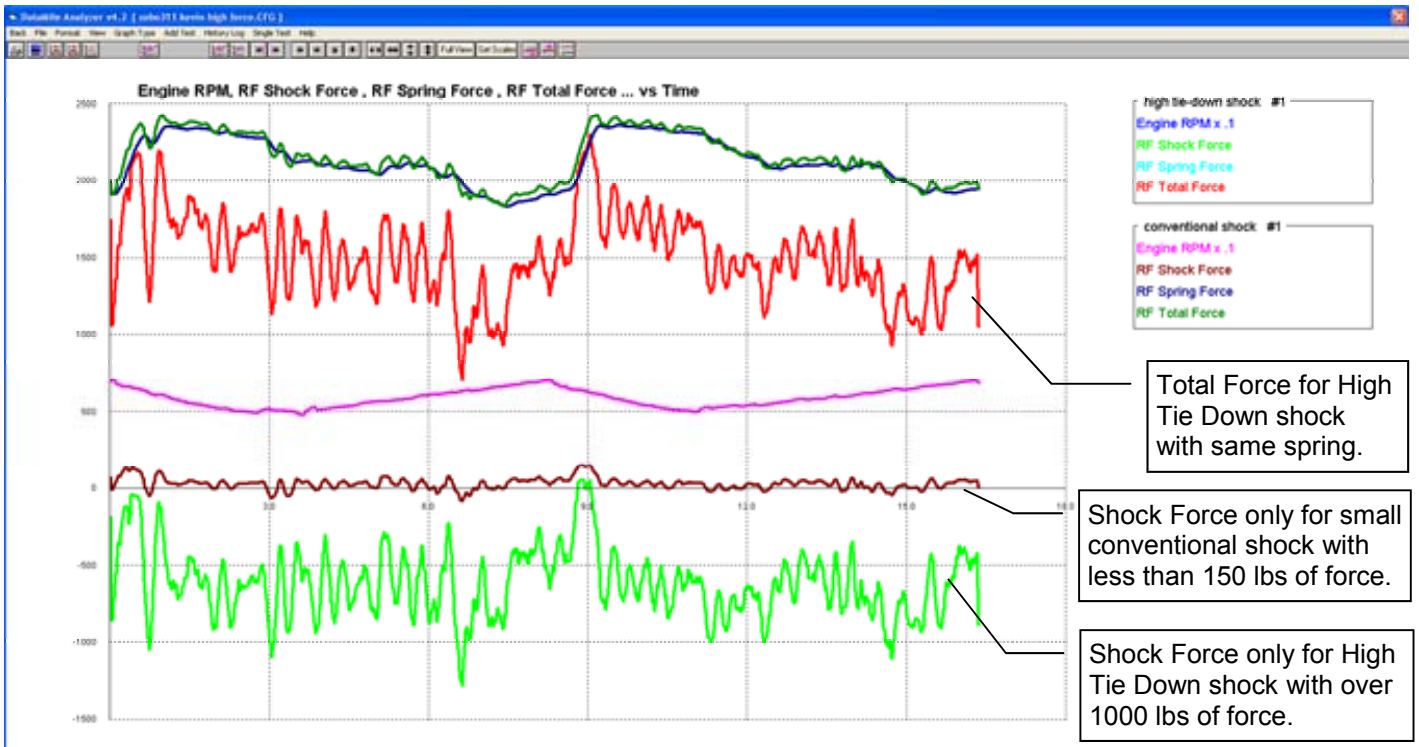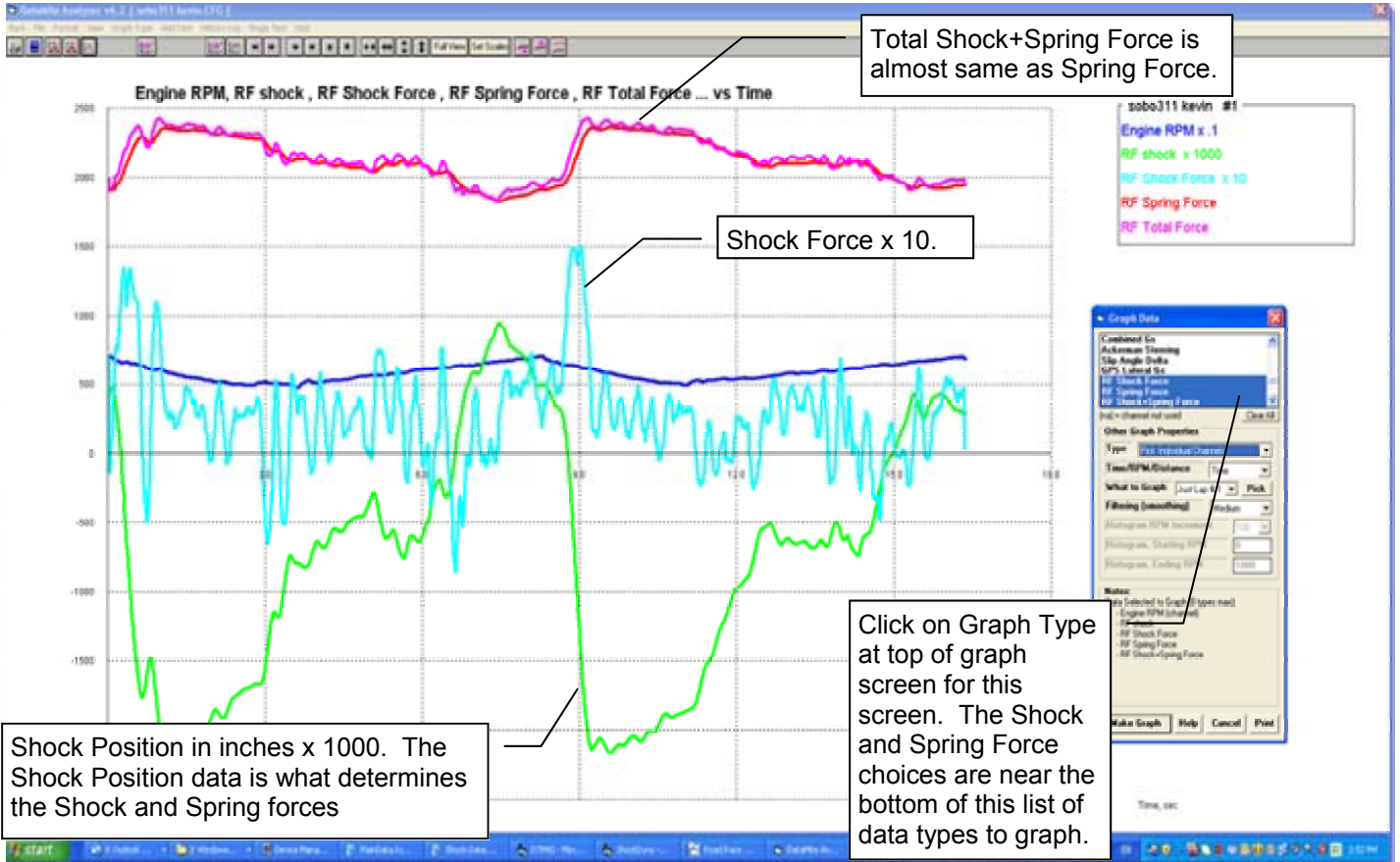
Click the Import Button to import this data, as shown to the right.

Click OK (back) to close out of this screen. At the Vehicle Specs screen you can select File, then Save or Save As to save the Vehicle Specs with this new Shock Dyno data you have imported. This data is considered part of the Vehicle Specs.

Shock/Spring Specs (first window)

OK (back)   File   Load from Shock Dyno   Edit   Help

○ Right Front   ○ Left Front   ○ Right Rear   ○ Left Rear

General Specs

Sensor, Shock and Spring Setup

Shock Data
Spring Data
Sensor Motion Ratio
Shock Motion Ratio
Spring Motion Ratio
Sensor Reading at Ride Height
Sensor Reading, Lower is Compression
Shock Gas Force
Spring Rate, lb/in
Spring Force at Ride Ht, lbs
Bump Spring Rate, lb/in
Spring Travel to Bump Spring, in

Labels/Comments
Comment
Shock Adjustment

Import Shock Dyno Data

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 Right Front
Spring Rate:   171.38
Spring Free Length:  18.12
Adjustment:   3 clicks #1
File Name:   #1 - Coil over\try coil over with regular shock004
Data Point 1   -10.500   200.1
Data Point 3   -8.500    179.8
Data Point 4   -6.000    156.7
Data Point 5   -3.500    128.1
Data Point 6   -1.000    71.1
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Data above was organized, then placed in clipboard by the Shock Dyno program   [Import]   [Cancel]

☑ I know Installed Heights for These Coil Overs   [Help]

| Right Front | 6.5 | Left Front | 6.8 |
| Right Rear | 5.4 | Left Rear | 5.5 |

Help
Enter a Velocity for the shock curve where you have a Force reading.

[Clear]   [Print]   [Sort]

Shock/Spring Specs (second window)

OK (back)   File   Load from Shock Dyno   Edit   Help

○ Right Front   ○ Left Front   ○ Right Rear   ○ Left Rear

General Specs

Sensor, Shock and Spring Setup
Sensor mounted on Coil Over ▼

Shock Data   Standard ▼
Spring Data   Linear ▼

Sensor Reading at Ride Height   0
Sensor Reading, Lower is Compression   No ▼
Shock Gas Force
Spring Rate, lb/in   171.38
Spring Force at Ride Ht, lbs   1991.4

Labels/Comments
Comment   From Shock Dyno: #1 - Coil over\try coil over
Shock Adjustment   3 clicks #1

Shock Dyno Graph

Help
Click on the down arrow button to select where the shock sensor is located, and how the shock sensor's motion relates to the shock and spring motion. p xx

Velocity	Force	Velocity	Force
-10.500	200.1	.500	22.4
-8.500	179.8	1.000	2.5
-6.000	156.7	3.500	-100.6
-3.500	128.1	6.000	-160.9
-1.000	71.1	8.500	-204.3
-.500	56.7	10.500	-235.8
.000	36.8		

[Clear]   [Print]   [Sort]

Here's a DataMite graph of Shock, Spring and Total Shock+Spring Force vs time for 1 lap. Because this is a conventional shock, the shock force is small compared to the spring force.

Total Shock+Spring Force is almost same as Spring Force.

Shock Force x 10.

Shock Position in inches x 1000. The Shock Position data is what determines the Shock and Spring forces

Click on Graph Type at top of graph screen for this screen. The Shock and Spring Force choices are near the bottom of this list of data types to graph.

Total Force for High Tie Down shock with same spring.

Shock Force only for small conventional shock with less than 150 lbs of force.

Shock Force only for High Tie Down shock with over 1000 lbs of force.

Graph above shows that big "high tie down" shocks have a big effect on the Shock Force and the Total Force.