

## DataMite Hardware Installation Notes

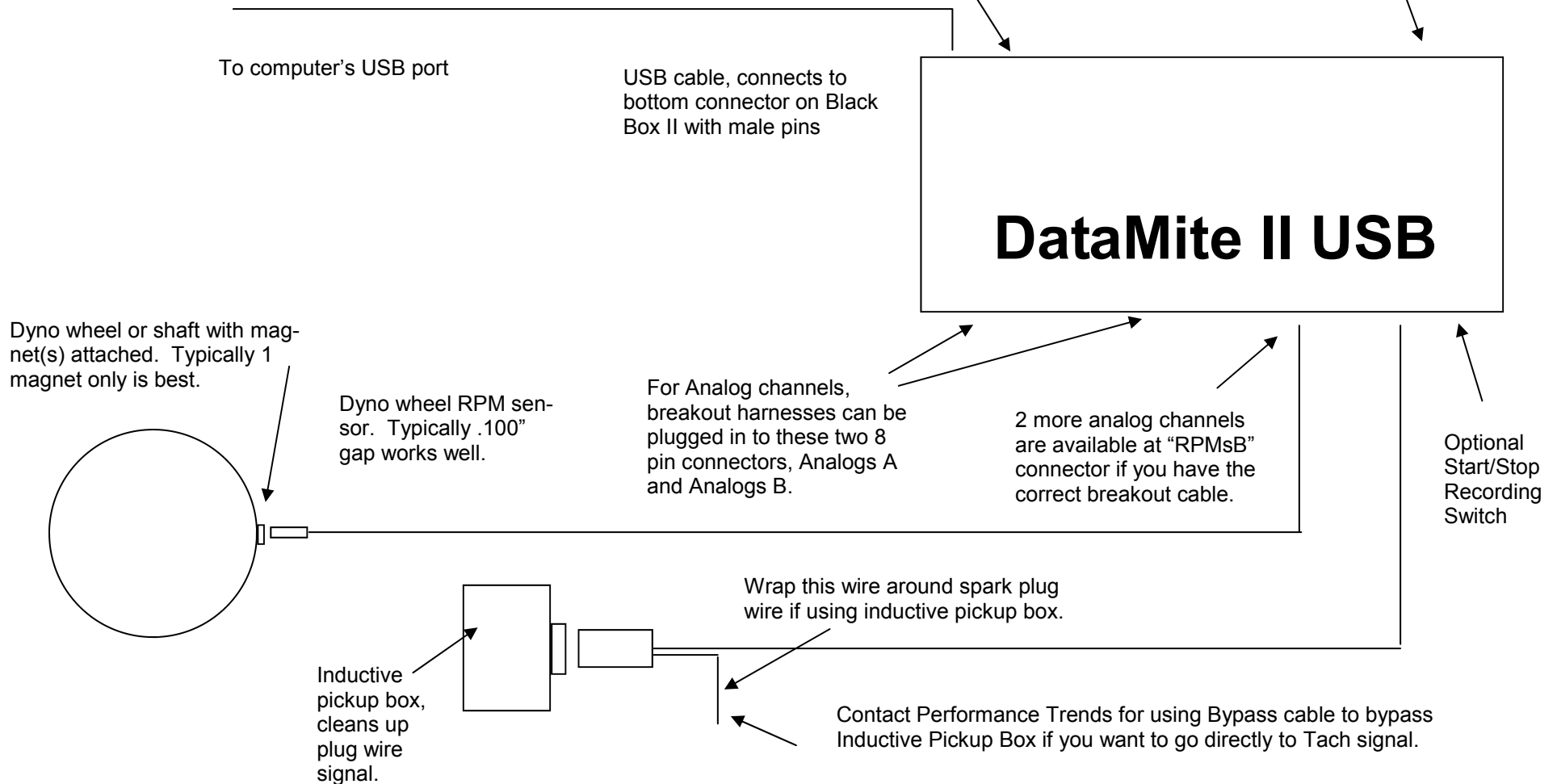
These DataMite Installation instructions cover most all optional sensors. Typically the appropriate printed sheet is included with the DataMite hardware when it is shipped from the factory, to avoid confusion. Here, they are not organized in any particular fashion, and many of these notes can be outdated, or could be meant for internal build instructions within Performance Trends. They are provided here as general information, and to anyone not very well versed with the DataMite options, it would be easy to use the wrong instructions with a sensor. It is therefore recommended you email Performance Trends at [feedback@performancetrends.com](mailto:feedback@performancetrends.com) for the appropriate page number for your sensor or situation.

# DataMite III USB Dyno Wiring for RPM

Check Appendix 2, starting on page 189, especially Section 4 Selecting Locations for Mounting your Black Box II on page 192 for more tips on installing your system.

DC power in. Note, system may function with just USB power, but results will not be accurate without this DC power connected.

Thermocouples for temperature measurements plug into 4 connectors here.

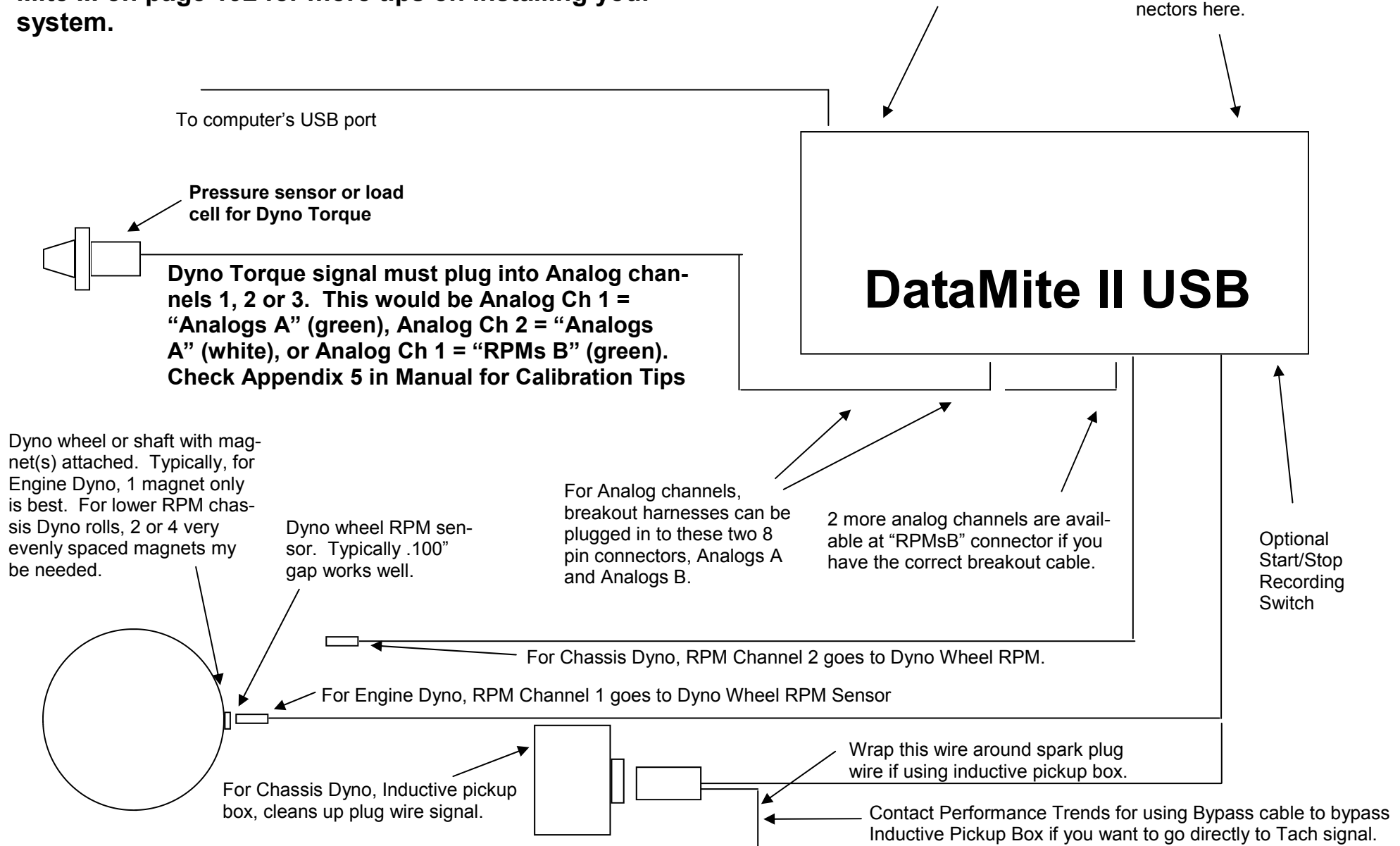


# DataMite III USB Wiring for Absorber Dyno

**Check Appendix 2, starting on page 189, especially Section 4 Selecting Locations for Mounting your DataMite III on page 192 for more tips on installing your system.**

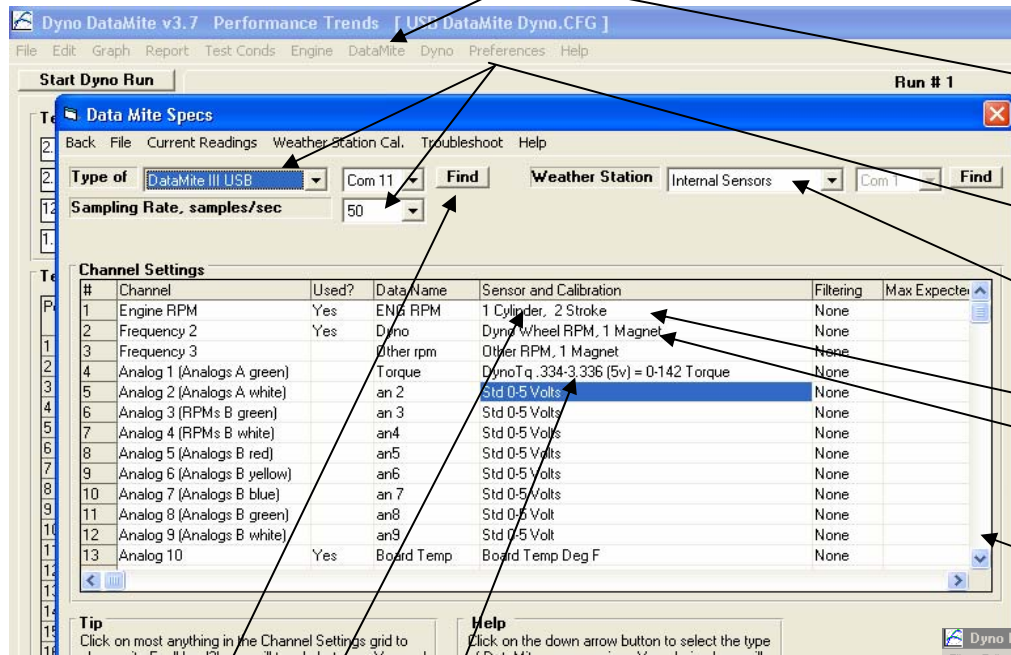
DC power in. Note, system may function with just USB power, but results will not be accurate without this DC power connected.

Thermocouples for temperature measurements plug into 4 connectors here.



# DataMite III USB Dyno Software Setup

If you Open the correct Example Test File BEFORE setting up the software (see “Notes on Your Dyno Configuration” sheet) then most critical settings will be correct when you open this screen.



Configure DataMite III Channels by first clicking on DataMite at top of main screen.

Select “DataMite III USB” or “DataMite Mini USB” (whichever you have) as the “Type” as shown here and select 50 samples per second.

Assign Internal Sensors if you have Internal Weather Station.

For Inertia Dynos, you typically use both RPM channels as shown here. Most all single cylinder Kart engines (Briggs included) will use the Engine RPM config of 1 Cylinder, 2 Stroke.

For most **DataMite IIIs** with thermocouples, you will use internal Thermocouple Channels. Slide the slide bar down to see these channels, which are below the section of screen shown here.

**IMPORTANT:** Click on the “Find” button to find possible Com ports. To start, choose the highest Com Port # shown (except possibly 3).

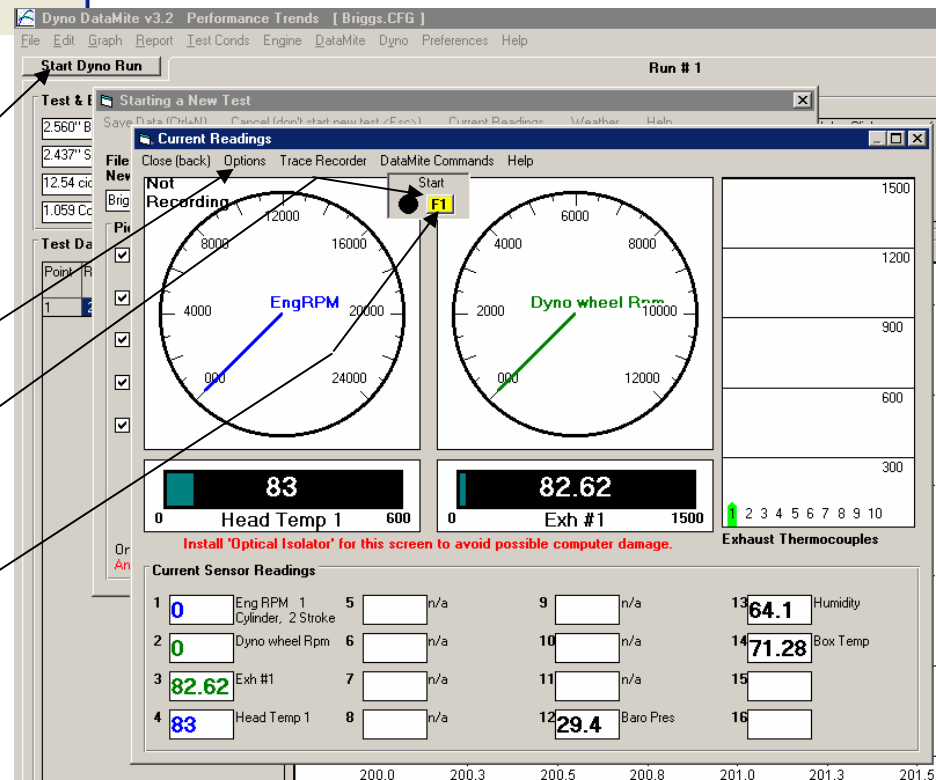
For Absorber Dynos, like a water brake, Stuska™, Go Power™, use Analog Channels 1 or 2 for Dyno Torque. Also, because the dyno is typically direct drive to the dyno, you will assign Engine RPM as 1 Cylinder, 2 Stroke and use RPM Channel 1 for Dyno RPM. Channel 2 RPM will typically NOT be used.

To start a test, click on Start Dyno Run button

Click on Options to set which channels show up on these Gauges

Press <F1> key to start recording data for the test.

Press <F2> key at the end of the test.



# USB DataMite Black Box Internal Weather Station

Mount your DataMite in the same room as the engine, so the DataMite sees the same air as the engine. The Barometric Pressure and Humidity of the air at the engine WILL be the same at the engine as it is at the DataMite. However, the temperature may be different.

For improved accuracy, you can mount a thermocouple at the air inlet to the engine and assign that thermocouple as “Std Thermocouple, Eng Intake Air” in the Sensor and Calibration column in the DataMite specs and the software will then use that channel for performance corrections. If you purchased one of these air thermocouples, separate instructions will explain this in more detail.

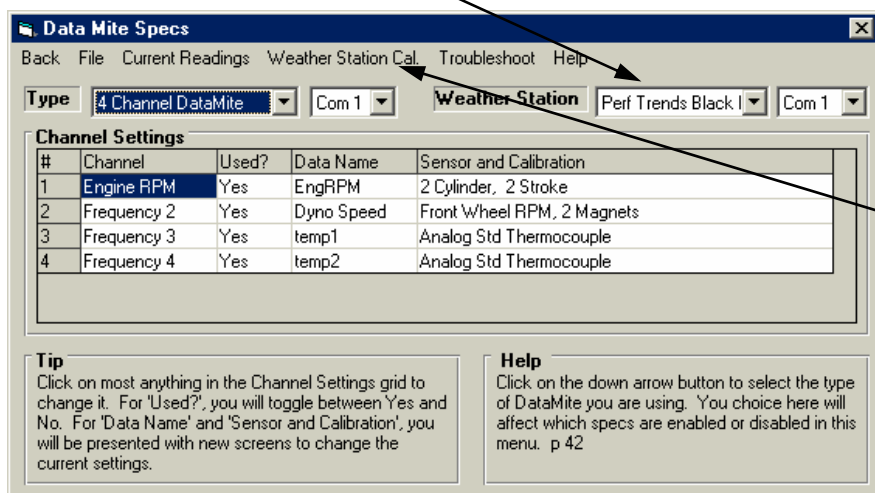
You must configure the DataMite software for the Black Box weather station as shown below.

**Fan Operation:** The DataMite III and Mini USB have recirculating fans which cycle on and off for improved weather sensor accuracy and long fan life. The default fan operation for the DataMite III is with the fan cycling on and off whenever it is powered up, by the power supply or the USB cable. The Mini’s fan only comes on when the “Current Readings” screen has been displayed at least once. Then it stays on for as long as the program runs, until you shut down the program. You can have the DataMite III operate much like the Mini (turning off the fan when the program is not running) by going into Preferences, the “Calculations (cont)” tab, and set “Turn Fan Off When Shutting Down” to Yes. However, if you turn off power to the DataMite III, then turn power back on, it will revert to the default condition with the fan cycling on and off whenever power is on to the DataMite III.

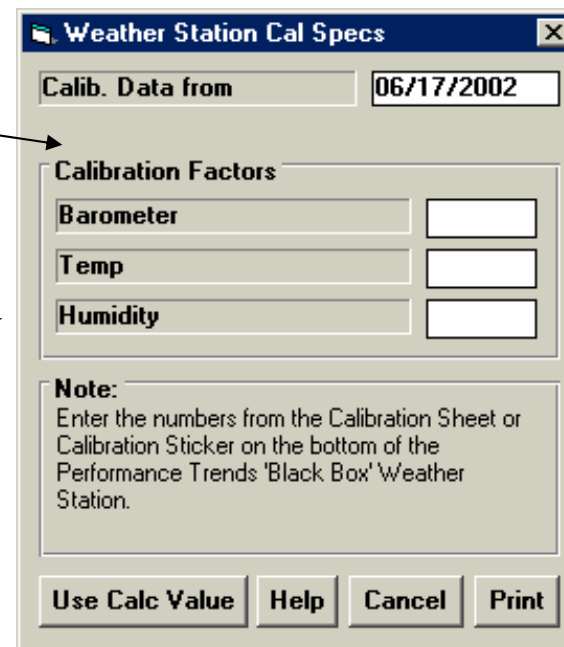
Calibration #s for sn \_\_\_\_\_

Select: **Internal Sensors** as the weather station in the DataMite specs.

Type in the numbers written below, then click on ‘Use Calc. Value’ so the program can more accurately read the weather station’s readings. For most all situations, these numbers are “0”



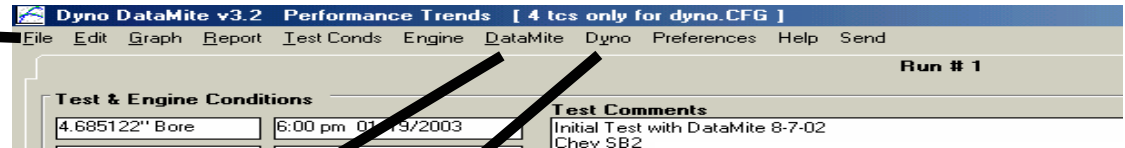
Click on Weather Station Cal. (visible only after you select ‘Black Box’ as the weather station) to bring up the calibration screen shown to the right.



# Notes on Your Dyno Configuration

First click on File, then Open (from all saved tests) to open an example test file, similar to the dyno and DataMite system you have. Then click on DataMite and Dyno to obtain critical menus shown below to configure your Dyno system

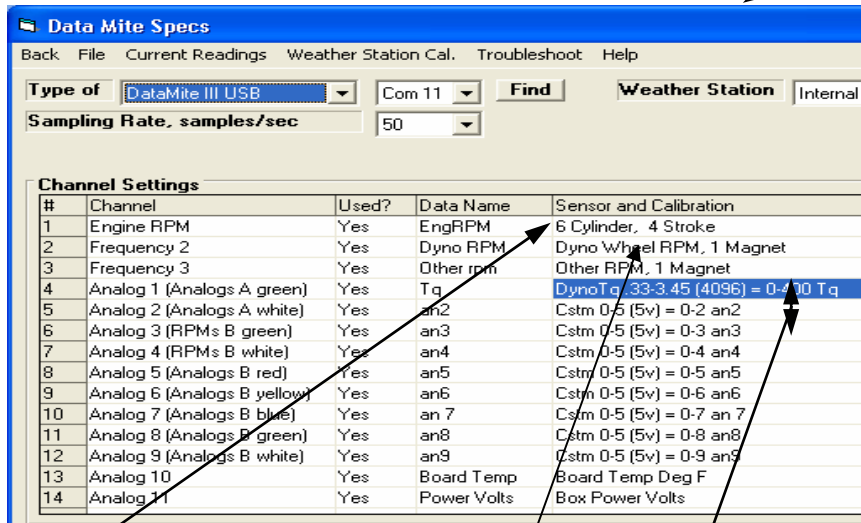
Click on "File", then "Open (from all saved tests)". Then choose this Example test to start building your first test file, which will configure your DataMite and Dyno Specs.



- \_\_\_ Stock Briggs.cfg    \_\_\_ ALC-MAG.cfg
- \_\_\_ Black Box II.cfg    \_\_\_ USB DataMite Dyno.cfg
- \_\_\_ DataMite Mini USB Example.CFG

Click on Torque Measurement to tell program you have:

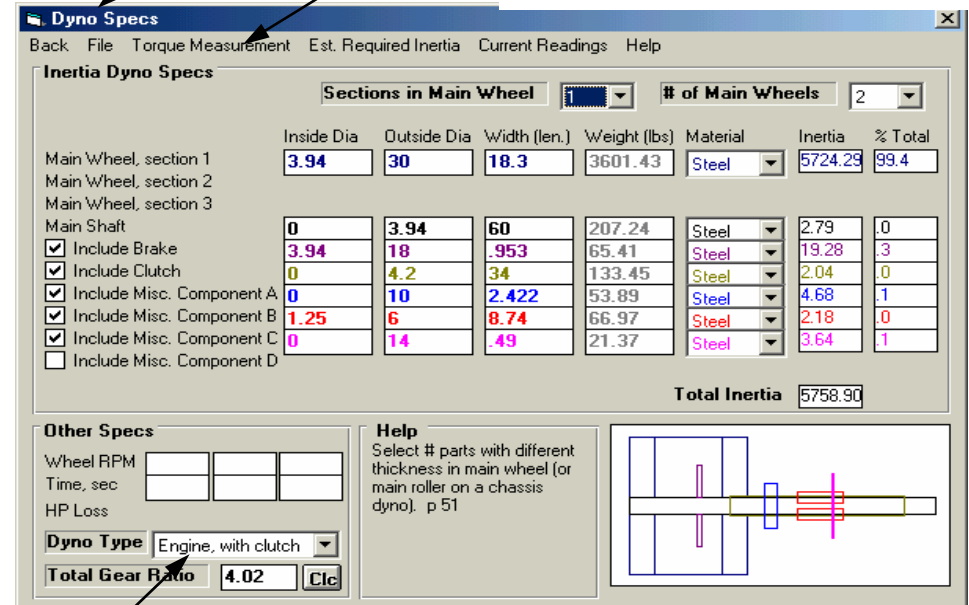
- 1) An inertia dyno
- 2) An absorber (torque arm) dyno (see Appendix 5 in manual).



First row, Engine RPM: set to

Row 2 (frequency row 2): set to

If Absorber Type Dyno: Analog 4 for Black Box II, Analog 1 for DataMite II or Analog 1 for DataMite III USB): set to



Dyno Type setting determines if you will measure both engine and dyno RPM, or if you need to. We recommend you select

Total Gear Ratio is then: Used only for clutch slip calculations  
Critical to enter correctly    Not used

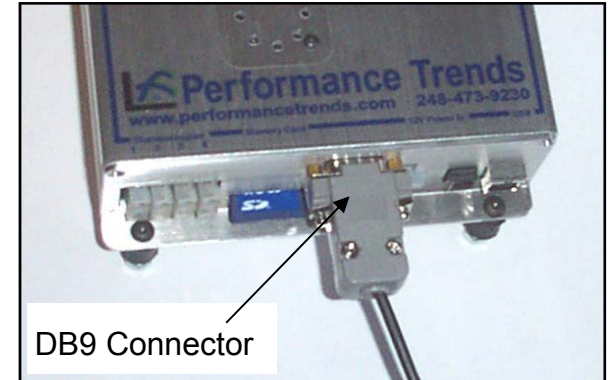
**IMPORTANT:** For this Dyno Type, go into Preferences, then Calculations tab, then set "Engine RPM is Calculated RPM" to Yes.

Once you have made these critical changes, click on File at the top of these screens, then Save as Master DataMite (or Dyno) specs.

# DTM III GPS Sensor Tips (Road Race/Circle Track systems only)

Install the GPS sensor on top of the car, away from any vertical obstructions (windshield, spoiler, etc) which could prevent the sensor from “seeing” the various GPS satellites.

The center of the roof is ideal if it will not be vulnerable to damaged there. Typically the magnet in the sensor is sufficient to hold it in place on steel panels. Use the threaded hole in the bottom of the sensor if you need a more secure mount.



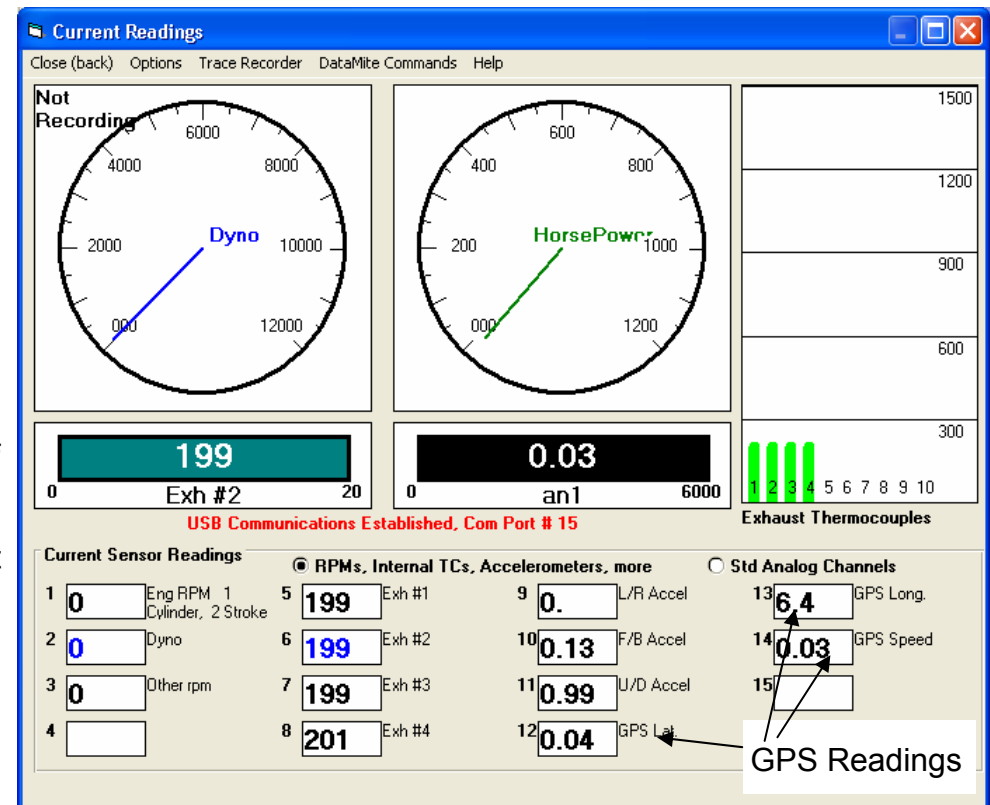
Plug the other end of the cable into the DB9 connector on the DataMite III USB box.

You do not have to tell the software the GPS sensor is installed. When the software reads your recorded data on the Flash Card, it will see if there is any GPS data available and use it as appropriate.

You can check the functioning of the GPS sensor by clicking on DataMite at the top of the Main Screen, then Current Readings. These readings are RELATIVE GPS position in feet, showing how GPS has changed since you first opened this screen. These stationary readings are not as accurate as when the vehicle is moving. Also displayed is GPS Speed, indicating how fast the GPS sensor is moving.

**IMPORTANT:** It may take several minutes for the GPS sensor to communicate with enough satellites to determine its position. Until it finds the satellites, you will see zero readings, the same as if the GPS sensor is not connected. This is especially true if you are near or inside buildings, or if the sensor has not been used for several days.

The GPS sensor **does** remember some things about the last time it was used, to get quicker location measurements the next time it is powered up. Therefore, if you are inside buildings, a new GPS sensor may never be able to find the satellites until it is moved outside at least once.

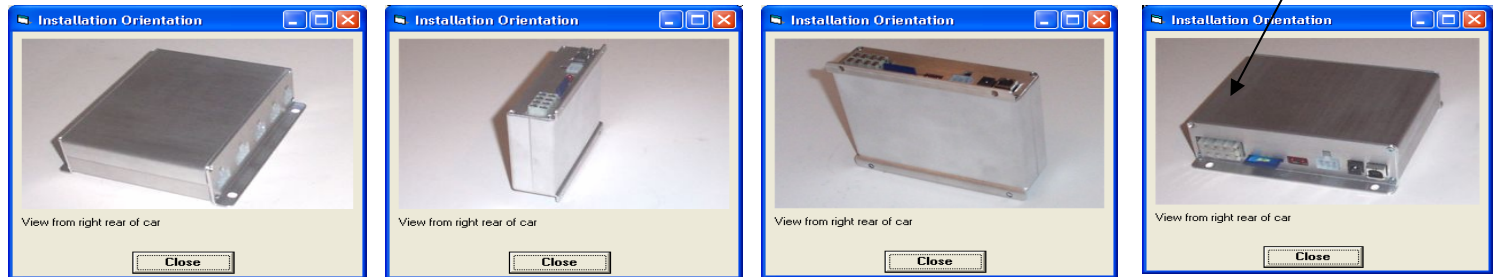


# DTM III USB Mounting Tips for Accelerometers

The DataMite III USB has a 3 axis accelerometer inside, to measure acceleration Gs in all directions. However, you must tell the software how you have mounted the box so it knows which accelerometer is measuring the front to back acceleration, side to side acceleration, etc.

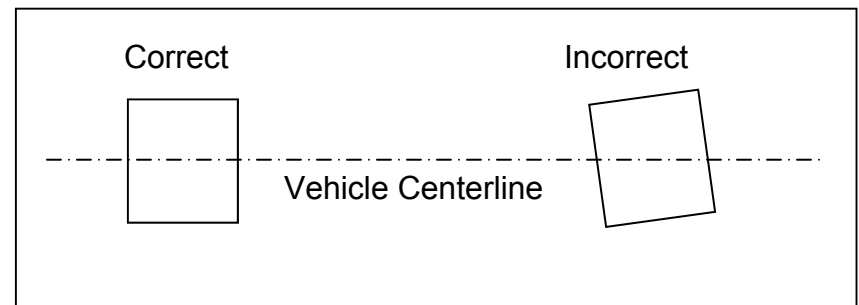


Here are just 4 of the 14 possible mounting orientations. These are all views from the right, rear corner of the vehicle.



Mount the box as vertically if on edge or level if mounted flat as possible. Mount the box as parallel to the vehicle's centerline as possible.

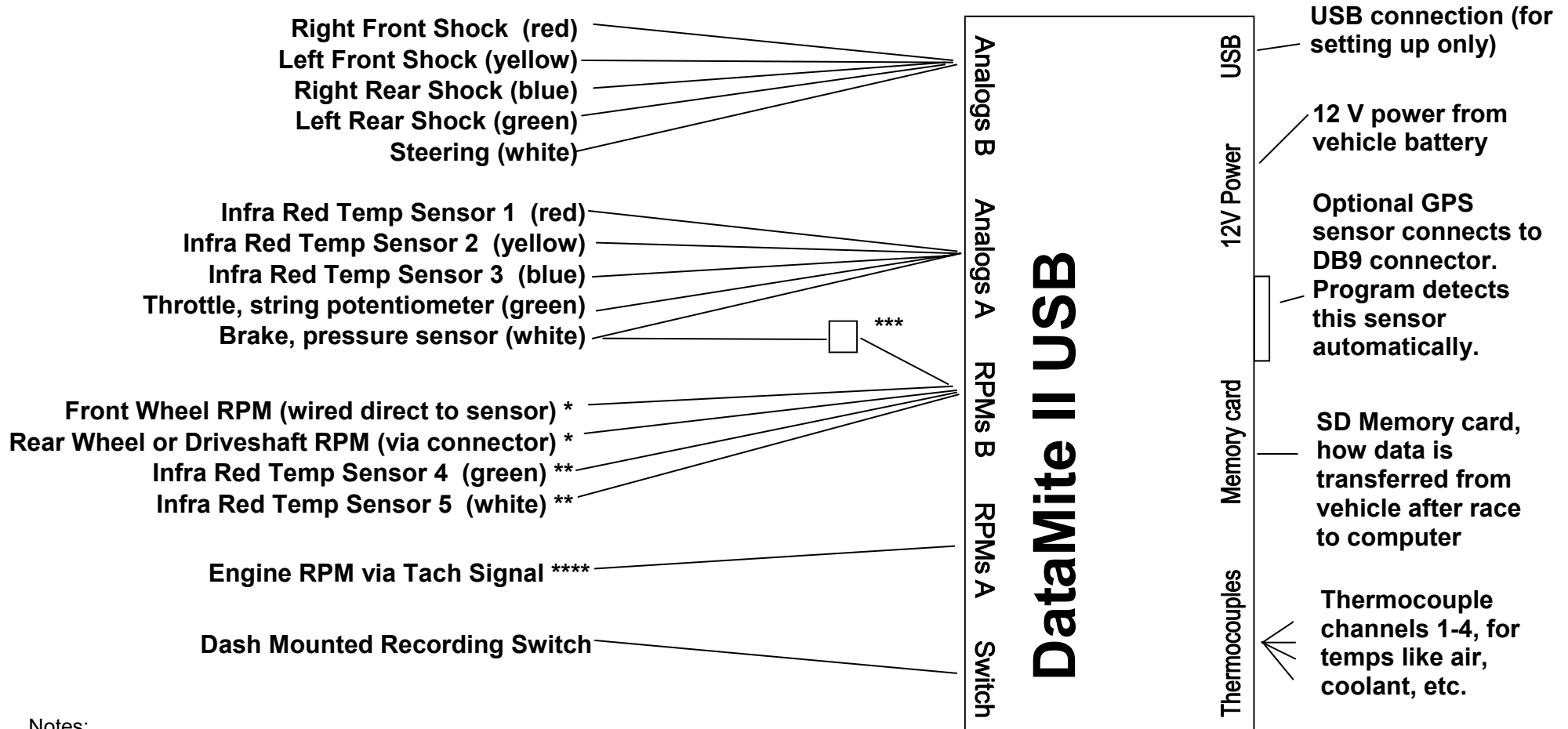
General Tips: Mount box using rubber isolators provided to isolate from vibration. Mount away from engine or exhaust heat and away from ignition wires or components.



# DataMite III USB Wiring for Typical Road Race/Circle Track Car

The sensors and connections below will match up with the Example File in the DataMite software called **DataMite III USB Sensors**. Open this file and save its settings as you master DataMite specs (per instruction sheet). Then install sensors as shown below.

**IMPORTANT:** The sensors and connections below match those in the **DataMite III USB Sensors** file (making setup easy), but are not the ones you *must* use. Other sensors can be used and connected to different channels than what is shown here.



## Notes:

\* Front and Rear Wheel (or Driveshaft) RPMs are not as necessary if you are using GPS, but can still provide additional useful data.

\*\* If you use the green or white analog inputs for RPMs B which require 5V power, you must connect the 2 pin power connector to the 2 pin mating connector from either Analogs A or Analogs B. **These are not available if Internal Weather Sensors are installed.**

\*\*\* This 2 pin connector lets you pull in 5V power from the Analogs A white connector.

\*\*\*\* Engine RPM input, typically works best from an MSD box's "Tach" signal. Other types of optical or magnetic sensors also possible.

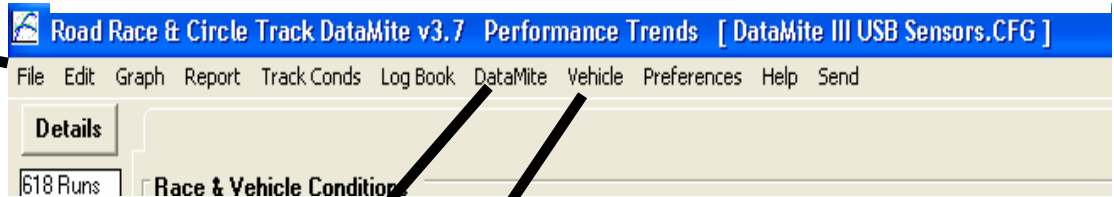
If you change a sensor or connector from what is indicated above, you must let the program know. That is done by clicking on DataMite at the top of the main screen, and setting the channel specs for the appropriate channel. See additional instruction sheets or Section 2.5 DataMite Specs in the manual.

You can rezero ALL suspension sensors with 1 easy command. Click on DataMite at top of main screen, then Rezero at top of DataMite Specs screen then Rezero Suspension Sensors.

# Notes on Your DataMite Configuration

First click on File, then Open (from all saved tests) to open an example test file, similar to the vehicle and DataMite system you have. Then click on DataMite and Vehicle to obtain critical menus shown below to configure your DataMite system

Click on "File", then "Open (from all saved tests)".



Then choose this Example test to start building your first test file, which will configure your DataMite and Vehicle Specs.

\_\_\_\_DataMite III USB Sensors.cfg

When you are done entering these specs, click on File, then Save as Master DataMite Specs.

Click here to see which Com Port you could be connected to (typically the highest number shown).

When you are done entering these specs, click on File, then Save as Master Vehicle Specs.

#	Channel	Used?	Data Name	Sensor and Calibration	Filtering	Max Expecte
1	Engine RPM	Yes	Engine RPM	8 Cylinder, 4 Stroke	None	
2	Frequency 2	Yes	Front Wheel	Front Wheel RPM, 2 Magnets	None	
3	Frequency 3	Yes	Rear Wheel	Rear Wheel RPM, 2 Magnets	None	
4	Analog 1 (Analog A green)	Yes	Throttle	Throttle 0-5 (5v) = 0-2.8 Throttle	None	
5	Analog 2 (Analog A white)	Yes	Brake PSI	Brake 5-4.5 (5v) = 0-1000 Brake PSI	None	
6	Analog 3 (RPMs B green)	Yes	IR Temp 4	Ustm 0-3 (5v) = 32-212 IR Temp 4	None	
7	Analog 4 (RPMs B white)	Yes	IR Temp 5	Cstm 0-3 (5v) = 32-212 IR Temp 5	None	
8	Analog 5 (Analog B red)	Yes	RF Shock	RF Shock 0-5 (5v) = 0-8 RF Shock	None	
9	Analog 6 (Analog B yellow)	Yes	LF Shock	LF Shock 0-5 (5v) = 0-8 LF Shock	None	
10	Analog 7 (Analog B blue)	Yes	RR Shock	RR Shock 0-5 (5v) = 0-8 RR Shock	None	
11	Analog 8 (Analog B green)	Yes	LR Shock	LR Shock 0-5 (5v) = 0-8 LR Shock	None	
12	Analog 9 (Analog B white)	Yes	Steering	Steering 0-5 (5v) = 0-8 Steering	None	
13	Analog 10	Yes	Board Temp	Board Temp Deg F (corr: 0)	None	

Channels are identified by connector name on box and color on connector.

Turn channels Off or On by clicking in the "Used" column.

Click here to enter a name for each channel, which will be used in graphs and reports.

Powerful Rezero Command  
Click on the DataMite menu to select the type of choice here will or disabled in this

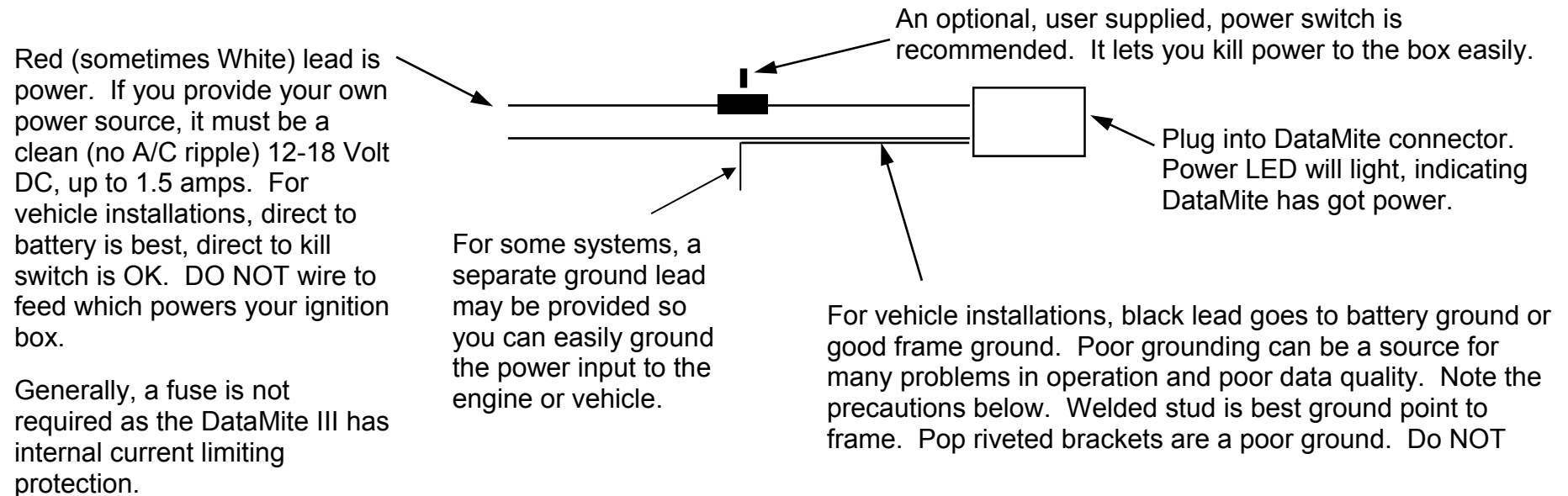
If you have weather sensors installed in the box, choose Internal Sensors here. Then channels Analog 12 and Analog 13 can NOT have external sensors connected.

Choose how you have mounted your box in the vehicle so the program knows how the accelerometers are arranged.

Click in the "Sensor and Calibration" column to display a new screen. There you will describe the sensor and tell the program, say, how many inches of travel is equal to how many volts signal.

Most entries in the Vehicle Specs screen above are not critical unless you are calculating torque and HP from accelerating data, or calculating clutch, torque converter, or tire slip.

# DataMite III Vehicle Connector Wiring Diagram



**Important: The lighted recording switch for the DataMite II will not come on or flash without the SD card plugged in.**

## Precautions:

The DataMite software allows you to display the Current Readings in a “live display” (what’s happening right now) through the USB connection. For simple checks, the power from the USB port alone may provide enough power. However, if several sensors are connected, or you want to see how the sensors will read with 12V power, you must power up from the vehicle’s battery, or with a 12 VDC wall transformer (500 mAmp minimum). These are available from Performance Trends for a nominal charge. If you use your own transformer, **BE SURE it is “center positive” where the center pin has the 12 V power and the outside barrel is ground.**

Improper grounding of the system or a high voltage spikes coming from a sensor through the DataMite can damage your computer. Here are some tips to reduce this possibility:

- The DTM-PS power supply should be plugged into the same outlet as your computer (plug both into the same power strip).
- For Dynos, the engine or dyno frame should have a good earth ground (grounded to cold water pipe or grounding rod).
- Laptop computers running off their battery, not a 110 VAC power supply, are less likely to have problems.

**See Appendix 2 in the User’s Manual for full details**

# DataMite II Calibration Sheet for Custom Sensor, cont

“Correction” (bottom entry in menu) is for fine tuning the calibration for a particular situation, like a shock travel sensor once it is installed in the vehicle. Correction is a number you want **ADDED** to the final reading. For example, if a thermocouple is reading too low by 5 degrees, you can enter 5 for the correction to increase this number by 5. If an accelerometer is reading too high by 0.05 Gs, you can enter -.05 to reduce this number by .05.

The Correction is very useful for shock or steering travel sensor, where we give you the calibration, say for a 6” travel sensor, with the first 4 readings in the menu to the right. But then, you want to “zero out” the sensor to read 0 at vehicle ride height for the shocks and with steering wheel pointed straight ahead for a steering sensor. This is done following the procedure below:

This is only available in the Pro version of the software and must be turned on. Do this by clicking on Preferences at top of main screen, then Calculations tab, then set All Correction to Calibration of Selected Recorded Channels to Yes. Then click on OK to save this change.

You will first enter the first 4 entries as shown to the right. Then once the sensor is installed, with the vehicle at ride height, you can either:

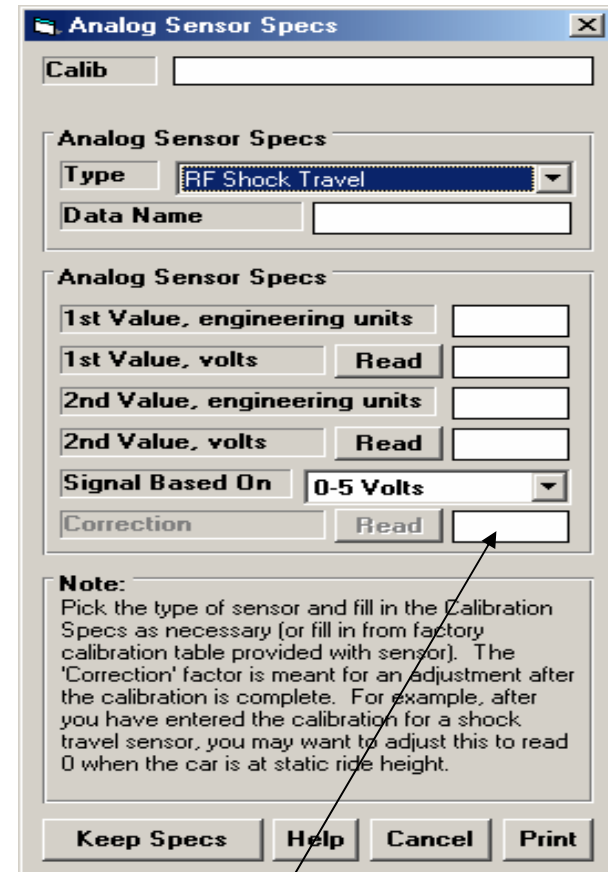
- 1 Read what the sensors are showing in the “Current Readings” screen in the DataMite software. If a reading is showing 2.64 but you want it to read 0, then enter -2.64 as the Correction.
- 2 Or, click on the “Read” button to have the software figure it automatically. After you click on Read, the program will ask what the reading should have been at that time.

The software will now read “0” for that shock at ride height.

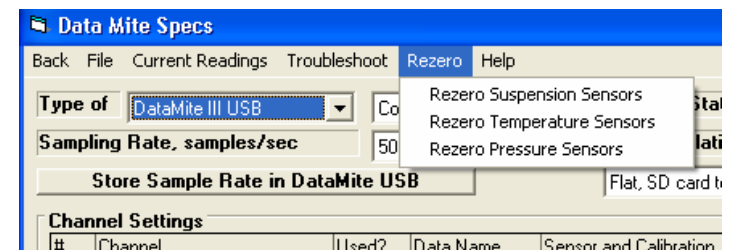
Note that if you already had a Correction of 5 entered, and you want that channel to read 3 higher than it was reading, you must add that amount to the current Correction,  $5 + 3 = 8$ . Remember to use a **negative** number for readings you want to **reduce** by a certain amount.

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

A new feature in Version 3.7 lets you rezero several channels at once. Look for Rezero at the top of the DataMite Specs screen and choose you option as shown to the right.



Correction



# DataMite III Eng Intake Air for Weather Corrections

An engine's output will vary with the weather conditions it is running in. The DataMite software can correct for these changes to give Corrected torque and HP numbers. When making comparisons from different days, Corrected torque and HP are more repeatable and are therefore the numbers you should use.

To do accurate weather corrections, accurate barometric pressure, humidity and temperature of the air entering the engine must be done. Barometric pressure, humidity and temperature sensors can be built into the DataMite III box. The barometric pressure at the box is EXACTLY the same at the engine, even if they are in different rooms. The humidity at the box is typically very close to that at the engine, even if they are in different rooms. However, the temperature at the box can be quite different between the box and the engine.

For that reason, you can choose to measure the air temp at the engine for more precise corrected data. There is a special thermocouple channel you can choose to do this with, called Eng Intake Air. If you pick this calibration for one of the thermocouple channels, and mount that thermocouple in the air inlet stream to the engine, the program will use this temperature for correction factors.

To do this:

1 Click on DataMite at the top of the Main Screen.

2 Click on the Sensor and Calibration for one of the thermocouple channels and choose Intake Eng Air.

3 Mount a thermocouple with an exposed tip or a special "air temperature" type thermocouple in the air stream going directly to the engine. **NOTE: Space this back from the engine inlet enough so that fuel "stand off" or "back spray" from the carb does not get fuel on the thermocouple. This will cool the thermocouple and record too low a temperature.**

1) Click on DataMite

2) Use scroll bars to scroll down to bottom of DataMite III channels, to find the thermocouple channels. Click in the Sensor and Calibration channels for one of these Thermocouple channels.

3) Pick Eng Intake Air as the calibration

4) Click on Keep Specs

#	Channel	Used?	Data Name	Sensor and Calibration
10	Analog 7 (Analog B blue)		an 7	Std 0-5 Volts
11	Analog 8 (Analog B green)		an8	Std 0-5 Volt
12	Analog 9 (Analog B white)		an9	Std 0-5 Volt
13	Analog 10	Yes	Board Temp	Board Temp Deg F
14	Analog 11	Yes	Power Volts	Box Power Volts
15	Analog 12	Yes	Baro Pres	Std. Baro Pres Calibration
16	Analog 13	Yes	Humidity	Std. Humidity Calibration
17	Analog 14 (Analog A blue)	Yes	Box Temp	Std. Box Temp Calibration
18	Analog 15	Yes	Exh #1	Std Thermocouple [A], Exh #1
19	Analog 16	Yes	Exh #1	Std Thermocouple [A], Exh #1
20	Analog 17	Yes	Exh #6	Std Thermocouple [A], Exh #6
21	Analog 18	Yes	Exh #8	Std Thermocouple [A], Exh #8

**Note:**  
Pick the type of sensor and fill in the Calibration Specs as necessary (or fill in from factory calibration table provided with sensor). The 'Correction' factor is meant for an adjustment after the calibration.

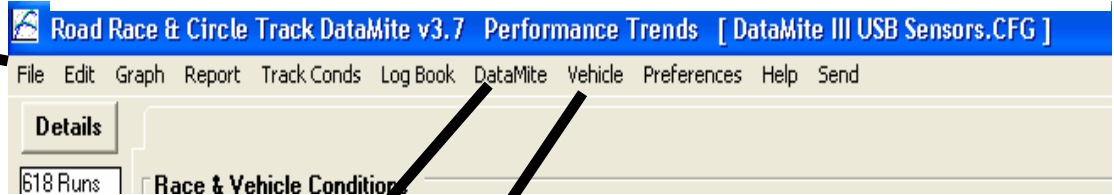
# Notes on Your DataMite Configuration

First click on File, then Open (from all saved tests) to open an example test file, similar to the vehicle and DataMite system you have. Then click on DataMite and Vehicle to obtain critical menus shown below to configure your DataMite system

Click on "File", then "Open (from all saved tests)".

Then choose this Example test to start building your first test file, which will configure your DataMite and Vehicle Specs.

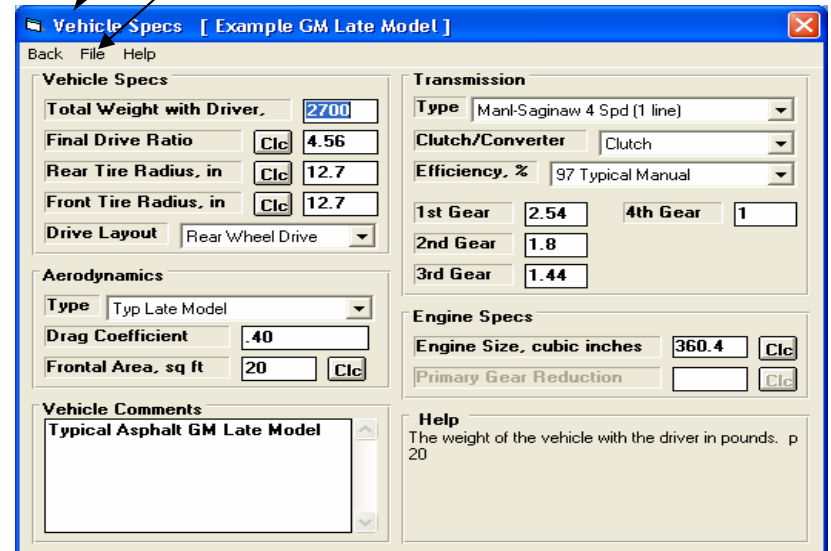
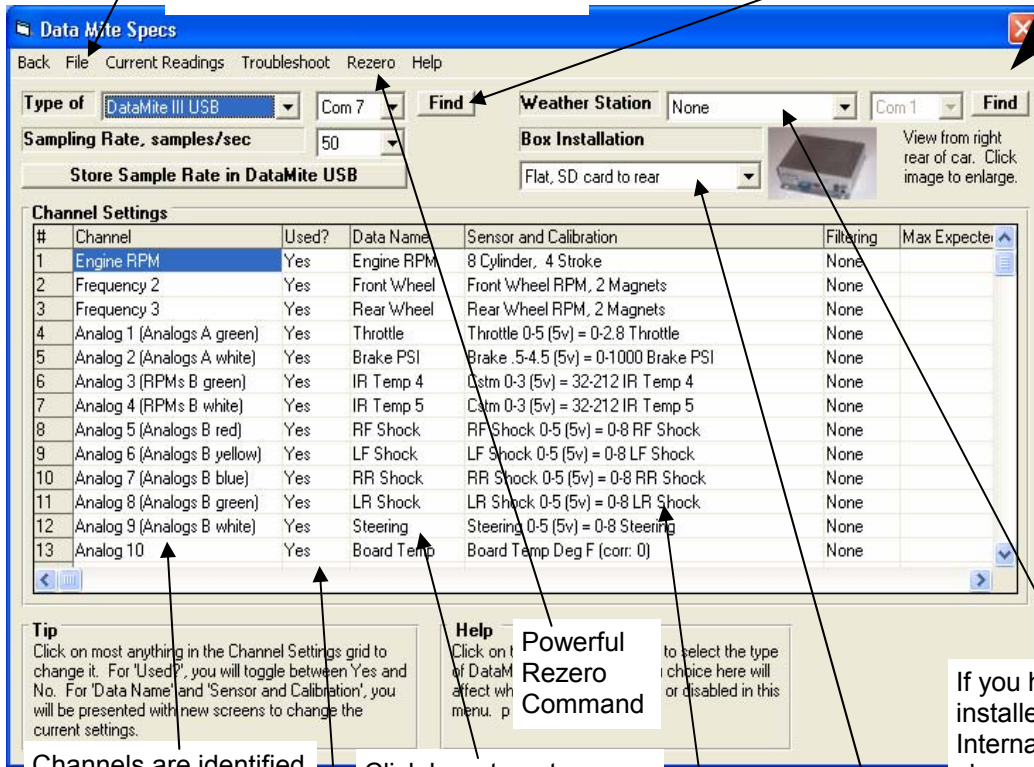
Drag USB DataMite.cfg



When you are done entering these specs, click on File, then Save as Master DataMite Specs.

Click here to see which Com Port you could be connected to (typically the highest number shown).

When you are done entering these specs, click on File, then Save as Master Vehicle Specs.



Channels are identified by connector name on box and color on connector.

Turn channels Off or On by clicking in the "Used" column.

Click here to enter a name for each channel, which will be used in graphs and reports.

Powerful Rezero Command  
Click on the Rezero Command menu. p

If you have weather sensors installed in the box, choose Internal Sensors here. Then channels Analog 12 and Analog 13 can NOT have external sensors connected.

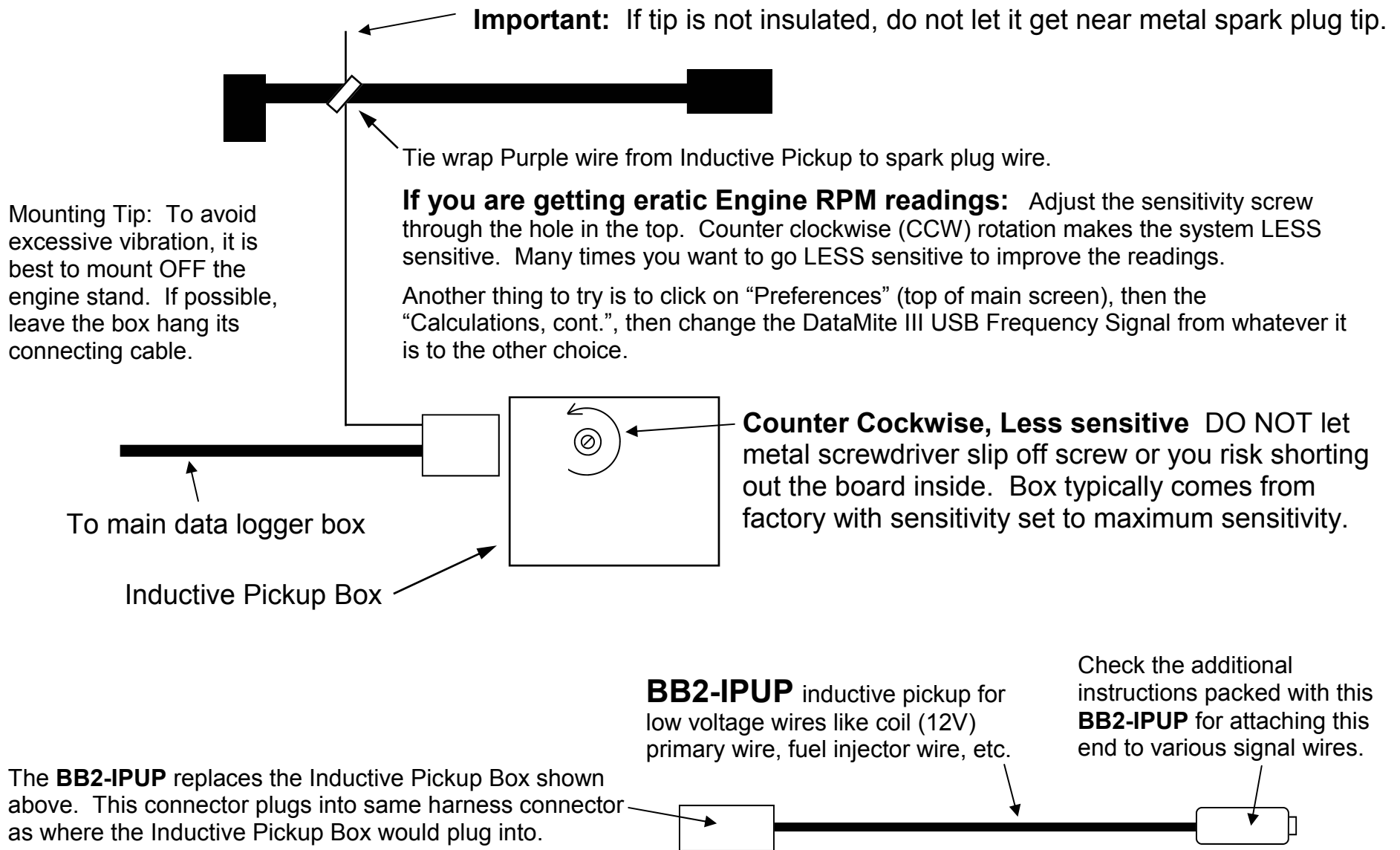
Choose how you have mounted your box in the vehicle so the program knows how the accelerometers are arranged.

Most entries in the Vehicle Specs screen above are not critical unless you are calculating torque and HP from accelerating data, or calculating clutch, torque converter, or tire slip.

Click in the "Sensor and Calibration" column to display a new screen. There you will describe the sensor and tell the program, say, how many inches of travel is equal to how many volts signal.

# DataMite External Inductive Pickup Wiring Installation

**Important:** Do *not* kill engine by disconnecting the plug wire from the spark plug. This may cause high voltage spikes to travel back to your computer, damaging your COM port. Instead, ground the spark plug to kill the engine.



**See Appendix 2 in the User's Manual for more details**

# DataMite Strain Gauge Amp Setup

View from back of 8 pin connector

8	7	6	5
4	3	2	1

Connections:

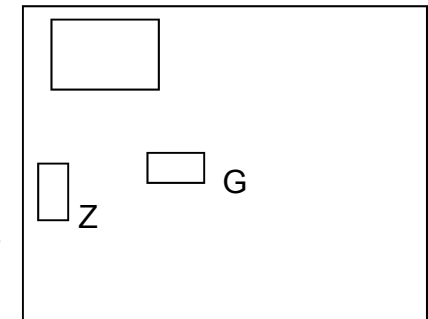
1. Black, ground from logger (typically comes wired in harness)
2. Red, 5V power from data logger (typically comes wired in harness)
3. White (typically) from strain gauge, signal - \*
4. Black (typically) from strain gauge, excitation -
5. White, amplified signal back to logger (typically comes wired in harness)
6. no connection
7. Green (typically) from strain gauge, signal + \*
8. Red (typically) from strain gauge, excitation +

\* Typically green and white to these pins are for a load cell in tension. Reverse green and white if you want to read the load cell in compression.

Amp Adjustments:

1. After wiring up the amplifier as above, hook it up to your data logger. Set up this channel as Std 0-5 Volts. Go into the Current Readings screen and watch this channel display volts.
2. Remove screws from cover to reveal the Zero and Gain screw adjustments. DO NOT touch any part of the board with a screwdriver except the screws on the adjustment potentiometers.
3. Determine how much load you are going to put on the load cell and calculate how much voltage you should see from the amplifier. First, calculate the percent of desired full scale this weight is. For example, if you hung 100 lbs on a 2 ft arm, you are producing 200 ft lbs. If you want the full scale to be 800 ft lbs, you have added 25% load ( $200/800 = .25 \times 100 = 25\%$ ) This should then produce a 25% increase in the desired amplified signal voltage.
4. Typically, the desired full voltage is 4.5 volts, a 4.2 volt increase over the starting voltage. Typically .3 volts is a good starting voltage.  $.25 \times 4.2$  volts is 1.05 volts, which you must add to the starting .3 volts ( $1.05 + .3 = 1.35$  volts). This means you want 1.35 volts from the amp when you produce the 200 ft lbs on the dyno.
5. Adjust the Zero pot until you get about .3 volts with no load on the load cell
6. Hang weights to get a load on the load cell, the 200 ft lbs. Adjust the Gain pot until you get the desired 1.35 volts.
7. Remove the weight and see if you are back to .3 volts. If not, repeat steps 5 and 6 until you get close enough to the desired .3 volts with no load and 1.35 volts with the 200 ft lbs. Plus/minus 0.01 volts is typically close enough for the zero reading, .03 volts for the loaded reading.

Adjustments in Amp



Notes:

- The .3 volts is used for most all calibrations as a good zero load voltage. The 1.35 volts will change depending on the calculations you do above for your particular situation.
- This calibration does NOT have to be very precise. You will do a precise calibration through the DataMite software as described in Appendix 5 after you get these voltages close. These adjustments are just so you get a good voltage change for the amount of load your dyno will see, but not so much that you max out the voltage.

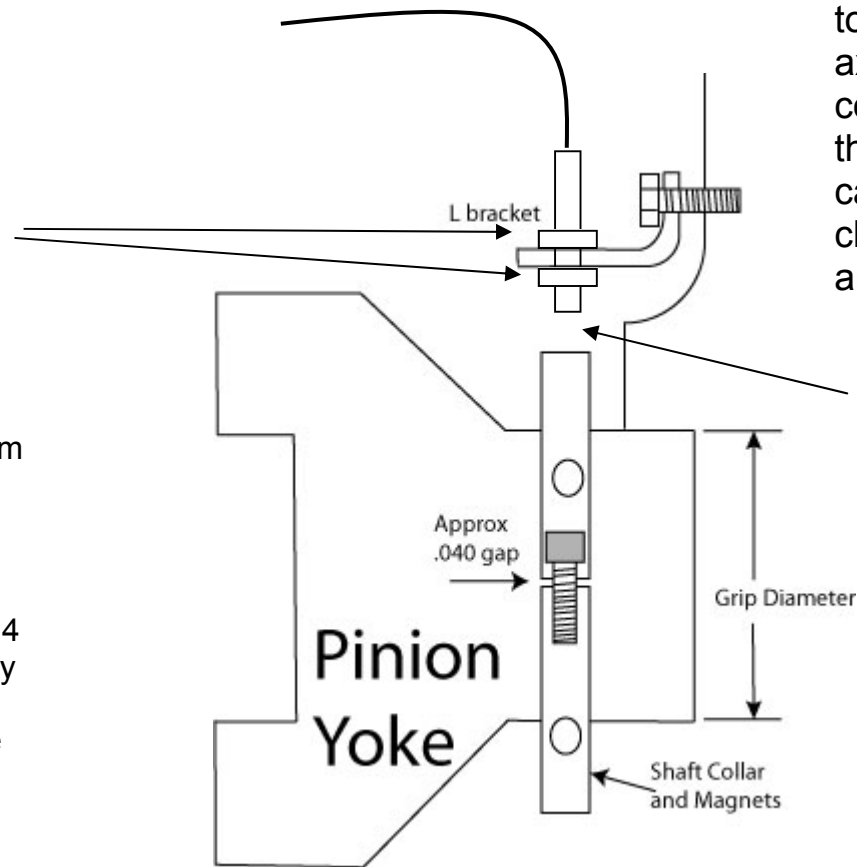
# DataMite III Driveshaft RPM Collar Installation

**IMPORTANT:** You must install the sensor bracket on something that moves with the driveshaft yoke. This picture shows you mounting it to the rear axle housing and the rear axle yoke. You **CAN NOT** install the collar on the transmission Yoke and the bracket on the underbody of the car, because the clearance will change with suspension movement and vibration.

For the standard 5/16" diameter sensors, use flat washers under the nuts.

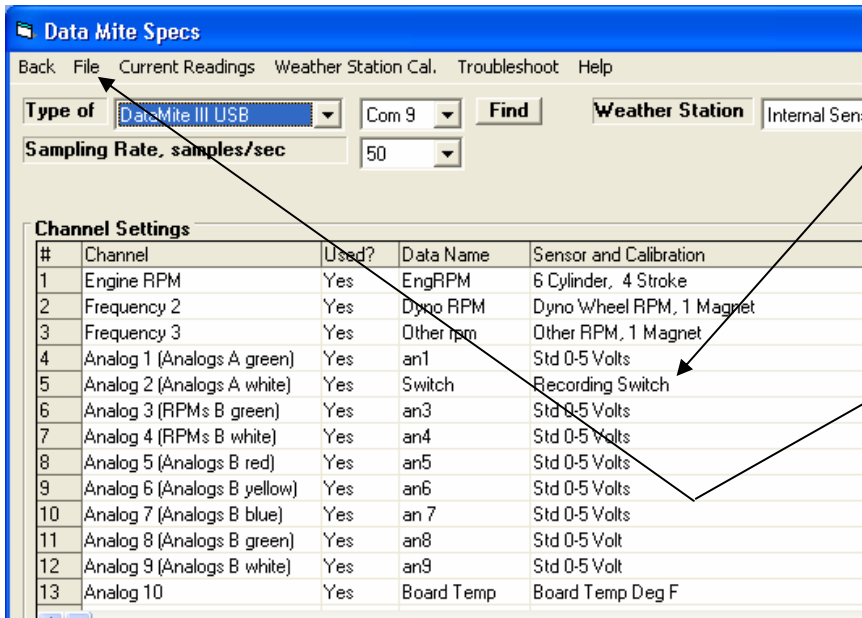
Use Loctite or RTV on all threads to prevent them from backing out.

Collars come with holes for 4 magnets. However, typically they have only 2 magnets installed. Check this before you install the collar. In DataMite Specs screen, assign this channel as Driveshaft RPM and tell the software now many magnets are in the collar.



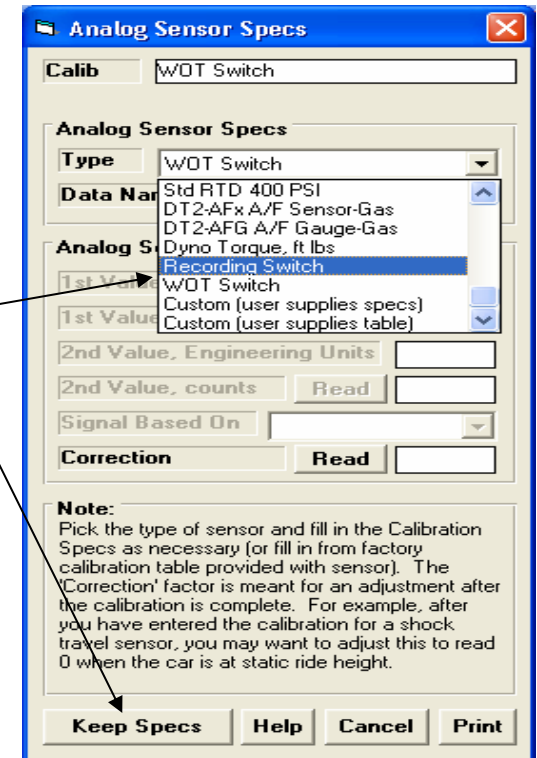
Adjust to about .080 inch gap to start with. If you have RPM dropping out at higher RPMs, adjust to a closer gap.

# DataMite III USB Recording (or WOT) Switch Operation



You must assign one of the analog channels as a Recording Switch.

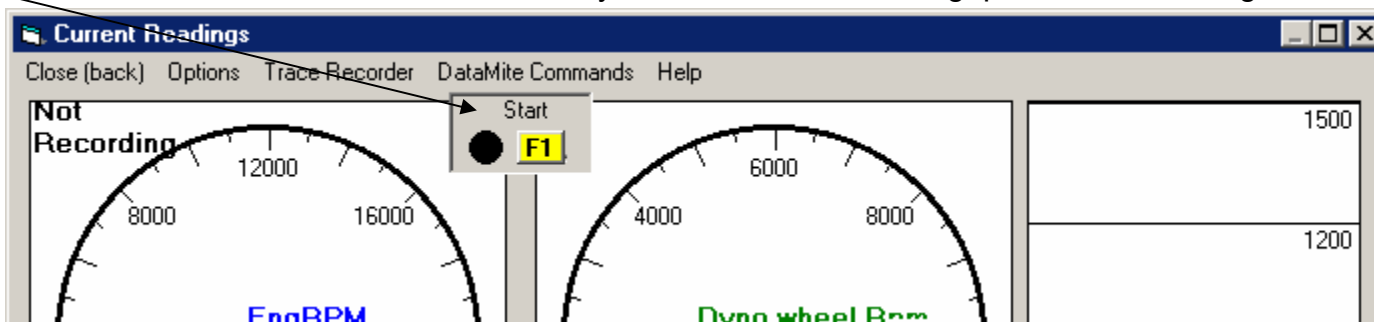
- 1) Click on the Sensor & Calibration column for the channel you will use
- 2) Pick Recording Switch from the menu shown on the right.
- 3) Click on Keep Specs.
- 4) Back at the DataMite specs screen, be sure to click on File, then Save as Master DataMite Specs to save this change.



Note that WOT Switch is also an option. When using this calibration, this input does NOT start or stop the recording. You must do that via the F1 and F2 key. This switch just marks exactly when the engine is Full Power (Wide Open Throttle). When this switch is pushed now marks what part of the test will be used for doing power curves.

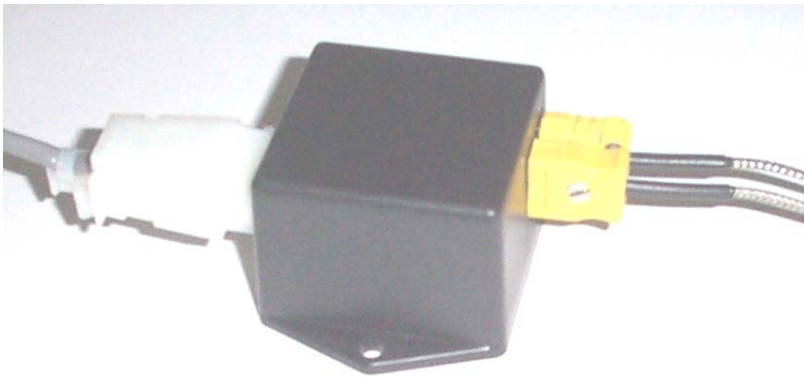
Plug the Switch into one of the analog channels. **DO NOT** plug the switch into the 4 pin connector marked "Switch" on the DataMite III USB logger box. That is for a vehicle switch.

Now when you run a test, you can still press F1 or F2 to Start and Stop recording, or click on the F1 (then F2) button. But you can also press and hold the Record switch button (for about 1 second) to start recording. Then after the recording has started, release the button. When you are finished recording, press the button again for about 1 second to stop recording



**IMPORTANT:** If you do not have the switch plugged into the correct channel, recording may start automatically as soon as you go to the Current Readings screen.

# DataMite Dual Thermocouple Converter Installation Tips



The Dual Thermocouple Converter lets you read 2 K thermocouples as a 0-5 volt signal. It is both very precise and very affordable. Here are some tips for mounting and using it.

Keep it away from heat sources.. Mount at least 3 feet away from very hot surfaces, like exhaust surfaces. When possible put some type of heat shield between the converter and the heat source. Note: The shield should "hide" the converter from the heat source but still allow good air circulation around the converter.

Isolate the converter from vibration. It is best to let it dangle, suspended from the lead to the 6 pin connector. If you mount it with the tabs, use rubber isolators and ideally mount it off the engine dyno test stand.

The thermocouple connectors grip the terminals of the yellow K thermocouple connector very tightly. Avoid repeatedly connecting and disconnecting these connectors if possible.

Set up the calibration in the DataMite software following the 4 steps shown to the right.

## Setting up Calibration in DataMite Specs Screen

1) In DataMite Specs, click here to display the "Analog Sensor Specs" screen for this channel.

2) Pick one of the Thermocouple channels from this list.

3) Choose "D Dual Compact" as the Type of thermocouple channel.

4) Click on Keep Specs to copy these settings back to DataMite Specs.

The 'Analog Sensor Specs' dialog box contains the following fields and options:

- Calib:** Std Thermocouple [D], Exh #1
- Analog Sensor Specs:**
  - Type:** Std Thermocouple, Exh #1
  - Data Name:** Exh #1
  - Type:** D Dual-Compact (selected from a dropdown menu with options: A DTM II Internal, B Corsa Single, C Large, D Dual-Compact, E Quad (4 channel))
- 1st Value:** [Empty]
- 1st Value, Engineering Units:** [Empty]
- 2nd Value:** [Empty]
- 2nd Value, Engineering Units:** [Empty]
- Based On:** 0-5 Volts
- Buttons:** Read, Calibration History
- Bottom Buttons:** Keep Specs, Help, Cancel, Print

# DataMite v3.7 Supplement Instructions

The printed manual talks about v3.2. The recent changes and additions to v3.7 of the software are discussed and illustrated in Appendix 7, which has not yet been added. You can view Appendix 7 on screen by clicking on Help (top of main screen), then Display v3.7 Supplement.

**Dyno DataMite v3.7 Performance Trends [ bansh13 kevin to cu11.CFG ]**

File Edit Graph Report Test Conds Engine DataMite Dyno Preferences Help

**Start Dyno Run**

**Test & Engine Conditions**

31.98" Bore	1:23 pm 09/23/2008
31.98" Stroke	PkTq: .00 @ 0
25687.76 cid 2 Cycle	PkHP: .00 @ 0
1.047 Corr. Factor	Operator: Brett

**Test Comments**

Banshee 50cc 155 Main  
( Stock tail pipe )  
Reported Ex + widen, tid

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

Show Previous Run

Point	RPM	Corr Tq	Corr HP
1	200		

**Corr Tq**

1.0

Help F1

- Introduction to Basic Windows Commands
- About DataMite Analyzer
- Display User's Manual
- Display v3.7 Supplement
- Display Hardware/Sensor Installation Tips
- Display Readme.doc File (recent changes)
- DataMite Analyzer Pro Features
- Performance Trends on the Web
- Other Performance Trends Products
- Test Com Ports
- Ask for Remote Assistance
- Email Current Test to Performance Trends

Click on Display v3.7 Supplement and Display Readme.doc file for the latest info on this data logger and program features.

# DataMite Mini USB Dyno Wiring for RPM

Check Appendix 2, starting on page 189, especially Section 4 Selecting Locations for Mounting your DataMite USB on page 192 for more tips on installing your system.

DC power in. Note, system may function with just USB power, but results may not be accurate without this DC power connected.

**DataMite Mini USB**

To computer's USB port

For Analog channels, a breakout harness can be plugged into the 4 pin connector. Shown here is a thermocouple converter, a common option.

Optional Thermocouple Converter

6 Pin RPM Connector

Dyno wheel or shaft with magnet(s) attached. Typically 1 magnet only is best.

Dyno wheel RPM sensor. Typically .100" gap works well.

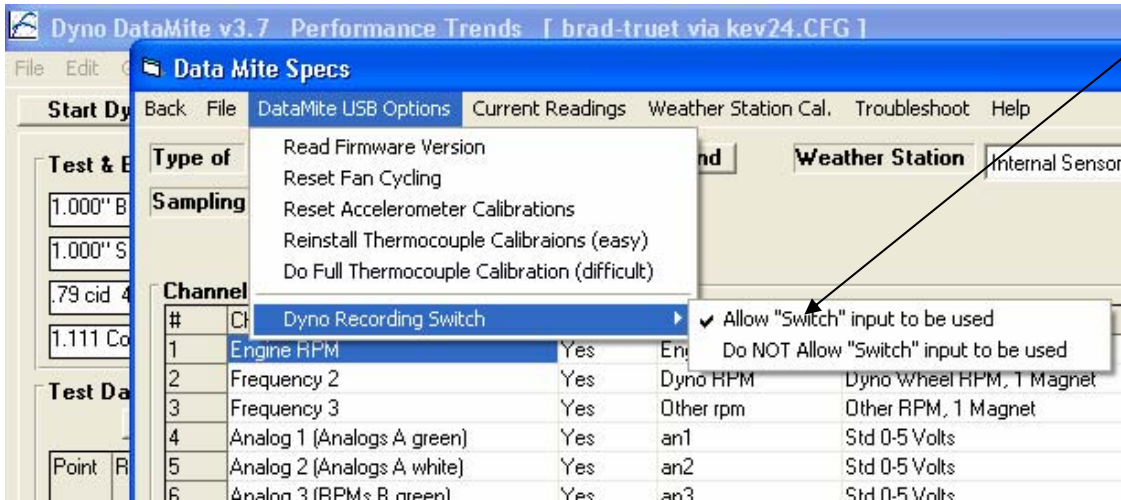
Thermocouples for temperature measurements plug into 2 connectors here.

Wrap this wire around spark plug wire if using inductive pickup box.

Inductive pickup box, cleans up plug wire signal.

Contact Performance Trends for using Bypass cable to bypass Inductive Pickup Box if you want to go directly to Tach signal.

# DataMite III USB Recording Switch Operation



Go into DataMite specs, click on DataMite III Options, then Dyno Recording Switch, then Allow "Switch" input to be used. Now the software will start and stop recording on either the <F1> or <F2> keys on the keyboard, or pressing and releasing a special switch from Performance Trends which plugs into the DataMite III USB's 4 pin "Switch" input. See Figure below.

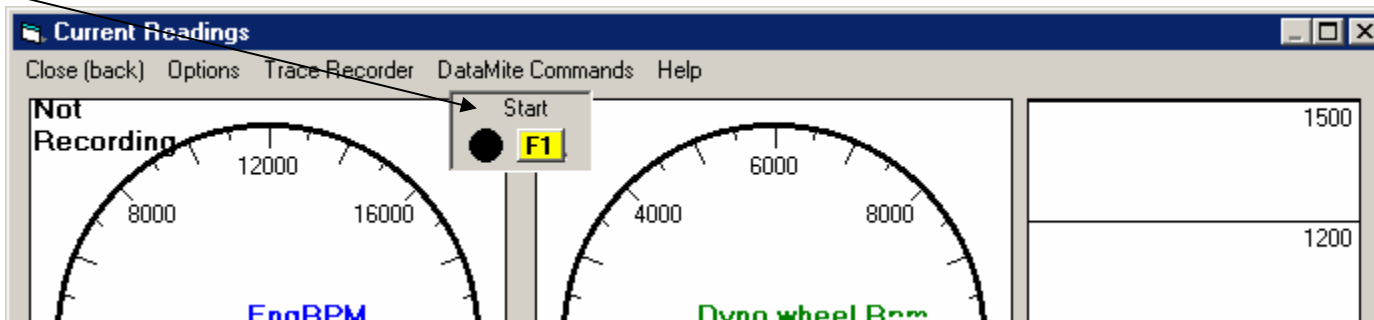
**NOTE:** You must have Firmware Version 1.06 or later (starting around Oct 2008) in your DataMite III UDB for this to work. Click on DataMite USB Options, then Read Firmware Version to check.



Switch Connector

Plug the Switch into the 4 pin connector marked "Switch" on the DataMite III USB logger box as shown to the right.

Now when you run a test, you can still press F1 or F2 to Start and Stop recording, or click on the F1 (then F2) button. But you can also press and hold the Record switch button (for about 1 second) to start recording. Then after the recording has started, release the button. When you are finished recording, press the button again for about 1 second to stop recording



**IMPORTANT:** If you do not have the switch plugged into the correct channel, recording may start automatically as soon as you go to the Current Readings screen.

# DataMite Infra-Red Temperature Sensor Notes

The Infra-Red temperature sensor puts out a 0-4.5 volt signal over a range of 0 to 150 deg C (32 to 302 deg F). For typical calibration numbers, see Analog Sensor Specs screen below.

The sensor has a “spot diameter” which expands at a conical angle 22 deg. For example, at a distance of 5 inches, the circular area it is measuring the average temperature of is a circle of about 2 inches in diameter. See graph to the right. This means if you want precise measurements of a particular area, you must mount the sensor close to that area.

## Mounting tips:

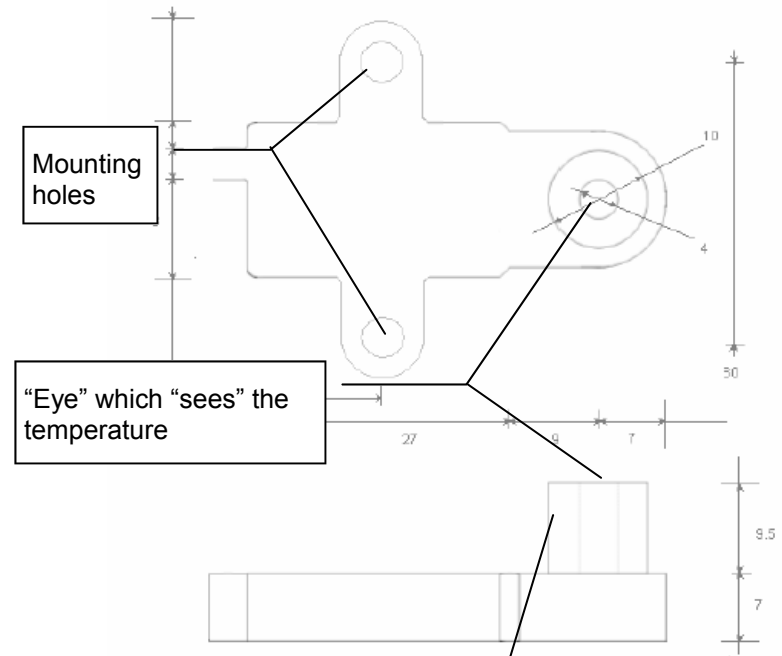
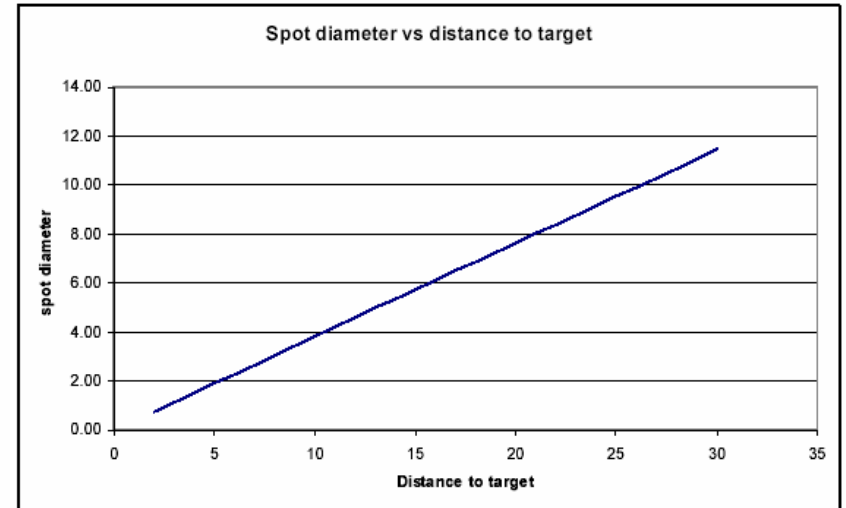
If mounting to record tire temperature, it is best if you mount to a bracket which moves with the tire’s movement. If the distance and angle of the sensor eye to the tire is changing, it is quite likely you can measure just tire temperature some times, and tire and road at others, introducing errors.

Keep the sensor body and line of sight to the target away from engine exhaust, from which the heat can introduce errors.

Do not let the aluminum “temperature reference” cylinder around the eye of the sensor touch other metal. This can affect the temperature of this “reference” and introduce errors in the measurements.

## Wiring:

Red = 4.75 to 5 VDC power, 6 mA  
 Black = Ground  
 Blue = signal

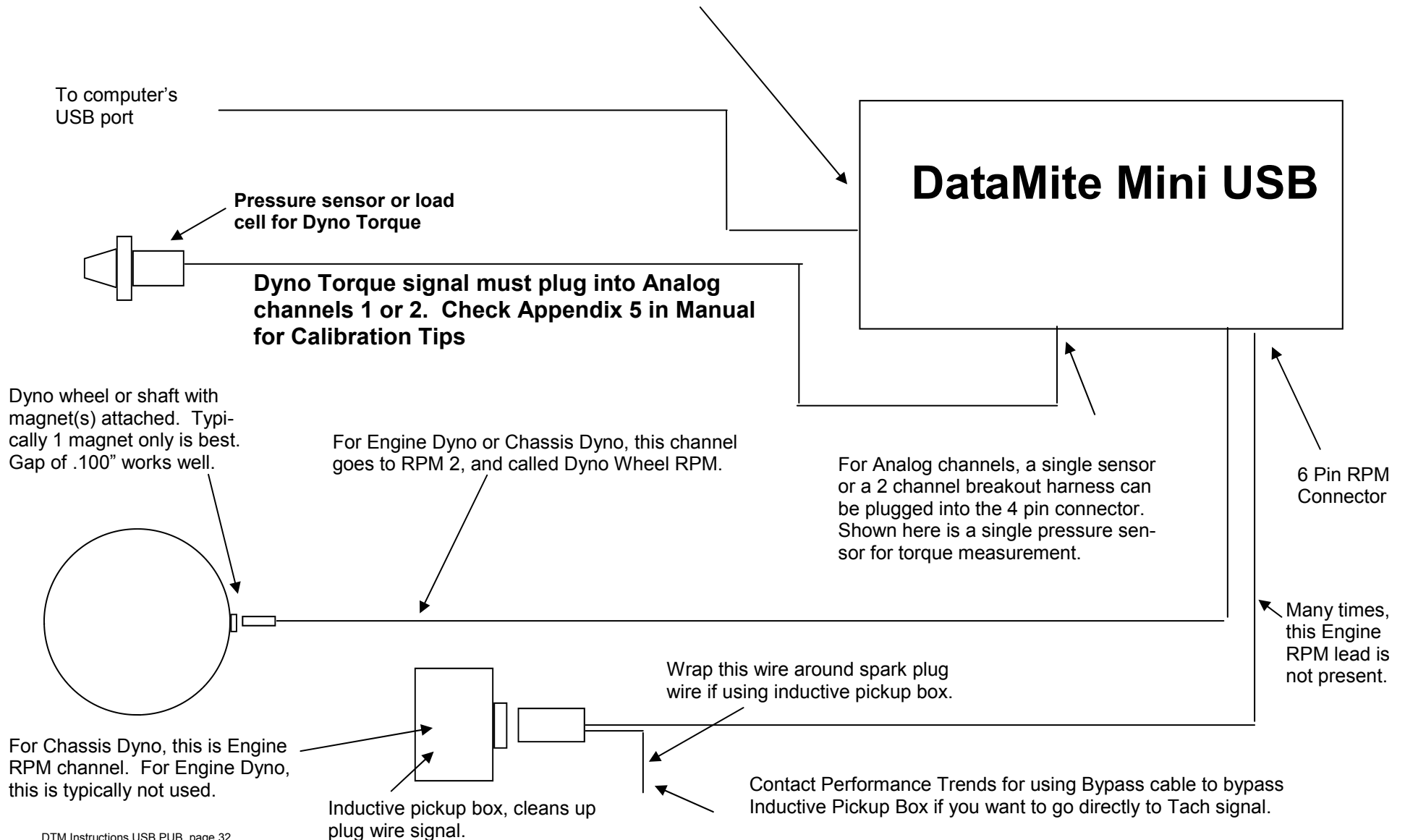


Cylindrical, aluminum heat reference for the IR temperature sensor. When mounted, this should NOT touch any metal components for best accuracy.

# DataMite Mini USB Dyno Wiring for Absorber Dyno

Check Appendix 2, starting on page 189, especially Section 4 Selecting Locations for Mounting your DataMite USB on page 192

DC power in. Note, system may function with just USB power, but results may not be accurate without this DC power connected.

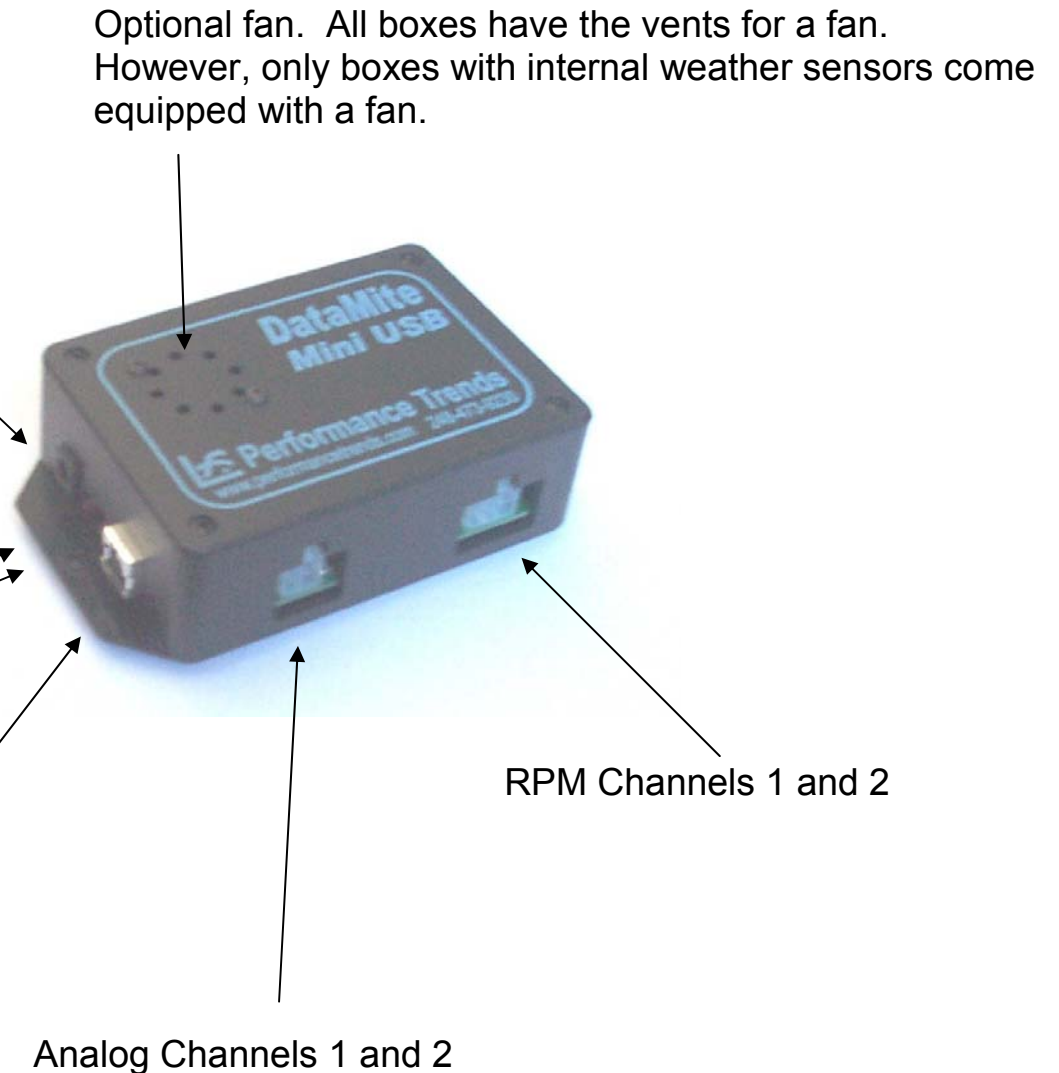


# DataMite Mini USB Connections

12 Volt DC power in. Note: Box will operate correctly without 12 Volt power, using only power from the USB cable in most situations. However, for some sensors you need a full 12 Volts for best accuracy. Therefore, it is recommended you use 12 volt power for all your testing.

Operation LEDs. These LEDs will not light if the processor inside the DataMite Mini USB is not operating correctly or has no power.

USB Cable to Computer



# DataMite III USB SD Memory Card

The Drag Race and Road Race/Circle Track versions of the DataMite III use an SD memory card for storing data during on-track testing. These cards are typically 1.0 GB in size (1000 meg).

The memory is typically broken up into 8 segments. This means you can record 8 different track sessions before you need to remove this card and download its contents. If you record 9 sessions before downloading, you will overwrite your first session with the data from the 9th session.

Downloading is done by inserting this card into the SD card slot of your computer, or a separate SD card reader which attaches to a USB slot. Performance Trends can supply these readers. Then start up your DataMite Analyzer software. Click on File in the upper left, then New (get data from DataMite) to be presented with the New Test screen shown below. From here you pick various items you want to carry over from the previous test, or new settings to be made. Click on Get Data in the upper left corner and you will be presented with a screen where you can choose any of the 8 segments to download. The most recently recorded session (segment) is always presented as the default.

These cards **MUST BE PROPERLY FORMATTED** to work. You can NOT just buy another card and expect it to work. Contact Performance Trends to purchase another card if you think you need a backup.

The SD card may come already installed in the slot of your DataMite III USB or inside a package with these instructions.

NOTE: Your recording switch will not light until the DataMite III USB has this memory card installed properly into the slot.

Be sure card is always in the unlocked position for data recording



A screenshot of the 'Starting a New Test' software window. The window has a blue title bar and a menu bar with 'Get Data (start new test Ctrl+N)', 'Cancel (don't start new test &lt;Esc&gt;)', 'Current Readings', 'Weather', and 'Help'. The main area contains several sections: 'File Name for New Test' (Drag USB DataMit2.CFG), 'Track/Event' (Sports Nats Cols 07), 'Run #' (2), 'Run Description' (1st time run), 'Folder Name for New Test' (My-Tests), and 'Type of Test' (Custom (no Laps/F...)). Below this is a section titled 'Pick Which Specs to Keep, based on current file [Drag]'. It has several checkboxes: 'DataMite' (checked), 'Vehicle' (checked), 'Log Book (keep most non-changing inputs)' (checked), 'Track Conds' (checked), and 'Test Comments' (checked). Each checkbox has a 'See Specs' button. To the right of these are fields for 'Type: DataMite III USB', 'Vehicle File [Gto.dat]', 'Veh Wt: 3580 lbs.', 'Final Drive Ratio: 4.3', 'Rear Tire Radius: 14.5', 'Front Tire Radius: 14.2', 'Trans: Auto', 'Keep All Inputs' (unchecked), 'Lane: .', 'Tree: Full :500.', 'Track Len: 1320 ft.', 'Dnsty Altitude: 1906 ft.', 'Air Temp: 77 deg F', 'Wind: 7 MPH', 'Actual Results: MPH: 116.66, ET: 11.227'. At the bottom, there is a text box with the comment 'hesitated top of low gear badly, not overwound!'. A red warning message at the bottom says 'Once a New Test is started, you can easily erase or modify any of the s... Any specs not selected to 'Keep' will be mostly blank when you start the...'. A callout box points to the 'Get Data' button with the text 'Click here to download a test session (segment)'. Another callout box points to the 'Type of Test' dropdown with the text 'Be sure you have set DataMite III USB as the "Type" of logger in the DataMite Specs, and then saved it as the "Master"'. A third callout box points to the 'Segment 2' dropdown in the 'Read Com Port' window with the text 'Click on down arrow for dropdown list of all segments to choose a different segment.'. The 'Read Com Port' window has a title bar and contains the text 'Download this segment', 'Segment 2 is last one recorded.', and a dropdown menu showing 'Segment 2'. At the bottom of the 'Read Com Port' window are buttons for 'Download this Segment' and 'Cancel'.

# DataMite Fuel Flow, Using 2 Flow Meters

The Pro version of the DataMite software (v3.7 A.058 or later) allows you to use 2 fuel flow sensors. You can choose either:

To add the 2 flow readings together (like when you have 2 sensors in parallel, so about half the flow goes through 1 meter and half goes through the other meter).

To subtract one flow reading from the other (like when you have 1 sensor measuring the fuel TO the engine, and 1 sensor measuring the flow being returned FROM the engine).

To do this, you first must specify the 2 sensors in the DataMite specs screen, as shown to the right.

After this, you must ALSO specify what to do with these 2 fuel readings in the Preferences menu. See pic to lower right.

Dyno DataMite v3.7 Performance Trends [ Try 2 Fuel Flows.CFG ]

Start Dyno Run Run # 1

Back File DataMite USB Options Current Readings Weather Station Cal. Troubleshoot Help

Type of DataMite III USB Com 9 Find Weather Station Internal Sensors

Sampling Rate, samples/sec 50

#	Channel	Used?	Data Name	Sensor and Calibration
1	Engine RPM	Yes	EngRPM	4 Cylinder, 4 Stroke
2	Frequency 2	Yes	Fuel 1	Fuel Flow (x 1.233)
3	Frequency 3	Yes	Fuel 2	Fuel Flow (x 1.265)
4	Analog 1 (Analog A green)	Yes	Tq	DynoTq 0-1 (5v) = 0-100 Chnl #4
5	Analog 2 (Analog B blue)	Yes	Channel 5	Std 0-5 Volts
6	Analog 3 (Analog C red)	Yes	Channel 6	Std 0-5 Volts
7	Analog 4 (Analog D yellow)	Yes	Channel 7	Std 0-5 Volts
8	Analog 5 (Analog E purple)	Yes	Channel 8	
9	Analog 6 (Analog F white)	Yes	Channel 9	
		Yes	Air Fuel ratio	
		Yes	Throttle	
		Yes	Steering	
		Yes	Brake	
		Yes	Position	

Other RPM Specs

Calib Fuel Flow (x 1.265)

RPM Sensor Specs

Sensor Fuel Flow

Multiplier 1.265

Data Name Fuel 2

Analog Sensor Specs

1st Value, Engineering Units Read

1st Value, freq (hz) Read

2nd Value, Engineering Units Read

2nd Value, freq (hz) Read

TC Corr. (adds to) Read

Note: Pick the location of the sensor and # of magnets (or 'targets' if a different type of sensor is being used) on the rotating component.

Keep Specs Help Cancel Print

Dyno DataMite v3.7 Performance Trends [ Try 2 Fuel Flows.CFG ]

Start Dyno Run

File Edit Graph Report Test Conds Engine DataMite Dyno Preferences Help

Preferences

Main Screen Operation Performance Est. Emailing Graphing Filing System Printing

Calculations Calculations (cont)

Units

Units for Entire Program English

Units for Engine Inputs English

Absorber Dyno: Allow Correcting for Engine Inertia Effects Yes

DataMite III USB

Frequency Signal Trailing Edge

Frequency Holdoff Time, mSec 0.2

Do Fast Current Readings Calcs No

Turn Fan Off When Shutting Down Yes

Fuel for BSFC Add 1st and 2nd channels

Use 1st fuel channel

Add 1st and 2nd channels

Subtract 2nd channel from 1st

OK Cancel Help Restart Showing Help Tips Turn Off all Help Tips Don't Ask About Updating Restore Defaults

# DataMite III Engine RPM Input Options

The DataMite III has options to NOT use every ignition pulse on the Engine RPM input. NOT using every pulse improves RPM accuracy for 2 cases.

First is for uneven firing engines, like Harley Davidsons. Then you should set the program to use every 2nd pulse. This lets the electronics just every 2nd pulse, which will be evenly spaced.

Second is for improving V8 RPM quality. If the spark signal is advanced just 1 degree, from a previous firing, that is a 2deg change out of 90 degrees (89 deg vs 91 deg). This can make engine RPM jump around A Lot. If you change this to just using every 4th pulse, engine RPM readings can be MUCH more stable.

**Data Mite Specs**

Type of: DataMite III USB | Com 13 | Find | Weather Station: Internal Sensors

Sampling Rate, samples/sec: 50 | Store Settings in DataMite III USB

Box Installation: Flat, SD card to left

#	Channel	Used?	Data Name	Sensor and Calibration
1	Engine RPM	Yes	Engine RPM	8 Cylinder, 4 Stroke, (/ 2)
2	Frequency 2	Yes	Driveshaft RPM	Driveshaft RPM, 2 Magnets
3	Frequency 3	Yes	Other rpm	Other RPM, 1 Magnet
4	Analog 1 (Analog A green)	Yes	an1	Std 0-5 Volts
5	Analog 2 (Analog A white)	Yes	an2	Std 0-5 Volts
6	Analog 3 (RPMs B green)	Yes	an3	Std 0-5 Volts
7	Analog 4 (RPMs B white)	Yes	an4	Std 0-5 Volts
8	Analog 5 (RPMs B blue)	Yes	Vacuum	Std 0-5 Volts
9	Analog 6 (RPMs B red)	Yes	an6	Std 0-5 Volts
10	Analog 7 (RPMs B yellow)	Yes	an 7	Std 0-5 Volts
11	Analog 8 (RPMs B purple)	Yes	IR Track Temp	Cstm. 693-1.69 (5v) = 71-150 IR Track Temp
12	Analog 9 (RPMs B brown)	Yes	Fuel Psi	25 PSI MSI600 Sensor
13	Analog 10	Yes	Board Temp	Board Temp (.01)
14	Analog 11	Yes	Power Volts	Box Power Volts

**Engine RPM Specs**

Calib: 8 Cylinder, 4 Stroke, (/ 2)

Engine Specs

# Cylinders: 8 | Engine Type: 4 Stroke

Use Ign. Pulses: Every 2nd pulse

Notes:  
Pick the # cylinders in the stroke operation. For small "distributorless" or small "4 cycle" engines, you may have to adjust these specs for accurate RPM readings. For example, a 'Briggs' motor fires every revolution like a 2 stroke, so call a Briggs a '1 Cyl/ 2 Stroke'.  
Change 'Use Pulses' from 'All pulses' to create smoother Engine RPM data on multi cylinder engines at higher RPM (like V-8s).

Buttons: Keep Calib., Help, Cancel, Print

**Tip**  
Click on the type choice here will be disabled in this screen.

**Callout 1:** Click on Sensor and Calibration for Engine RPM for the screen shown to the right.

**Callout 2:** In this screen, choose every 2nd pulse for Harley Davidsons or every 4th pulse for V8 engine with jumpy engine RPM signals. Then click on the Keep Calib. Button in the lower left. NOTE: This change will NOT change data which has already been recorded, just future data.

**Callout 3:** select the type choice here will be disabled in this