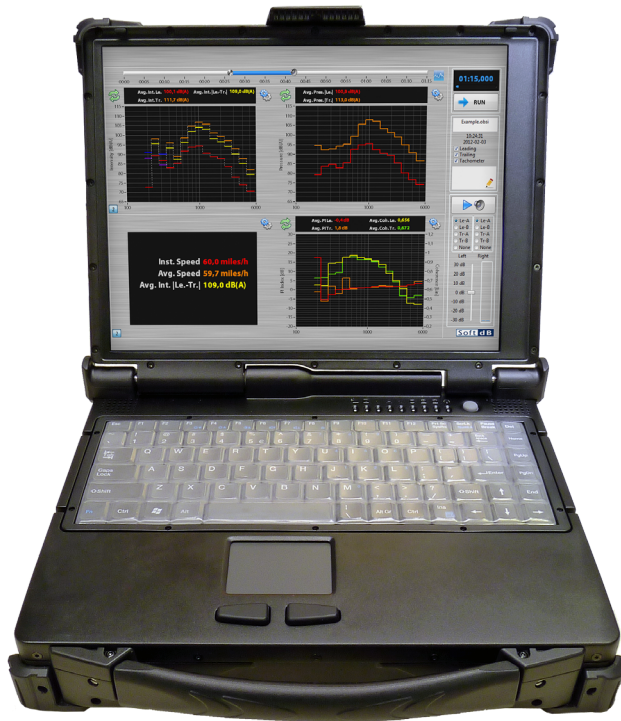


# OBSI Module

Real-Time On Board Sound Intensity measurement & post-processing software

User Guide – V1.1



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# 1 Introduction

Congratulations on your purchase of the **OBSI Module**.

The OBSI Module is a powerful tool to perform tire-pavement noise according to AASHTO TP 76-10 standard method. This software combines the measurement and post-processing tools to produce high quality results.

The OBSI Module is intended to run on an I-Track System, but can also be used with an Alto-6 using a stand alone computer. The software can also be installed on a stand alone computer to use the post-processing tools.

## General Specifications

<p><b>Measurement Types</b></p>	<ul style="list-style-type: none"> <li>• Sound Intensity</li> <li>• Sound Pressure</li> <li>• Coherence</li> <li>• PI Index</li> <li>• Audio signals</li> <li>• Vehicle speed</li> <li>• Vehicle traveled distance</li> </ul>
<p><b>Display Types</b></p>	<ul style="list-style-type: none"> <li>• 1/3 Octave band</li> <li>• FFT</li> <li>• Time History</li> <li>• Numerical indicators</li> </ul>



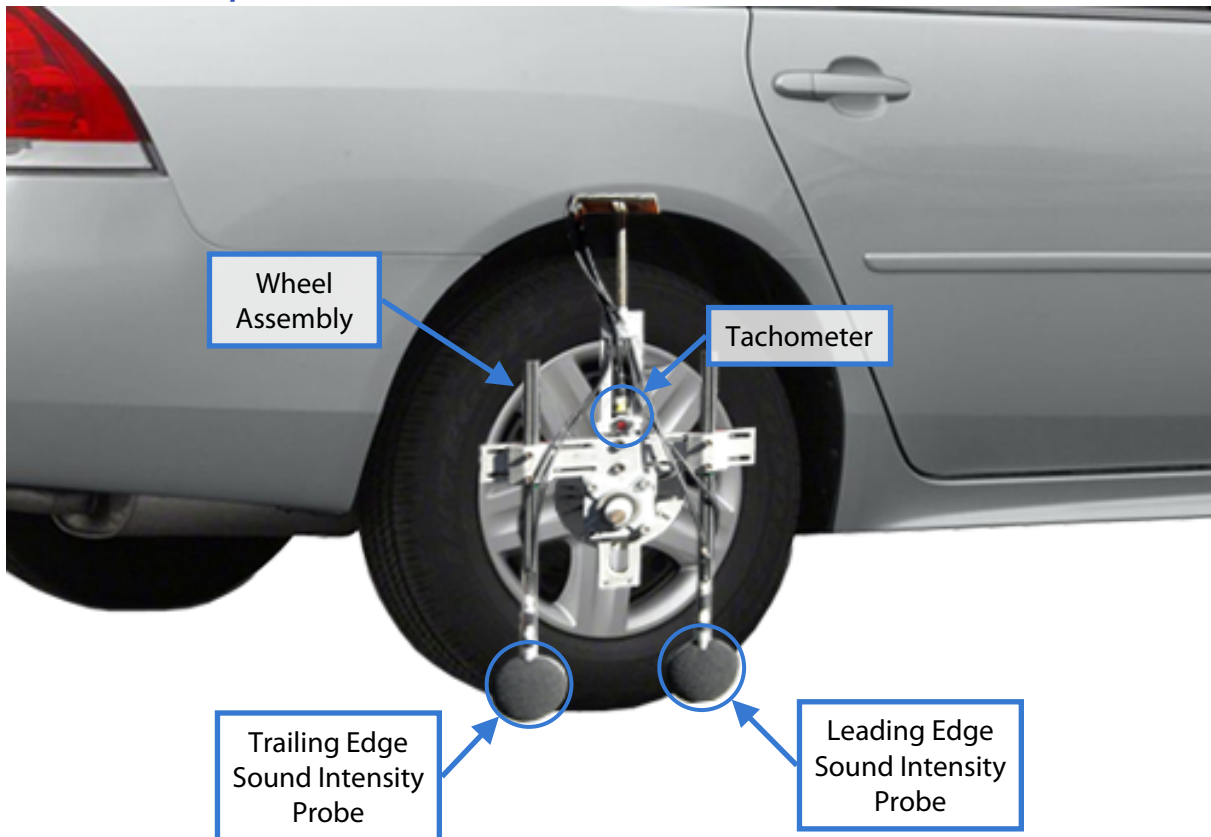
## 2 System Description

This user guide covers only the software part of the measurement system as the sensors and the fixture are not supplied with the software. For more information about relevant sensors, please contact Soft dB at [contact@softdb.com](mailto:contact@softdb.com).

For the purpose of this user guide, the I-Track system will be used as the base system. A dual ICP probe and ICP tachometer will also be used. A special version of the I-Track system with higher input ranges is available as an option; please contact Soft dB at [contact@softdb.com](mailto:contact@softdb.com) for more information.

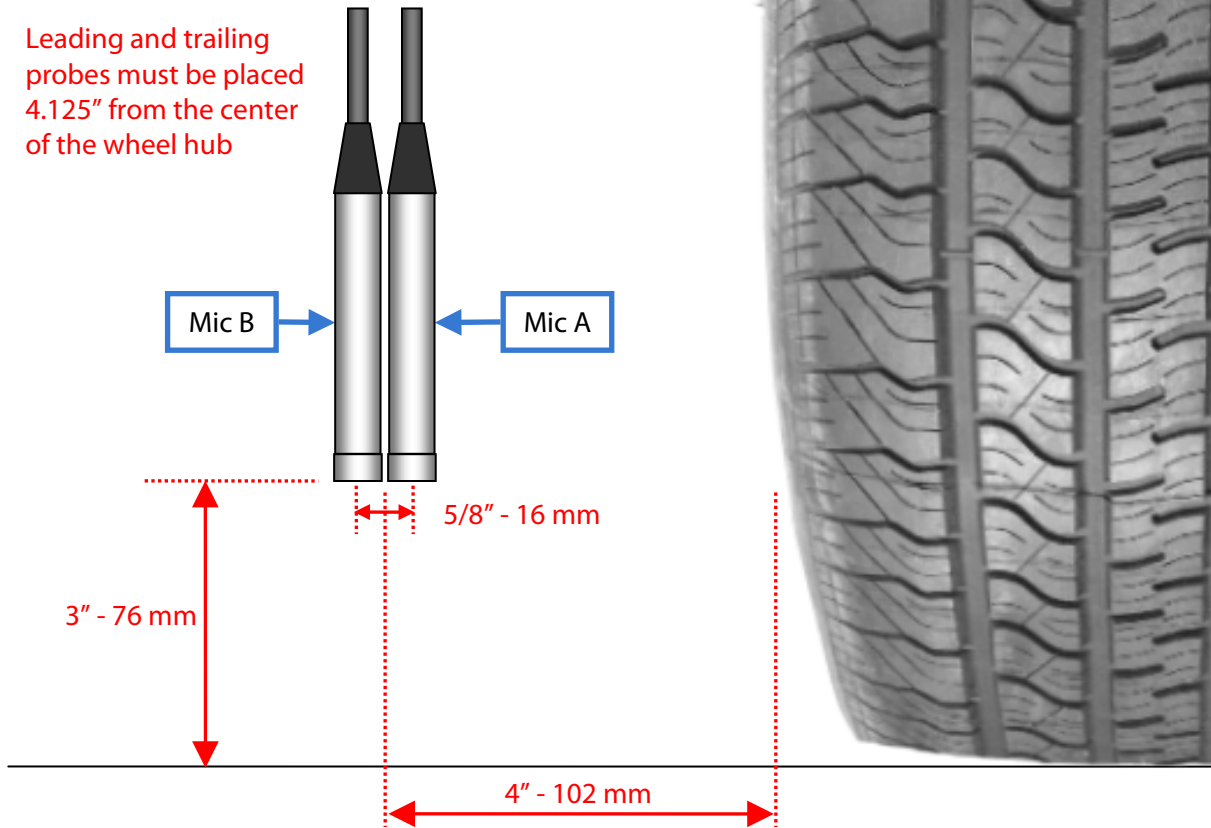
### 2.1 OBSI Setup

#### *General OBSI Setup – Dual-Probe Vertical with Tachometer*



## General OBSI Setup - Probe position

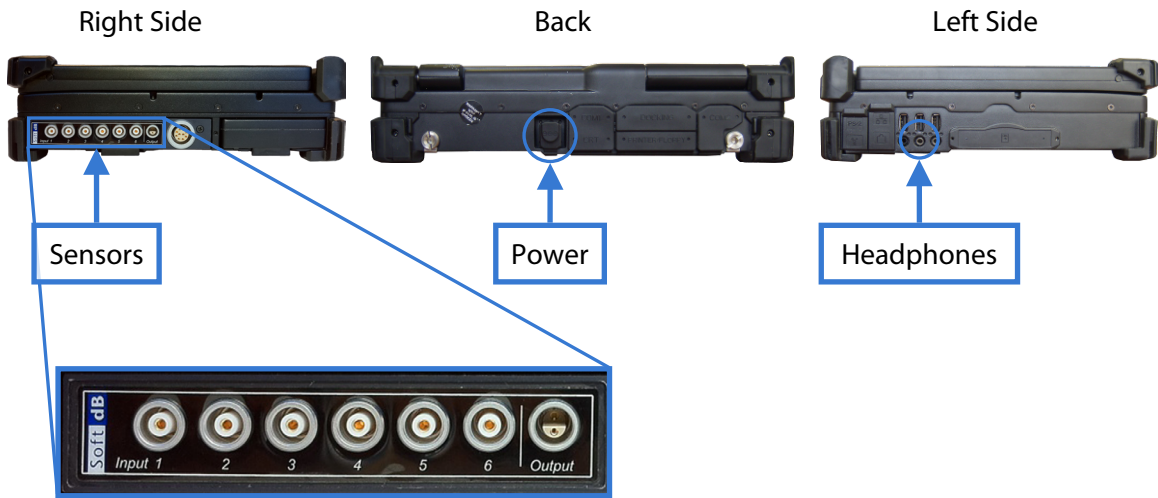
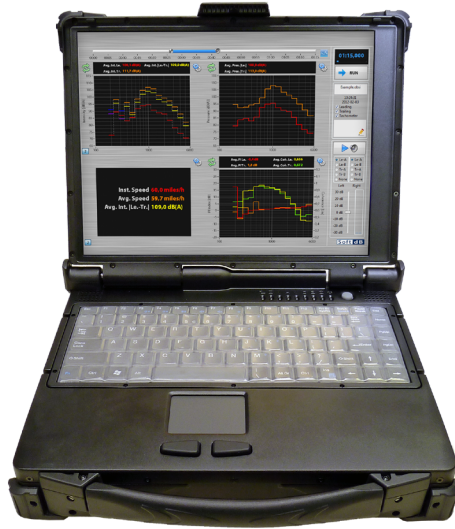
Leading and trailing probes must be placed 4.125" from the center of the wheel hub



The current OBSI standard specifies use of an ASTM F2493 Standard Reference Test Tire (SRTT) (P225/60R16) available from Michelin. A purchasing procedure is detailed in appendix.



## 2.2 Connections





## 3 Quick Start

### Step 1 Start up

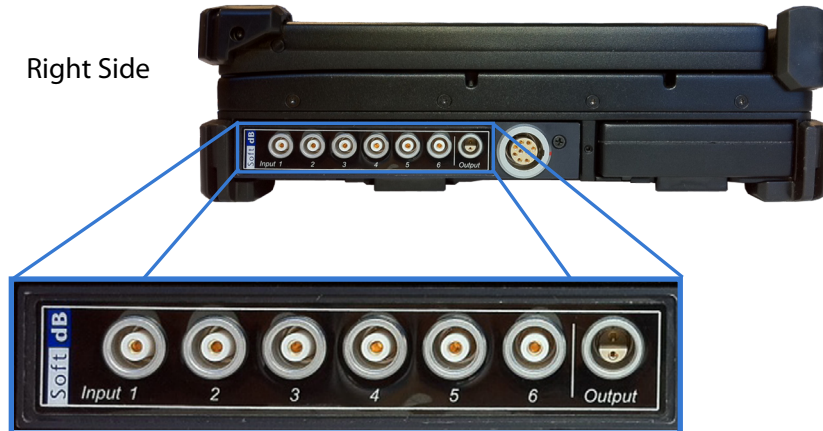
- 1) Turn on the laptop by pressing the power button.



- 2) Once Windows® started, launch the OBSI software from the start menu.

### Step 2 Connexions

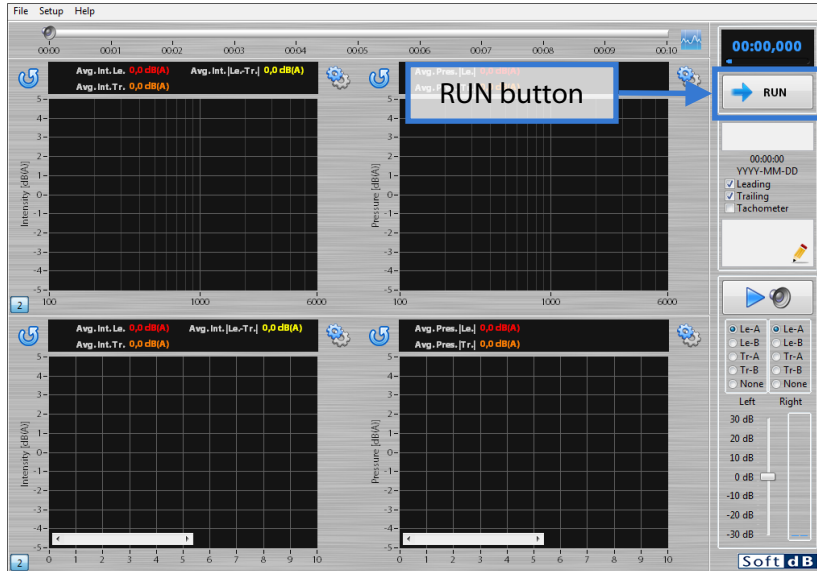
- 1) Connect the microphones to the DSP input connectors using appropriate cabling:



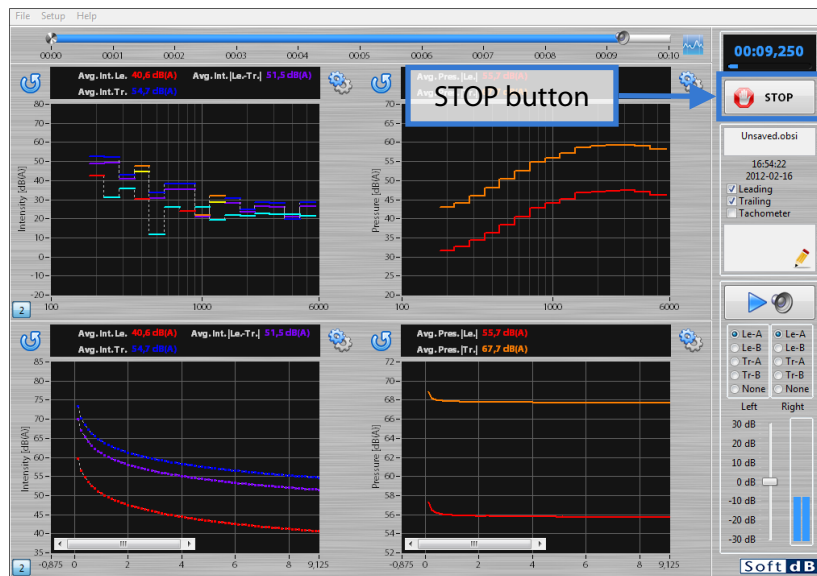
- Channel 1: Leave unconnected,
- Channel 2: Tachometer,
- Channel 3: Leading Edge Probe – Mic A,
- Channel 4: Leading Edge Probe – Mic B,
- Channel 5: Trailing Edge Probe – Mic A,
- Channel 6: Trailing Edge Probe – Mic B.

## Step 3 Launch the measurement

- 1) Launch the measurement by clicking the RUN button:



- 2) Run the measurement for a while and stop it by pressing the STOP button:



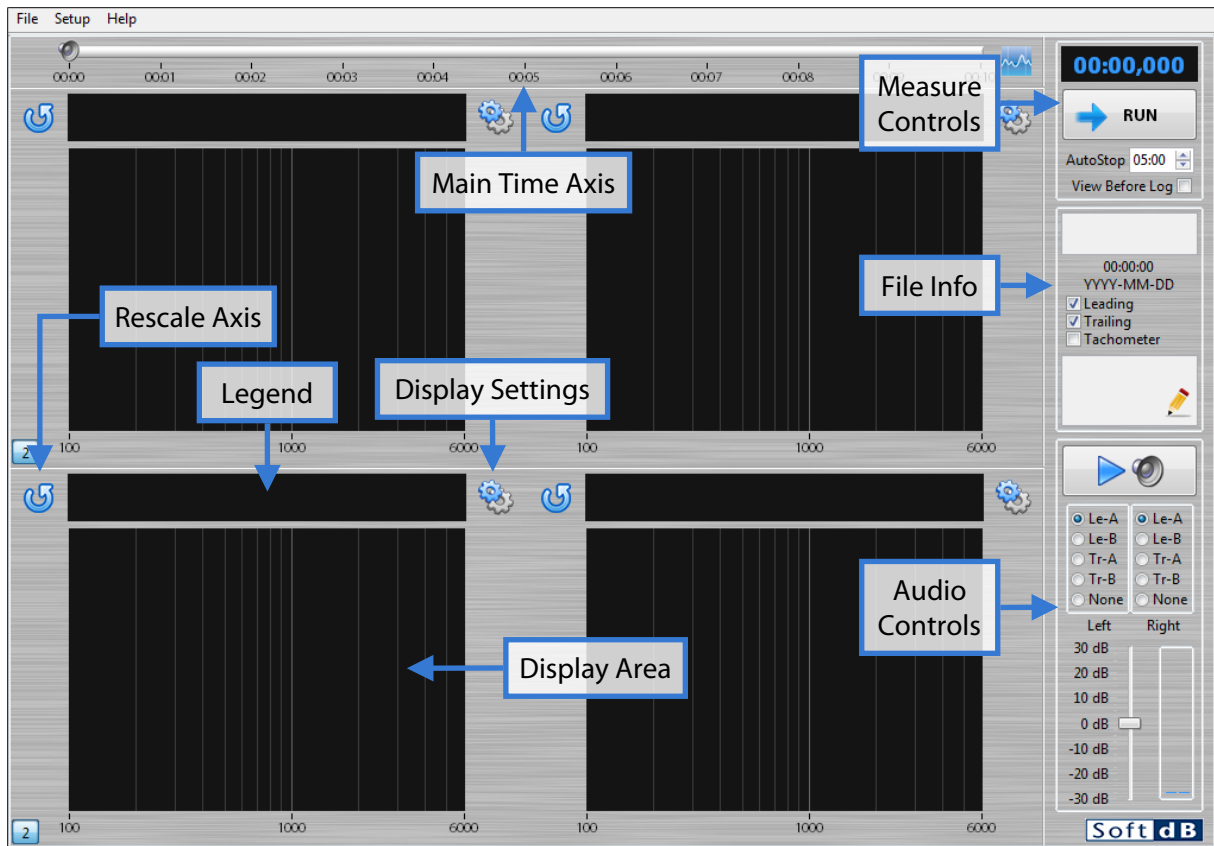
- 3) Save the measurement by clicking on the blinking record warning or with ctrl+.

## 4 Software Description

### 4.1 Main Interface

The main interface is used for both performing a measurement and post-processing.

#### Main Interface



#### 4.1.1 Measure Controls

The measure controls are related to the acquisition behavior. The top indicator shows the elapsed time when measuring.

The RUN/LOG/STOP button controls the measurement. Two modes are available:

- Log on start;
- View before log.

The auto-stop duration defines a logging maximum duration. When this duration is reached, the logging process is automatically stopped. This duration can range from 1 s to 60 minutes.

#### 4.1.1.1 Log On Start

When using this mode, the measurement starts with logging when pressing the RUN button. The RUN button then becomes the STOP button. The measurement is stopped when the user clicks this button or when the auto-stop duration is reached.

To select this option, uncheck the “View Before Log” checkbox.

#### 4.1.1.2 View Before Log

When using this mode, the measurement starts without logging when pressing the RUN button. The RUN button then becomes the LOG button. When pressing the LOG button, the measurement is reset with logging effective. The LOG button then becomes the STOP button. The measurement is stopped when the user clicks this button or when the auto-stop duration is reached.

To select this option, check the “View Before Log” checkbox.

### 4.1.2 File Info

The file info cluster contains the basic information about a measurement file such as:

- File name,
- Recording date,
- Active sensors,
- Comment.

When a measurement file is loaded, this information is updated. When a measurement starts, this information is also updated with the current settings.

Clicking on the pencil icon on the comment field will launch the File Info interface allowing to edit the comment. Once the comment has been edited, the measurement file needs to be saved to record the changes.

### 4.1.3 Audio Controls

The audio controls allow to listen to the audio streams during a measurement or on a measurement file. The PLAY/PAUSE button starts or stops the audio playback of a recorded measurement file.

The source selection radio buttons links the selected sensor to the audio channel. For example, the right channel could be linked to the mic A from the leading probe and the left channel to mic B.

The bottom left slider applies an additional gain to the operating system volume control and the bottom right vertical scales represent the audio dynamic ranges.

#### 4.1.4 Main Time Axis

The main time axis represents the whole measurement time range. Two cursors allow the selection of a certain portion of the measurement to perform averaging and a third cursor represents the current audio position during audio playback.

Clicking on the graph button on the right side of this axis displays the main time history which shows a time history of a selected data source, such as averaged sound intensity or vehicle speed. The source data can be selected from several choices on the Display Setup interface (4.5.2).

## 4.1.5 Display Area, Legend, display Settings and Rescale Axis

The display area can be one of the following displays:

- Time history graph,
- 1/3 octave band graph,
- FFT graph,
- Numeric indicators.

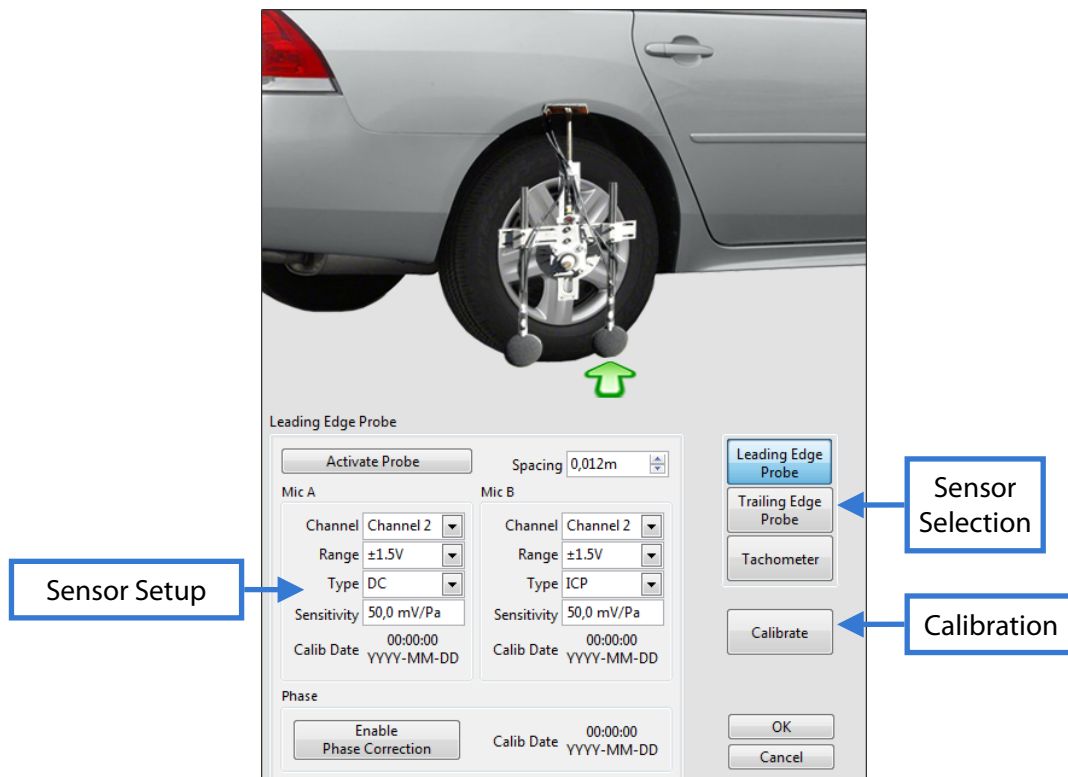
The graph type and the data to be displayed are selected in the display setup interface. This interface can be launched using the Display Settings button.

The legend on the top of each display area identifies the plot and displays the global level.

## 4.2 Input Setup

The Input setup is used prior to perform a measurement and is used to calibrate the sensors. To launch this interface, go to Setup/Input Setup.

### *Input Setup Interface*





## 4.2.1 Sensor Selection

The sensor selection radio buttons allow the selection of the Leading Edge Probe, the Trailing Edge Probe or the Tachometer. The input setup interface will behave according to this control state.

## 4.2.2 Sensor Setup

### 4.2.2.1 Intensity probes

The intensity probes setup includes all the relevant information such as:

- Probe enabled state
- Mic A and B input Setup:
  - Input channel,
  - Input range (when available),
  - Input type (AC, DC or ICP),
  - Input sensitivity
  - Amplitude calibration date.
- Microphone spacing (OBSI standard = 16 mm)
- Phase correction enabled state and phase calibration date.

To perform sensor calibration (amplitude or phase), click on the calibrate button to launch the calibration interface.

### 4.2.2.2 Tachometer

The tachometer setup includes all the relevant information such as:

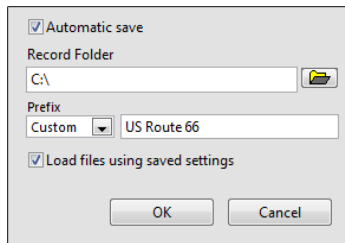
- Tachometer enabled state
- Tachometer input Setup:
  - Input channel,
  - Input range (when available),
  - Input type (AC, DC or ICP),
  - Input sensitivity.
- Schmitt Trigger thresholds;
- Wheel diameter and calibration date;
- Number of ticks per rotation.

To perform a calibration of the wheel diameter, click on the calibrate button to launch the calibration interface.

### 4.3 Record Setup

The record setup describes the software behaviour when it comes to record measurement files. To launch this interface, go to Setup/ Record Setup.

#### Record Setup Interface



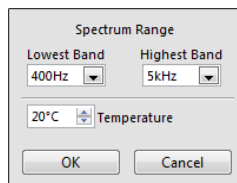
The automatic save checkbox allows to automatically save a measurement file at the end of the measurement process otherwise the measurement needs to be manually saved using File/save or ctrl+s or clicking on the blinking record warning visible on the main interface at the end of an unsaved measurement.

The measurement files will be recorded in the record folder. The default directory is located at My documents/OBSI/.

The prefix allows the user to specify a string of characters at the beginning of the file name. The prefix can be the current date or a custom one. The measurement files will be automatically incremented from 000 to 999. A common file name will have the following format: "Prefix\_001.obsi".

The "Load files using saved settings" check box will load a measurement file and restore the display settings and the computing settings to the way they were at the moment the measurement was saved. Leave this checkbox unchecked when you want to load measurement files using the current display settings and computing settings.

### 4.4 Computing Setup

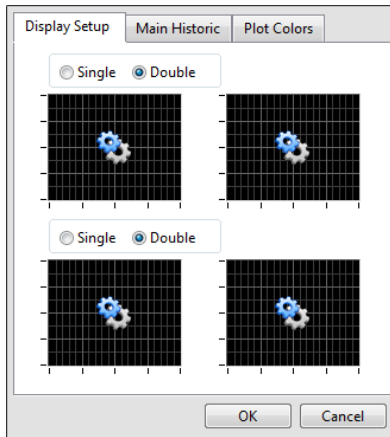


The computing setup allow to set the spectrum range (OBSI standard = 400 Hz to 5 kHz) and the temperature. These computing settings do not need to be set prior to measurement and can be changed. Any change to this interface will be automatically applied to the current measurement file.

## 4.5 Main Display Setup

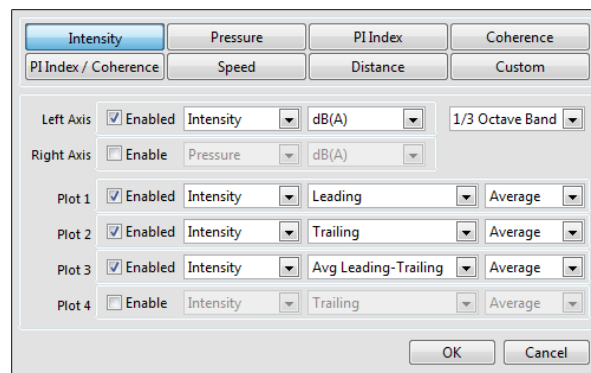
The main Display Setup controls how the software will display the results. To launch this interface, go to Setup / Display setup.

### 4.5.1 Display Setup Tab



The display setup tab allows to edit the main interface appearance. The number of display areas can be defined and their individual display setups can be defined in the Display Area Setup interface by clicking on the gear icon of each display.

#### 4.5.1.1 Display Area Setup Interface



The display area setup interface defines the display type and data type of a specific display area.

The available display types are:

- Time history graph,
- 1/3 octave spectrum graph
- FFT spectrum graph
- Numerical indicator

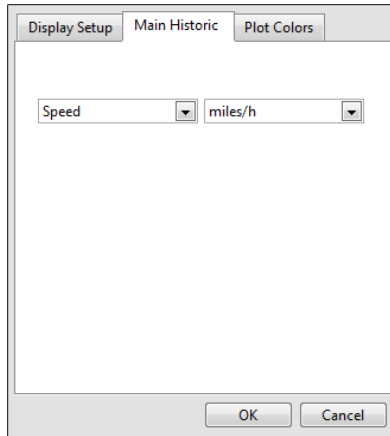
Each graph can display up to 4 plots which can be of two different types, intensity and pressure or coherence and PI index for example. The available data are:

- Intensity (dB, dBA,  $W/m^2$  or  $W/m^2(A)$ ) – (Instantaneous or Time averaged)
  - Leading edge probe
  - Trailing edge probe
  - Average leading edge / trailing edge
- Pressure (dB, dBA,  $Pa^2(rms^2)$  or  $Pa^2(rms^2)(A)$ ) – (Instantaneous or Time averaged)
  - Leading edge probe (mic A)
  - Leading edge probe (mic B)
  - Leading edge probe (average mic A / mic B)
  - Trailing edge probe (mic A)
  - Trailing edge probe (mic B)
  - Trailing edge probe (average mic A / mic B)
  - Average leading edge / trailing edge
- PI Index (dB, or linear) – (Instantaneous or Time averaged)
  - Leading edge probe
  - Trailing edge probe
- Coherence (dB, or linear) – (Instantaneous or Time averaged)
  - Leading edge probe
  - Trailing edge probe
- Speed (m/s, km/h, mile/h or ft/s) – (Instantaneous or Time averaged)
- Distance (m, km, mile or ft) – (Instantaneous or Time averaged)

Several presets are available from the top radio buttons:

- Intensity,
- Pressure,
- PI Index,
- Coherence,
- PI Index/ Coherence,
- Speed,
- Distance.

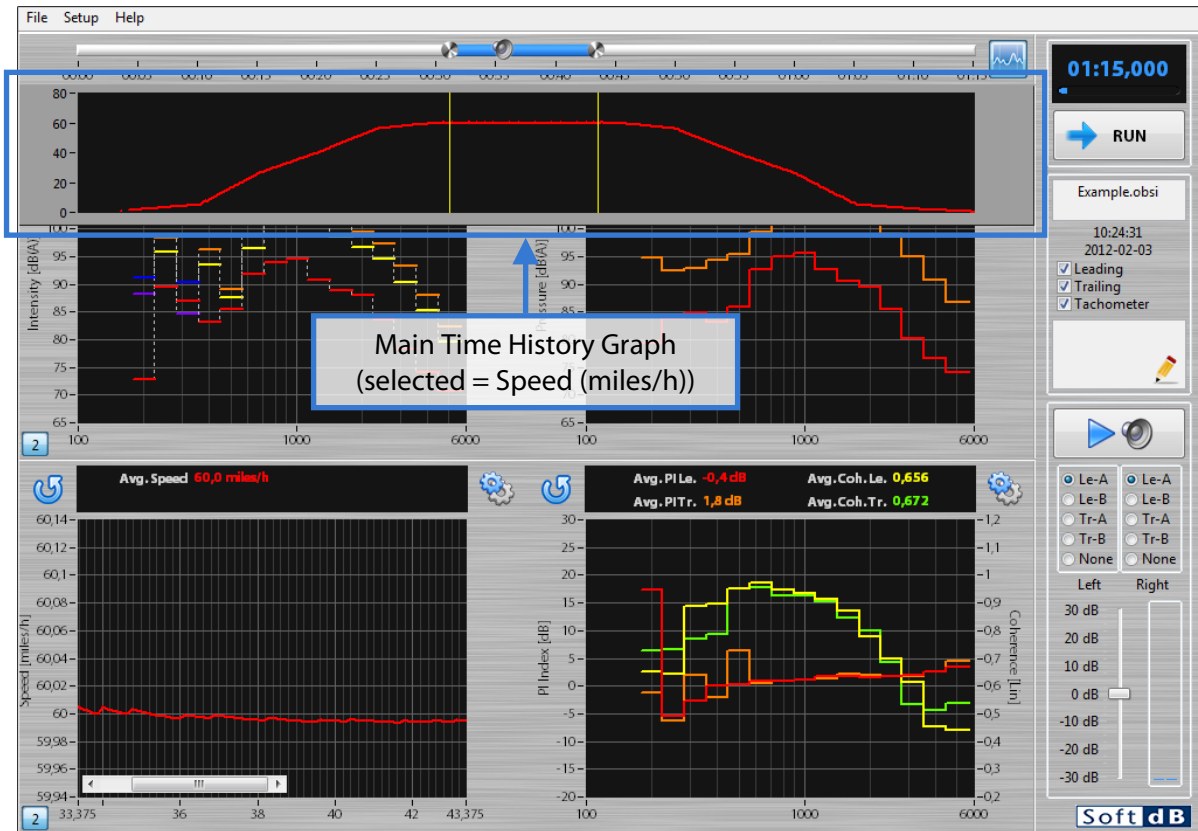
#### 4.5.2 Main Historic Tab



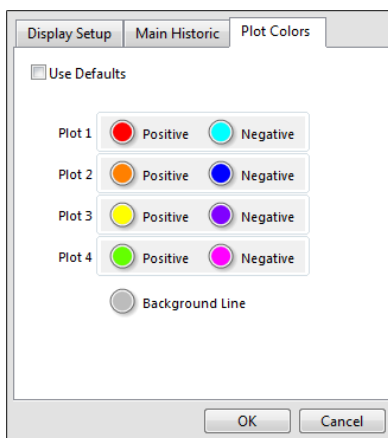
The main historic tab allows to define the data contained in the main time history. The main time history graph is a useful tool when it comes to define the time boundaries to a specific portion of the measurement.

For example, the following figure illustrates the speed in miles/h in the main time history graph. And the main time axis boundaries are then adjusted to the measurement portion where the speed was stable at 60 miles/h (OBSI standard) and perform averaging on this specific portion of the measurement.

Once the measurement time boundaries are set, the measurement region of interest can be saved using File/Save selection as.



### 4.5.3 Plot Colors Tab



The plot colors tab allows to define the plot colors. The positive and negative colors are used to specify the direction of the intensity vector. For all other data, the positive color is used.

## 4.6 Data Export

The data can be exported as a tab delimited file that can be opened with any spreadsheet software. The data contained in this file are the data displayed on the main interface graph. To get a specific dataset in the exported data, it needs to be displayed in its appropriate form on the main interface.

For example, if the 1/3 octave sound intensity and sound pressure time history is displayed on the main interface, these dataset will be exported in the output file.

Two export functions are available. The first is "Export Current" which exports the currently loaded file and the second is "Export Multiple" which allows exporting several files to a single output file.

To export data, go to File/Export.

## Appendix 1 Standard Reference Test Tire (SRTT) Purchasing Procedure

**Purchasing Standard Reference Test Tires (SRTT)**  
**ASTM STANDARD SPECIFICATIONS E1136 AND F2493**  
**Michelin North America, Inc.**

General Information:

1. All SRTT tire purchase requests and credit applications must be written and submitted in English.
2. All tires are shipped pre-paid by the purchaser by the carrier specified by the purchaser. Any shipping issues are to be reconciled between the purchaser and the requested carrier.
3. Tires will be shipped as soon as possible depending on inventory availability and approval of the sale.
4. Tires are priced at \$300 each for the P195/75R14 (ASTM E1136) and \$335 each for the P225/60R16 (ASTM F2493). Prices are subject to change.
5. Please provide the following information at the time the order is placed:
  - a. Purchase order number.
  - b. Designated carrier and with customer shipping account number.
  - c. Number of tires needed by the specific tire size requested.
  - d. Ship to address along with "attention of" name and contact phone number.
  - e. Bill to address along with "attention of" name and contact phone number.
  - f. Requested date for arrival of the tires. Domestic U.S. shipments normally take 5 to 7 business days by truck. International shipments normally take between 2 and 6 weeks to arrive depending upon carrier and method selected.

Existing SRTT Customers:

1. North American Domestic purchases for existing SRTT customers:
  - a. To place an order, Domestic Purchasers have the option of calling Michelin Customer Service Center at 1-800-847-8475, by sending an e-mail to [tcar.dealer.team@us.michelin.com](mailto:tcar.dealer.team@us.michelin.com) or by sending a fax to 864-458-5750.
  - b. For Domestic credit-approved accounts, an invoice will be sent by mail for payment of tires.
  - c. Payment Terms are Net 30 days or cash in advance without exception.
2. International purchases for existing SRTT customers:
  - a. To place an order, International Purchasers must send order requests by e-mail only to [tcar.dealer.team@us.michelin.com](mailto:tcar.dealer.team@us.michelin.com).
  - b. All international purchases are required to pay cash in advance.

New SRTT Customers:

1. To be considered for a new North American Domestic account, a copy of the attached "Application for Domestic Purchase – Standard Reference Test Tires" must be completed and submitted by the prospective customer to the Michelin Customer Service Department. Failure to provide all required information and/or documentation may require that the account pay cash in advance for the shipments. Any account that does not qualify for a credit limit based upon their financial information, will be required to pay cash in advance.
2. To be considered for a new International account, a copy of the attached "Application for Foreign Purchase – Standard Reference Test Tires" must be completed and submitted by the new customer to the Michelin Customer Service Department.
3. Prospective accounts take 10 business days to be approved after all applicable paperwork is received in English. Once approved the paperwork can be completed for sale and shipment of the tires

SRTT tires are sold directly by Michelin North America, Inc. to approved test laboratories, automotive-related manufacturers, government agencies, and other users that require a standard reference test tire. SRTT tires are manufactured throughout the year in specific campaign quantities (i.e. batches) that will be identified by the tread area markings.

Rev 08Nov2011 WCP





## Michelin North America, Inc. Credit Information Request

### Standard Reference Test Tires (SRTT) – Domestic Prospect

Date (MM/DD/YYYY): \_\_\_\_\_  
 Company Legal Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_ County: \_\_\_\_\_  
 Federal Tax ID: \_\_\_\_\_ Year Current Business Established: \_\_\_\_\_

**BILL TO INFORMATION**

Name: \_\_\_\_\_  
 Street: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_  
 Country: \_\_\_\_\_

**SHIP TO INFORMATION**

Name: \_\_\_\_\_  
 Street: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_  
 Country: \_\_\_\_\_

SHIP TO Contact Name: \_\_\_\_\_ Phone: \_\_\_\_\_ EMAIL: \_\_\_\_\_  
 Multiple Shipping Locations : \_\_\_\_ Yes \_\_\_\_ No (If Yes, please include a separate list of addresses of multiple shipping locations)

ACCOUNTS PAYABLE CONTACT NAME: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ EMAIL : \_\_\_\_\_

Estimated Annual Purchases: \_\_\_\_\_  
 SUBMITTED BY: \_\_\_\_\_ Title: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ EMAIL : \_\_\_\_\_

If the Company is owned by a Parent Company, provide their Name and Address:

*In addition, you May Be Required To Provide Documentation for the Legal Form of the Business*

- **Corporation** : Articles of Incorporation, **Partnership** : Partnership Agreement.
- **Limited Liability Company (LLC)** : Articles of Organization. Signed and indicating managing member.
- **Other** :

[Return Application with all required documentation to:](#)

[Payment Terms](#)

Attn: Ann Taylor Customer Service Department  
 Michelin North America, Inc. PO Box 19001 Greenville SC  
 29602. Phone: (800) 458-8475 Fax: (864) 458-5750  
 EMAIL: tcar.dealer.team@us.michelin.com

Credit     Cash In Advance

**IMPORTANT INFORMATION**

- Please provide this complete form with **ALL** requested information and documentation at submission of application.
- The companies last 2 fiscal years end financial statements **MUST** be provided to be considered for a credit line for any account. For Cash in Advance , please submit your payment to the following:  

Bank of America	ABA # 0260-0959-3
101 S. Tryon Street	Bank Account #: 3750201402
Charlotte, NC 28255	Account Name: CR Funding, Inc.
	SWIFT Code: BOFAUS3N
- Tax Status is required for each ship to State: Please attach Tax exemption certificate or resale certificate copy, otherwise any applicable tax will be automatically invoiced and any claim or refund had to be treated directly with the state tax authorities.



Michelin North America, Inc.  
Credit Information Request

**Foreign Purchase Standard Reference Test Tires (SRTT)**

Date (MM/DD/YYYY): \_\_\_\_\_

Company Legal Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_ Country: \_\_\_\_\_

**BILL TO INFORMATION**

Name: \_\_\_\_\_  
Street: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_  
Country: \_\_\_\_\_

**SHIP TO INFORMATION**

Name: \_\_\_\_\_  
Street: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_  
Country: \_\_\_\_\_

**SHIP TO** Contact Name: \_\_\_\_\_ Phone: \_\_\_\_\_ EMAIL: \_\_\_\_\_

Multiple Shipping Locations :  Yes  No  
(If yes, please include a separate list of addresses of multiple shipping locations)

Estimated Annual Purchases: \_\_\_\_\_

SUBMITTED BY: \_\_\_\_\_ Title: \_\_\_\_\_  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ EMAIL : \_\_\_\_\_

If the Company is owned by a Parent Company, provide their Name and Address:  
\_\_\_\_\_

**IMPORTANT INFORMATION**

- **FREIGHT CARRIER** : All tires will be shipped via the Freight Carrier of your choice. This information must be provided when purchase order is placed. There will be no collect shipments.
- **PAYMENT TERMS** : All foreign orders are on *Cash in Advance* basis. Funds will be wire transferred to the following:  
Bank of America  
101 S. Tryon Street  
Charlotte, NC 28255  
ABA # 0260-0959-3  
Bank Account #: 3750201402  
Account Name: CR Funding, Inc.  
SWIFT Code: BOFAUS3N
- This is the only bank account approved for payments. To avoid any delay , the account name should be included in the wire transmission details.
- The Shipping authorization will be released until the funds are received and applied to your account.
- Any bank fee related to the wire transfer has to be covered by you, shipments can be subject to being held for release if the payment does not match the full amount of the purchase order.

[Return Application with all required documentation to:](#)

Attn: Ann Taylor Customer Service Department  
Michelin North America, Inc. PO Box 19001 Greenville SC 29602.  
Phone: (800) 458-8475 Fax; (864) 458-5750 EMAIL:tcarr.dealer.team@us.michelin.com