

OPERATING INSTRUCTIONS
FOR

FIBEROPTIC

DISPLACEMENT MEASUREMENT SYSTEMS

mDMS, mcDMS and muDMS

Model _____

Serial Nos. _____

SOFTWARE & FIRMWARE UPDATES

DMS sensors can be updated remotely at any PC. The most current edition of software and firmware is posted at <http://www.philtec.com/downloadssupport/firmware.html>

PROCEDURE

Download the firmware update program to your local hard drive.

Locate the .exe file and execute the program. Follow the on-screen instructions.

The program will instruct you when to reboot the sensor (turn power off, and turn power on).

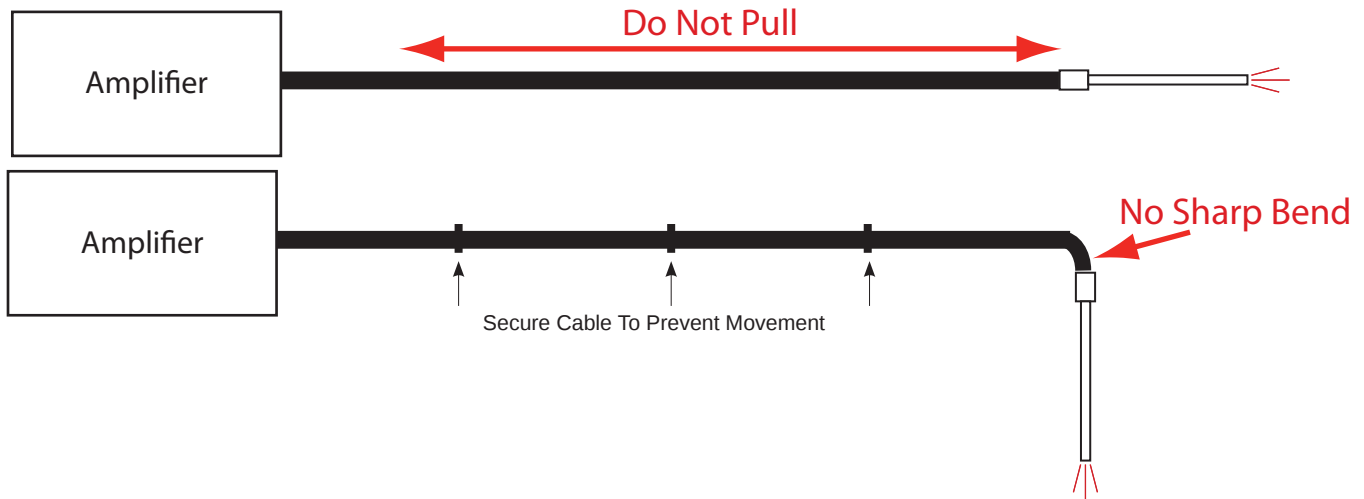
SPECIAL HANDLING INSTRUCTIONS



Care should be used in handling the sensor tip and fiber optic cable assembly.

- Avoid Sharp Bends Behind the Sensor Tip
- Avoid Putting the Cable In Tension

Note: The fiberoptic cable sheathing will stretch or lengthen when pulled - but the glass fibers do not stretch, they can break.



WARRANTY

Displacement Measurement Systems are warranted by Philtec, Inc. against defects and workmanship for 12 months from the date of shipment from the factory. Damage to the fiberoptic cable or sensor tip are not covered under this warranty.

Description

mDMS ... mini-Displacement Measurement Systems with Type D fiberoptics are microprocessor-based systems for providing linearized outputs of distance using RS-232 protocol. They are comprised of:

- Reflectance Dependent Fiber optic Light Guides To Develop Analog Input Signals
- Digital Processing Units with storage capacity for 25 calibrations
- RS232 output
- AC/DC Power Supply

Power Requirements

Single Channel:

12 VDC @ 350mA

Power & serial communications
are handled via a Y cable that
is included with the sensor.



muDMS ... mini-Displacement Measurement Systems with Type D fiberoptics are microprocessor-based systems for providing linearized outputs of distance using USB 2.0 protocol. They are comprised of:

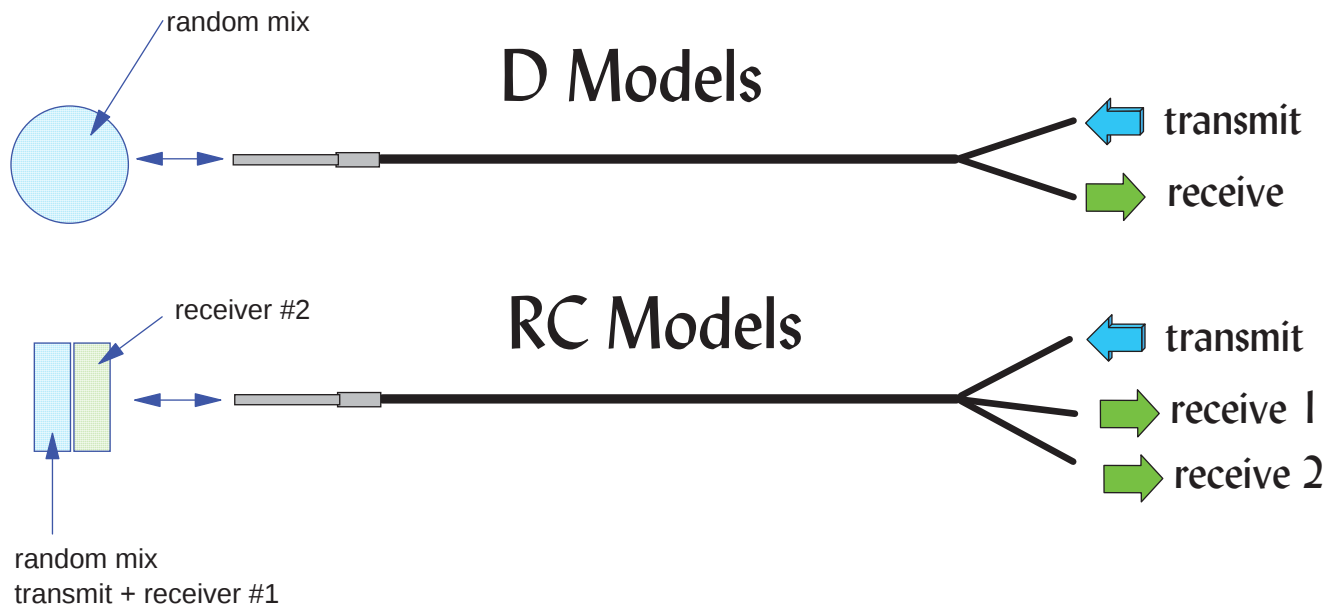
- Reflectance Compensated Fiber optic Light Guides To Develop Analog Input Signals
- Digital Processing Units with storage capacity for 25 calibrations
- USB output on mini-USB connector
- USB output locking adapter cable, mini-USB to standard USB
- Locking Weathertight Connector with AC/DC Power Supply

Power Requirements

Single Channel: 12 VDC @ 350mA



FIBEROPTIC PROBES



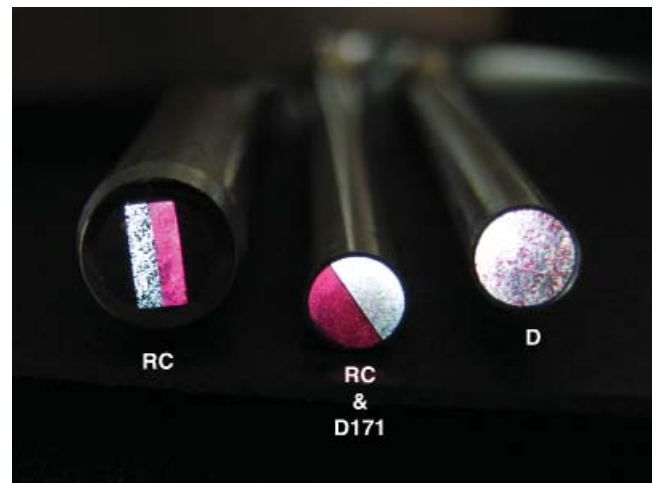
FIBER MIX

D models have a random mix of transmitting and receiving fibers.

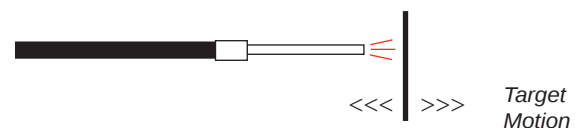
D models are always made with round fiber bundles.

RC models are provided with round and rectangular fiber bundles.

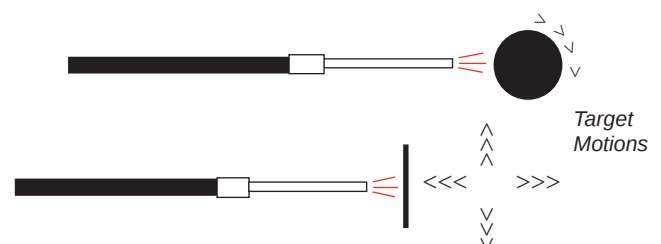
RC models have one transmit bundle and two detector bundles side-by-side.

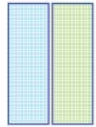


D models (Reflectance Dependent) are used for single axis vibration and stroking motions, where the target reflectivity is constant.

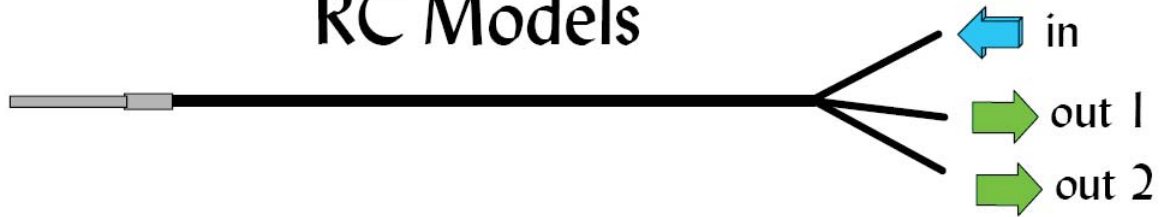


RC models (Reflectance Compensated) are used for translating and rotating targets, where the target reflectivity is variable.

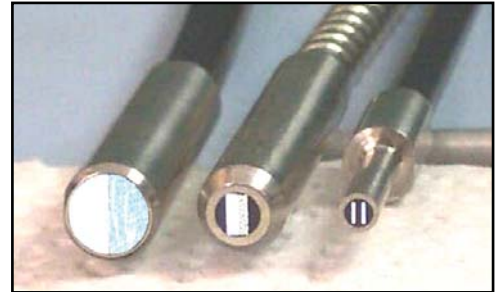




RC Models



RC OPERATING PRINCIPLE. One fiber bundle sends light to the target, two other bundles receive light reflected back from the target. The transmit bundle is randomly mixed with one receive bundle in the tip of the probe. The two receive bundles are arranged adjacent to one another as shown here. The light intensity in the two receivers are processed ratiometrically in the DMS, compared with 24 bit resolution to stored calibration data. This ratiometric function provides the distance measure which is independent of target reflectance variations; i.e., **reflectance compensated**.



IMPORTANT:

Always ensure that the sensor tip, target area and optical path are clear and clean. Accurate motion amplitude measurements are dependent upon the precise reflection of rays of light from target surfaces. Lint, dirt, or debris particles can obstruct, diffract or reflect light rays in unpredictable directions, thereby compromising the achievable accuracy of these devices. Sensor tips can be cleaned with alcohol and a soft cloth or tissue.

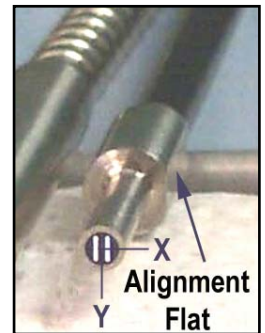
SENSOR TIP FIXTURING and ALIGNMENT

1) ALIGN THE SENSOR TIP

RC sensors have adjacent fiber bundles in the face of the sensor. Note there is an alignment flat on the casing to aid with alignment. The flat is ground parallel to the split between the adjacent fiberoptic bundles.

Depending upon the application, there may be a preferred orientation for best performance. For example:

- If the target is cylindrical, it is usually best to mount the sensor with the X axis parallel to the cylindrical axis
- If there is lateral motion, it may be preferable for the direction of motion to be parallel to the x axis
- The sensor is 10 times more sensitive to tilt about the Y axis than the X axis. If tilt is directional, orient the sensor so that the target pivots about the sensor's X axis.
- If targets are discontinuous, voltage spiking at the leading and trailing edges of the parts will occur when the direction of travel is parallel to the X axis. The voltage spiking is eliminated when the direction of parts travel is parallel to the Y axis.
- For smooth and continuous flat surfaces, sensor tip orientation is not critical.



2) MOUNT THE SENSOR, so that the tip is perpendicular to the target surface.

NOTE: The collar and tip are not necessarily exactly parallel to each other. For factory calibrations the tip is clamped square to the target whenever possible. For best accuracy, clamp to the probe tip and not to the collar.

Calibrations

Two factory calibrations are provided with each sensor channel: a mirrored (specular) target and a dull (diffuse) target. The calibration data is stored on board each sensor in separate calibration tables. Hard copies of each calibration chart are provided under separate enclosure.

Additional calibrations (up to 25) can be stored per channel.

Communication

Communication with sensors is conducted thru RS232 or USB ports. Multiple RS232 units can be daisy-chained together.

The RS232 pins are standard:

From a PC:

Pins 1, 7 & 9 = not connected

Pin 2 = Receiver

Pin 3 = Transmitter

Pins 4, 6 & 8 = connected all together

Pin 5 = Ground

(From the DMS: pin 2 = transmit; pin 3 = receive)

Temperature Stabilization

The amplifier is equipped with a temperature stabilization feature.

Procedure - Apply power to the sensor and allow the amplifier time to reach thermal equilibrium, about ½ hour or more. Increase the Set Temperature 2 - 3 degrees above the equilibrium temperature. The amplifier temperature will be maintained at the set temperature ± 0.1 °C.

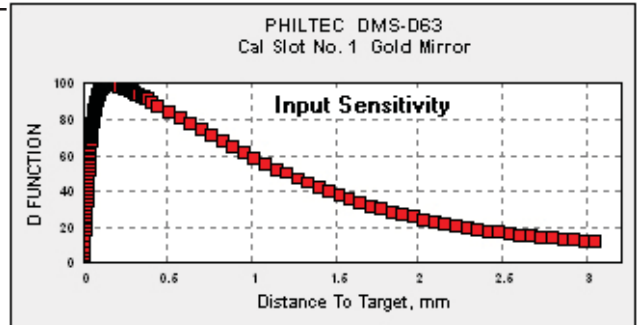
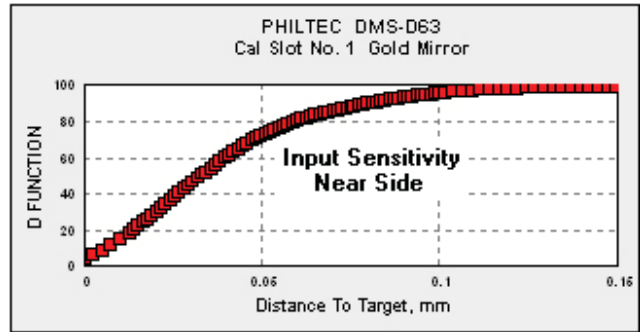
Notes:

- 1. If the amplifier temperature creeps above the set temperature by more than 0.1 degree, further increase the set temperature to reach a stable and controllable temperature set point.*
- 2. This heater circuit has limited heat flow capacity. If the active temperature drops below the set temperature, which may happen when the ambient temperature drops significantly, reset the control to 2-3 degrees above the lowered equilibrium temperature.*
- 3. The sensor should be kept thermally isolated from its mounting base.*

OPERATING RANGES AND GAPS

Calibration data is stored on-board each sensor. This means the sensor can be gapped for measurements anywhere within the sensor's total operating range.

As with all type D fiberoptics, optimum performance is achieved where signal-to-noise is greatest; i.e., where the D function has the steepest slope (greatest sensitivity). A sensitivity chart is included with every sensor calibration showing its D function vs. Distance. When optimum performance is desired, refer to that chart to determine the optimum gap settings.

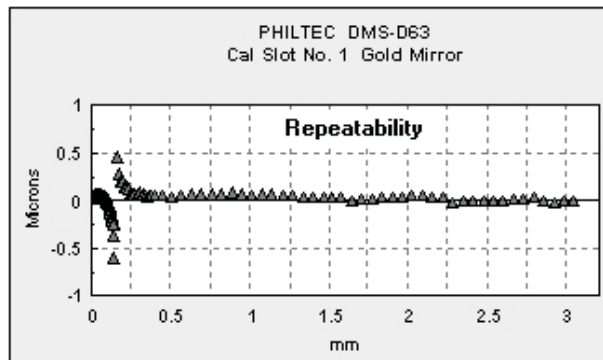


FACTORY CALIBRATIONS AND ACCURACY

Each sensor is been calibrated using a 0.2 micron accuracy linear air bearing stage.

Procedure

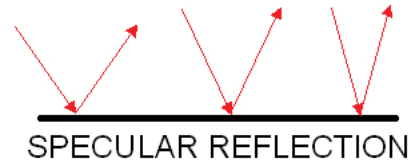
1. Mount the target on the stage table.
2. Mount the sensor off the stage table. The target moves during calibration. The sensor is stationary.
3. Begin with the sensor making light contact with the target.
4. Move the stage with target away from the sensor in small steps covering the total operating range.
5. After each step move, a) the stage position is read from the stage encoder and b) the sensor outputs are read. These two data are stored in the designated calibration slot.
6. Then, without disturbing the setup, the stage is moved back to its original position using the same steps. This time, the stage position is read from the sensor at each calibration step.
7. Repeatability is a measure of the accuracy of the sensor. A chart is prepared for each sensor calibration, where the repeatability data is graphed over the sensor's operating range. These charts graph the difference between the stored calibration (data moving away from the sensor) and the read data on the return moves.



REFLECTIVE NATURE OF THE TARGET SURFACE

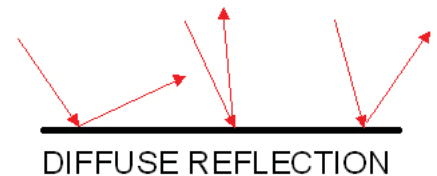
1. Specular Targets...*A mirror surface calibration should be used when making measurements to mirrored surfaces.*

A factory supplied calibration to a specular target is stored in cal slot #1, where the target is a front surface mirror. This calibration should be used if the target surface is any highly polished, mirrored, glossy or very shiny (specular) target. Thin transparent materials require their own calibration, which should be stored in a separate slot.



2. Diffuse Targets... The surface looks dull rather than shiny. *A diffuse surface calibration should be used when making measurements to diffuse surfaces.*

A factory supplied calibration to a diffuse reflector is stored in cal slot #2, where the target surface is anodized aluminum. With diffuse surfaces, reflected light rays travel randomly varying path lengths back into the sensor tip. Reflectance compensation does not correct for random scattering of light rays, which can lead to measurement errors.



So, for diffuse target surfaces, which include anything with a dull, flat or matte finish, as well as those with machined, honed or ground finishes:

- Use the diffuse calibration or
- Calibrate the system to the target material and store in a separate cal slot.

MATERIAL	% REFLECTANCE
Gold Mirror	100
Mirror Polished Aluminum	85 - 90
Mirror Polished Stls Stl	60 - 70
Brushed Aluminum	40 - 50
Copper Clad PC Board	45
Finely Ground Steel	30 - 35
Anodized Aluminum	20 - 25
Silver Paint, Glossy	15 - 20
Photo Paper, High Gloss	15
inkjet Paper, Bright White	7 - 8
Fiberglass, Glossy	7
Black Plastic, Glossy	6
Black Matte Finish	3
Column of Water	2
Flat Black Rubber	1

The table here shows the relative reflectance of some common materials.

Operation

1. **Apply power to the sensor.**
2. **Load into PC & Execute** the DMS Control Software provided. The sensors will first go thru an initialization routine. During this process, in addition to many other checks, the software reads and copies all of the calibration tables from the sensor.
3. **Allow the sensors time to reach thermal equilibrium**, app. 20 minutes. For example, in a factory environment, where the air temperature has been around 24 C, the sensor temperatures rise to about 32 C. Therefore, the heater controls should be set to 2-3° C higher in each sensor. They are very stable at this set point.

NOTE: The temperature set point may require higher or lower set temperatures depending upon the factory temperatures in winter and summer months.

The Set Temperature should be 2 - 3 degrees above the equilibrium temperature. The amplifier temperature will be maintained at the set temperature ± 0.1 °C. If the amplifier temperature creeps above or below the set temperature by more than 0.1 degree, change the set temperature to reach a stable temperature set point.

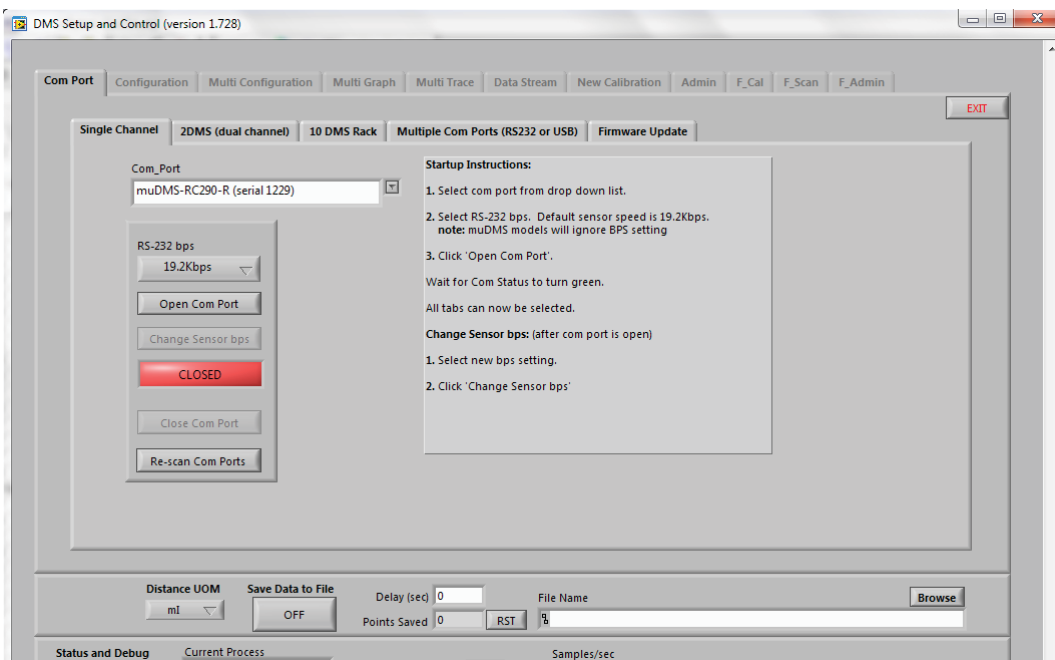
4. The sensors are now ready to make measurements.

DMS Control Software

The DMS Control Software opens at the **Com Port** tab.

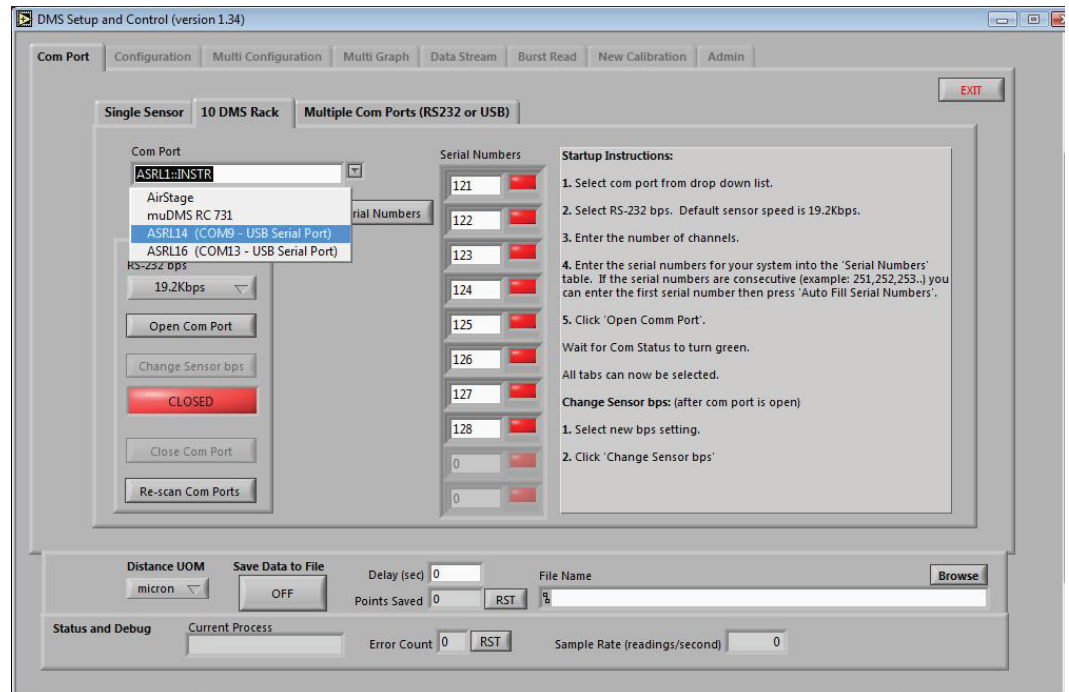
Opening One Sensor

1. To open a single sensor, go to “Single Channel” tab and
For RS232 sensors, select the com port from the drop down list.
For USB sensors, find the sensor serial number from the drop down list.
2. Click Open Com Port



Opening Multiple RS232 Sensors on One Com Port

1. At the **"10DMS Rack"** tab select the com port from the drop down list.
2. At "Number of Channels, enter the number of sensors to open.
3. Enter the sensor serial numbers
4. Click Open Com Port

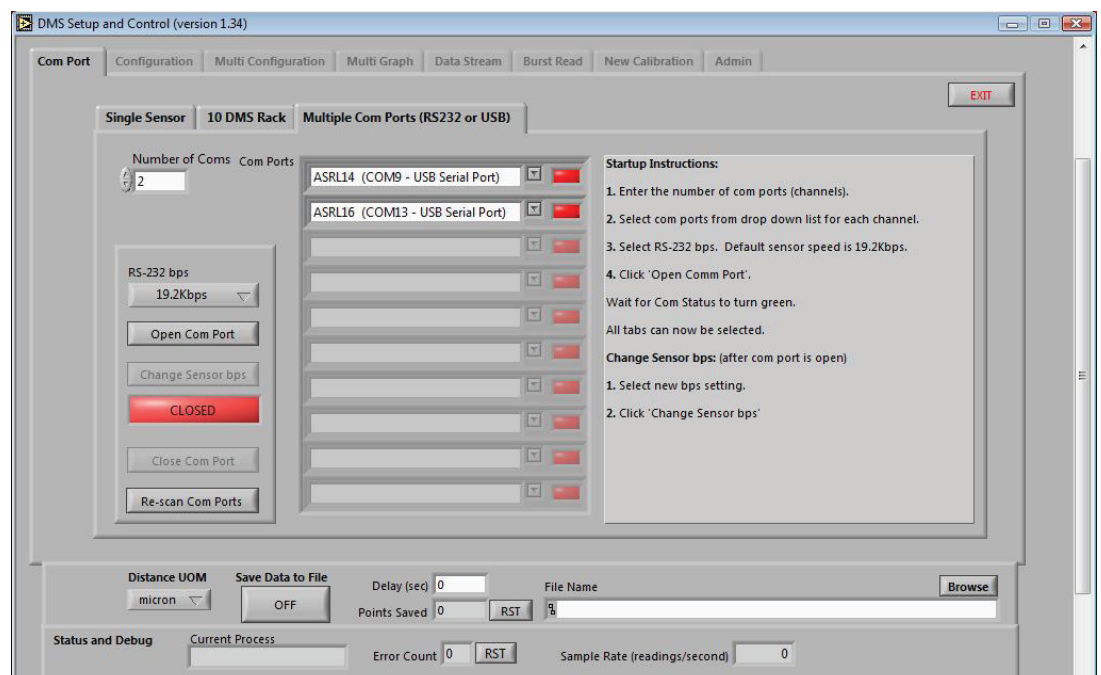


Opening Multiple Sensors on Multiple Com Ports

1. At the **"Multiple Com Ports"** tab enter the number of com ports to open.
2. At **"Com Ports"**, in each open window, select a port from the drop down list.
3. Click Open Com Port

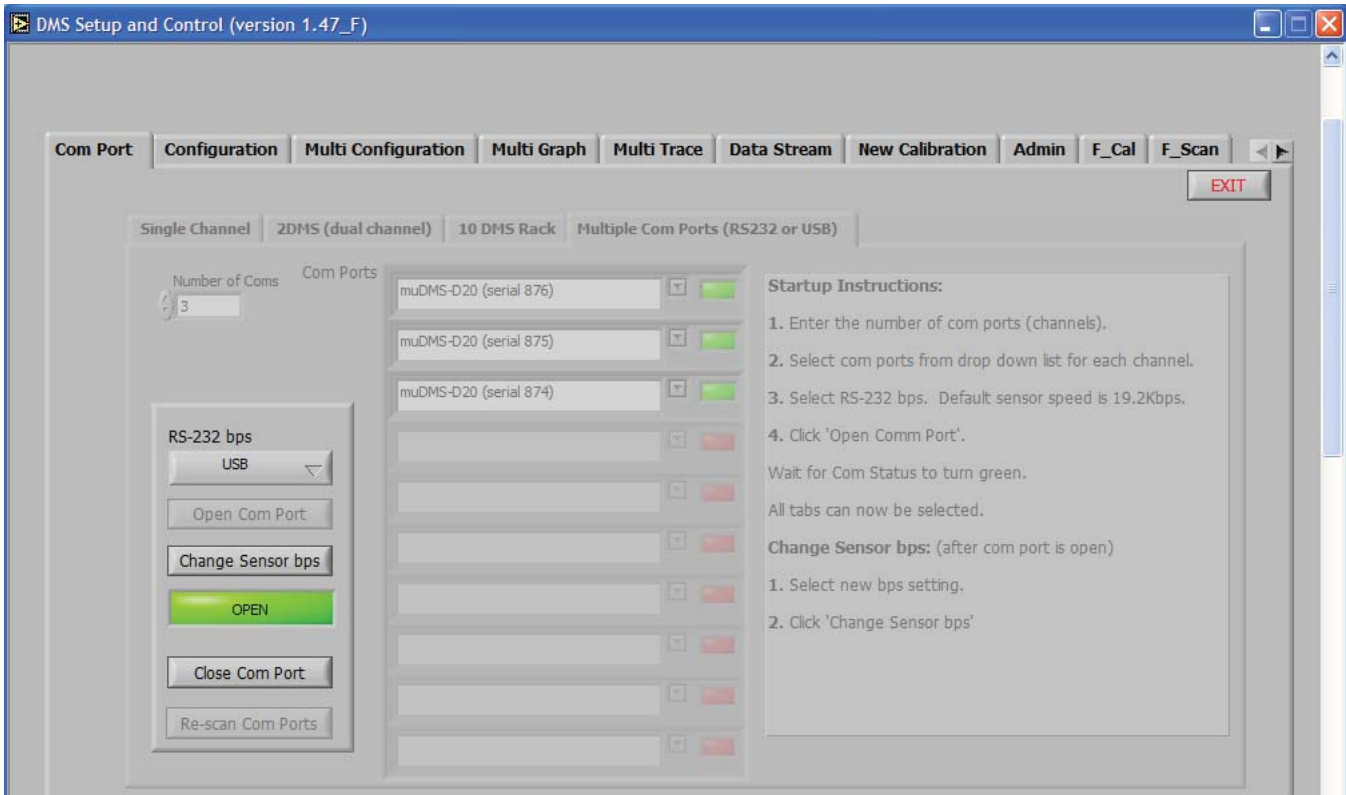
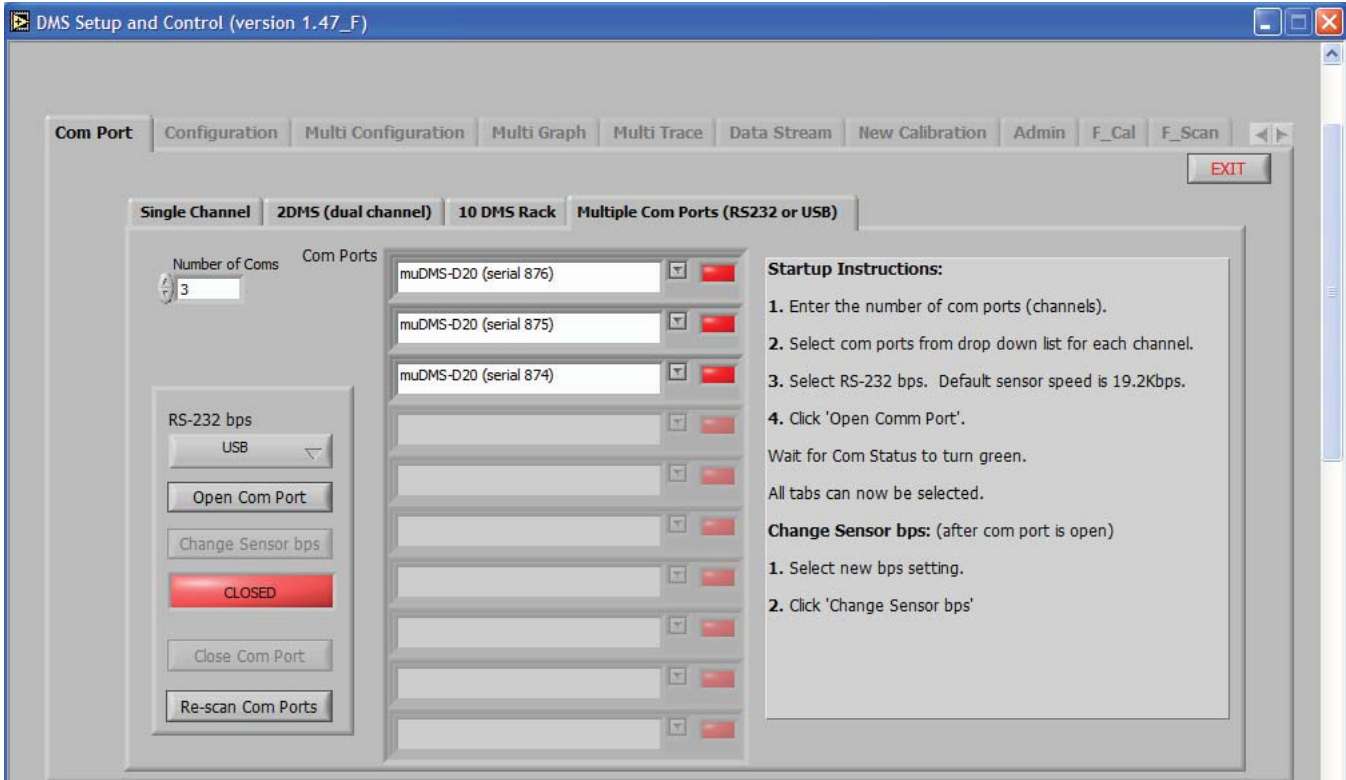
NOTE

Each com port can only open one sensor in this mode.



Opening Multiple USB Sensors on One USB Port

1. Any standard USB Hub can be used to multiplex USB sensors thru one USB port.
2. At "Number of Channels, enter the number of sensors to open.
3. Enter the sensor serial numbers
4. At RS232 bps select USB
5. Click Open Com Port. All green lights indicate the sensors are communicating with the PC.



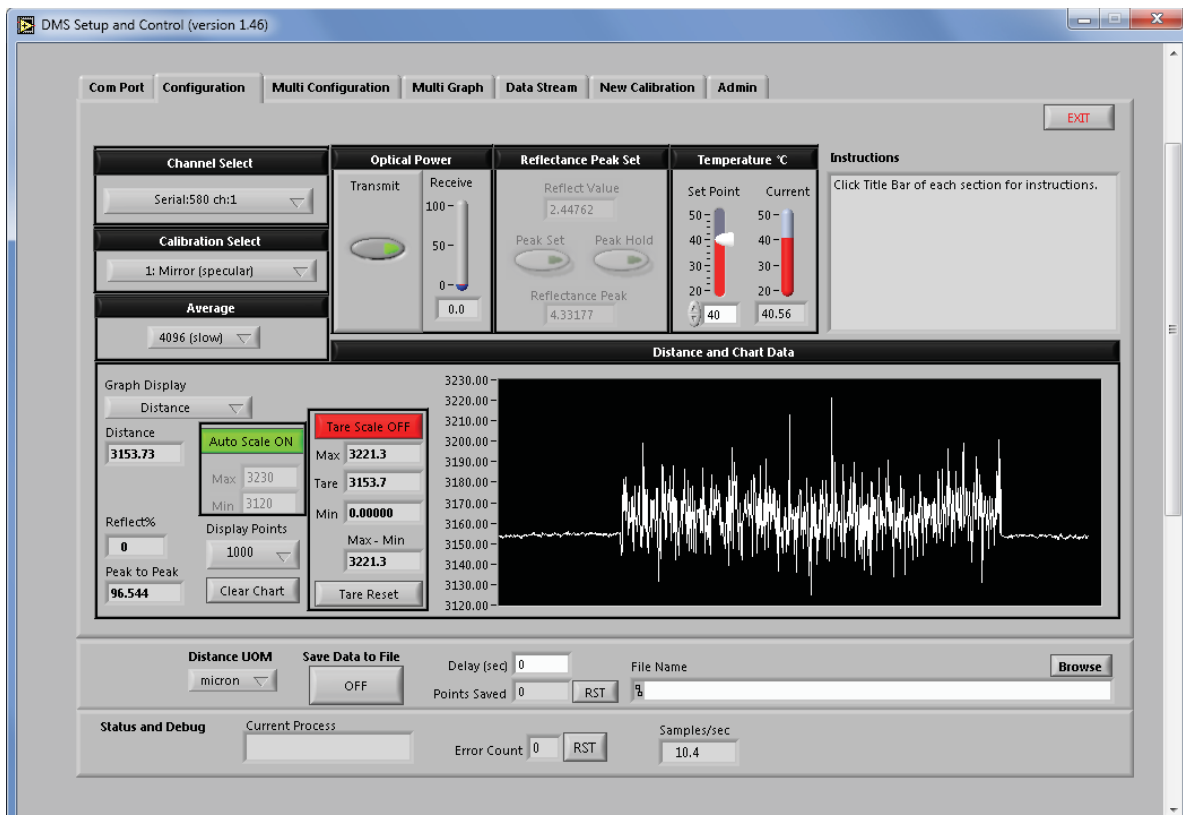
SETUP & CONFIGURATION

Use the **Configuration Tab** to setup the sensor for measurements. The sensor should be fixtured in place perpendicular to the target to be measured. *Click the Title Bar of each section for instructions.*

NOTE:

The software will recognize the type sensor. If the sensor is a RC type, the Reflectance Peak Set block will be locked out. The Reflectance Peak Set block becomes active when the sensor selected is a D type.

- 1. Temperature:** Use the slide controls to set the temperature of the electronics. For best accuracy with slow speed applications, allow the unit to reach steady state temperature prior to making any measurements. This can take 15 - 30 minutes. If the heater is not needed it can be turned off (set to 0) to reduce power consumption.
- 2. Channel Select:** select the sensor channel or the sensor serial number.
- 3. Calibration Select:** choose the appropriate calibration data table for the target to be measured.
- 4. Optical Power :** read *Receive Power*. Most applications will run with 100% transmit power. Move the sensor thru its operating range and note the highest Receive Power. For mDMS and mcDMS units the LED power is adjustable in 4 steps: 0, 33, 66 & 100. For muDMS units the LED power is continuously adjustable. The sensor will function normally with 1% or higher signal power.



5. For D models: *Reflectance Peak Set:* With the optical peak power maximized at step 3, the sensor must be scaled (calibrated) to the reflectance of the target to be measured. There are two methods:

- Manual - Adjust the sensor gap for maximum 'Reflect Value' and press 'Peak Set'. This will lock in the reflectance value in the 'Reflectance Peak' window.
- AutoPeak - Press 'Peak Hold' and move the sensor tip slowly thru the peak reflectance value. The reflectance peak will be captured and held in the 'Reflectance Peak' window.

6. After setting the reflectance peak value, reset the operating gap to the desired starting point for measurements.

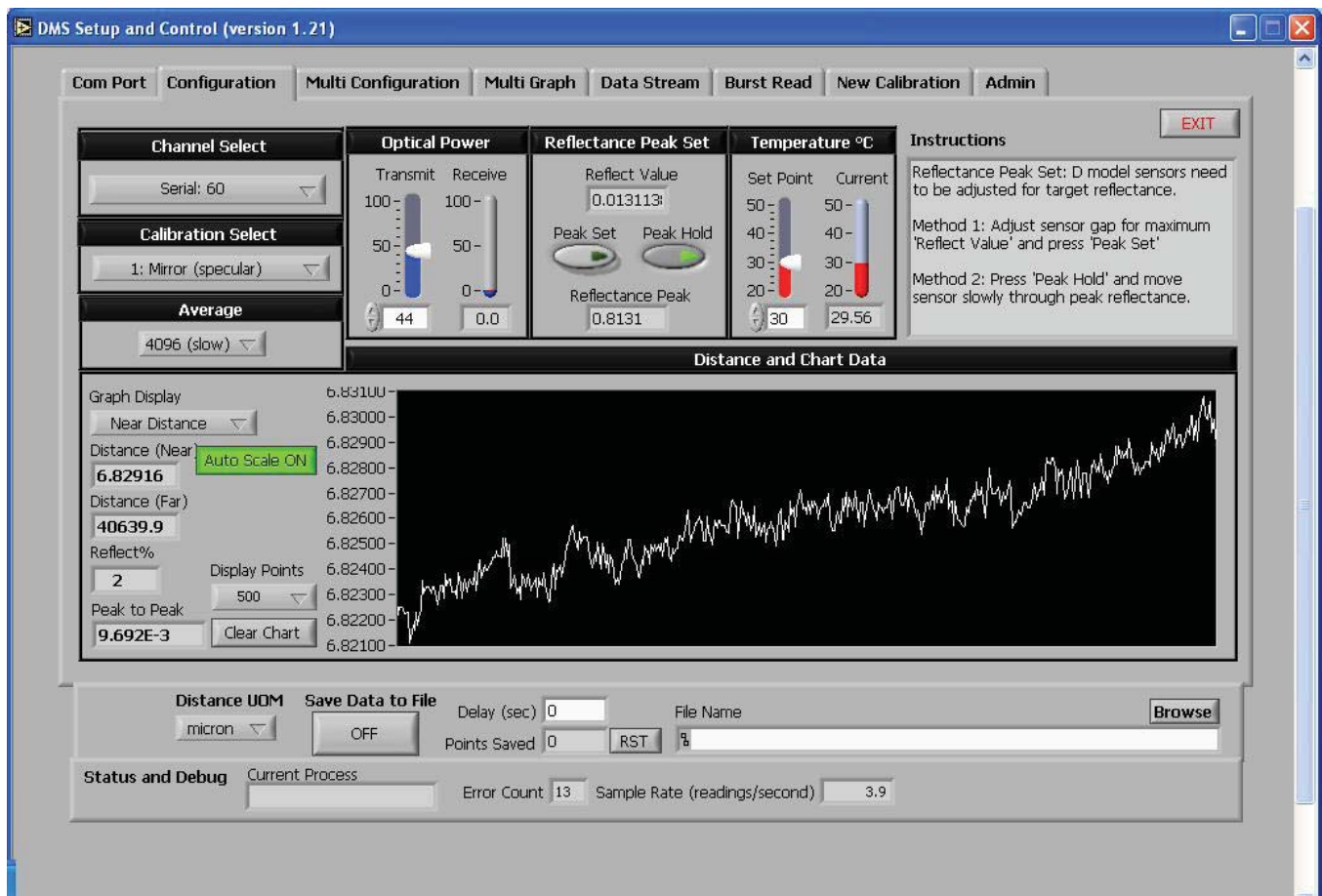
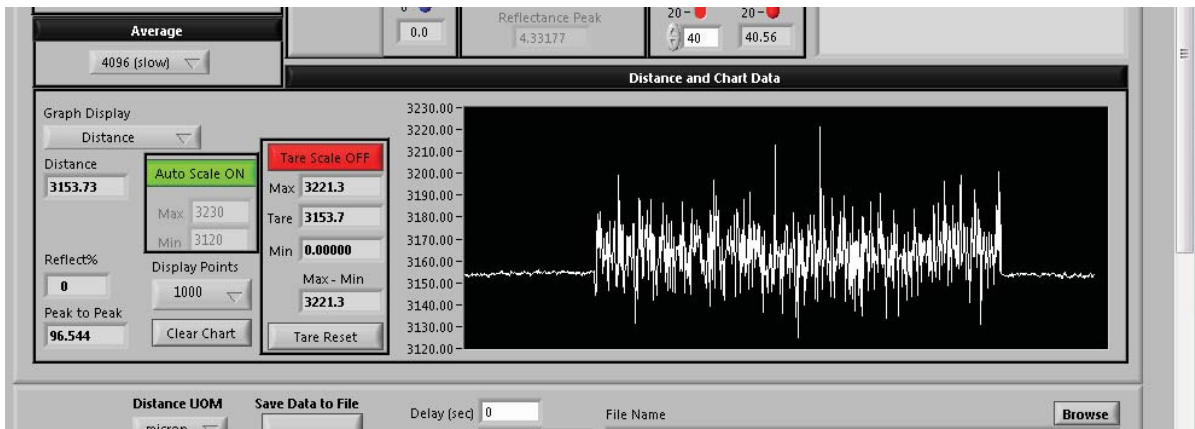


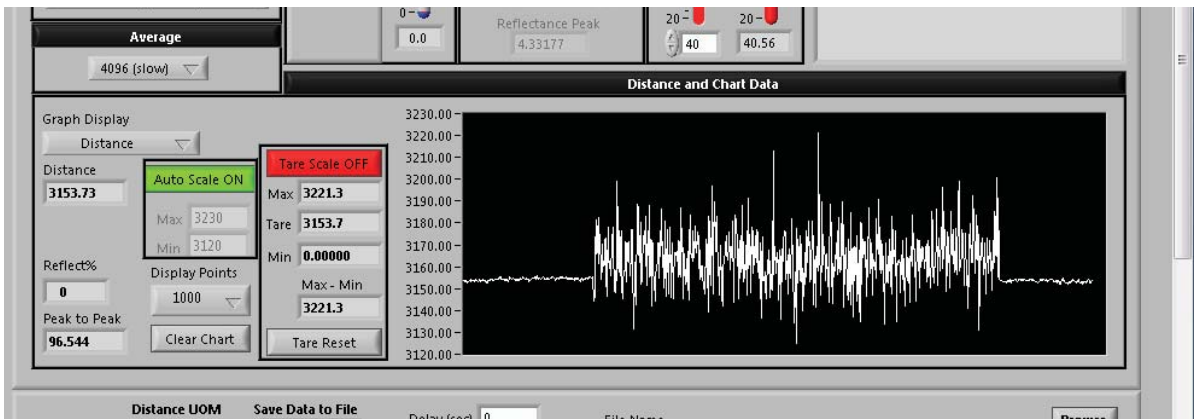
Chart Data



This live graph displays data with selectable point density from 50 - 4000 points on an autoscaling chart.

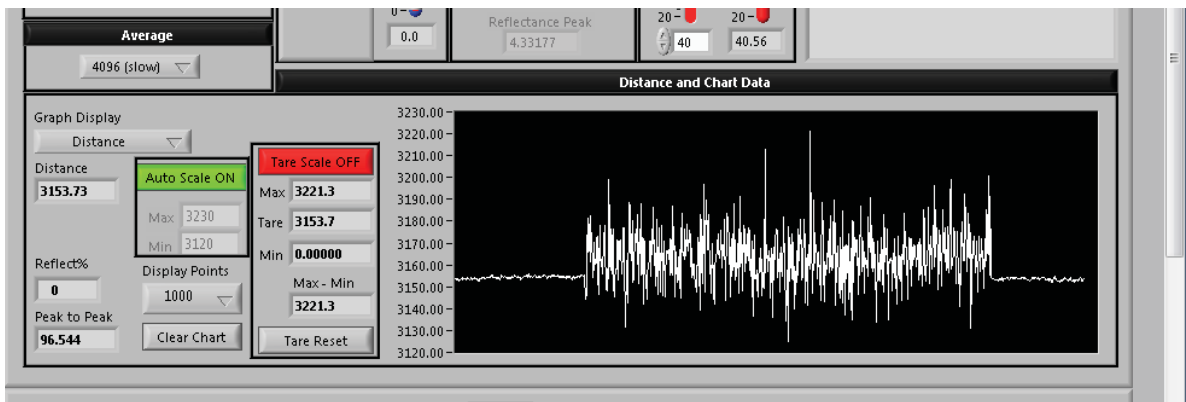
AUTOSCALING

The chart can be cleared at any time and it will restart autoscaling the current input data. Autoscaling can be turned off at any time. When autoscaling is off, the minimum and maximum points are displayed. The user can enter any value in the min-max windows.



PEAK-TO-PEAK

Peak-to-peak displays the difference between the maximum and the minimum value of the points displayed on the live chart. If 50 points are displayed, this is the pk-pk reading of 50 points. If 4000 points are displayed, it is the pk-pk reading of 4,000 points. If the chart is reset this value resets.



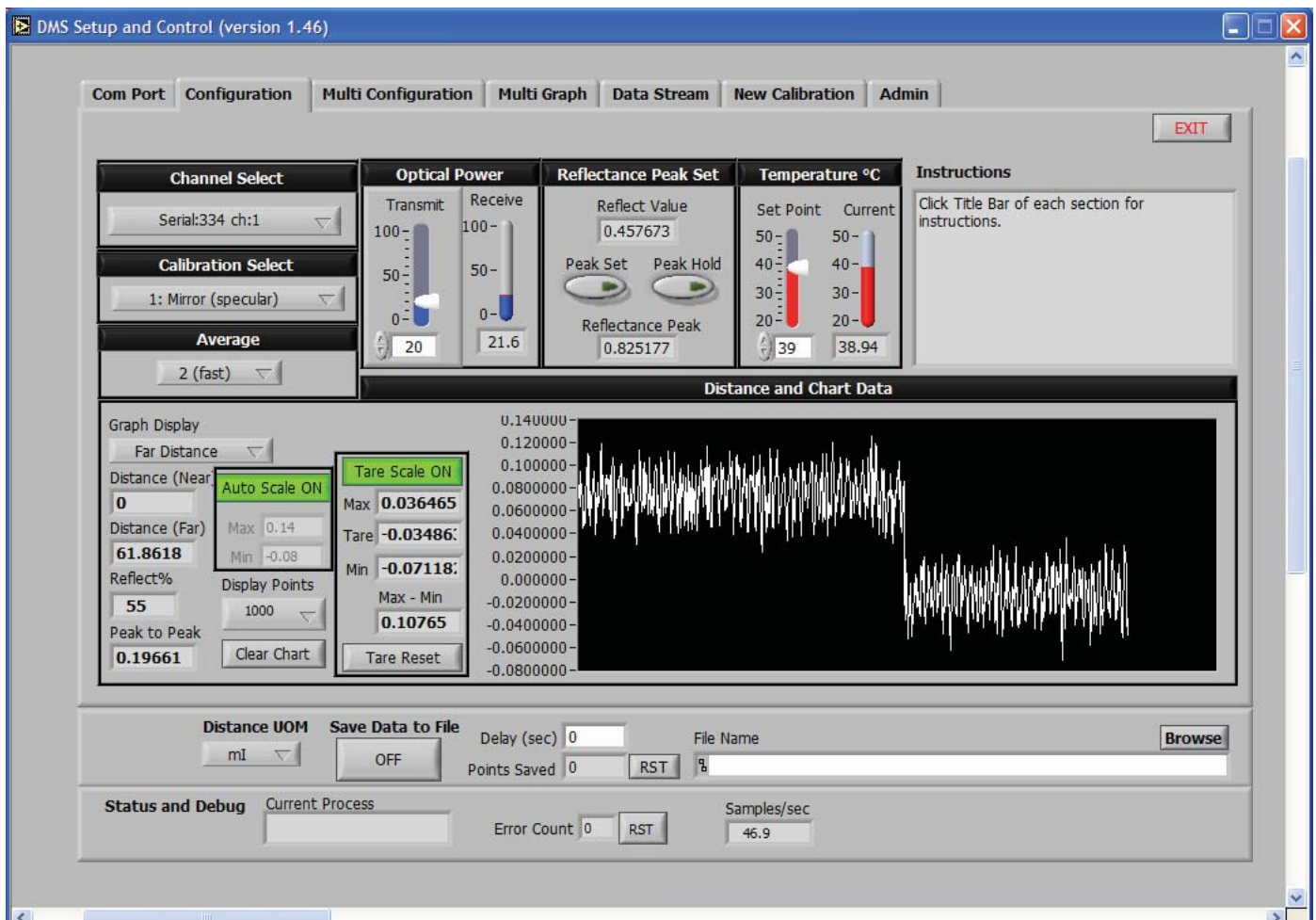
TARED READINGS

A Tare Function is included in the Live Chart Display.

- In the TARE WINDOW click 'Tare Reset' to activate tared readings.
- With Tare Scale ON, the live chart displays the tared values.
- With Tare Scale OFF, the live chart displays the untared values.
- The Tare Window displays the Maximum and Minimum tared values as well as the Max.-Min. difference (pk-pk tared reading).

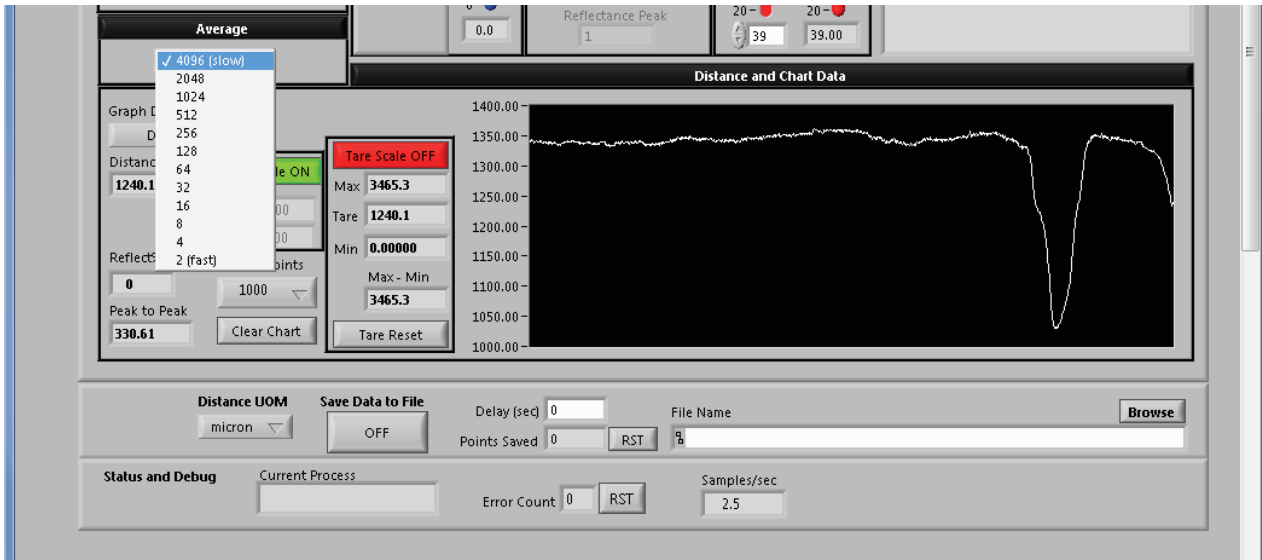
Max - Min is the pk-pk value of the tared readings. This value holds until the tare is reset.

Note: *Tare Reset can only be done at the Configuration Tab.*



AVERAGE

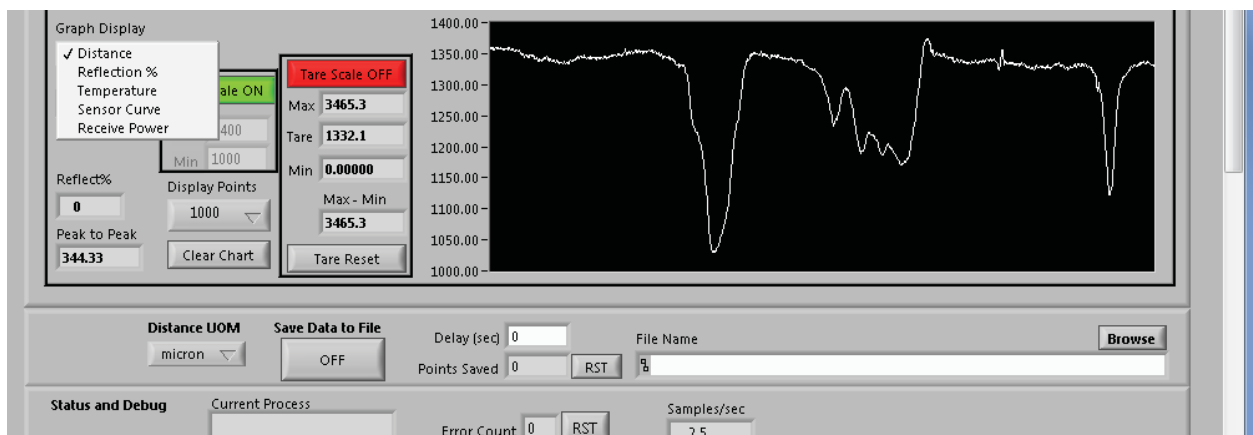
All DMS sensors have an internal sampling rate of 10 KHz. The average filter controls how many readings the sensor will average together before sending the results to the serial port. Higher averages will slow down sensor response and increase resolution. The actual sample rate (readings/second) is displayed below the live chart. The maximum achievable data rate is limited by the serial connection. At the slowest speed (4096), the sample rate is approximately 0.4 seconds per data point. At the fastest speed (2), the sample rate is 200 microseconds per point. For the very highest speed, use the Data Stream tab.



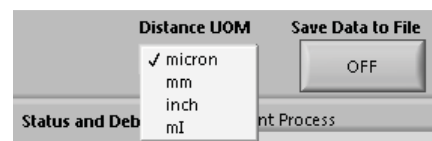
GRAPH DISPLAY

At Graph Display, select one parameter to chart from the drop-down list:

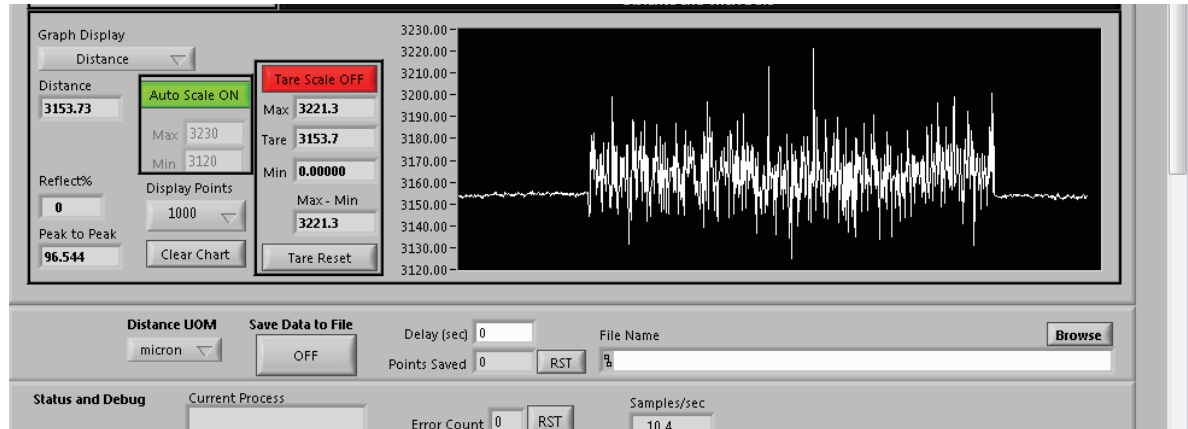
- Distance - select units of measure at Distance UOM*
- Reflection % - compares the target material to the reflectivity of the calibration table selected
- Temperature - sensor amplifier temperature, °C
- Sensor Curve - raw sensor curve generally used for factory diagnostics
- Receive Power - the amount of optical power received from a target



* Select Distance UOM (*Units of Measure*):
microns or mm (millimeters), or inch or mI (milliInches)



SAVING DATA TO FILE



There is a common interface at each tab for saving data to a file. Click **Browse** to name a data file.
NOTE: Use the file extension .txt. Use Excel to open the text file.

- **Delay** - dial in the number of seconds desired between data points. Default = 0 seconds
- **ON/OFF** - Click the OFF button to start taking data. The button state will change to ON. The # of points saved is accumulated in the *Points Saved* window. Click the ON button to stop recording data. The button state will change to OFF. Data collection can be restarted by pressing the ON/OFF button again, and the data will be added to the same data file.

The table below shows a sample of the data recorded. Note the column headings give the sensor serial number and channel number.

- Time Stamp - An absolute time stamp
- Delta T - The amount of time between successive data points, accurate to approx. 1 microsecond
- Raw Sensor Output - A factory diagnostic
- Signal Power - % Optical Power returned from the target
- Temperature - Amplifier Temperature, °C
- RC/D Near Distance - Distance for an RC sensor or for the Near Side of a D sensor
units of measure = previous set from live graph
- D Far Side Distance - Distance on the Far Side for a D sensor
units of measure = previous set from live graph
- Reflect Percent - reflectivity of the target material compared to the calibration table selected
- RC-D near tare - Tared Distance for an RC sensor or for the Near Side of a D sensor
- D far Tare - Tared Distance on the Far Side for a D sensor

Note: Time stamping data points enables post processing applications such as fft analysis.

	1671 / 1	1671 / 1	1671 / 1	1671 / 1	1671 / 1	1671 / 1	1671 / 1	1671 / 1	1671 / 1
Time Stamp	Delta T	Raw Sensor	Signal	Temperature	RC/D near	D far side	Reflect %	RC-D near	D far Tare
YYYY-MM-DD HH:MM:SS.sss	Sec	Output	Power	°C	Distance	Distance		Tare	
2013-08-28 08:49:39.062	3.929017E-001	0.772418	0.4	35.1	1.333712E+002	*****	0.6	1.333712E+002	*****
2013-08-28 08:49:39.450	3.929017E-001	0.772404	0.4	35.1	1.333695E+002	*****	0.6	1.333695E+002	*****
2013-08-28 08:49:40.634	3.929017E-001	0.771969	0.4	35	1.333137E+002	*****	0.6	1.333137E+002	*****
2013-08-28 08:49:41.811	3.929017E-001	0.77237	0.4	35	1.333651E+002	*****	0.6	1.333651E+002	*****
2013-08-28 08:49:42.985	3.929017E-001	0.772035	0.4	35.1	1.333221E+002	*****	0.6	1.333221E+002	*****

SAVING DATA TO FILE NOTE

For Excel to display the Time Stamp as a text string, change the Column Data Format from General to Text before importing the data.

MULTI-CHANNEL CONFIGURATION

The **Multi Configuration** tab simultaneously displays data from as many as 10 sensor channels. For single channel units, only one column is active. At this tab you can control or set the following individual sensor variables:

- data average
- transmit power
- amplifier set temperature
- calibration slot

Text Import Wizard - Step 3 of 3

This screen lets you select each column and set

Column data format:

☐ General

☒ Text

☐ Date: MDY

☐ Do not import column (skip)

'General' is remaining

Data preview

Text	General
Time Stamp	11671 / 11671 / 11671
YYYY-MM-DD	HH:MM:SS.sssDelta T
2013-08-28	08:49:39.062392.9016
2013-08-28	08:49:39.450392.9016
2013-08-28	08:49:40.634392.9016

DMS Setup and Control (version 1.19)

Com Port Configuration Multi Configuration Multi Graph Data Stream Burst Read New Calibration Admin

EXIT

Serial	Serial	Serial	Serial	Serial	Serial	Serial	Serial	Serial	Serial
521	379	378							
Average	Average	Average	Average	Average	Average	Average	Average	Average	Average
4096	4096	4096	<0>	<0>	<0>	<0>	<0>	<0>	<0>
Transmit%	Transmit%	Transmit%	Transmit%	Transmit%	Transmit%	Transmit%	Transmit%	Transmit%	Transmit%
100	100	100	0	0	0	0	0	0	0
Receive%	Receive%	Receive%	Receive%	Receive%	Receive%	Receive%	Receive%	Receive%	Receive%
5.9	5.9	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Set °C	Set °C	Set °C	Set °C	Set °C	Set °C	Set °C	Set °C	Set °C	Set °C
38	38	38	0	0	0	0	0	0	0
Live °C	Live °C	Live °C	Live °C	Live °C	Live °C	Live °C	Live °C	Live °C	Live °C
38.0	37.9	38.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calibration	Calibration	Calibration	Calibration	Calibration	Calibration	Calibration	Calibration	Calibration	Calibration
1	1	1	0	0	0	0	0	0	0
RC/ D near	RC/ D near	RC/ D near	RC/ D near	RC/ D near	RC/ D near	RC/ D near	RC/ D near	RC/ D near	RC/ D near
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
D Far	D Far	D Far	D Far	D Far	D Far	D Far	D Far	D Far	D Far
3048.0	3048.0	3048.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Reflect%	Reflect%	Reflect%	Reflect%	Reflect%	Reflect%	Reflect%	Reflect%	Reflect%	Reflect%
7.9	8.6	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Distance UOM Save Data to File Delay (sec) 60 File Name C:\grace tests\378_379_521.txt

micron ON Points Saved 1430 RST

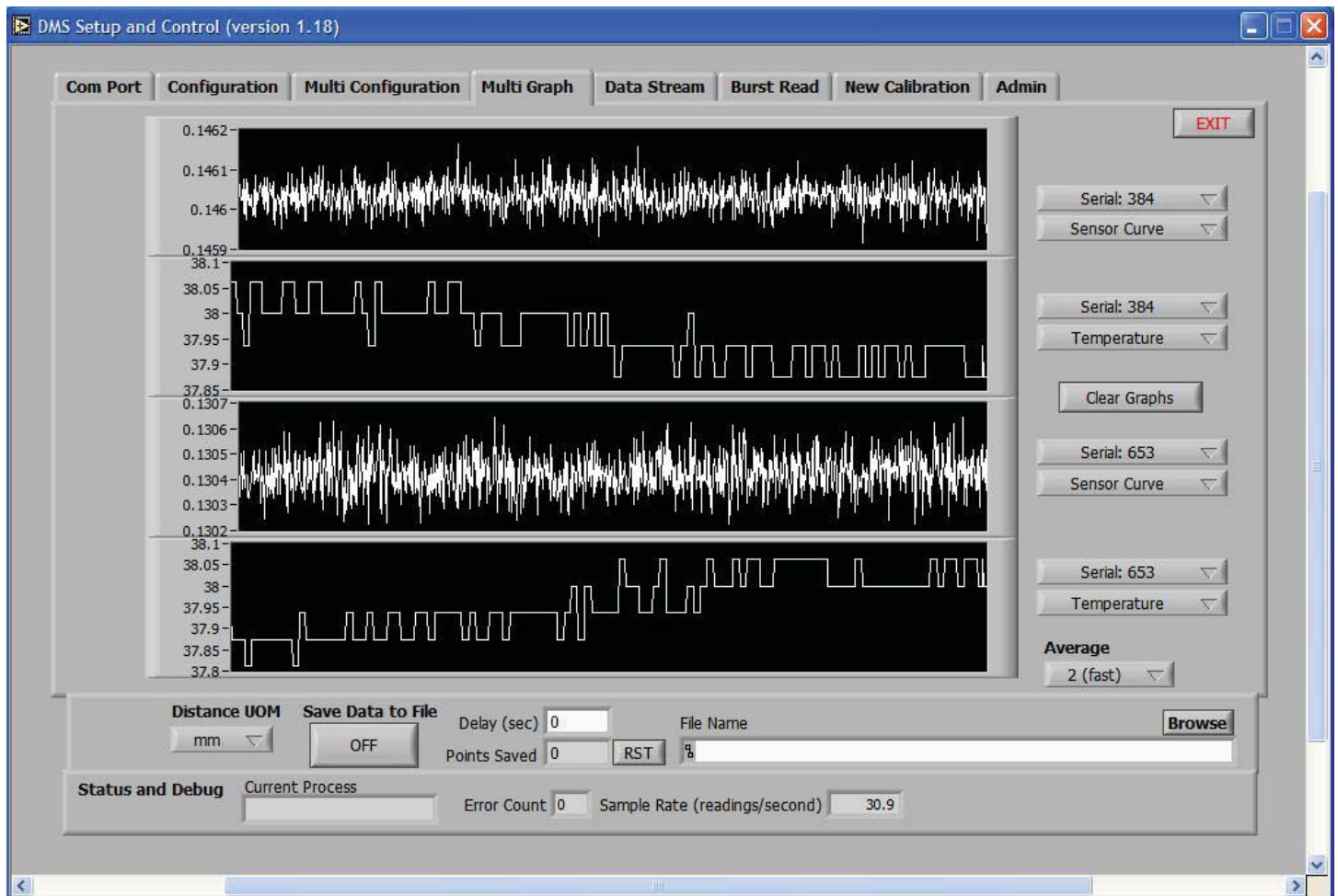
Status and Debug Current Process Error Count 60 Sample Rate (readings/second) 10.1

MULTI-CHANNEL GRAPH

The **Multi Graph** tab simultaneously displays four live autoscaling charts.. The charts display 1000 points when fully loaded. Data averaging can be controlled and units of measure selected.

Each chart has drop down menus for

- » selection of sensor
- » selection of displayed parameter

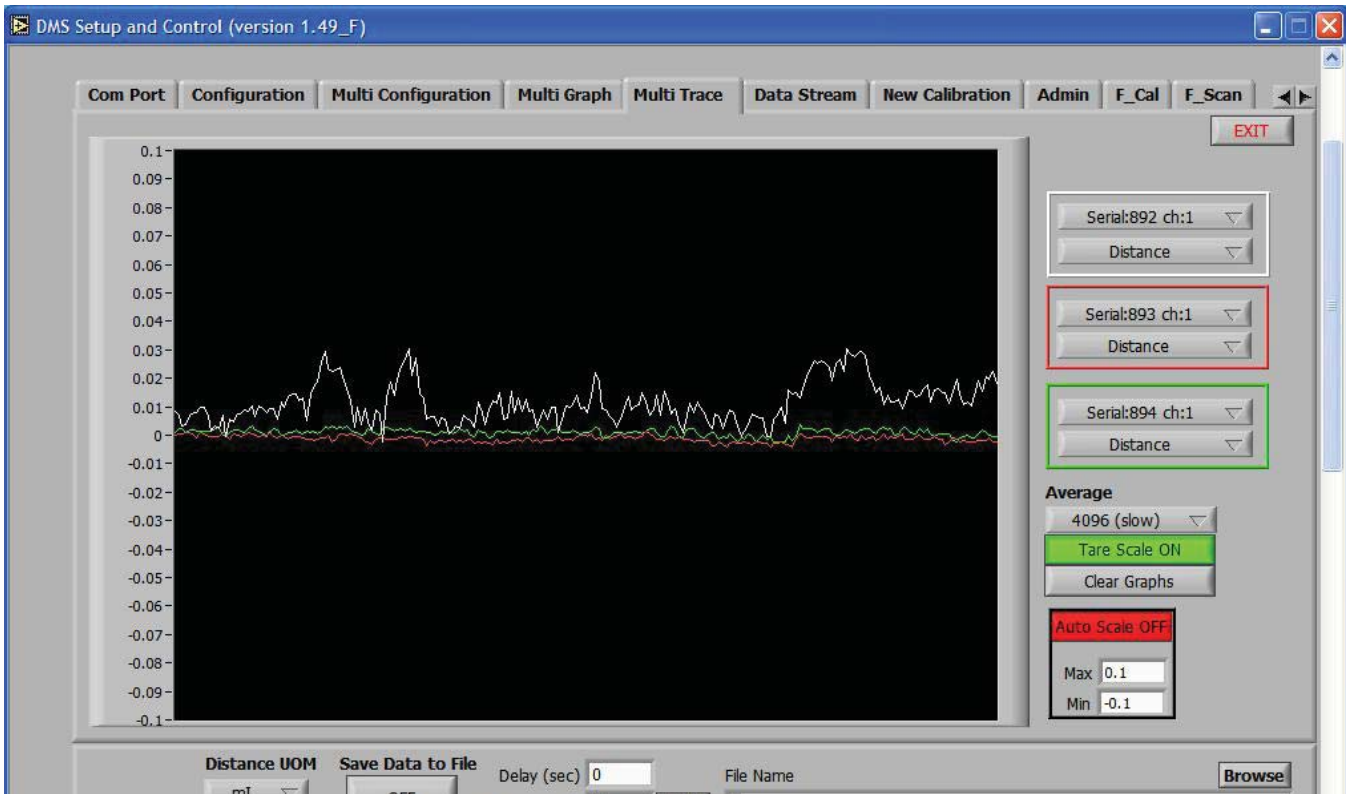


MULTI-TRACE

The **Multi Trace** tab simultaneously displays three live autoscaling charts with Tared or Non-Tared Readings. The charts display 1000 points when fully loaded. Data averaging can be controlled and units of measure selected. *NOTE: Tare Reset can only be done at the Configuration Tab.*

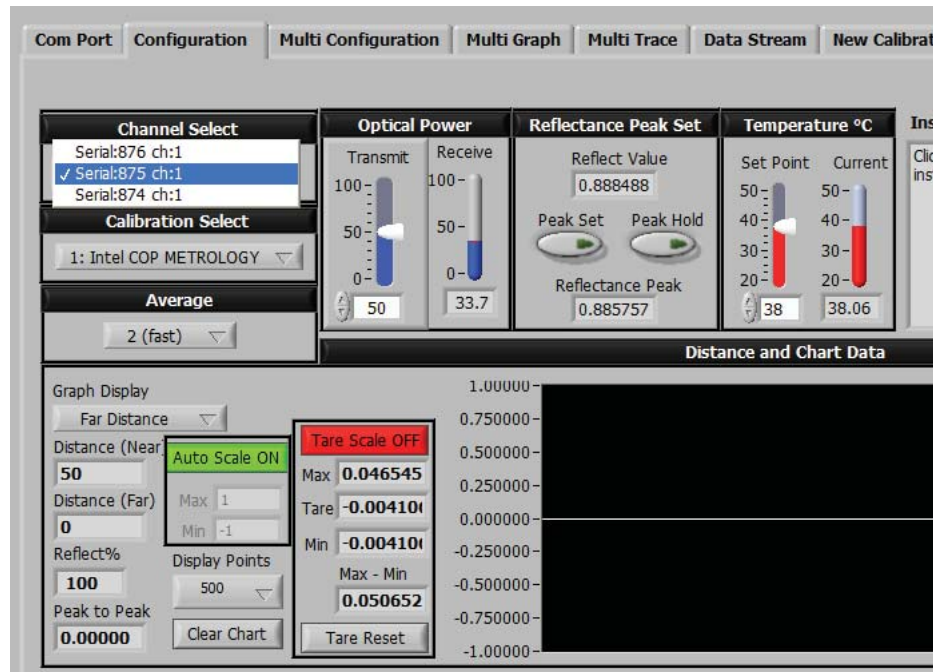
Each chart has drop down menus for

- » selection of sensor
- » selection of displayed parameter



EXAMPLE: SETUP PROCEDURE

1. Use the Config Tab to setup each sensor prior to using Multi Trace
2. At Channel Select pick a sensor
 - a) Set The Optical Peak
 - b) Reset the Tare
3. Repeat For Each Sensor



DATA STREAM

The **Data Stream** mode enables continuous recording of data at high speeds.

Default presets include:

- Time Stamp
- Reflectivity
- Temperature

For USB units, 5000 readings per second will be achieved as follows:

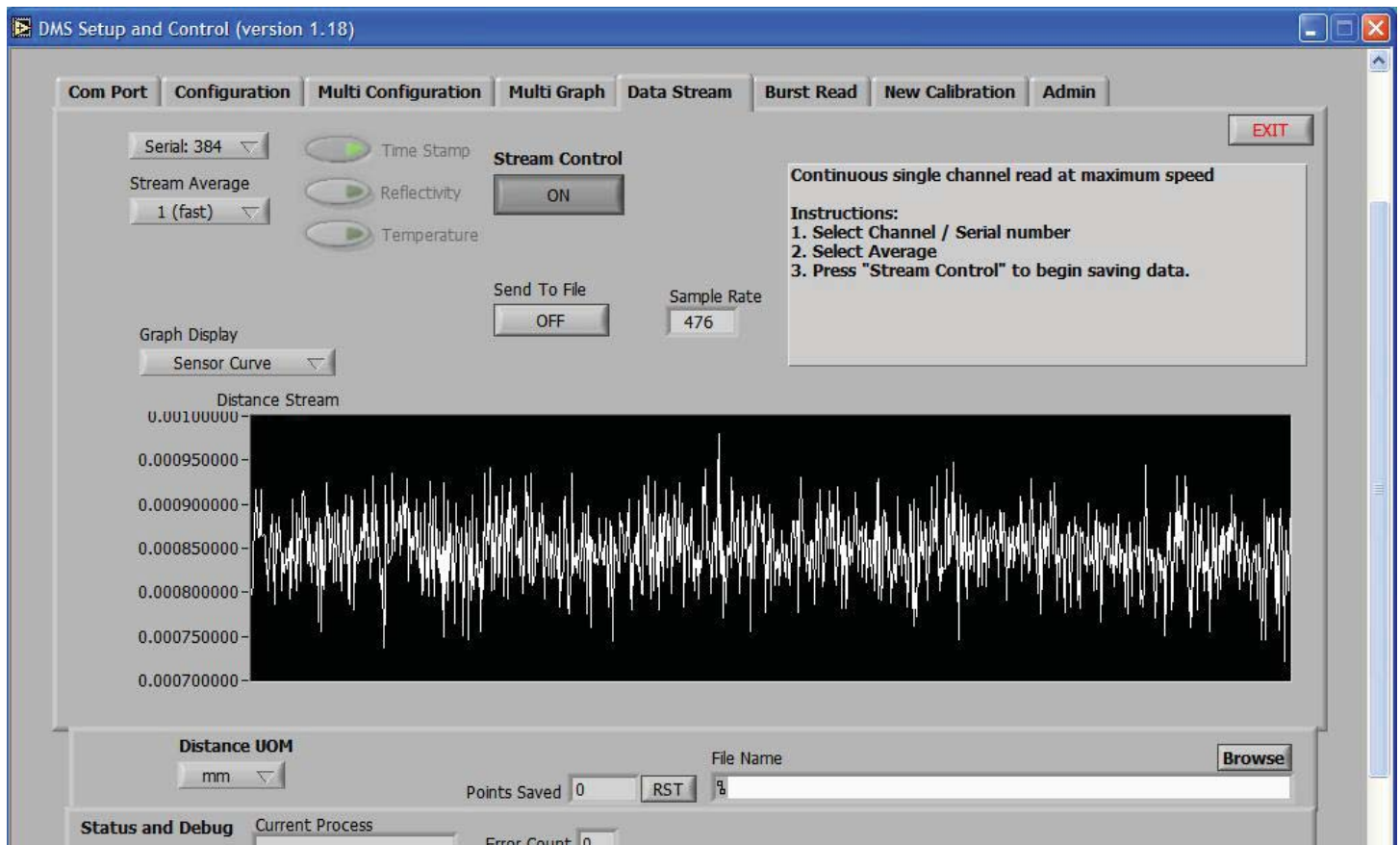
- set stream average to 1 (fast)
- deselect the Reflectivity and Temperature presets

For RS232 units, 5000 readings per second will be achieved as follows:

- set the BPS to 115.2 Kbps
 - set stream average to 1 (fast)
 - deselect the Time Stamp, Reflectivity and Temperature presets
- Click the **Stream Control** Button to begin saving data
- Note: If you have not preselected a file, you will be instructed to browse to a file for saving the data.
Use the file extension .txt when naming the file.

As data is streaming to the file:

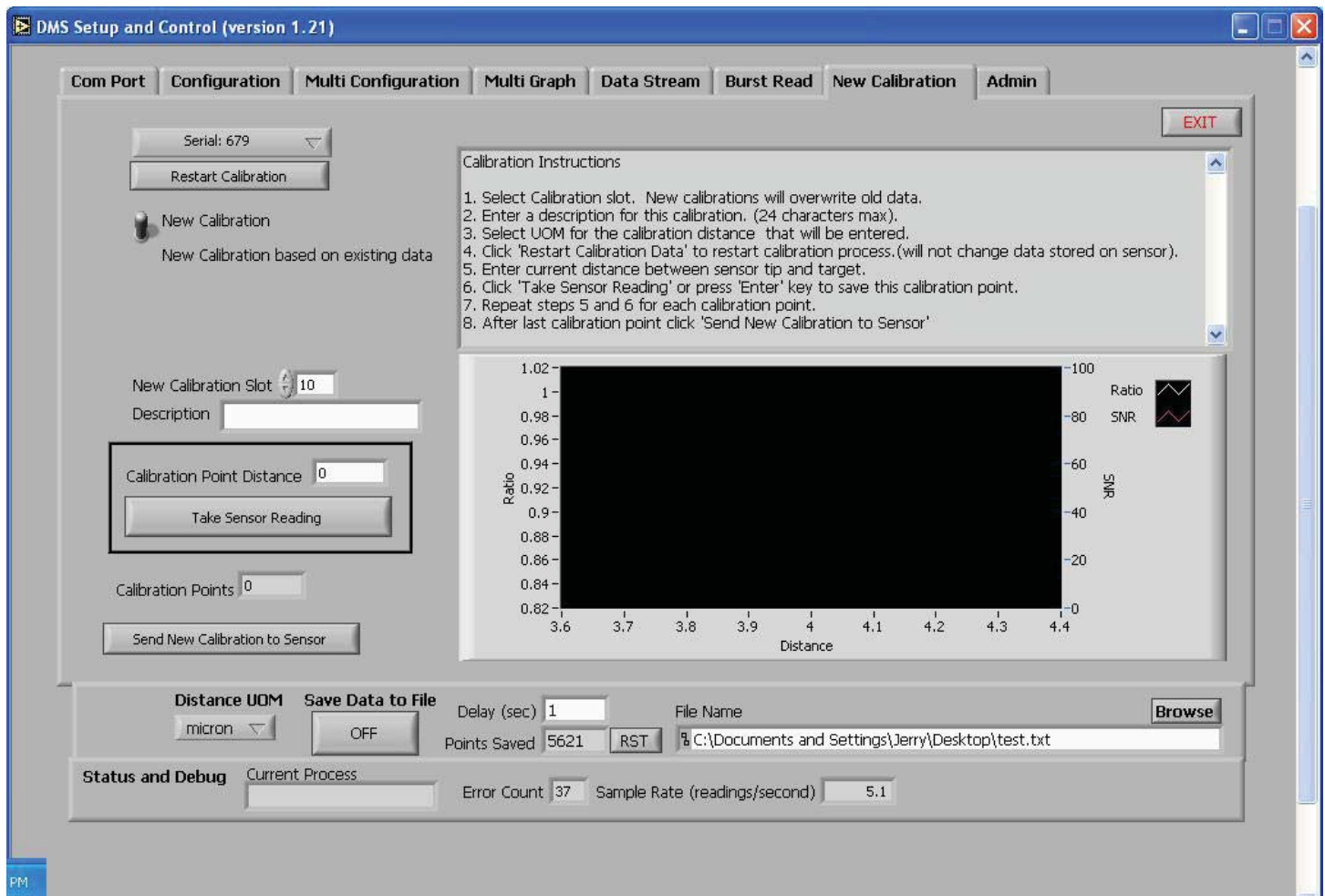
- a) **Points Saved** ... accumulates the total number of readings
- b) **Sample Rate** ... displays the active number of readings per second



NEW CALIBRATION

The **New Calibration** tab can be used to create a new calibration for the sensor.

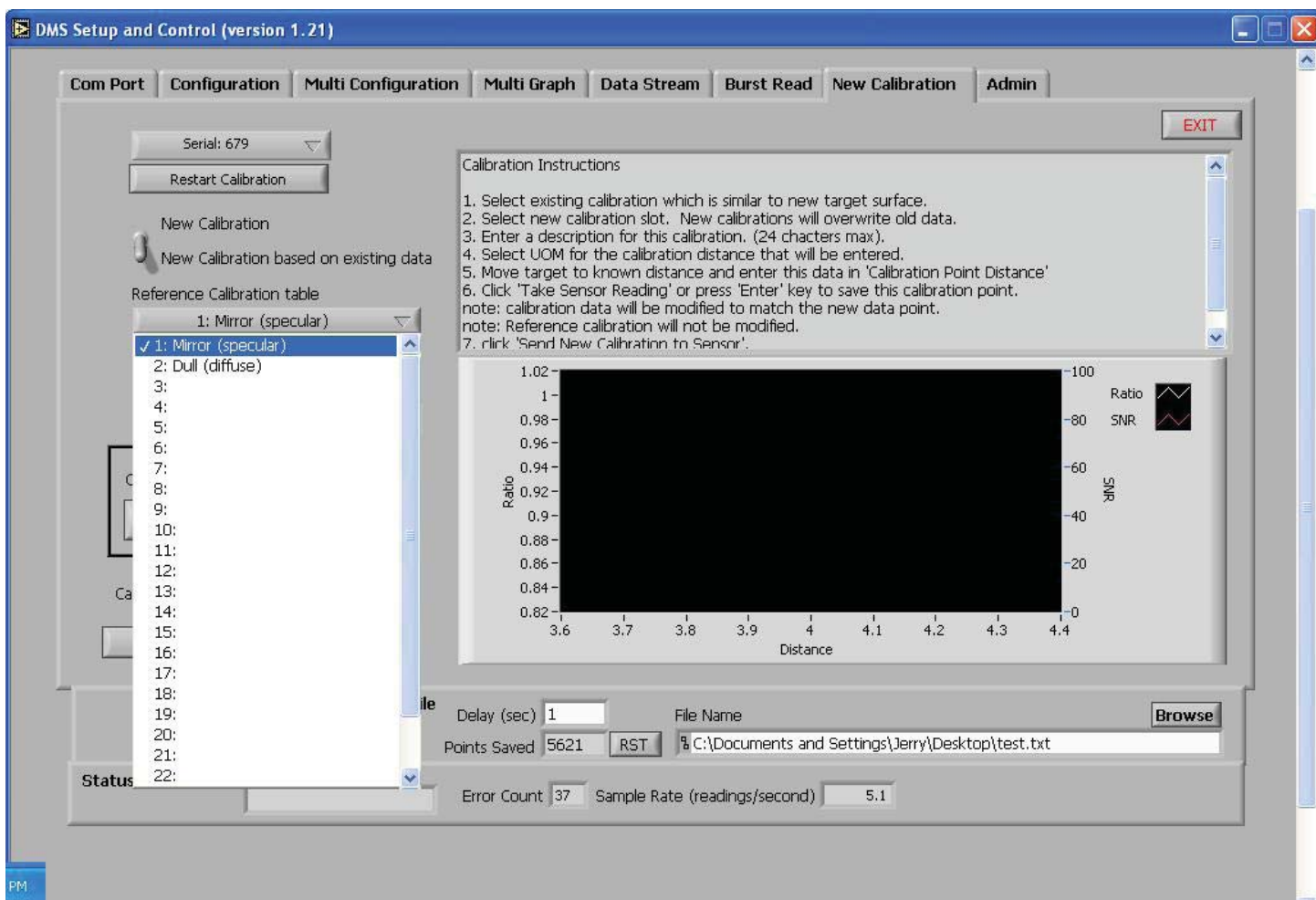
- At **New Calibration Slot**, select the calibration slot to be used
- At **Description**, enter a description of the calibration
- At **Distance UOM**, select the units of measure that will be used for the calibration distance
- Click Restart Calibration
- At **Calibration Point Distance**, enter the current distance between the sensor and the target
- Click **Take Sensor Reading**
- Repeat the previous 2 steps until the calibration is completed
- Click "Send New Calibration To Sensor"



NEW CALIBRATION BASED ON EXISTING DATA

The **New Calibration** tab can also be used to rescale an existing calibration. Only one data point is required for scaling. Digital sensors are normally provided with two calibration tables: mirror and diffuse targets. Select the table which best fits a new target. For best accuracy, pick a scaling distance that is in the middle of the range of operation for the application.

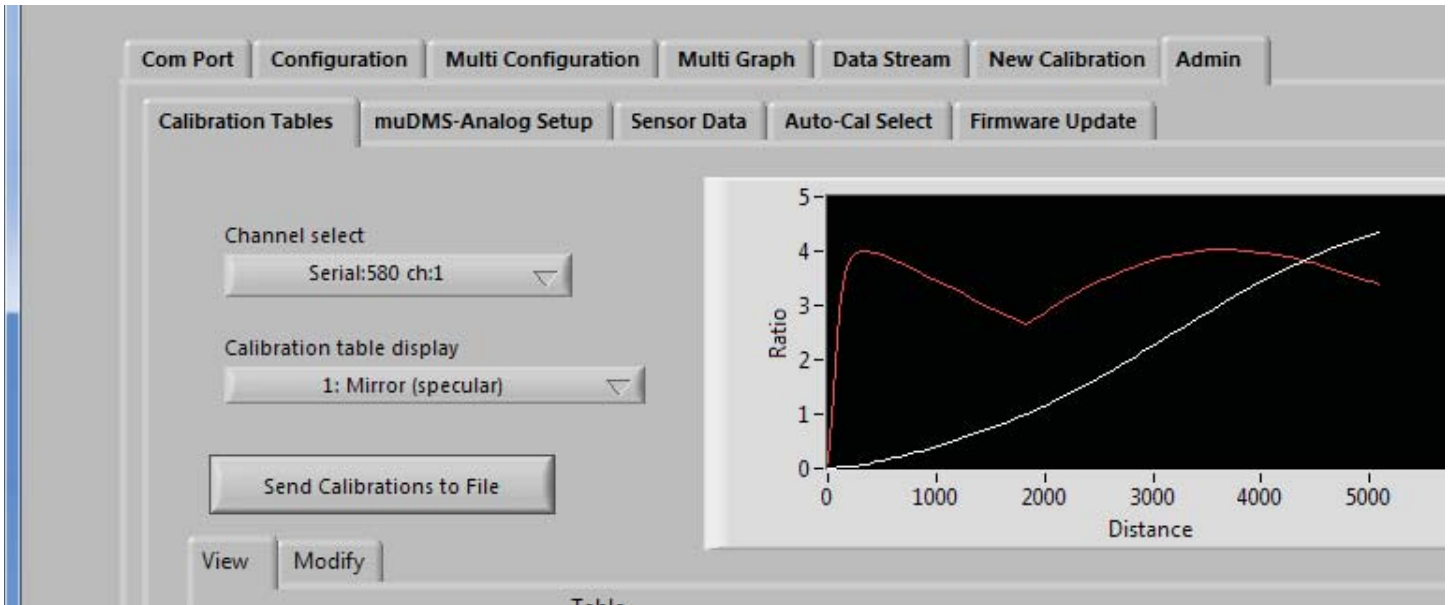
- At **Reference Calibration Table**, select the reference table
- At **New Calibration Slot**, select the calibration slot to be used
- At **Description**, enter a description for the calibration
- At **Distance UOM**, select the units of measure that will be used for the calibration distance
- At **Calibration Point Distance**, enter the scaling distance between the sensor and the target
- Click **Take Sensor Reading**
- Click **"Send New Calibration To Sensor"**



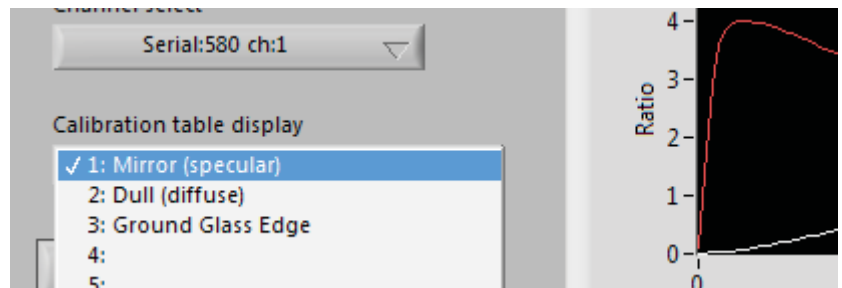
ADMIN - CALIBRATION TABLES

The **Admin-Calibration Tables** tab allows the user to inspect the stored calibration data in chart view and tabular forms.

Click on “**Send Calibrations To File**” to create a text file of a calibration table.



Calibration Table Display - Use this drop-down menu to select a calibration table for viewing and editing.



A calibration table includes three columns of data:

1. Distance - units are selectable at the UOM button
2. Ratio - the raw (unscaled) sensor output function
3. SNR - a measure of the signal strength/target reflectance

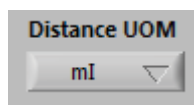
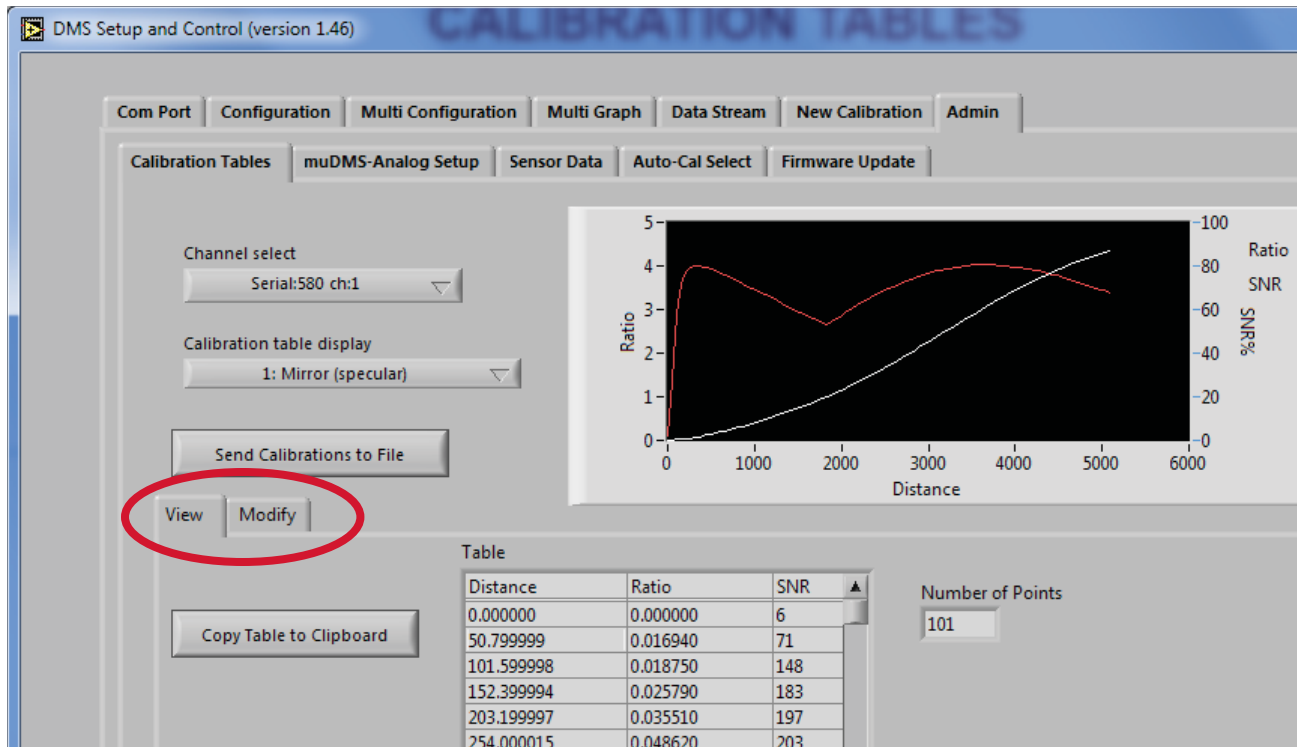


Table		
Distance	Ratio	SNR
0.000000	0.000000	6
50.799999	0.016940	71
101.599998	0.018750	148
152.399994	0.025790	183
203.199997	0.035510	197
254.000015	0.048620	203
304.799988	0.064250	204
355.600006	0.081030	204

CALIBRATION TABLES - EDITING

There are two sub-tabs: **View** and **Modify**.

In the View Tab calibration tables can be sent to a file or they can be copied to a clipboard.

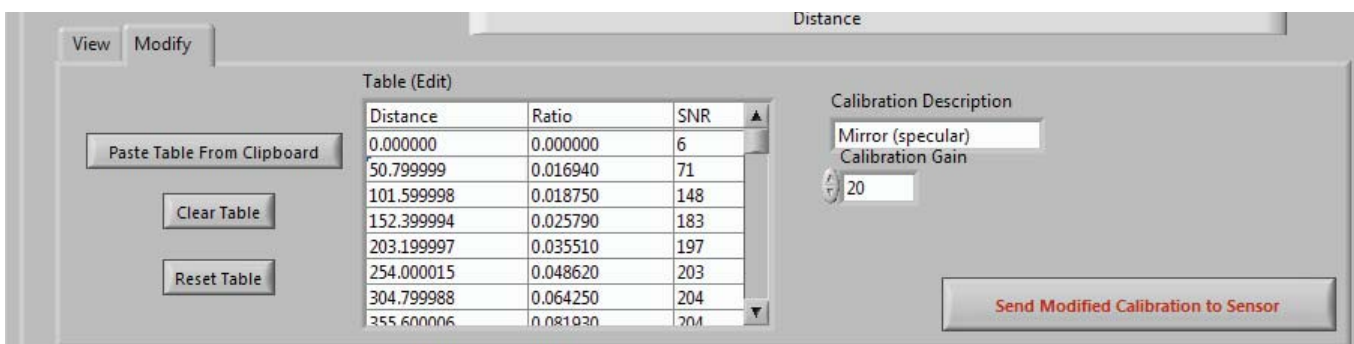
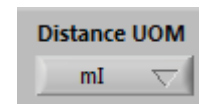


In the Modify Tab

- Calibration tables can be pasted from the clipboard
- The Calibration Description can be edited
- The Cal Table can be reset to original values if an error has been made
- The Calibration Gain (Sensor Gain) can be entered if known.

Sending A Calibration Table To The Sensor

1. Select a slot from the Calibration Table Display drop-down menu. That is where the calibration table will be stored.
2. At Distance UOM, select the Distance Units (microns, mm, mInch)
3. Enter Calibration Description
4. Enter Calibration Gain (usually 100)
5. Click 'Paste Table From Clipboard'
6. Click 'Send Modified Calibration To Sensor'



ADMIN - SENSOR DATA

The **Admin-Sensor Data** tab is used to view sensor information for factory diagnostic purposes.

The screenshot shows the 'Admin-Sensor Data' tab in the 'DMS Setup and Control (version 1.21)' application. The interface includes a top menu bar with tabs: Com Port, Configuration, Multi Configuration, Multi Graph, Data Stream, Burst Read, New Calibration, and Admin. Below this, there are sub-tabs: Calibration Tables, Sensor Data, and Auto-Cal Select. An 'EXIT' button is located in the top right corner of the main panel.

The main panel displays several sensor parameters and an ErrorLog table:

- Status Channel: 0
- Serial: 679
- Response Curve: 3.62930
- Receive Power: 27
- Temperature: 28.50
- Model Type: R
- Firmware: 2.667
- Cal: 6
- Near: NaN
- Far: NaN
- SNR%: NaN

The ErrorLog table is located on the right side of the panel. It has a header with columns: Error, Source, and Description. The table contains five rows of data:

Error	Source	Description
128	getta	
128	getta	
16	getta	
128	getta	
128	getta	

ADMIN - AUTO-CAL SELECT

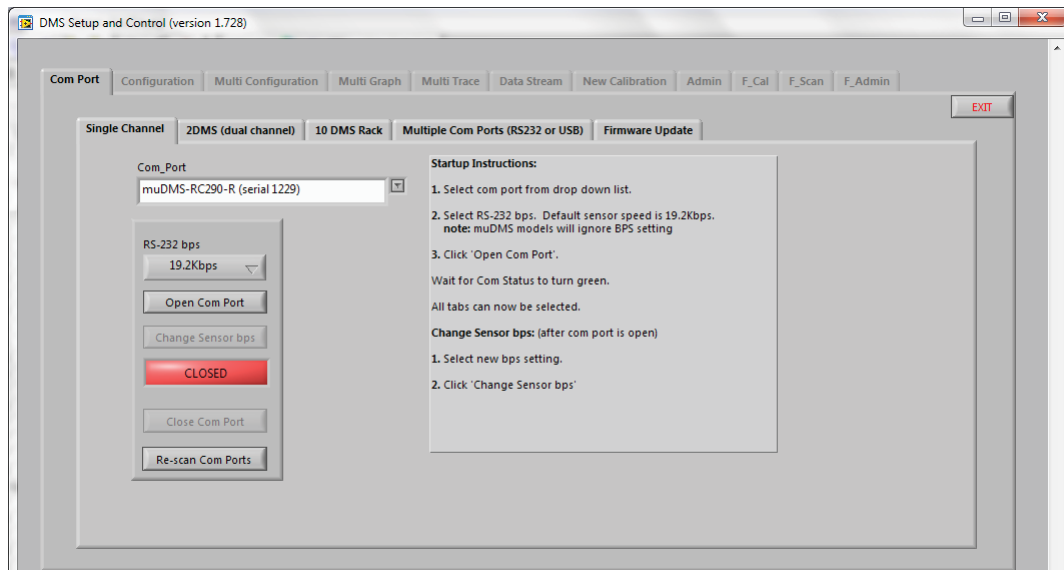
The **Admin-Auto-Cal Select** tab is intended for use in applications where 2 or 3 distinctly different targets are to pass by the sensor, and the distance measure to each of those targets is required.

When the **Admin-Auto-Cal Select** tab is in view, the sensor will lookup distance information from the stored calibration tables based upon the reflectivity of the target surfaces. For example, targets with a mirror-like finish (specular reflectors) have a different response than dull or diffuse reflectors, and therefore the two calibration tables are stored on board the sensor. The controls at this tab allow the user to select ranges of reflectivities of the targets that will be measured. The sensor will generate accurate distance information based upon the appropriate calibration table, as defined by the reflectance values. This function has no impact on the sensor sample rate.

Auto-Cal Select turns off when this tab is deselected.

Firmware Update

- With the sensor powered on and connected to a PC, open the DMS software to the default first screen.
- Do not open Com Port, click the Firmware Update Tab



Follow the Update Instructions

