Leddar™ Evaluation Kit

Leddar™ Configuration

User Guide

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1. Introduction

Leddar™ Configuration provides configuration parameters and operation functionalities for the Leddar™ Evaluation Kit.

The installation procedure for Leddar™ Configuration is covered in the *Leddar™ Evaluation Kit User Guide*. Abridged instructions are also provided in the *Leddar™ Evaluation Kit Quick Reference Guide* delivered with the unit.

2. Evaluation Kit Configuration

2.1. Connecting to a Device

To configure a device, you must first connect to the device.

To connect to the device:

1. In Leddar™ Configuration, click the connect button ().

Figure 1: Connecting to a Device

2. In the **Connection** window, select the device that you want to establish a connection with and click **Connect**.

The device has a default name. Once connected, you can modify the name (see section "2.3.1 Device Name" on page 14).

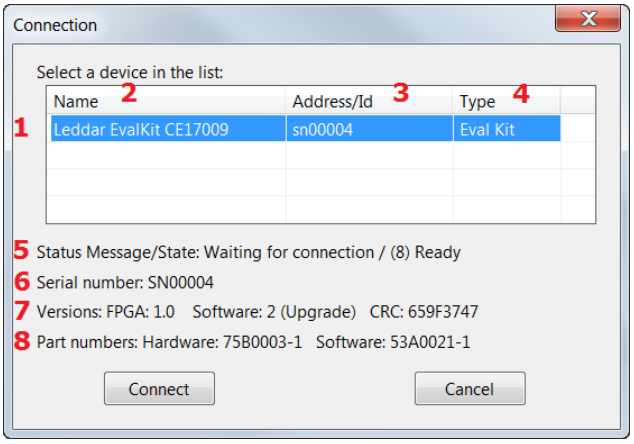

Figure 2: Connection Window

Upon connecting to the device, the Leddar™ Configuration main window opens.

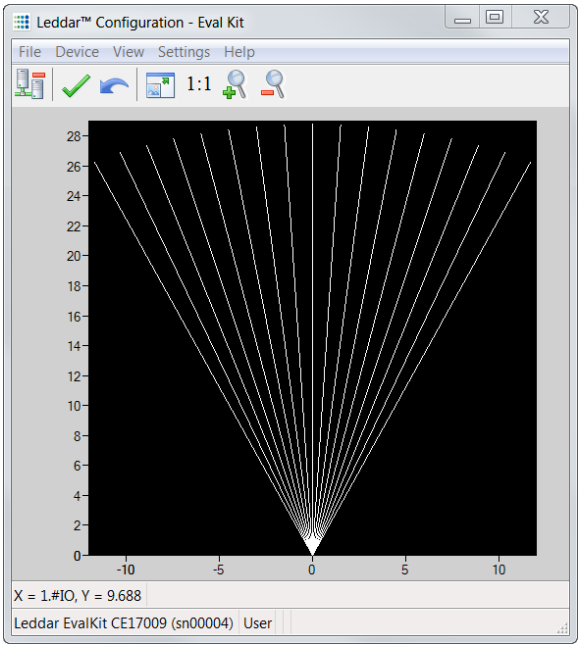

Figure 3: Leddar™ Configuration Main Window

For more information on the main window, see section "2.2 Leddar™ Configuration Main Window" on page 8.

The following is a description of the information shown in the **Connection** window.

1. Device List

The device list displays all the devices that are currently detected.

The color of items in the list indicates the status of a device:

- Black: This device is available and no user is connected to it.
- Blue: Another instance of Leddar™ Configuration is connected to this device.
- Red: The device was disconnected or turned off.

2. Name

The device name can be modified (see section "2.3.1 Device Name" on page 14).

3. Address/Id

The serial number as encoded in the USB address.

4. Type

The product name.

5. Status Message/State

The status message is the connection status for a device, which indicates, for example, if a device is available or in use.

6. Serial Number

The serial number of the device as assigned by LeddarTech.

7. Versions

- FPGA: The firmware version of the device.
- Software: The software version of the device.

8. Part Numbers

This provides the hardware and software part numbers of a device as assigned by LeddarTech.

2.2. Leddar™ Configuration Main Window

After connecting to the Evaluation Kit, the main window opens.

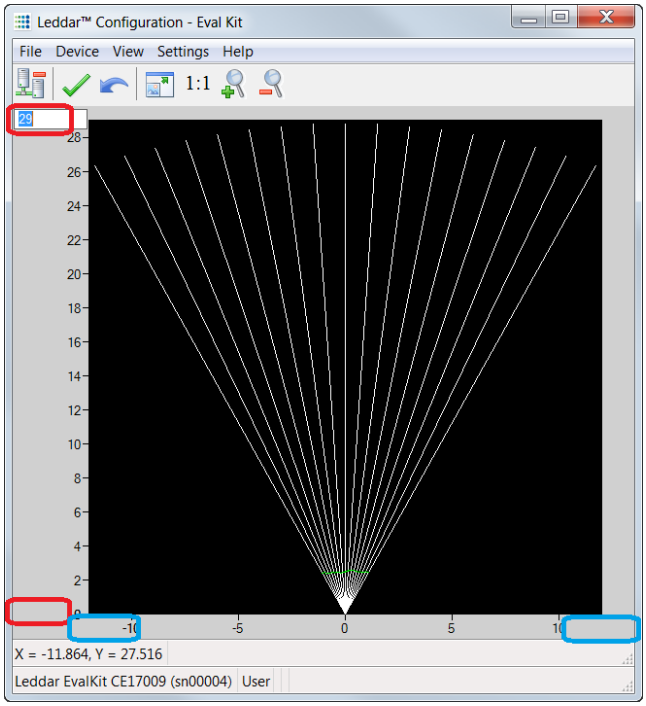

Figure 4: Leddar™ Configuration Main Window

The measurements are plotted in a symbolic graph containing the 16 segments (white lines) originating from the sensor. Detections are drawn as arcs in their corresponding segments. Only valid measurements are displayed. A more detailed description of the measurements can be obtained in the **Raw Detections** dialog box (see section "2.10 Raw Detections" on page 29).

The X and Y numbers at the bottom are the mouse cursor position coordinates.

2.2.1. Toolbar Display Controls

The toolbar includes several buttons for adjusting the view of the main window display.

2.2.1.1. Fit to window

Click the fit-to-window button () to adjust the sensor view to the main window.

2.2.1.2. Force equal horizontal and vertical scales

When the equal scaling button (1:1) is depressed (button highlighted), the original ratio of the display is kept or restored. The horizontal and vertical scales will be set to the same values and the beam will be displayed in accordance with the beam properties (e.g., the display will show a 45° beam for a 45° sensor).

Click the button again to change the vertical and horizontal scales independently.

Note: *When in equal scaling mode, you cannot zoom the display horizontally or vertically, i.e., holding the <Control> or <Shift> key down while zooming in or out will have no effect. The scales cannot then be modified by entering values in the fields shown in Figure 4 above.*

2.2.1.3. Zoom in

Click the zoom in button () to zoom in vertically and horizontally around the center of the display.

2.2.1.4. Zoom out

Click the zoom out button () to zoom out vertically and horizontally around the center of the display.

2.2.2. Scale

The window opens with the default scale setting. The horizontal and vertical scales can be changed manually by entering new values in the fields accessible by clicking the areas shown in Figure 4 above.

To apply the changes, click anywhere in the main window.

2.2.3. Panning and Zooming

The display in the main window can be panned and zoomed in different ways. Panning and zooming is done relative to the mouse cursor position.

You can move up, down, and sideways by clicking and dragging the display.

To zoom the display in and out, use the mouse wheel alone. This has the same effect as clicking the zoom in ( ) or zoom out ( ) button respectively (see sections 2.2.1.3 and 2.2.1.4).

To zoom the display horizontally, hold the <Control> key of the computer keyboard down while using the mouse wheel.

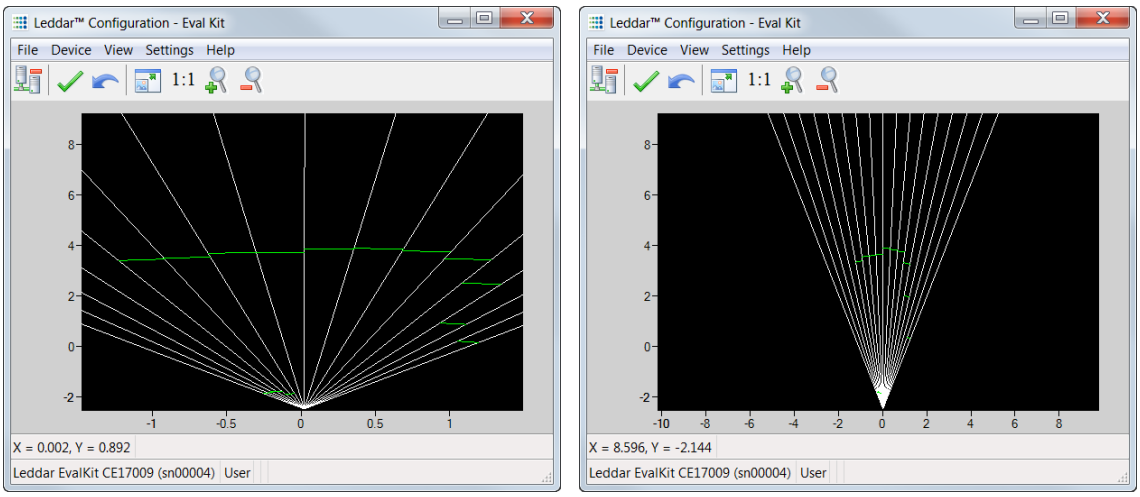

Figure 5: Zooming In *(left)* and Out *(right)* Horizontally

To zoom the display vertically, hold the <Shift> key down while using the mouse wheel.

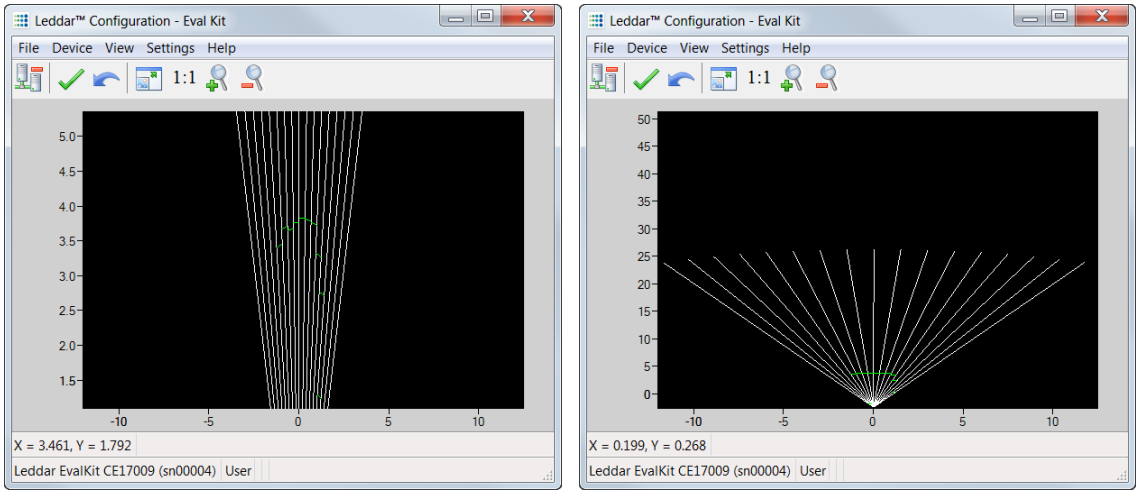

Figure 6: Zooming In *(left)* and Out *(right)* Vertically

The measurements of a detection point appear as a pop-up when you point to it with the mouse cursor for a more accurate assessment of the detection. Detection points are shown in the form of green lines (arcs) in the main window for visibility reasons.

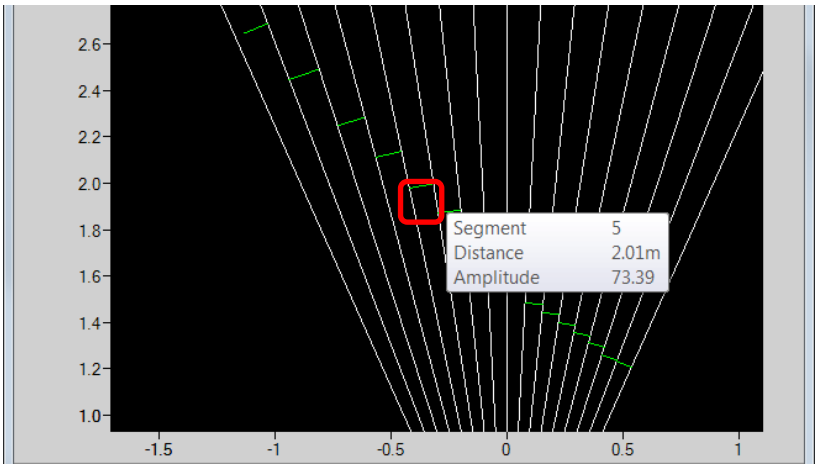

Figure 7: Detection Point Coordinates

2.2.4. Changing the Sensor Origin

The sensor origin may be modified to match the physical position of the sensor. If you do so, the main window display can better match the physical installation of the sensor. For example, if the sensor is installed 4 m above the ground with a 2 m offset from the system reference position, the sensor origin can be set to -2 m in the X axis and 4 m in the Y axis.

The sensor origin can be modified by clicking the sensor origin in the main window display and then dragging the sensor to the desired position. A dot appears when the cursor is in the right position to modify the origin as shown in Figure 8.

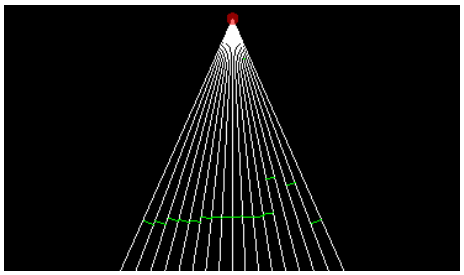

Figure 8: Dot indicator to Modify the Sensor Origin

If you click and drag the sensor origin, the sensor position is displayed in the status bar as shown in Figure 9 below.

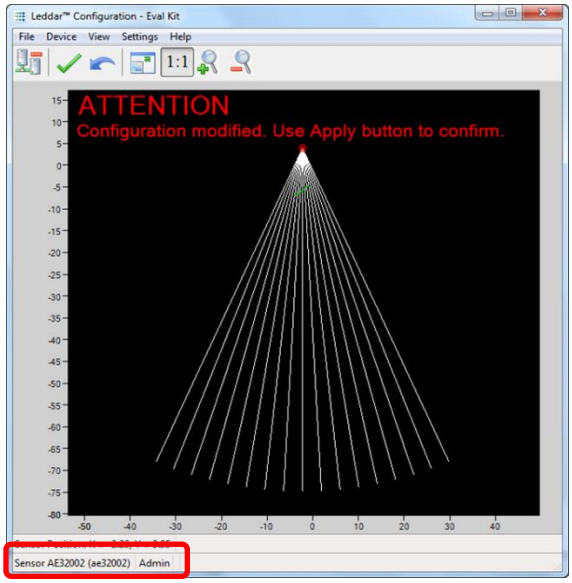

Figure 9: Sensor Position Display

To apply the changes, click the apply button ( ).

The sensor origin is saved in the sensor and can also be modified by editing the parameters in the sensor position settings window (see section "2.3.3 Sensor Position" on page 15).

2.2.5. Changing the Sensor Orientation

The sensor orientation may be modified to match the physical orientation of the sensor. If you do so, the main window display can better match the physical installation of the sensor. For example, if the sensor is installed with a 45° angle offset from the system reference orientation, the sensor orientation can be set to 45°.

The sensor orientation can be modified by clicking the outer sector of the beam in the main window display and then dragging the beam to the desired orientation. The sector is highlighted when the cursor is in the right position to modify the orientation as shown in Figure 10.

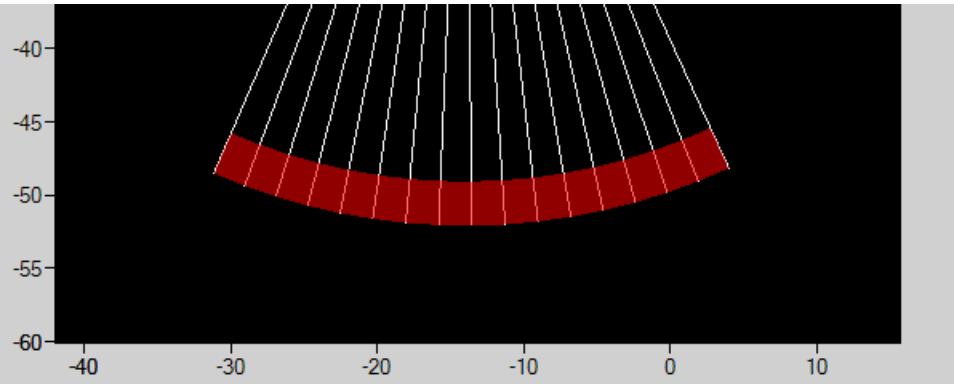

Figure 10: Highlight of Sector to Modify the Sensor Orientation

If you click and drag the sensor orientation, the sensor orientation is displayed in the status bar as shown in Figure 11.

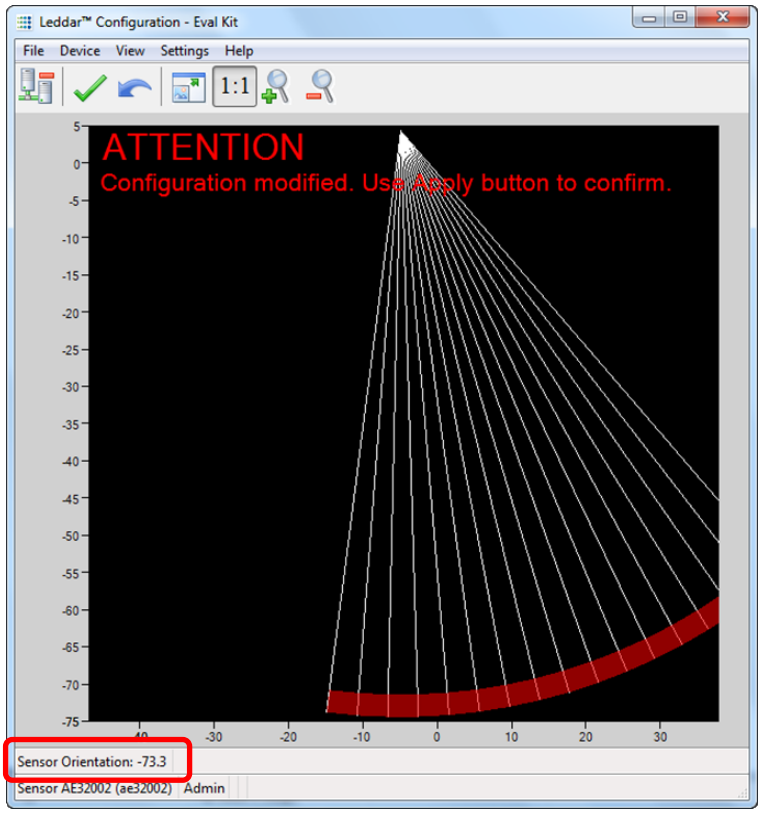

Figure 11: Sensor Orientation Display

To apply the changes, click the apply button (✓).

The sensor orientation is saved in the sensor and can also be modified by editing the parameters in the sensor position settings window (see section "2.3.3 Sensor Position" on page 15).

2.3. Settings

The sensor stores a number of settings. Once saved in the sensor, these parameters are effective at each power up. The Leddar™ Configuration software loads these parameters upon each connection.

2.3.1. Device Name

When you connect to a sensor for the first time, it has a default name. You can change that name at any time.

To change the device name:

1. Connect to a device.
2. On the **Device** menu, point to **Configuration** and click **Name...**

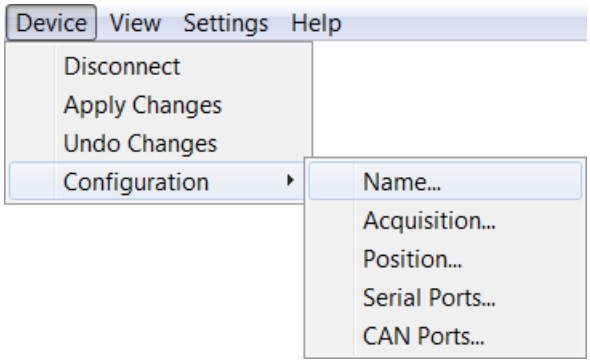

Figure 12: Device Menu and Configuration Menu Items

3. In the **Device Name** dialog box, in the **Name** field, enter the new name of the device and click **OK**.

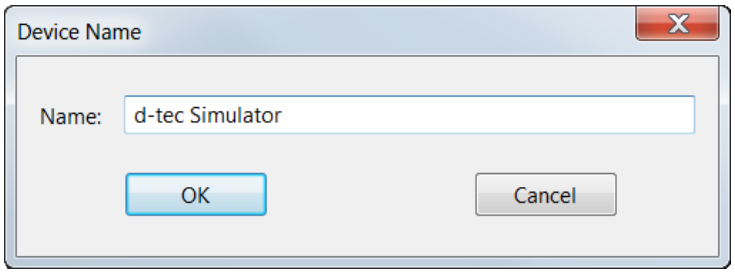

Figure 13: Device Name Dialog Box

4. To apply the change, click the apply button (✓) in the Leddar™ Configuration main window.

2.3.2. Acquisition Settings

The acquisition settings allow you to define parameters to use for detection and distance measurement.

To open the **Acquisition Settings** dialog box, on the **Device** menu, point to **Configuration** and click **Acquisition...**

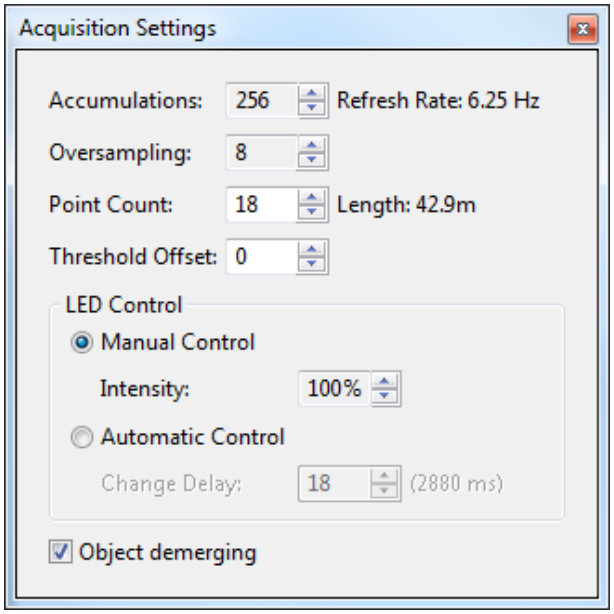

Figure 14: Acquisition Settings Dialog Box

The numbers on a grey background are modified only by using the arrows, while the ones on a white background can additionally be modified manually by the numeric keypad of your keyboard.

To apply the changes, click the apply button (✔) in the main window.

2.3.3. Sensor Position

The sensor position allows you to define the sensor position with respect to the reference of the system it is used in. See sections 2.2.4 and 2.2.5 for more information.

To open the **Sensor Position** dialog box, on the **Device** menu, point to **Configuration** and click **Position...**

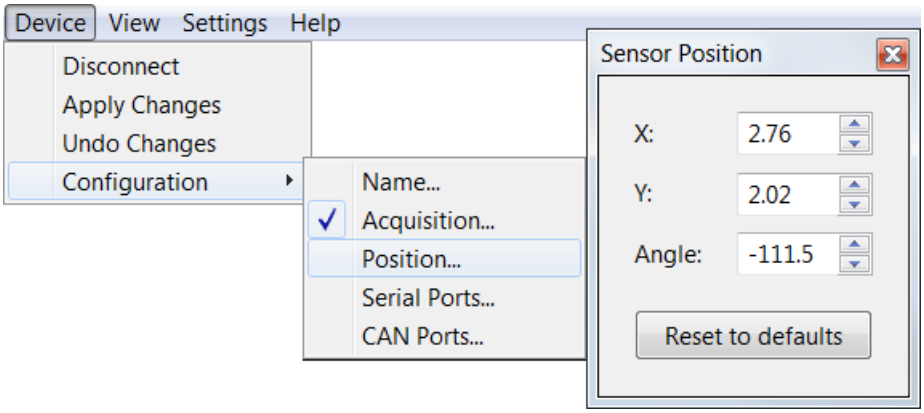

Figure 15: Device Menu and Sensor Position Dialog Box

The numbers are modified either by using the arrows or by entering the value manually.

Note: *A "V" mark next to a menu item indicates that the corresponding dialog box is currently open as shown in Figure 15 above.*

2.3.4. Serial Ports

The sensor serial port settings are configurable.

To open the **Serial Ports Settings** dialog box, on the **Device** menu, point to **Configuration** and click **Serial Ports...**

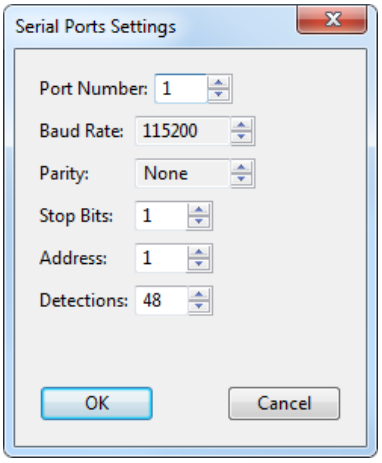

Figure 16: Serial Ports Settings Dialog Box

The numbers are modified by using the arrows or by entering the value manually.

Table 1: Serial port settings description

Parameter	Value
Port Number	Select 1 for the RS-485 port on the terminal block
Baud Rate	9600, 19200, 38400, 57600, 115200 bps
Parity	None, odd, even
Stop Bits	1, 2
Address	1 to 247
Detections	0 to 48

2.3.5. CAN Ports

The sensor CAN port settings are configurable.

To open the **CAN Port Settings** dialog box, on the **Device** menu, point to **Configuration** and click **CAN Ports...**

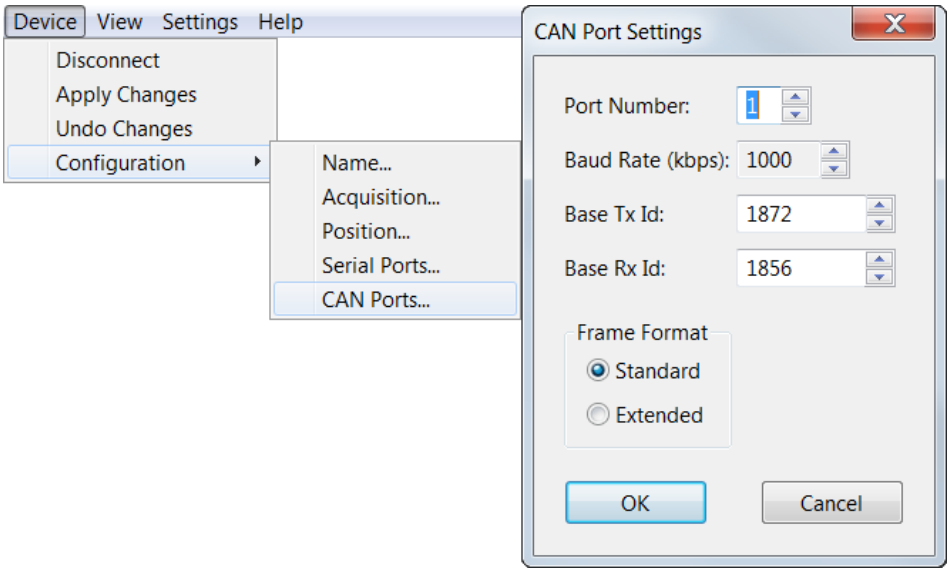

Figure 17: Device Menu and CAN Port Settings Dialog Box

The numbers are modified by using the arrows or by entering the value manually.

Table 2: Sensor CAN port settings description

Parameter	Value
Port Number	Select 1 for CAN communication
Baud Rate	10, 20, 50, 100, 125, 250, 500, 1000 kbps
Base Tx Id	The CAN arbitration id used for data messages FROM the evaluation kit containing the detections. The arbitration id of the messages containing the number of detections will be this value plus one (see protocol documentation).
Base Rx Id	The CAN arbitration id used for data messages TO the evaluation kit (see protocol documentation).
Frame Format	Standard, Extended

2.3.6. Advanced Zone Detection

This configuration option is available in **Device** menu -> **Configuration** -> **Advanced Detection Zones**.

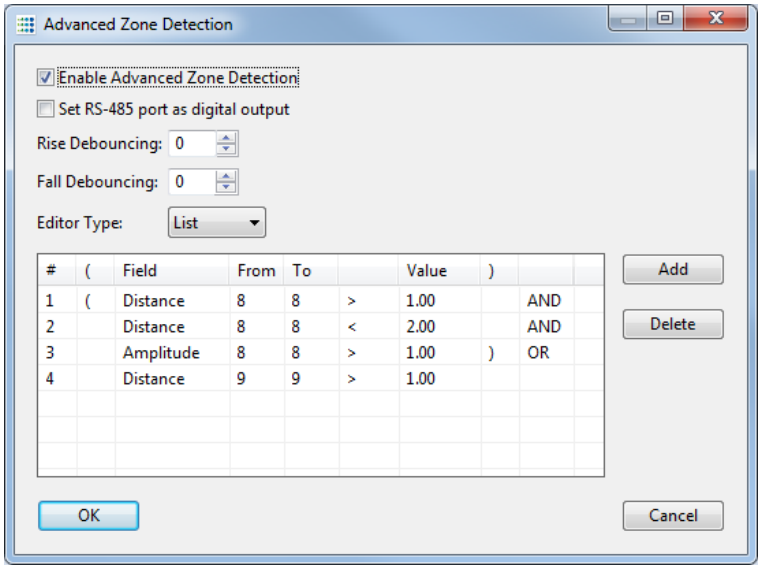

Figure 18: Zone Detection Configuration Window

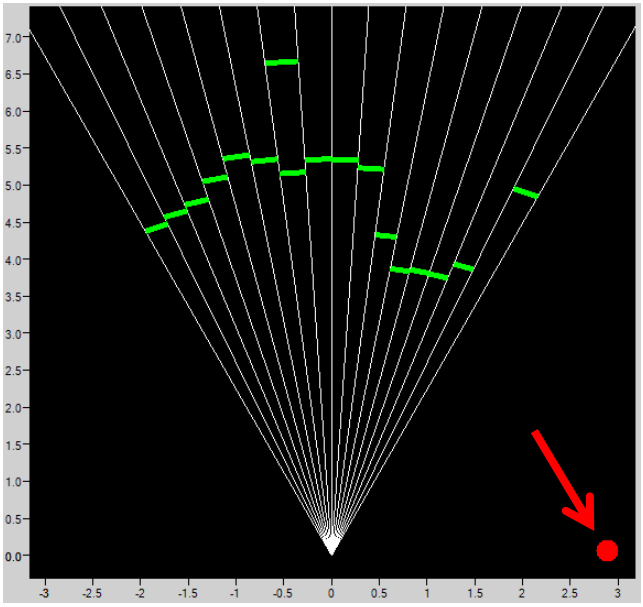

Figure 19: Trigger ON Example

2.4. Saving and Loading a Configuration

The software configuration for a device can be saved to a file. This enables you to backup settings and restore them in case of system failure or in case you want to revert to earlier settings. You can also get the configuration that was stored with a record file.

To save a configuration:

On the **File** menu, click **Save Configuration As…**

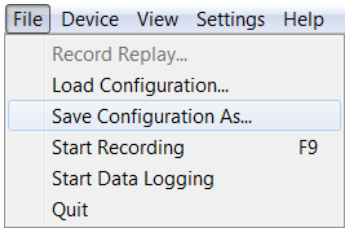

Figure 20: File Menu

To load a configuration:

On the **File** menu, click **Load Configuration…**

2.5. Configuring Detection Records

Detection records provide a playback of detections recorded by a device. This visual information can be useful for verification, troubleshooting, or training purposes. Detection records allow for a full data playback stored in a *.ltl file that can later be reloaded and replayed.

A description of the elements available in the **Record Settings** dialog box is presented after the following three procedures.

To configure the detection record:

1. In the Leddar™ Configuration software, on the **Settings** menu, click **Record...**
2. In the **Record Settings** dialog box, under **Record directory**, select the path where you want to save the record file.

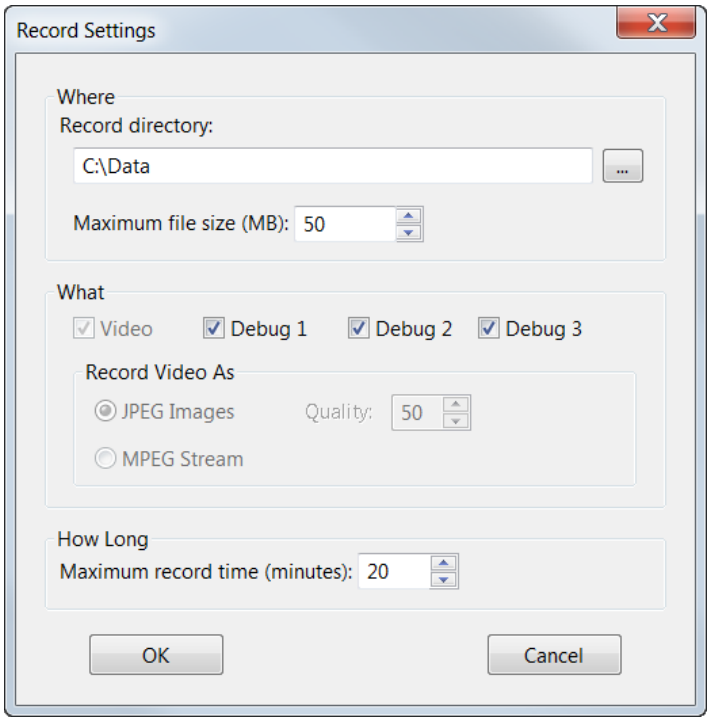

Figure 21: Record Settings Dialog Box

3. In the **Maximum file size** field, set the maximum file size by using the arrows or by entering the value manually.

The recording stops for the current file once it reaches the maximum file size and automatically switches the recording to another file. This is to keep record files of manageable sizes.

4. Under **What**, select one of the **Debug** check boxes.

5. Under **How Long**, next to **Maximum record time**, determine the length of time for recording by using the arrows or by entering the value manually.

At the end of that period, recording will stop even if the file size has not reached its maximum.

6. Click **OK** to save the settings.

To start a recording:

1. Connect to the sensor for which you want to make a detection record.
2. On the **File** menu, click **Start Recording**.

   OR

   On the computer keyboard, press the <F9> key.

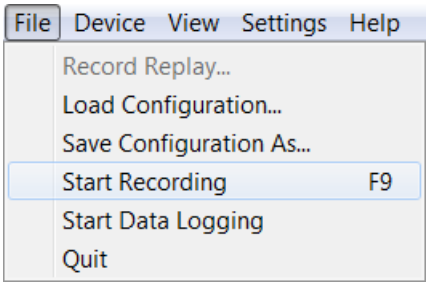

Figure 22: File Menu

To stop a recording manually:

On the **File** menu, click **Stop Recording**.

OR

On the computer keyboard, press the <F9> key.

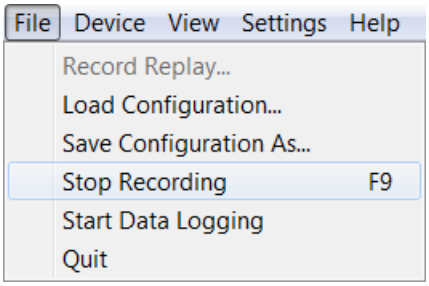

Figure 23: File Menu

The following is a description of the elements available in the **Record Settings** dialog box.

Record directory

The record directory is the folder in which all record files will be saved. These files are in a proprietary format, with the extension *.ltl, and can only be opened and viewed with the Leddar™ Configuration software.

Maximum file size

Record files can be quite large. Set the maximum file size as needed. The recording stops for the current file once it reaches the maximum file size and automatically switches the recording to another file. This is to keep record files of manageable sizes.

Debug

These check boxes are reserved for the use of LeddarTech technicians.

Maximum record time

The value entered as the **Maximum record time** determines the length of the time for recording. At the end of that period, recording will stop even if the file size has not reached its maximum.

2.6. Using Detection Records

Once you have completed a recording, you can review it and extract part of the recording.

The **Record Replay** dialog box offers the same functions as a regular video player: there is a stop button, a play button, and frame-by-frame forward and backward buttons.

The **Position** slider lets you move directly to a desired position.

The **Playback Speed** slider lets you adjust the speed of the recording playback; faster is to the left.

The **Start**, **End**, and **Extract** buttons allow you to select a portion of the recording and extract it for further reference or analysis.

To play a record:

1. If you are connected to a device, disconnect from the device.

   OR

   Open another Leddar™ Configuration software main window.

Note: *The record files can also be opened by double-clicking them.*

2. On the **File** menu, click **Record Replay...**

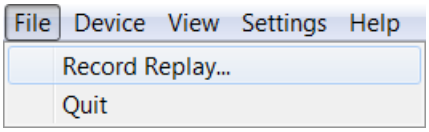

Figure 24: File Menu

3. In the **Record Replay** dialog box, click the browse button to select a file.

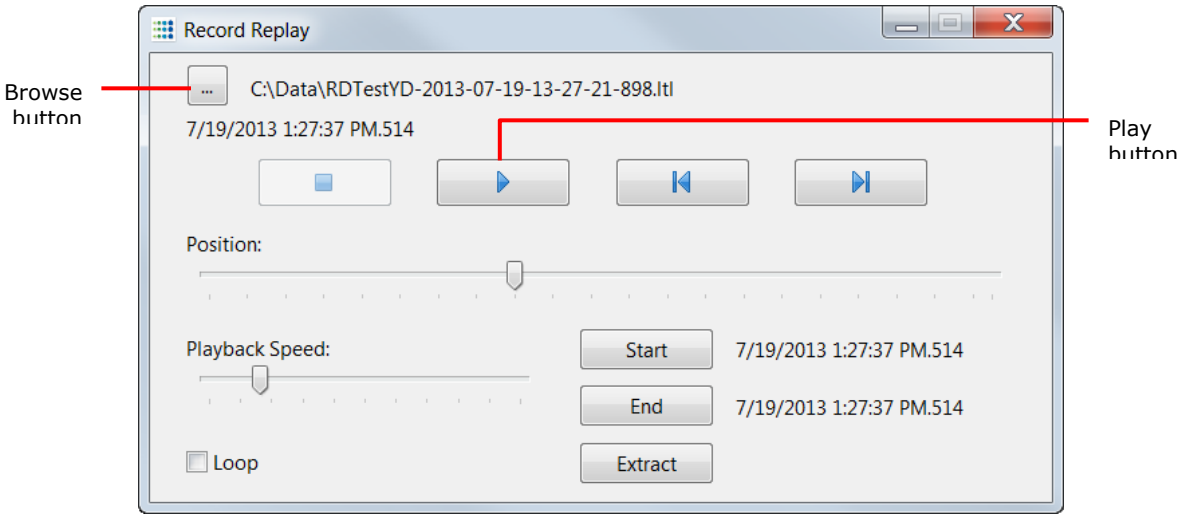

Figure 25: Record Replay Dialog Box

4. Click the play button to start the playback.

To extract a record file segment:

1. Set the **Position** slider to the position where you want the file segment to start and click the **Start** button.
2. Set the **Position** slider to the position where you want the file segment to stop and click the **End** button.

   OR

   Play the record and stop it at a position of interest and then click the **Start** button; restart playing the record and stop it again at a position of interest and click the **Stop** button.
3. Click the **Extract** button to extract and save that file segment.

2.7. Data Logging

The data logging function is used to output the data to a .txt file. This file can be imported in a software application, such as Microsoft Excel, for offline analysis.

The duration of the record is indicated in the status bar.

Each line of the generated text file contains the information related to a single detection.

Table 3: Field Description of the Log Text File

Time (msec)	Segment [0 15]	Amplitude [0 512]	Distance (m)	Status
12735204	7	0.9	33.61	1

- The time of the detection is 12735204 milliseconds from the time the sensor was started.
- The location of the detection is segment 7 (the 8th segment).
- The amplitude of the detection is 0.09, which is very low (small, far, or dark object).
- The distance of the detection is 33.61 meters.
- The status indicates a normal measurement.

To use the data logging function:

1. On the **Settings** menu, click **Data Logger...**

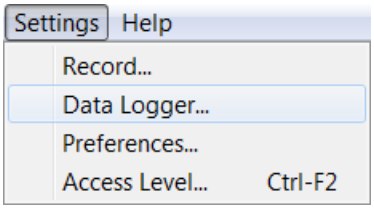

Figure 26: Settings Menu

2. In the **Data Log Settings** dialog box, under **Folder**, click the browse button to select the path where you want to save the log and click **OK**.

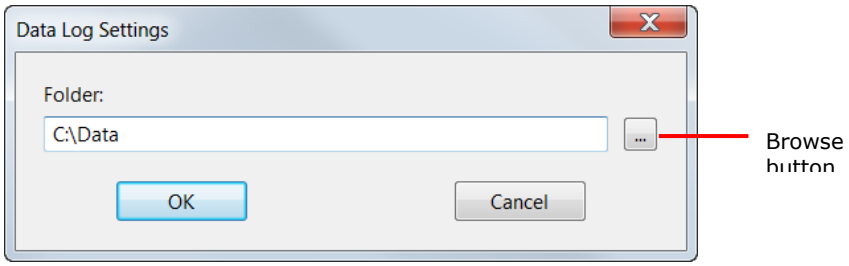

Figure 27: Data Log Settings Dialog Box

3. On the **File** menu, click **Start Data Logging**.

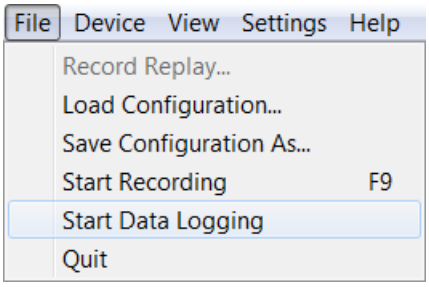

Figure 28: File Menu

4. To stop recording, on the **File** menu, click **Stop Data Logging**.

A .txt file is saved in the selected directory.

2.8. Device State

Information about a device is accessible when connecting to a device in the **Connection** window or by clicking the **Device State** command on the **View** menu.

The **Device State** window opens.

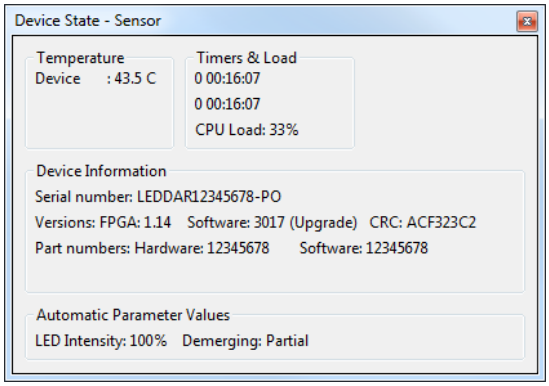

Figure 29: Device State Window

Temperature

This section indicates the temperature of the device.

Timers & Load

This feature gives information in days, hours, minutes, and seconds about two types of activities of a device. The first line indicates the time elapsed since the last device reset, the second since the last power cut or outage.

The CPU load indicates how much of the sensor processor capacity is in use. When the load reaches near 100%, the processor may no longer be able to process all the data. The effective frame rate may be impacted.

Serial Number

This is the serial number of the device as assigned by LeddarTech.

Versions

- FPGA: The firmware version of the device.
- Software: The software version of the device.

Part numbers

This provides the hardware and software part numbers of a device as assigned by LeddarTech.

LED Intensity

This is the current LED power in use by the sensor. It automatically adapts to too strong / too weak detections when properly activated in the acquisition settings window.

Demerging

This indicates the current object demerging status, when activated in the acquisition settings. It may be:

- Partial: when the demerge sensor didn't process all pulses characteristic of merged objects.
- Completed: when the sensor processed all pulses characteristic of merged objects.

2.9. Preferences

Preferences are used to change various settings related to the display of the Leddar™ Configuration software.

The **Preferences** dialog box is opened by clicking the **Preferences** command on the **Settings** menu.

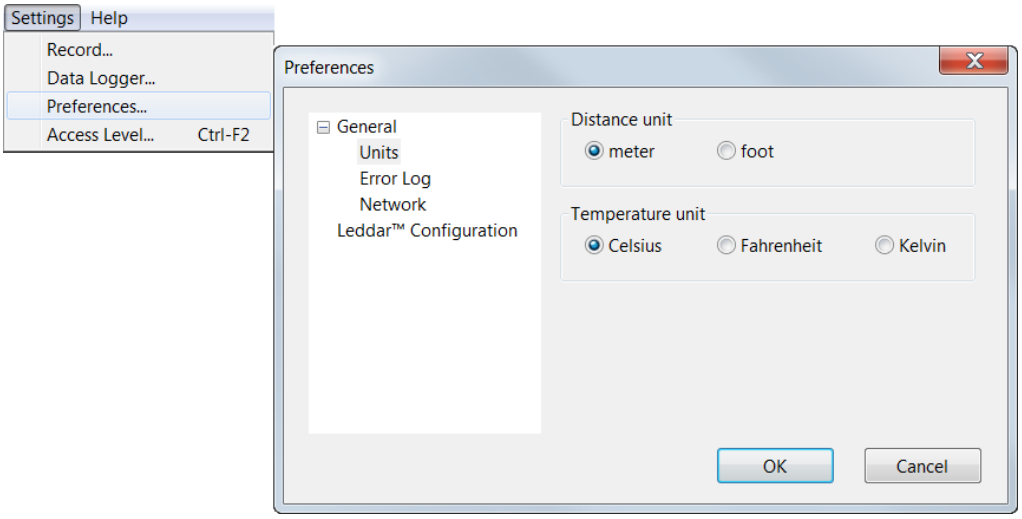

Figure 30: Settings Menu and Preferences Dialog Box

Distance unit

The unit that is applied to distances displayed in the Leddar™ Configuration software.

Temperature unit

The unit used when displaying temperatures.

There are also other settings available in the **Preferences** dialog box.

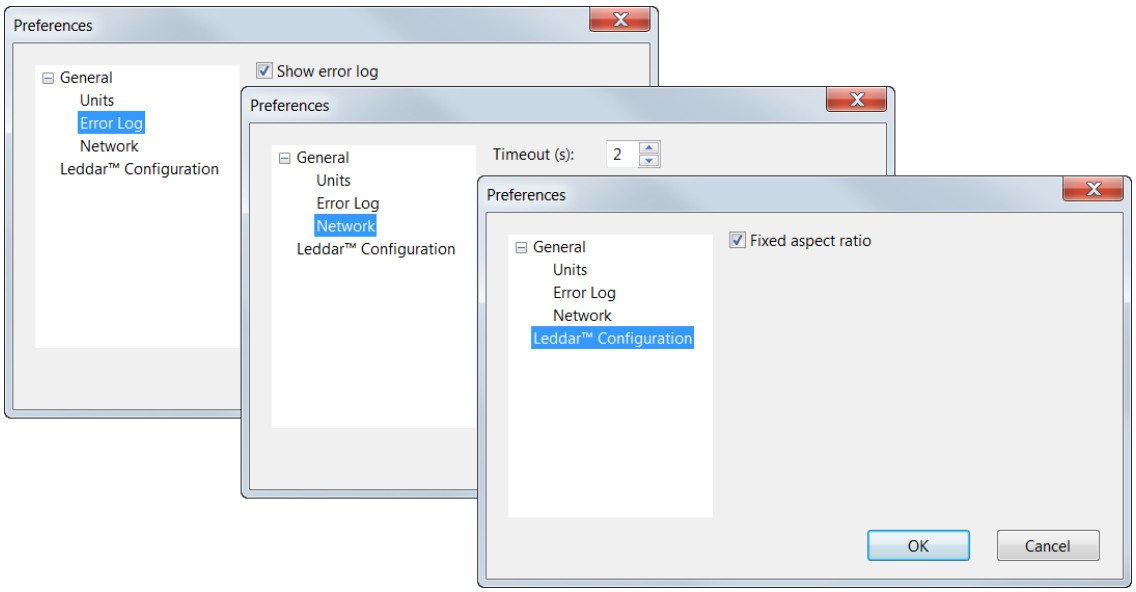

Figure 31: Error Log, Network, and Leddar™ Configuration Settings

Show error log

Selecting the **Show error log** check box displays error messages that are logged during the current session. Error messages are displayed in the **Error Log** window.

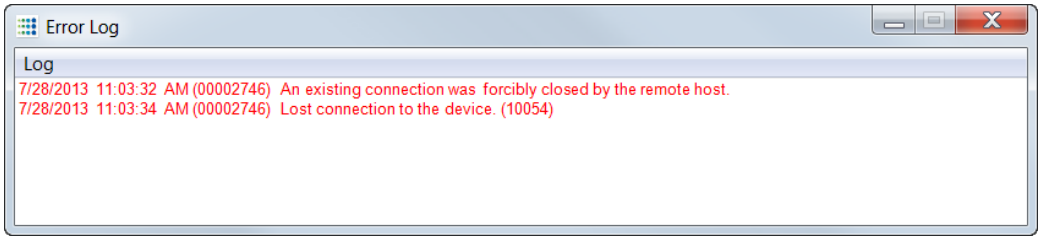

Figure 32: Error Log Example

Timeout

This value in seconds is the time Leddar™ Configuration will wait for a response to determine when the communication is lost. The default value is 2.

Fixed aspect ratio

When this check box is selected, you can resize the Leddar™ Configuration main window while keeping the original ratio. When the check box is cleared, the width and height of the main window can be resized independently.

Detection Arc Thickness

This option allows a user to modify the pixel width of the displayed green detections arcs in the main window.

2.10. Raw Detections

The **Raw Detections** dialog box allows you to view detection values in many ways. It provides filters to isolate segments and detection parameters.

To open the **Raw Detections** dialog box, on the **View** menu, click **Raw Detections**.

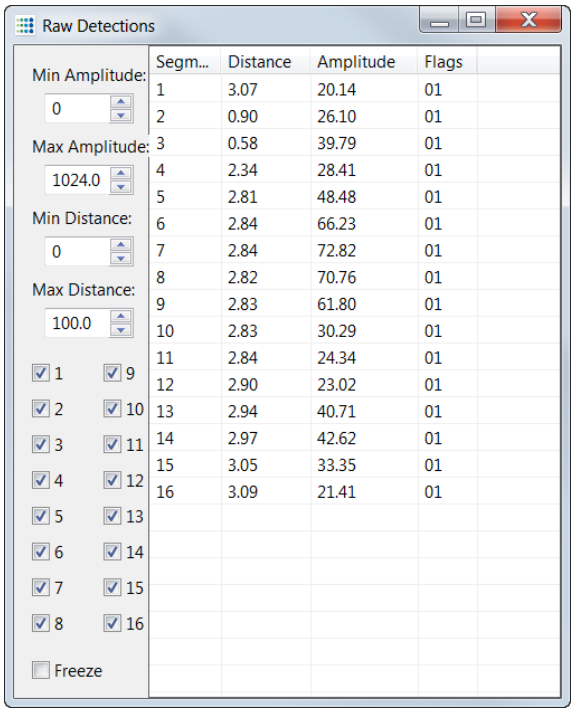

Figure 33: Raw Detections Dialog Box

Figure 34 presents an example of raw detections. When there is no detection in some segments, only the segments where detection occurred appear in the list.

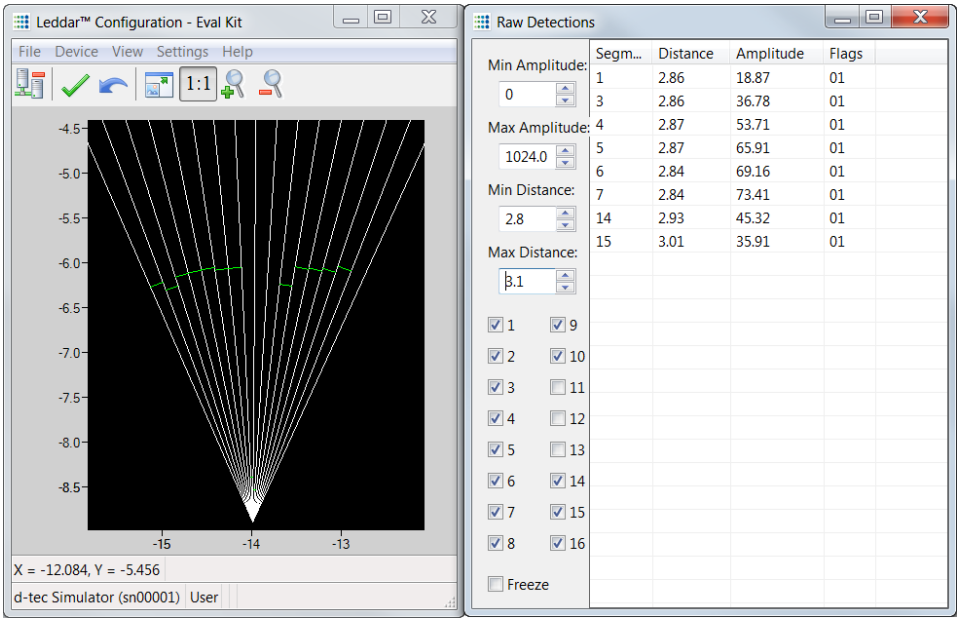

Figure 34: Example of Detection Filters

The following is a description of the parameters available in the **Raw Detections** dialog box.

Min and Max Amplitude

The value entered in the **Min Amplitude** field will show only detections of amplitude higher or equal to that value. For example, if the minimum amplitude is set to 5, only the detections of amplitude 5 and more will be displayed.

The value entered in the **Max Amplitude** field will show only detections of amplitude lower or equal to that value. For example, if the maximum amplitude is set to 8, only the detections of amplitude 8 and lower will be displayed.

Setting a value in both fields will result in a range of amplitude to display.

Min and Max Distance

The value entered in the **Min Distance** field will show only detections at a distance greater or equal to that value. For example, if the minimum distance is set to 10, only the detections at a distance of 10 and more will be displayed.

The value entered in the **Max Amplitude** field will show only detections at a distance smaller or equal to that value. For example, if the minimum distance is set to 20, only the detections at a distance of 20 and less will be displayed.

Setting a value in both fields will result in a range of distance to display.

Boxes 1 to 16

Check boxes 1 to 16 allow you to select which segments to display.

Freeze Parameter

When selected, the **Freeze** parameter freezes the values displayed in the **Raw Detections** dialog box. To return to the live display, clear the check box.

Segment Column

The **Segment** column lists the segment for which there is a detection according to the filters used. The segment numbers are read from left to right starting at 1.

Distance and Amplitude Columns

The **Distance** column displays the distance of the detection and the **Amplitude** column displays its amplitude.

Flag Column

The **Flag** column displays a number that represents a detection type.

Table 4: Flag Value Description

Bit position	Bit 0	Bit 1
0	Invalid measurement	Valid measurement
1	Reserved	Reserved
2	Reserved	Reserved
3	Normal measurement	Received signal is above the saturation level. Measurements are valid (VALID is set) but have a lower accuracy and precision. Consider decreasing the LED intensity.
4	Reserved	Reserved
5	Reserved	Reserved
6	Reserved	Reserved
7	Reserved	Reserved

The **Flag** field provisions for 8 bits encoded as a bit field. Three bits are currently used. The following table presents the implemented decimal values of the status bit field.

Table 5: Status Value Description

Status value (decimal)	Status value (binary)	Description
1	00000001	Normal measurement (valid)
9	00001001	Saturated signal (valid)

2.11. View RS-485 Data

With an RS-485 interface to the sensor (e.g., using an RS-485 to USB adapter cable), it is possible to establish a connection to the sensor and display the sensor measurements in the Leddar™ Configuration software.

To open the **RS-485** window, on the **View** menu, click **RS-485 Viewer**.

Select the serial port and serial port settings to match the connected sensor. Click the **Start** button to establish connection and display the measurements.

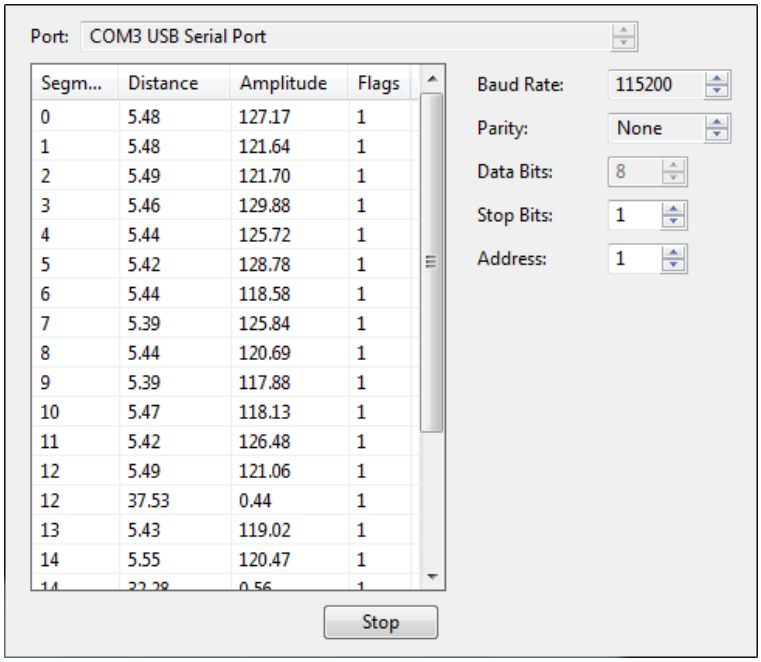

Figure 35: RS-485 Data

3. Help

For technical inquiries, please contact LeddarTech technical support by registering online at www.leddartech.com/support to easily:

- Follow up on your requests
- Find quick answers to questions
- Get valuable updates

Or by contacting us at:

+ 1 418 653 9000

+ 1 855 865 9900

8:30 a.m. - 5:00 p.m. Eastern Standard Time

To facilitate the support, please have in hand all relevant information such as part numbers, serial numbers, etc.

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