

G4 LD Utility

Software Reference Manual



 **LARSON DAVIS**
A PCB DIVISION

Larson Davis

G4 LD Utility

Software

Reference Manual

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How This Manual is Organized

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An overview of the display and available features

(Module 2) Getting Started With G4 LD Utility

(Module 3) Working With Data Files in G4

(Module 4) Upgrading Software, Firmware, and Options

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(Appendix A) G4 Settings Reference

Quick reference for settings and options in G4

Module 1 Introduction to G4

G4 LD Utility (G4) software enhances the features, flexibility, and ease-of-use of Larson Davis products with the following capabilities:

- Provides dependable and intuitive interface for remote or local operation of sound and vibration measurement instruments
- Provides network security options for remote SLM instruments when enabled
- Connects automatically to known instruments
- Provides a scheduling interface for instrument run time, alert notifications, measurement trigger levels, and other features
- Allows you to easily create and manage instrument setups, calibration and calibration management
- Facilitates file and instrument utility management one or multiple instruments
- Enables you to download, chart, analyze, and manipulate measurement data files in spreadsheets, graphs, and sound files
- Allows for data export to a Microsoft Excel®-compatible format for postprocessing and analysis

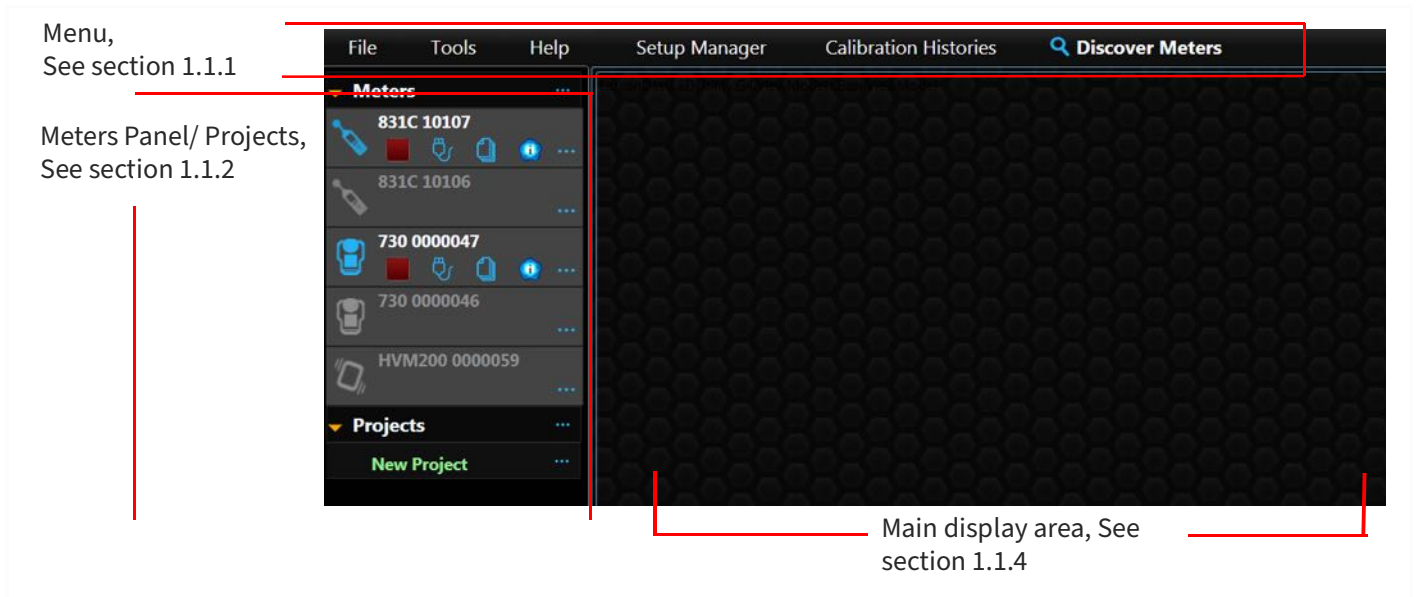
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1.1 G4 LD Utility Interface Overview

G4 Utility interface is divided into 3 sections: the Menu, the Meters Panel, and the Tab Display.

Figure 1-1 G4 Utility Interface



1.1.1 Main Menu

The main menu provides easy access to the listed features of G4. This section provides a brief overview of which settings and features are available. For details or help locating a setting, see **“G4 Settings Reference” on page A-1**, which lists all settings and features in the order they appear in G4.

Setup Manager Overview

Use G4 Setup Manager to store measurement setup files on the PC or on the meter. You can also use Setup Manager to perform the following tasks:

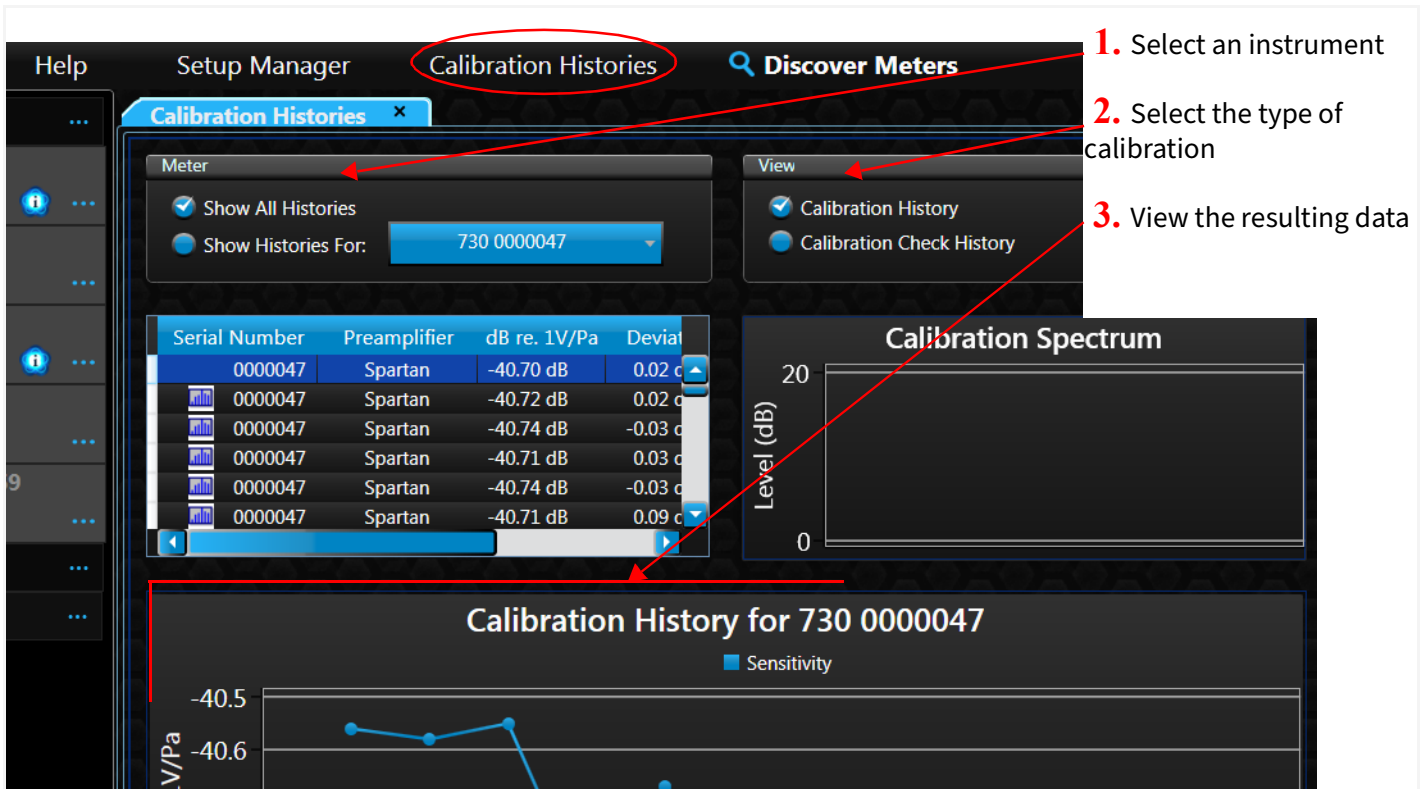
- Copy or share stored setup files
- Edit measurement setups stored on the instrument
- Access options for setups using the right-click menu

For details on using the Setup Manager, see **“Setup Manager Settings” on page A-11**.

Calibration Histories

When you select **Calibration Histories** from the main menu, the main window displays calibration information for all Larson Davis instruments as shown in *Figure 1-2*.


Figure 1-2 G4 Calibration Histories for All LD Instruments



1.1.2 The Meters Panel/ Projects Panel

The **Meters Panel** is always present and allows you to access multiple instruments or projects at any time.

When you launch G4, meters using WiFi, Bluetooth, or USB connections may automatically display in the Meters Panel. If you don't see your instrument in the list, click **Discover Meters** in the top menu bar.

TRY THIS Click the **arrow icon**  in-line with **Meters** to collapse the meter/project list and disconnect from all meters. Click again to open a collapsed panel, then click **Discover Meters** to reconnect with available meters. *Figure 1-2* shows these elements for reference.

LEARN MORE For additional help connecting your instrument, see the Getting Started module of the instrument manual. TCP connected instruments require additional setup. See [2.3.1 "Connecting the Meter to G4 via IP Address" on page 11](#).

Table 1.3 Icons On the Meters Panel



















Meter Type	 SLM	 HVM	 Dosimeter	
Run/Stop/Pause Status	Run 	Pause 	Stop 	Sleep 


Table 1.3 (Continued) Icons On the Meters Panel


Meter Type	 SLM	 HVM	 Dosimeter	
Connection Type	USB  USB with network security	WiFi, Ethernet WAN  WiFi, Ethernet WAN with network Security (https)	Bluetooth 	LAN  LAN with G4 Security (https)
Files Status	Files Stored on Meter 	No Files Stored on Meter 		
Info Icon	Click the info icon  to view a summary of live meter statistics			
Meter Menu 	<p>Rename Meter: Customize a nickname that displays in the Meters Panel.</p> <p>Hide Meter: Temporarily removes this meter from the Meters Panel.</p> <p>Forget Meter: Removes this meter from the Meters Panel.</p> <p>Modify Connection: Select this item to connect to the meter over TCP, or to set a unique port number.</p> <p>Upgrade Firmware: Process is unique to each meter. LEARN MORE See <u>"Upgrade Firmware" on page 24.</u></p>			

1.1.3 Using the Projects Panel

The Projects Panel allows you to group meters and the resulting data files (location, study, time of day etc.). For example, if I'm using an 831C and a Spartan dosimeter to study noise exposure in the North Mill, when I create a North Mill Project, measurement files for this project are stored together.

Projects are saved on your PC in the following location:
 "Public Documents\PCB Piezotronics\G4\Data\Projects"

Step 1. To create a new project, click the **menu icon**  in-line with **Projects**, and select **New Project**. A "New Project" entry appears on the line below.

Step 2. Click the **menu icon**  in-line with this project, and select **Rename Project**. Then click inside the name field to rename it.


Step 3. In the Meters Panel section above, drag and drop a meter on the Project name. Repeat the same action for other meters on this project.

LEARN MORE For more tips on organizing measurement files, see **2.5.3 "Adding General Information to Create Search-able Data Files" on page 16.**

Removing a Project

When you're finished with a project and want to remove it from the Projects Panel, complete this section.

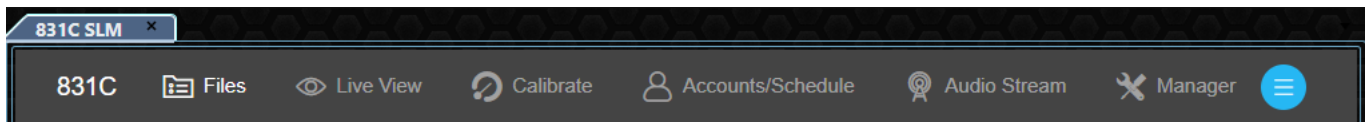
Step 1. Move or delete the project files for meters in the project.

Step 2. Click the **menu icon**  in-line with the project name, and select **Remove Project**.

1.1.4 Using the Main Display

When you click on the name of your connected meter in the Meters (or Projects) Panel, the meter tab opens in the main display area with the following views as shown in *Figure 1-4*, from left to right:

Figure 1-4 The Meter tab opens in the main display area

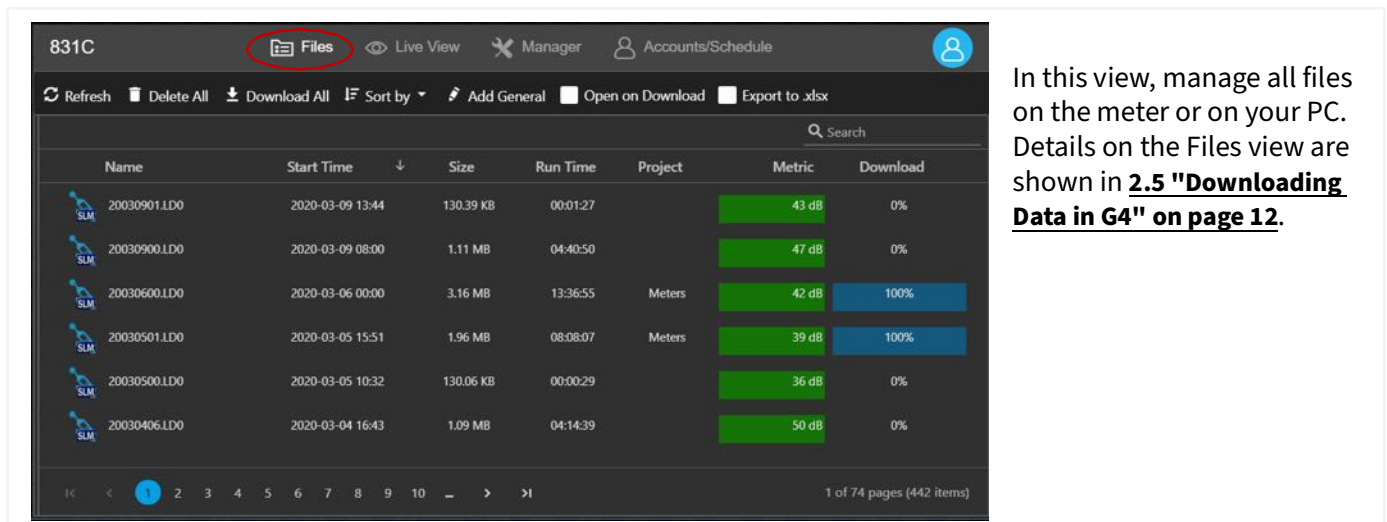


This section shows the features of the main display area for the SoundAdvisor 831C. Although views are much the same for other instruments, your screen may differ. To view specifics for your instrument, see the module that demonstrates your specific instrument (see Modules 7–11).

Files View Summary

With a meter tab open in the Tab Display, the Files view opens by default. Use this view to download, delete, export, and otherwise manage files on the meter and on your PC. *Figure 1-5* shows the 831C Files view as an example. Your display may differ.

Figure 1-5 Files View for SoundAdvisor 831C SLM

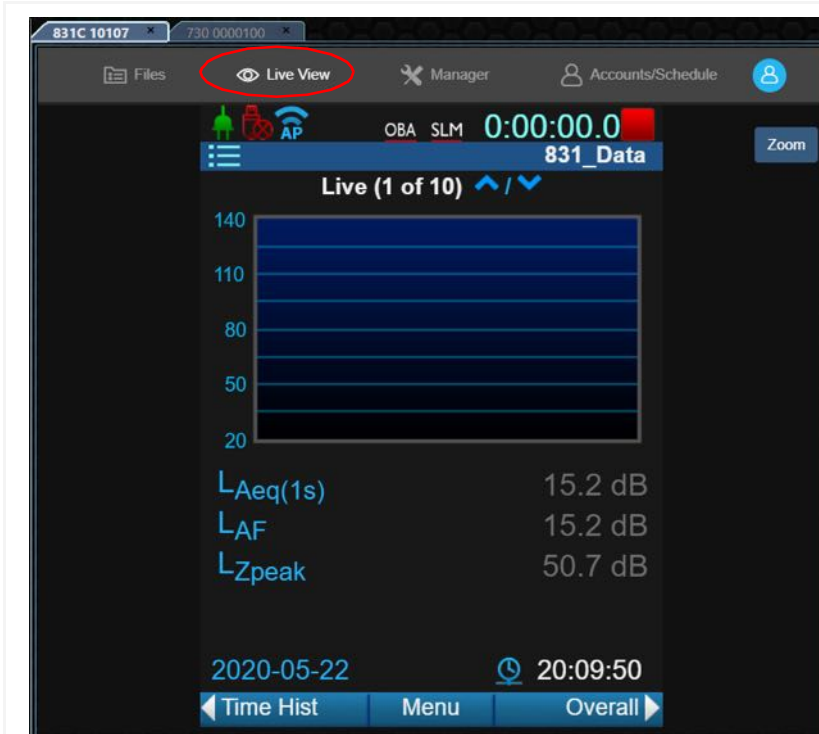


Name	Start Time	Size	Run Time	Project	Metric	Download
20030901.LDO	2020-03-09 13:44	130.39 KB	00:01:27		43 dB	0%
20030900.LDO	2020-03-09 08:00	1.11 MB	04:40:50		47 dB	0%
20030600.LDO	2020-03-06 00:00	3.16 MB	13:36:55	Meters	42 dB	100%
20030501.LDO	2020-03-05 15:51	1.96 MB	08:08:07	Meters	39 dB	100%
20030500.LDO	2020-03-05 10:32	130.06 KB	00:00:29		36 dB	0%
20030406.LDO	2020-03-04 16:43	1.09 MB	04:14:39		50 dB	0%

In this view, manage all files on the meter or on your PC. Details on the Files view are shown in **2.5 "Downloading Data in G4" on page 12.**

Live View Summary

Figure 1-6



With a meter tab open in the Tab Display, use the Live View to monitor or work with the meter just as you would if the meter was in hand. The Live View appears differently for each instrument. *Figure 1-6* shows the SoundAdvisor 831C Live View as an example.

Manager View Summary


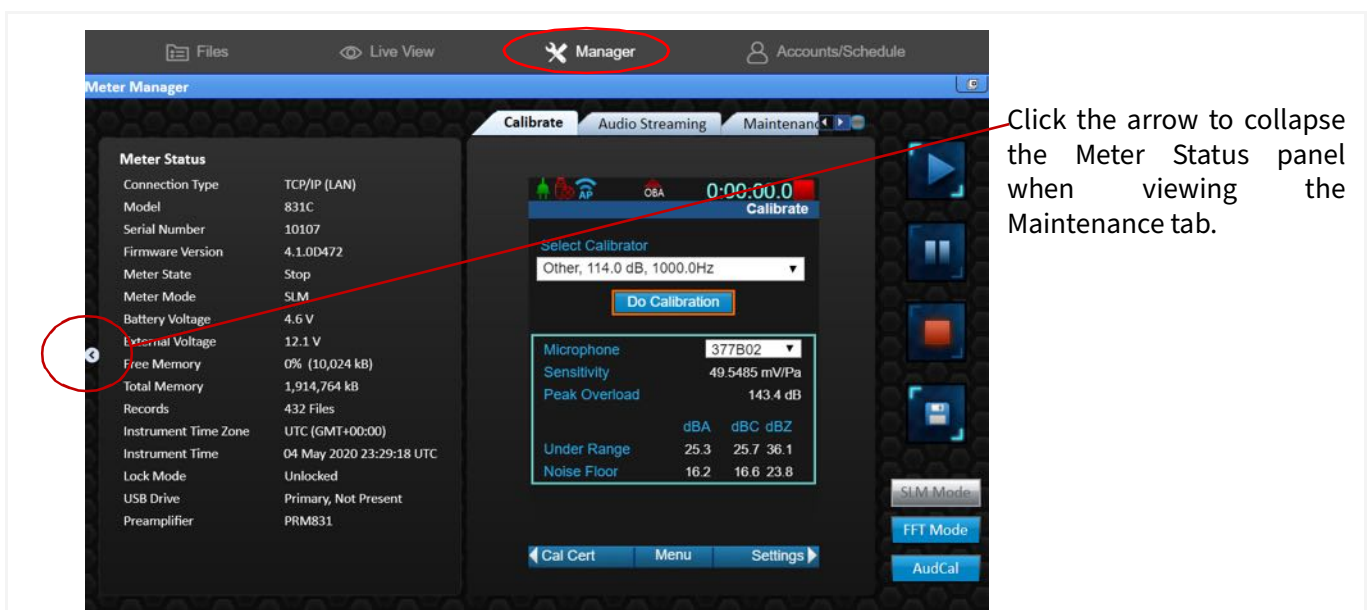
Use the Manager view (formerly the Meter Manager) to access meter specific functions, such as calibrating your meter, or streaming audio from the microphone. click on the name of your connected meter in the Meters Panel and choose  **Manager** from the Menu.

Figure 1-7 Manager View for SoundAdvisor 831C

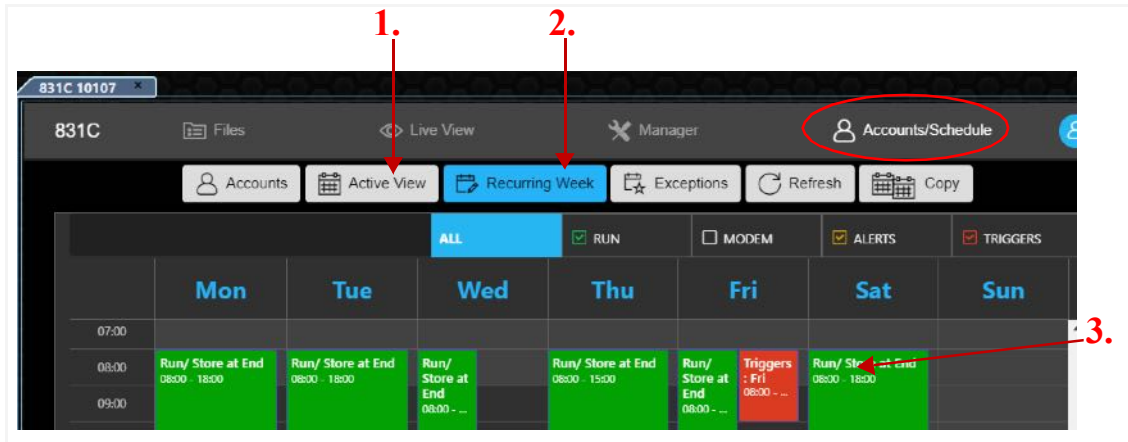


Click the arrow to collapse the Meter Status panel when viewing the Maintenance tab.

Accounts/Schedule View

This view is active only for SoundAdvisor 831C users when the Scheduling firmware option 831C-SCH is purchased and installed. For more information, see [Module 6 G4 Features for SoundAdvisor™ 831C](#).

Figure 1-8 Account Schedule View



- 1.** The **Active View** is “view-only.” You may not edit from this screen.
- 2.** To edit the schedule, choose **Recurring Week**.
- 3.** Items can be scheduled in 15 minute increments.

1.2 Supported File Types

G4 supports opening and working with the following Larson Davis file types:

- LDBIN, sound level meter files
- LDSYS, system properties files
- SLMDL, G4 Utility software files
- LD7, Spartan dosimeter files
- HVM1, HVM100 files
- HVM2, HVM200 and associated META files

When working with an HVM200 (HVM2) data file, G4 creates an associated META file, which encodes the changes and allows G4 to present them with each use.

- XLSX, or other MS Excel™-compatible files¹

1. See page i-2 for trademark and copyright information.

Module **2** Getting Started With G4 LD Utility

This module provides an overview of using G4 LD Utility to create, view, and process measurement data. Reviewing this module before proceeding to the module that refers to your specific meter (module 7–11) increases your understanding of G4 LD Utility.

In this module:

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2.3.2	Connecting the Meter to G4 via USB or Bluetooth	
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2.6.5	Exporting Data to a Spreadsheet by Using the Command Line	

2.1 Installing G4

Before you begin:

- Review G4 system requirements shown in *Table 2.1*.

Table 2.1 System Requirements

	Minimum	Recommended
Operating System	Windows 7	Windows 10 ² , 64-bit
Computer Processor	1.5 GHz	2 GHz
Computer Memory	4 GB	8 GB
Available Hard Disk Space	2 GB	2 GB
Screen Resolution	1024 X 768	1280 X 1024

Table 2.1 System Requirements (Continued)

USB Connection	Yes	Yes
Microsoft® Office	None	Excel® 2010 or later ¹
Broadband Internet	Required for remote Internet connections.	
¹ Recommended only if exporting data to Excel		
² Microsoft, Windows, and Excel are registered trademarks of Microsoft Corporation in the United States and in other countries.		

- Step 1.** To locate the most recent version of G4, navigate in a browser to www.LarsonDavis.com/G4.
- Step 2.** In the **Software** section, choose the version you need.
- Step 3.** The G4 installer downloads as a ZIP file to your PC.
- Step 4.** From the ZIP file, extract and run the EXE file. G4 creates a shortcut on the Desktop and a PCB Piezotronics folder on your Start Menu.

2.2 Upgrading Firmware and Firmware Options

APPLIES TO SLMs, 730 Dosimeter, HVM200, with G4 LD Utility version 4.5 or newer

To make use of G4 LD Utility features and functions, we recommend that you update your G4 software, then update your instrument firmware. The latest version of G4 contains the latest firmware for each instrument. If you need to install a firmware option, the process in G4 is similar to updating instrument firmware. For details on these processes, see **Module 4 Upgrading Software, Firmware, and Options**.

2.3 Connecting the Meter to G4

G4 Utility software connects Larson Davis instruments. Refer to the section below, which describes your meter connection.

In this section:

- **2.3.1 Connecting the Meter to G4 via IP Address**
- **2.3.2 Connecting the Meter to G4 via USB or Bluetooth**


2.3.1 Connecting the Meter to G4 via IP Address

APPLIES TO SLMs

When the SoundAdvisor 831C or Model 831-INT-ET is connected to a network and G4 is not able to automatically discover the meter, complete this process to establish a connection by using the meter's IP address.

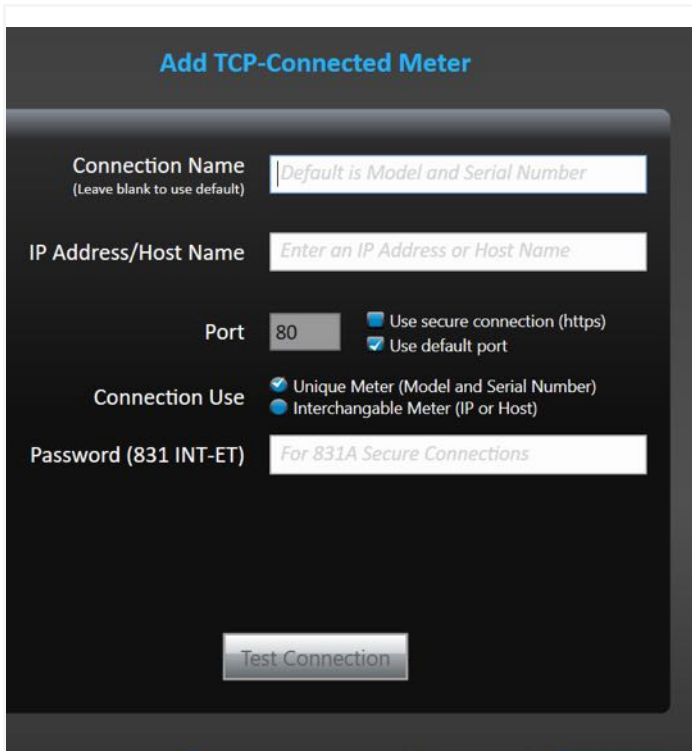
Before you begin:

- If you're using Model 831, connect an 831-INT-ET as shown in the *Model 831 Reference Manual*.

Step 1. In G4 in the Meters Panel, click the **menu icon**  in-line with **Meters**, and select **Add Meter** from the pop-up menu. This opens the Add TCP Connected Meter window.

Step 2. Enter information in the following fields, then click **OK**.

Figure 2-2 Adding a TCP/IP Connected Meter



- **IP Address/Host Name:** Enter the IP address of the instrument or meter.
- **Port:** Most users should leave this set to **Use default port**, unless instructed otherwise with the following circumstances:
 - To use network security on the meter with the secure port (Port 443), select the checkbox in-line with **Use secure connection (https)**. Port 443 is selected. For more information on G4 network security, see **Module 5**.
 - To designate a non-standard port, deselect both checkboxes and enter the **Port** number. Use this option only as directed by your IT professional.

- **Password:** If you're using Model 831 and 831-INT-ET, you may enter a password in this field. This field should not be used for the meter password.
- **Test Connection:** Enter the IP Address and press **Test Connection** to verify that G4 is communicating with the system. If no connection is established, verify the information you entered, or check with your IT professional.

2.3.2 Connecting the Meter to G4 via USB or Bluetooth

Larson Davis instruments connected via USB and Bluetooth (Spartan 730) connect automatically. The 831C is capable of making a WiFi connection when you insert a USB WiFi adapter in place of a USB cable.

For more information about connecting your instrument to G4 via these methods, refer to the instrument manual.

- In G4, go to **Help** → **Manuals**, and select the manual for your instrument.
- At www.LarsonDavis.com, go to **Support** → [select your product and model] → **Documentation**.

2.4 Creating a Measurement Setup and Making a Measurement

APPLIES TO All instruments

Prior to making a measurement with Larson Davis instruments, use G4 to easily define measurement parameters, required statistics, and the contents of the resulting data file.

The G4 measurement configuration (Setup) is customized for each instrument and measurement type. Modules 7–11 of this manual are example applications for each measurement type. Refer to the module which describes your measurement type for details and recommendations to make full use of your instrument.

2.5 Downloading Data in G4

APPLIES TO All instruments

G4 LD Utility was created to help you visualize, modify, display, and export your measurement data. The remaining sections of this module (2.6–2.7) demonstrate these capabilities.

In this section:

- [2.5.1 Using the G4 Files View to Download Data Files](#)
- [2.5.3 Adding General Information to Create Search-able Data Files](#)
- [2.5.4 Opening a File Saved On Your PC](#)

2.5.1 Using the G4 Files View to Download Data Files

The G4 Files view allows you to download files stored on a meter, access files that have been Auto-downloaded, and access files that have been imported.

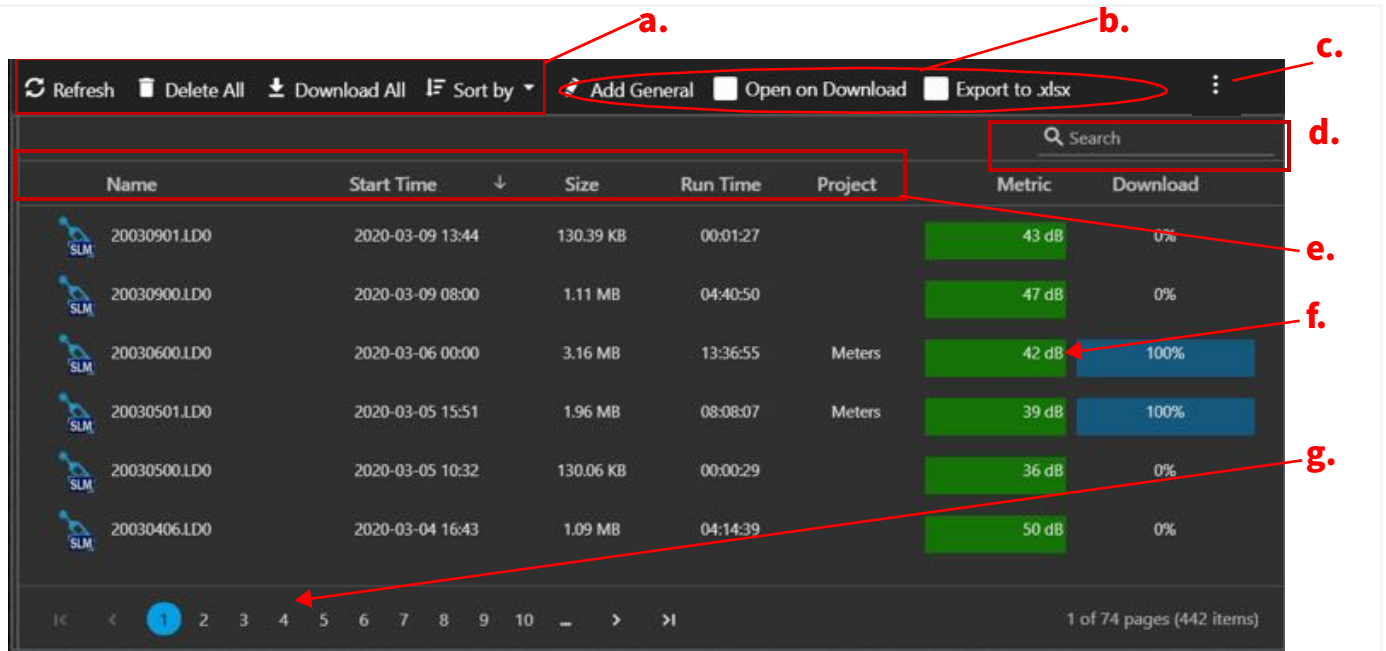
Images in the following example show the **Files** view for SoundAdvisor 831C. While the features are similar for other instruments, your display may differ slightly.

Before you begin:

- For download, establish a meter connection in G4.

Step 1. In G4, click on the name of your connected meter in the Meters Panel or Projects Panel. This opens the meter tab showing the Files view as shown in *Figure 2-3*.

Figure 2-3 G4 Files View for SoundAdvisor 831C

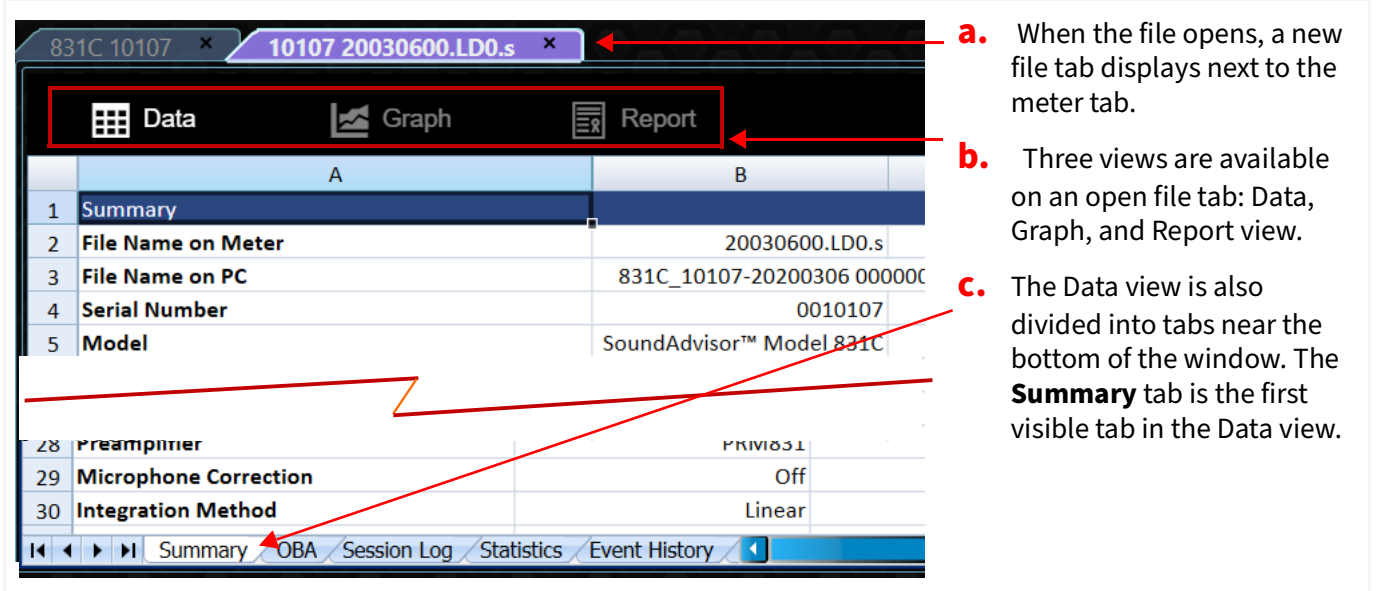


- a.** The Files view menu bar provides the following options for all files in the view: **Refresh**, **Delete All**, **Sort By**. Note: **Delete All** is not available when the meter is running.
- b.** For files you select in the list, the Files view menu bar provides these options: **Add General**, **Open on Download**, **Export to XLSX**. Note: **Open on Download** is not available when using auto-download.
- c.** When your G4 window is too narrow to display the whole menu bar, the **More Options icon** appears to provide access to all menu items.
- d.** In the **Search** bar, enter a keyword, project, file name, or date to display only files with those matching terms in the file list. Clear the Search bar to display the full list again. For details on this feature, see [2.5.3 Adding General Information to Create Search-able Data Files](#).
- e.** Click on any of these column headings to sort files according to that column.
- f.** Note: Values in the **Metrics** column do not display until the file is downloaded.
- g.** Access additional pages here when the number of files exceeds the first page.

Step 2. If a file shows **0%** in the **Download** column, double-click it; the download begins.

Step 3. Once the file is downloaded, double-click it; the file opens as a new tab in the Tab Display as shown in *Figure 2-4*.

Figure 2-4 Introduction to the File Tab



- a. When the file opens, a new file tab displays next to the meter tab.
- b. Three views are available on an open file tab: Data, Graph, and Report view.
- c. The Data view is also divided into tabs near the bottom of the window. The **Summary** tab is the first visible tab in the Data view.

Step 4. If you enabled Measurement History in the measurement setup (configuration), select the **Measurement History** tab near the bottom of the window to view associated data.

For the measurement shown in *Figure 2-5*, the data was stored every hour as a measurement history interval (record). Scroll to the right in G4 to view the **Sound Exceedance Count, Duration, Overloads, Trigger Sources and Levels**, and **OBA Statistics** columns. Your data may differ from what's shown here depending on your firmware, options, and settings.

Figure 2-5 Data View, Measurement History tab

	A	B	C	D	E	F	G	H	I	J
1	Record #	Date	Time	Run Duration	Run Time	Pause	LAeq	LAE	LASmin	LASmin Time
2	1	2017-05-05	02:01:46	00:58:13.9	00:58:13.9	00:00:00.0	37.5	73.0	32.5	02:59:09
3	2	2017-05-05	03:00:00	01:00:00.0	01:00:00.0	00:00:00.0	34.0	69.5	32.8	03:13:29
4	3	2017-05-05	04:00:00	01:00:00.0	01:00:00.0	00:00:00.0	34.0	69.6	32.8	04:38:38
5	4	2017-05-05	05:00:00	01:00:00.0	01:00:00.0	00:00:00.0	34.0	69.6	32.8	05:11:33
6	5	2017-05-05	06:00:00	01:00:00.0	01:00:00.0	00:00:00.0	34.5	70.0	33.1	06:07:32
7	6	2017-05-05	07:00:00	01:00:00.0	01:00:00.0	00:00:00.0	34.9	70.5	33.2	07:39:34
8	7	2017-05-05	08:00:00	01:00:00.0	01:00:00.0	00:00:00.0	51.5	87.0	33.1	08:15:07
9	8	2017-05-05	09:00:00	01:00:00.0	01:00:00.0	00:00:00.0	48.9	84.5	33.2	09:43:50
10	9	2017-05-05	10:00:00	01:00:00.0	01:00:00.0	00:00:00.0	51.6	87.1	33.6	10:25:55
11	10	2017-05-05	11:00:00	01:00:00.0	01:00:00.0	00:00:00.0	51.9	87.5	32.9	11:52:26
12	11	2017-05-05	12:00:00	01:00:00.0	01:00:00.0	00:00:00.0				3:31
13	12	2017-05-05	13:00:00	00:57:40.2	00:57:40.2	00:00:00.0				9:09

A red circle highlights the last two rows of the table, with an arrow pointing to the right. The text 'Scroll to the right to view additional data.' is written inside the circle.


Step 5. From the open File tab, click the  **Graph** view to display it as shown in *Figure 2-6*. Graph view is only available when you enable Time History in the measurement setup. (The specifics of your graph will differ.)

Figure 2-6 Open File tab, Graph View









- a.** The values panel follows the cursor and displays levels for where you place the mouse arrow.
- b.** Graphing Tools. See *Table 2.7 Graphing Tool Descriptions*.
- c.** In this example, each purple, vertical line (and related icons above the graph) indicates a measurement event and a sound record was taken.

About G4 Graphing Tools

G4's Graphing tools display in the top right of the Graph view.

Table 2.7 Graphing Tool Descriptions

Tool	Description
Audio Playback 	The icon displays from gray to green when a saved sound recording is playing.
Edit Bands 	Select and drag the Edit Bands tool over the graph to create an edit band. Data in the edit band can be excluded from the original data or given a decibel offset. When an Edit Band is created, the "Modified Data" section is added to the Summary tab of the  Data view.
Zoom 	Select and drag the cursor to zoom in on that portion of a graph. When a report is created while zoomed in, this is the view that appears on the report. Click the Reset Zoom button in the upper right to reset the view.
Graph Menu 	Use options in the Graph menu to customize the graph display.

Step 6. Click the  **Report** view to display a measurement summary in PDF format with official reporting statistics.

2.5.2 Utilizing G4 Auto-Download

APPLIES TO all instruments

The G4 Auto-download feature downloads data files from connected meters without user interaction. When G4 is running and a meter is connected and active, G4 automatically downloads all files that have not been downloaded previously. There are 2 exceptions to this:

- Auto-download won't begin, or is interrupted, while the meter tab is open in the Tab Display. To resume auto-download, close the meter tab.
- You can also configure G4 Auto-download to only download from a specific meter, or to ignore a specific meter, as shown in this section.

Using Auto-Export with Auto-Download

Before the auto-download begins, you may also select automatic export settings to export the data file to XLSX, JSON, and CSV. To do this, enable auto-download as shown in this section, then review [2.6 Exporting Data to Other Formats](#).

Before you begin:

- Establish a meter connection in G4.
- Set the location for your downloaded files. See “Downloaded Files Base Folder” in [A.2.1 File Options on page A-3](#).

Step 1. In G4, go to **Tools** → **Options**, and select the **Auto Download** tab.


Step 2. Select the checkbox in-line with the setting:


Automatically Download From All Spartan Dosimeters and SLMs Not Listed Below

Step 3. (Optional) If you want to exclude one or more meters from Auto-download, complete steps 3a–3c.

Creating a Meter Exception to Auto-Download

a. For each meter you want excluded from Auto-download, connect the meter in G4.

If needed, click  **Discover Meters** so that the meter displays as active in the Meters or Projects Panel.

b. Click the **blue plus icon**  in-line with **Add Individual Case**, and select a connected meter from the **Meter Name** drop-down menu.

c. If needed, repeat step b. for additional meters.

Step 4. Click **Save**, then click **OK** to confirm your choice.

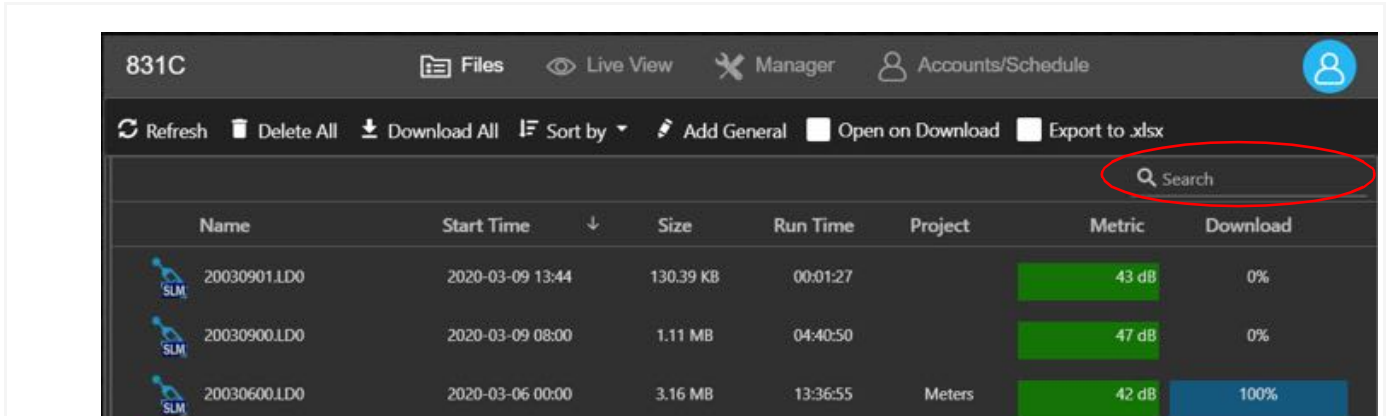
Step 5. Restart G4 for these settings to take effect.

2.5.3 Adding General Information to Create Search-able Data Files

APPLIES TO SLMs and Spartan Model 730

G4 version 4.5 + provides a helpful search bar on the open Meter tab in the Files view.

Figure 2-8 Search Bar on the Meter Tab Files View for 831C



G4 searches the file's general information (Notes), filename, time stamp information, meter name, and project name and returns all matching files in the file list. Clear the search bar to return to the original file list. This section shows how to add general information, or Notes, to your data files prior to and following download.

In this section:

- **Adding General Info Prior to File Download**
- **Adding General Info After File Download**

Adding General Info Prior to File Download

The Add General feature is an easy way to add keywords or other info identifying information to files. Because the Add General field appends this information to data files as they download to your PC, complete this process before making a measurement if auto-download is enabled, or just before downloading files when auto-download is not enabled.

Before you begin:

- Connect the meter to your PC. For details, see section **2.3 "Connecting the Meter to G4" on page 10.**

Step 1. In G4, click on the name of your connected meter in the Meters Panel or Project Panel. The meter tab opens on the right.

Step 2. Click  **Add General**, enter desired information, and click **OK**.

Step 3. Disconnect the meter and make a measurement.

Step 4. Reconnect your meter in G4. Each file downloaded contains the general information you entered.

Step 5. Click **Add General** and click **Clear**, or enter identifiers for the next measurement.

Adding General Info After File Download

G4 enables you to add information, such as keywords or other identifying terms, to a previously downloaded file. Files with this information are easy to locate by using the search bar in the top right of the open meter tab on the Files view.


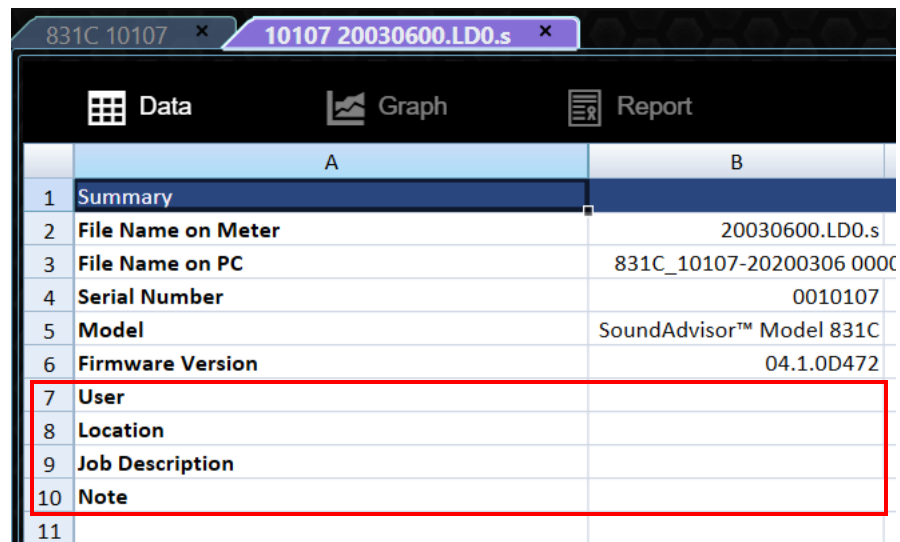

- Step 1.** In G4, open a data file on your PC (**File**→**Open a Data File**) or from a connected meter. The file tab opens on the  **Data** view **Summary** tab.
- Step 2.** Add a **User**, **Location**, **Job Description**, or **Note** in the Summary section, as shown in *Figure 2-9*.

Figure 2-9 Open File on the Data View Summary Tab



	A	B
1	Summary	
2	File Name on Meter	20030600.LD0.s
3	File Name on PC	831C_10107-20200306 0000
4	Serial Number	0010107
5	Model	SoundAdvisor™ Model 831C
6	Firmware Version	04.1.0D472
7	User	
8	Location	
9	Job Description	
10	Note	
11		

- Step 3.** Click **File**→**Save SLM File** or **Save Spartan File**, depending on the file type.
- Step 4.** Close the file and the meter tab (if applicable).
- Step 5.** In the Meters Panel or Project Panel, click on the connected meter to open the meter tab. G4 displays the meter tab on the Files view.
- Step 6.** In the top-right  **Search** field, enter one or more identifying terms. The corresponding files display in the file list.
- Step 7.** Clear the Search bar to display to the original file list.

2.5.4 Opening a File Saved On Your PC

- Step 1.** To open a file saved on your PC, in G4 go to **File**→**Open a Data File**, and select the file type from the pop-up menu. This opens a file explorer window.

- Step 2.** Navigate to the location of the downloaded file on your PC, select it and click **Open**.

Recommended Next Step:

- [2.6.4 Exporting Data to a Spreadsheet When the File is Open in G4](#)

2.6 Exporting Data to Other Formats

APPLIES TO All meters

G4 offers four methods to export data to a spreadsheet in addition to other formats as shown in this section.

In this section:

- [2.6.1 Utilizing Automatic Export to Multiple Formats With Auto-Download](#)
- [2.6.3 Exporting Data to a Spreadsheet When Utilizing Manual Download](#)
- [2.6.4 Exporting Data to a Spreadsheet When the File is Open in G4](#)
- [2.6.5 Exporting Data to a Spreadsheet by Using the Command Line](#)

2.6.1 Utilizing Automatic Export to Multiple Formats With Auto-Download

TAKE NOTE As described in the meter-specific modules in this manual (modules 7–11), this process is best completed immediately following the measurement setup and prior to making the measurement.

Before you begin:

- Connect your meter in G4.

- Step 1.** You may also choose to automatically export all downloaded files to XLSX, JSON, or CSV by doing the following:

Utilizing Automatic Export for Downloaded Files

- a. In G4, choose **Tools** → **Options**.
- b. On the **File Options** tab, locate **Export on Download**, and select checkboxes in-line with the export formats you want to create.
- c. Click **Save** to save and close the G4 Options window.
- d. Restart G4 to utilize the new file options.

2.6.2 Exporting Data to a Spreadsheet When Utilizing Auto-Download


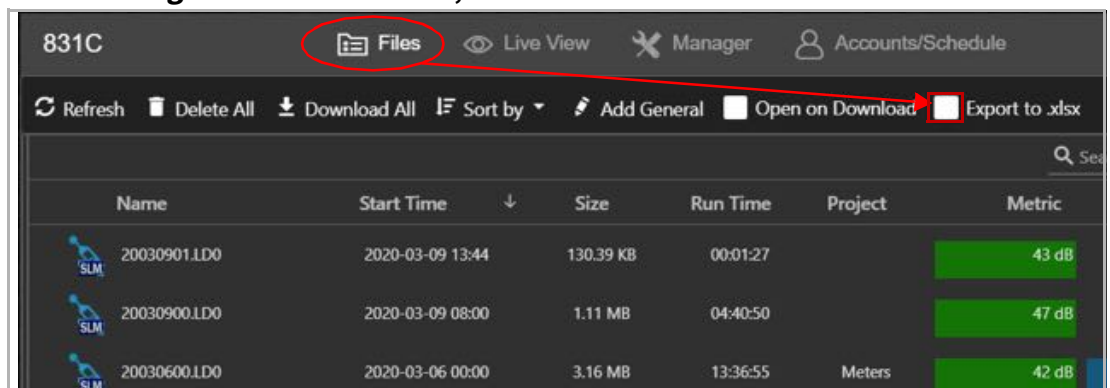
- Step 1.** In G4, open the meter tab.
- Step 2.** In the  **Files** view, select the checkbox in-line with **Export to XLSX** prior to downloading. As a result, Auto-download creates an XLSX file with the same name as the downloaded data file. Both files appear in the downloaded file location. The default location is set in **Tools** → **Options** → **File Options**, **Downloaded Files Base Folder**.


Figure 2-10 Meter Tab, Files View



2.6.3 Exporting Data to a Spreadsheet When Utilizing Manual Download

- Step 1.** Click on the name of your connected meter in the Meters Panel. The meter tab opens in the main tab display in the **Files** view.
- Step 2.** Select the checkbox in-line with **Export to XLSX**.
- Step 3.** Select the file or files you want to download, then click **Download**. The resulting XLSX file displays below the downloaded data file in the default downloaded file location.

2.6.4 Exporting Data to a Spreadsheet When the File is Open in G4

This is an alternative method to utilizing the **Export to XLSX** command from the  **Files** view. This method also allows you to save the exported data in a location other than the default downloaded file location.

- Step 1.** With the data file open in G4, choose **File** → **Export to Spreadsheet**.
- Step 2.** In the file explorer window that opens, choose the location to save the file.
- Step 3.** Give the file a descriptive name, if desired, and then click **Save**.

2.6.5 Exporting Data to a Spreadsheet by Using the Command Line

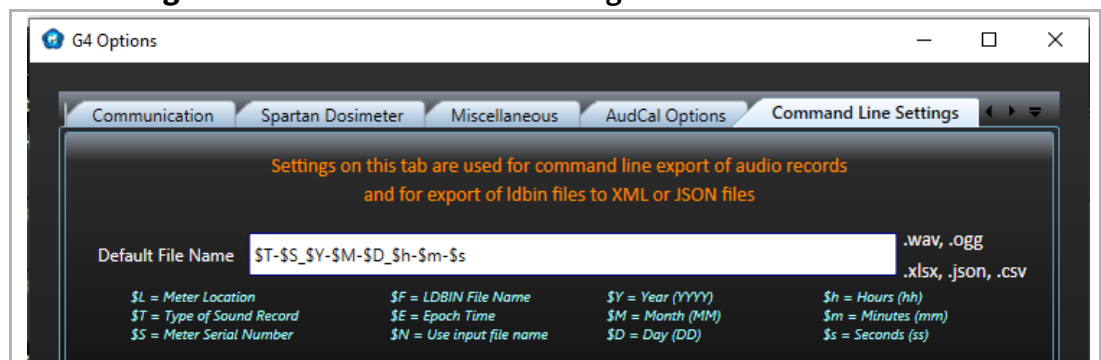
This section shows how G4 works with command-line parameters to export LDBIN files to XLSX format.

Before you begin:

- Connect your instrument in G4 and download the LDBIN file(s).

Step 1. In G4, navigate to **Tools** → **Options**, and select the **Command Line Settings** tab. Here you can define your a naming convention for extracted files.

Figure 2-11 Command Line Settings



Step 2. Define the extracted file naming convention:

- a. Enter the desired file name codes in the **Default File Name** field.

Example: “\$L_ \$E_ \$T” results in this filename: 03_1497891141_Measurement-11.00.xlsx

- The **Default File Name** in your G4 Command Line Settings window shows another example filename (see also *Figure 2-11*).
- We recommend that you include the incremental number in case a filename is repeated.
- You may also add specific text you want to appear in the name.

Step 3. Enter the default paths for the following and click **Save**.

- Default Input Location of LDBIN Files to Export
- Default Output Location for Exported Files

TAKE NOTE While the file paths can be specified in the command line itself, defining it here removes the need to define it in the command line.

Step 4. Verify that the input LDBIN file is downloaded to your PC.

Step 5. Open your PC’s **Command Prompt**.

Step 6. Using the prompt, navigate to the location of your “G4.exe” file.

TAKE NOTE The default location is “C:\Program Files\PCB Piezotronics\G4.”

Step 7. Enter either the Long form or the Short form command line as follows:

Figure 2-12

Table 2.1

Command	Parameter (optional)
-exportxlsx (Short form) -ex	none
-inputFile (Short form) -if	file name (when using the default location defined in step 3) Include the complete path or no path.
-destFolder (Short form)-df	(Optional) path for destination folder. If you omit this command, the default location you set in step 3 applies. If the folder you specify does not exist, G4 creates it.

• **Long form Parameters:**

G4 -exportxlsx -inputFile [path and/or] filename]
-destFolder [output directory]

Example: -exportxlsx -inputfile "c:\temp\LDBIN
Files\Airplane.ldbin" -destfolder "c:\temp\XLSX Files"

• **Short form Parameters:**

G4 -ex -if [file name]

Example:

G4 -ex -if "03_SLM_10107_17061900_LD0.ldbin"

LEARN MORE You can find more information on this and other file export commands when you request the G4 SDK documentation from Larson Davis.

Module **3** Working With Data Files in G4

This module helps you to quickly begin using G4’s file utility features to organize and otherwise work with data files—some of the most valuable and time-saving features it provides. For best results, complete the steps in **Module 2 Getting Started With G4 LD Utility**, then proceed to these sections in the order they’re presented.

In this module:

3.1	Graphing Large Data Files	-23
3.2	Creating an Edit Band	-24
3.3	Viewing the SLM Measurement Report	-24
3.4	Packaging Settings and Properties for SLM and HVM	-24
3.4.1	Saving SLM Settings to a File	
3.4.2	Pushing a Measurement Setup to Multiple Meters for SLM	
3.4.3	Pushing Settings to Selected Meters for Dosimeters	
3.4.4	Saving Instrument Settings to Your PC	
3.4.5	Extracting Properties from a Setup File	
3.4.6	Exporting Instrument Properties From Your PC to a Meter	
3.5	Options for Deleting Files	-29
3.6	Importing Data, Archive, or Legacy SLMDL Files	-31
3.7	Accessing Audio Files in G4	-31
3.7.1	Accessing Your Dosimeter Sound Recording Files	
3.7.2	Listening to SLM Sound Recordings	
3.7.3	Streaming Audio from the SLM	
3.7.4	Exporting Audio Files by Using the Command Line	
3.8	Exporting Data to a Spreadsheet by Using the Command Line	-37

3.1 Graphing Large Data Files

A measurement with many, frequent Time History and Measurement History samples can result in a very large data file. Enabling the OBA feature in addition can further increase the file size.

Rendering graphs for this kind of measurement in G4 may take longer than expected. If this is the case, G4 may display a dialog box that prompts you to select a portion of the full measurement to graph.

If the file contains more than 400,000 Time History records, G4 prompts you to select a portion of the data to graph.

To do this, enter a **Start Time** and an **End Time** in the following format: **yyyy/MM/dd HH:mm:ss**. Choosing a Start Time does not affect the spreadsheet or other Time History data.

3.2 Creating an Edit Band

APPLIES TO 730 Dosimeter and SLMs

The edit band tool allows you to select a period of data and either exclude it from the report or add a decibel offset (+/-).

LEARN MORE For more information, see the following sections:

- ["Using Automatic Exclusion for Bump Events in G4" on page 137](#)
- ["Creating an Edit Band Exclusion in G4" on page 138](#)

3.3 Viewing the SLM Measurement Report

APPLIES TO SLMs

You can generate a report from the following locations:

- **File** → **Open Data File** → **Report**
- **File** → **Generate SLM Report** generates a report for the open, selected file tab.
- Open a data file by using any method, navigate to the Time History Graph, and choose "Generate Report" from the **Graph menu** ☰ .

The report includes SLM data and modified data. When Time History is enabled, the Time History graph also appears. You can choose to create a PDF to save or share.

Figure 3-1 Generated SLM Report



3.4 Packaging Settings and Properties for SLM and HVM

APPLIES TO 831C, Model 831, LxT, and HVM

G4 file utility features enable you to export, import, or extract a settings file. Once packaged, you can choose to push the settings to one or more connected meters, or to share the file with another user via email, SFTP, or cloud storage.

G4 also enables you to package the system properties of a meter in a file, then push it to one or more connected meters. This feature simplifies the process of setting up multiple meters for a common project or purpose.

The saved file can also be shared via email, or uploaded to an SFTP or cloud storage account. Complete the applicable segments of this section that apply to your instrument.

In this section:

- [3.4.1 Saving SLM Settings to a File](#)
- [3.4.2 Pushing a Measurement Setup to Multiple Meters for SLM](#)
- [3.4.3 Pushing Settings to Selected Meters for Dosimeters](#)
- [3.4.4 Saving Instrument Settings to Your PC](#)
- [3.4.5 Extracting Properties from a Setup File](#)
- [3.4.6 Exporting Instrument Properties From Your PC to a Meter](#)


3.4.1 Saving SLM Settings to a File

APPLIES TO 831C, Model 831, and LxT instruments

When you create a measurement setup, that configuration is only available on that meter. Use this process to save it to a portable file format that can be saved to your PC or to other meters.

Step 1. In G4, click **Setup Manager** in the top toolbar.

Step 2. On the right side (meter side), select a meter from the blue meter selection drop-down menu.

Step 3. In the Setup Manager file list for that meter, click to highlight a Setup file, then click the **left transfer arrows**  to move the file to the left side (PC side). This opens the File Name window.

Step 4. Enter a unique, identifying file name and click **OK**. The Setup file appears in the file list on the PC side.

Recommended next step:

- To push the Setup to other meters, see [3.4.2 Pushing a Measurement Setup to Multiple Meters for SLM](#).

3.4.2 Pushing a Measurement Setup to Multiple Meters for SLM

APPLIES TO 831C, Model 831, and LxT instruments

G4 enables you to push a measurement setup file to multiple meters, and set it as the active setup in one process. If a measurement is in progress during the push, the measurement stops then resumes using the new setup.

Before you begin:

- Save a measurement setup file on your PC as shown in [3.4.1 "Saving SLM Settings to a File" on page 25](#) or [3.4.4 Saving Instrument Settings to Your PC](#).
- Establish a meter connection (for each meter) in G4.
- If you're using network security (HTTPS) in G4, log in to each meter you are pushing settings to.

Step 1. In G4, select the **Setup Manager**.

Step 2. On the PC side (right side) of the Setup Manager, select the instrument you are working with from the blue drop-down menu. (Ex: **SoundAdvisor Model 831C Settings in PC**), then select the Setup file you want to push from the file list below.

Step 3. On the meter side (right side), select **Selected Meters** from the blue drop-down menu near the top. Also, if you want the Setup to become immediately active on the meter, select the checkbox in-line with **Set Measurement Properties to Active**.

Step 4. In the Meters Panel (or Projects Panel) on the far left, verify that each meter (or Project) you want to push the Setup to is selected.

Step 5. Click the **right double arrow button**  to transfer the Setup file.

Step 6. In the pop-up window, enter a unique name for the Setup file and click **OK** to continue. G4 displays the transfer status in the right side (Meter side).

3.4.3 Pushing Settings to Selected Meters for Dosimeters

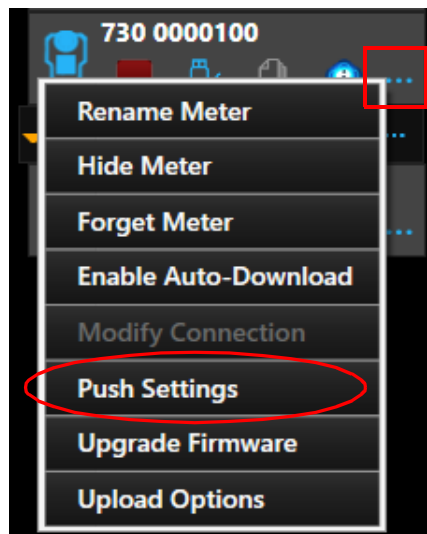
APPLIES TO Spartan 730 and 730IS

Before you begin:

- Establish a meter connection in G4.

- Step 1.** In the G4 Meters Panel, in-line with your connected meter, click the **menu icon** (three dots) and select **Push Settings**.

Figure 3-2 Pushing Dosimeter Settings to Multiple Meters



- Step 2.** In the window that opens, select the checkbox in-line with meters you want to update.
- Step 3.** Click **Select Settings File**.
- Step 4.** In the File Explorer window that opens, select a Setup file and click **Open**.
- Step 5.** Select **Push to Meters**. If there's a measurement in progress, the measurement stops and resumes using the new settings.

3.4.4 Saving Instrument Settings to Your PC

APPLIES TO SLM 831, 831C, and LxT instruments

Use this process to save a copy of the current instrument settings and properties to a new measurement setup file saved on your PC.

- Step 1.** In G4, go to the **Setup Manager**.
- Step 2.** On the meter side (right side), select a meter from the meter selection drop-down menu at the top.
- Step 3.** Select **File** → **Instrument Settings & Properties** → **Import to PC**.
- Step 4.** A dialog box displays all files on the currently selected meter. Choose the file with settings you want to import and click **Open**.

3.4.5 Extracting Properties from a Setup File

APPLIES TO SLM 831, 831C, and LxT instruments

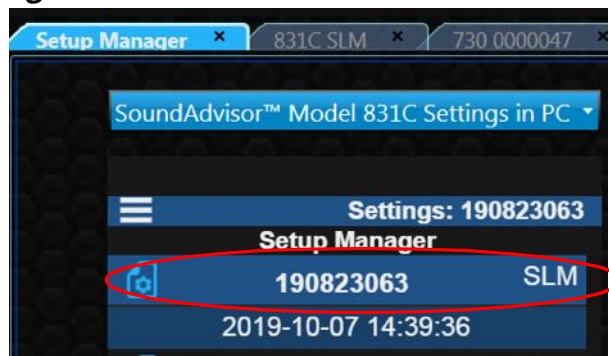
Use this process to create a copy of the measurement setup properties used for a previous measurement. The result is a new Setup file, which you can save to your PC or to another meter.

- Step 1.** In G4, go to **File** → **Instrument Settings & Properties** → **Extract Settings From File**.
- Step 2.** In the File Explorer window that opens, select the measurement setup file to extract, and click **Open**. G4 displays a success message.
- Step 3.** As directed, rename the extracted file.

Renaming the Extracted File

- a. With the meter connected in G4, click **Setup Manager** in the top toolbar. This opens the Setup Manager tab.
- b. Right-click the newly extracted file, which displays at the top of the list of Setups, and select **Save As** from the pop-up menu that appears.

Figure 3-3



- c. Enter a unique filename in the **Save As** field and click **OK**.

LEARN MORE G4 also enables you to push measurement settings to multiple connected meters. For more information on this feature, see section [3.4.3 Pushing Settings to Selected Meters for Dosimeters](#).

3.4.6 Exporting Instrument Properties From Your PC to a Meter

APPLIES TO This feature only works with SLM 831C, 831 and LxT instruments.

Use this process to set the system properties for one or more meters simultaneously.



Before you begin:

- Establish a meter connection (for each meter) in G4.
- Verify that the meter firmware is updated.
- If you're using network security in G4, log in to each meter you are pushing settings to.

Step 1. In G4, select the **Setup Manager**.

Step 2. On the PC side (left side) of the Setup Manager, select the instrument you are working with from the blue drop-down menu. (Ex: **SoundAdvisor Model 831C Settings in PC**).

Step 3. Click the **System Properties button** . The PC side (left side), displays the default System Properties.

Step 4. Use the **right or left arrows**   to access and edit values on any of the following system property pages:

- Device
- Time
- NTP
- Power
- Preferences
- Locale
- Displays
- Options
- Email
- Other
- Ref Spectra

Step 5. On the meter side (right side), choose **Selected Meters** from the blue drop-down near the top.

Step 6. In the Meters Panel (or Projects Panel) on the far left, verify that each meter (or Project) that you want to push these System Properties to is selected.

Step 7. Click the **right double arrow button**  to transfer properties. G4 displays the transfer status for each meter on the Meter side (right).

3.5 Options for Deleting Files

G4 version 4.6.5 and newer provides the following options when deleting files.

In this section:

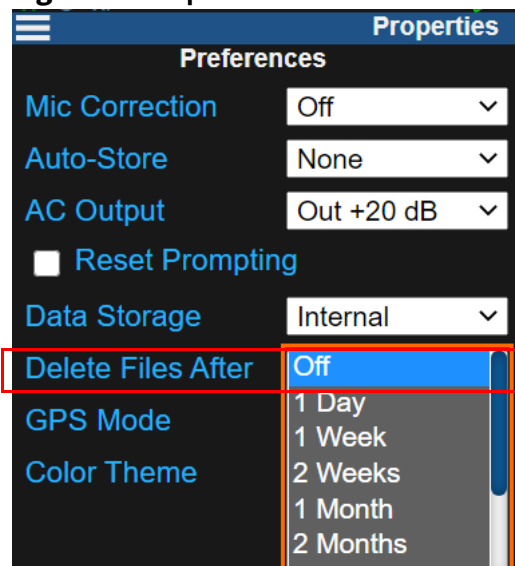
- Automatically Delete Files After
- Send Deleted Files to Recycle Bin

Automatically Delete Files After

When enabled, the SoundAdvisor 831C checks the age of all files once every 24 hours and to automatically deletes files older than the value you select. This feature is disabled by default. To edit the setting in G4, do the following:

- Step 1.** Select the meter  **Live View** →  **Tools** menu.
- Step 2.** Press the **right arrow**  to select the **Preferences** page.
- Step 3.** Select an option from the **Delete Files After** drop-down menu.

Figure 3-4 Options for Delete Files After



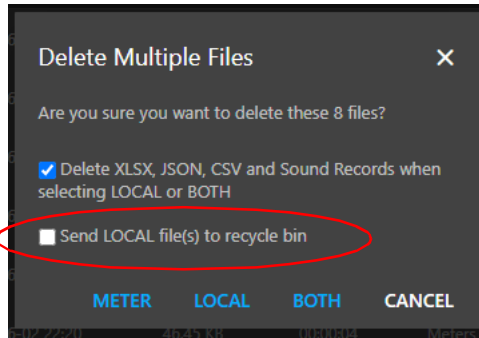
Send Deleted Files to Recycle Bin

When enabled, G4 sends all deleted files to the Windows Recycle Bin instead of completely deleting them. This feature is enabled by default. To locate the setting in G4, do the following:

- Step 1.** In G4, select **Tools** → **Options** → **File Options**.
- Step 2.** In-line with **When Deleting Files**, select or deselect the checkbox; then click **Save**.

TAKE NOTE Additionally, each time you select files to delete from the Files view, you have the option to select the checkbox in-line with **Send LOCAL Files to the Recycle Bin**.

Figure 3-5 Options When Deleting Files in the Files View




3.6 Importing Data, Archive, or Legacy SLMDL Files

Utilize the process in this section to import these file types:

- Meter measurement files stored on a USB drive
- Archive files
- Legacy SLMDL files (created by SLM Utility G3 software)

Importing a data file not only saves it to your PC, but also enables you to quickly export one or many files to a spreadsheet or other format.

Step 1. In G4, choose **File** → **Import Files** and select **USB Drive** or **Legacy Slmdl**.

Step 2. In the window that opens, locate and open the file from the location on your PC or on the inserted USB drive. The imported files display in the  **Files** view as saved on your PC.

TAKE NOTE You can locate the imported file in the applicable meter serial number folder in the Meters folder on your PC. Prior to G4 version 4.6.5, these files were saved in the Imported folder.

Recommended Next Step:

- [2.6 Exporting Data to Other Formats](#)

3.7 Accessing Audio Files in G4

In this section:

- [3.7.1 Accessing Your Dosimeter Sound Recording Files](#)
- [3.7.2 Listening to SLM Sound Recordings](#)

- [3.7.3 Streaming Audio from the SLM](#)
- [3.7.4 Exporting Audio Files by Using the Command Line](#)

3.7.1 Accessing Your Dosimeter Sound Recording Files

APPLIES TO Spartan 730 Dosimeter

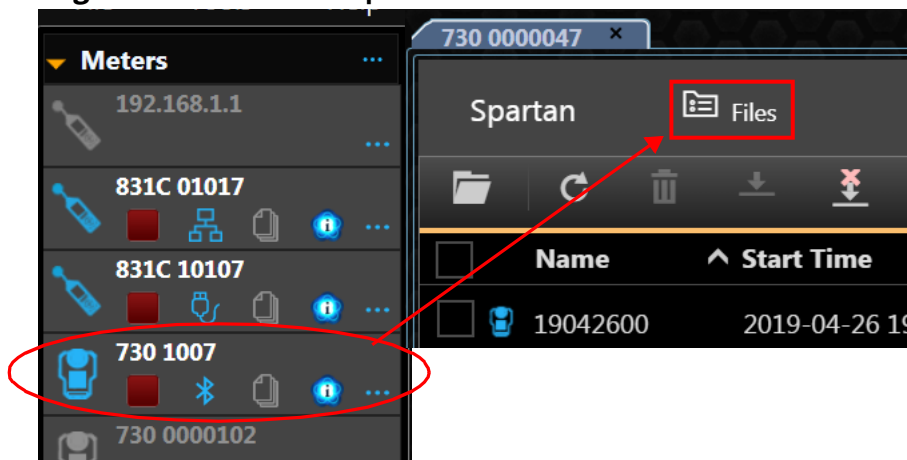
When you purchase the add-on sound recording firmware option (730-ESR), you can access the event sound recording files for a measurement on the Session Log tab of the Data view.

Before you begin:

- Connect your dosimeter to G4. For more information see [2.3 Connecting the Meter to G4](#).

Step 1. In the Meters panel, click on your connected meter. This opens the Meter tab in the **Files** view.

Figure 3-6 Files View Opens in G4

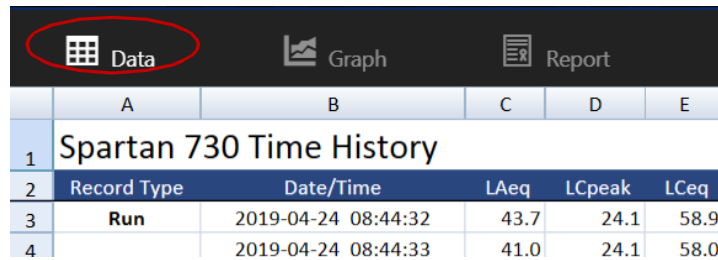


Step 2. Double-click a file with at least one recorded sound event. This opens the file in the **Data** view.



If auto-download is not enabled, the first double-click downloads the file. Double-click the file again to open the file on the **Data** view.

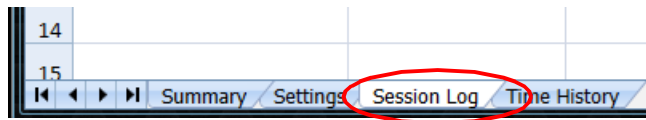
Figure 3-7 Spartan File Open in the G4 Data View



	A	B	C	D	E
1	Spartan 730 Time History				
2	Record Type	Date/Time	LAeq	LCpeak	LCeq
3	Run	2019-04-24 08:44:32	43.7	24.1	58.9
4		2019-04-24 08:44:33	41.0	24.1	58.0

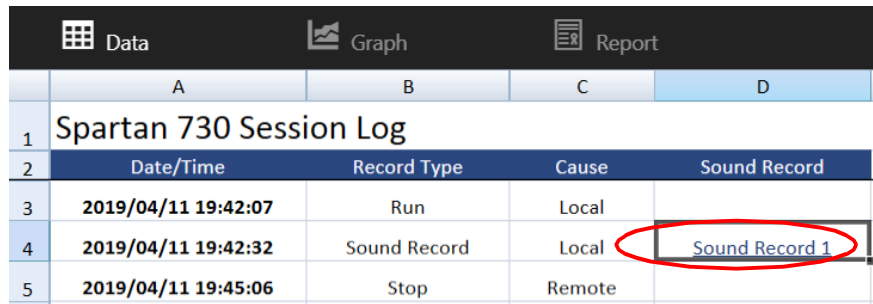
Step 3. Near the bottom of the page, click the **Session Log** tab to view a table of all recorded sound events.

Figure 3-8 Data View, Session Log Tab



Step 4. Click on a link in the **Sound Record** column. This opens the G4 media player window, where you can review and save the recording.

Figure 3-9 G4 Media Player Window



	A	B	C	D
1	Spartan 730 Session Log			
2	Date/Time	Record Type	Cause	Sound Record
3	2019/04/11 19:42:07	Run	Local	
4	2019/04/11 19:42:32	Sound Record	Local	Sound Record 1
5	2019/04/11 19:45:06	Stop	Remote	

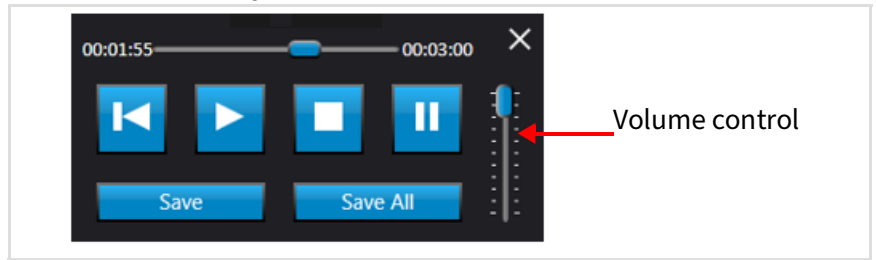
LEARN MORE For information on improving the playback quality, review section [3.7.2 Listening to SLM Sound Recordings](#).

3.7.2 Listening to SLM Sound Recordings

APPLIES TO 831C, 831, LxT, 831-INT-ET when Sound Recording firmware is purchased and installed.

G4 saves audio files in compressed or uncompressed format, according to your selection in the measurement setup (Setup Manager→Sound Page, **Compression**: “Off,” “Low,” “Normal,” “High”). The G4 player plays any sound record in the file.

Figure 3-10 G4 Audio Player



After you download sound records to your PC, we recommend the following third-party software for audio playback.

Table 3.11 Sound Recording Compatibility

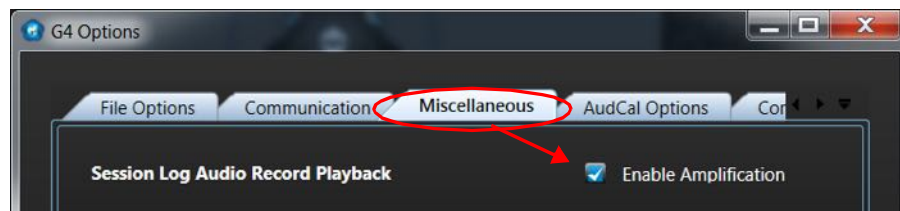
Uncompressed files	Compressed files
<ul style="list-style-type: none">Windows Media Player	<ul style="list-style-type: none">VLCGoogle Chrome Browser Extension for Windows Media Player

Using Playback from a Session Log



When playing a sound recording from the Session Log in G4, some very quiet sounds may not be audible. To amplify the playback sound, do the following:

- Step 1.** In G4, navigate to **Tools** → **Options**, and choose the **Miscellaneous** tab.
- Step 2.** Select **Enable Amplification**. All future Session Log playback files are also amplified, until you deselect this setting.

Figure 3-12 Enabling Playback Amplification



3.7.3 Streaming Audio from the SLM

- Step 1.** In G4, select your meter in the Meters Panel. In the meter tab that opens, select the  **Audio Streaming** view, then click the **power icon**  near the center of the audio dial (see *Figure 3-13*).

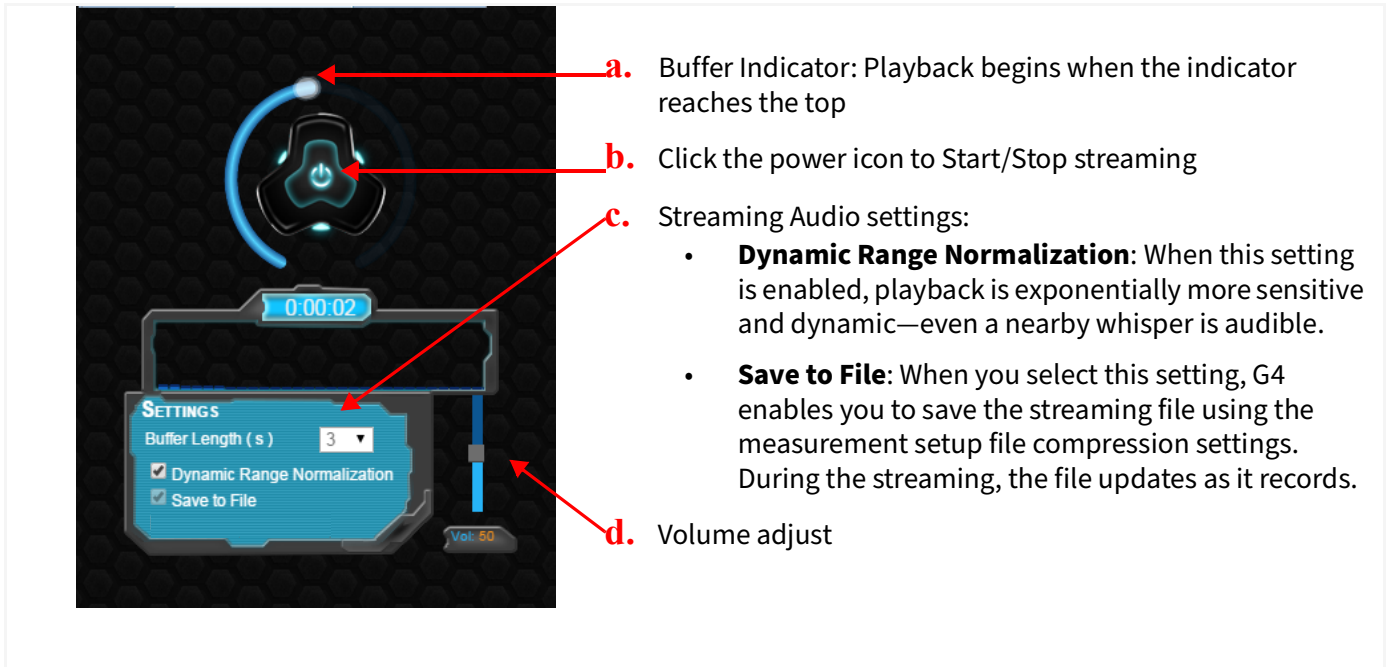
TAKE NOTE While streaming audio, the meter is locked for optimal performance.
For Model 831 and LxT: If two PCs are connected to the same meter, only one can stream audio at a time. In this case, a dialog box prompts the second connected PC to end the current stream before another can begin.

TAKE NOTE If you are using an 831-INT-ET, connect to the meter via TCP/IP to listen to streaming audio over a network or over the Internet.

For 831C: For 831C with updated (current) drivers, up to eight G4 clients can stream from a single site/831C.

The Compression setting you chose in the measurement Setup also applies to the audio stream (Setup Manager→Sound Page, **Compression:** “Off,” “Low,” “Normal,” “High”).

Figure 3-13 Audio Streaming



3.7.4 Exporting Audio Files by Using the Command Line

APPLIES TO SLMs, Spartan Dosimeter

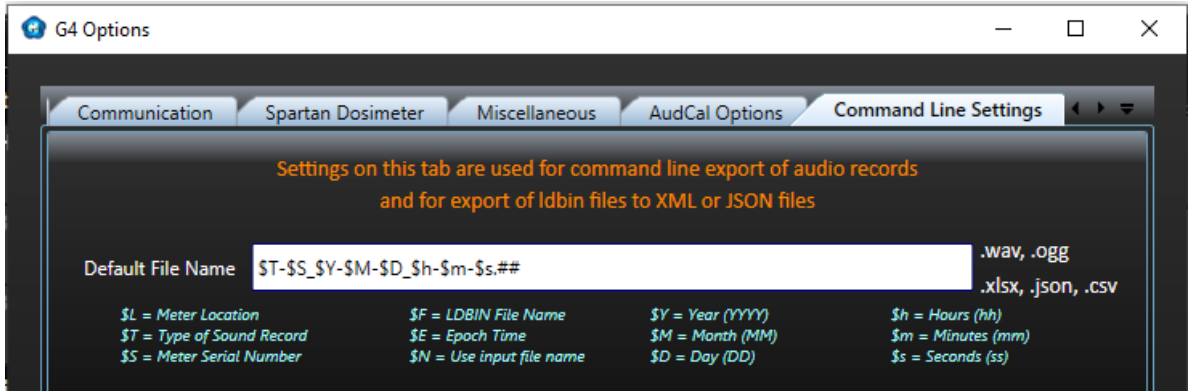
G4 enables you to export the audio records stored in an LDBIN file to individual WAV or OGG files.

Before you begin:

- Connect your instrument, and download the LDBIN file(s) containing the desired sound records.

Step 1. In G4, navigate to **Tools** → **Options**, and select the **Command Line Settings** tab.

Figure 3-14 Command Line Settings for Audio Files



Step 2. Enter the pattern of your desired file name for the extracted audio files:

- Enter the desired file name pattern in the **Default File Name** field, or use the default value.

Example: “\$E_\$T.##” results in an audio file with the following name: 1497891141_Measurement-11.00.wav

Table 3.15 provides essential details for the listed file name codes.

Table 3.15 File Name Codes and Descriptions

Codes	Description	File Name Result
\$T	Indicates the file type, and is expressed as: “measurement-xx,” “event-xx,” or “voice-xx”	1497891141_Measurement-11.00.wav, where “Measurement-11” indicates the eleventh measurement record, as shown in the Session Log.
##	Two-digit number that increases by one each time the same file name is exported.	<ul style="list-style-type: none"> 1497891141_Measurement-11.00.wav (first time) 1497891141_Measurement-11.01.wav (second time)
<any text>	Add any specific text you want to appear in the name. Text that isn’t already used as a file name code displays exactly as you enter it.	
	<blank>	If Default File Name is blank, exported files use the file type code: “_ \$T”
\$L	Two-digit meter location id (“01_” to “39_”) For more information, see “Site Location ID” in the <i>SoundAdvisor 831C Manual, Glossary.</i>	03_1497891141_Measurement-11.00.wav

G4 Data view, Session Log Tab

#	Date	Time	Record Type	Cause	# TH Record	Sound Record
1	2017-04-19	12:57:02	Run	Key	1	1
2	2017-04-19	12:57:02	Sound	Measurement	1	2 Sound Record 1
3	2017-04-19	12:57:12	Sound	Event	2	4 Sound Record 2
4	2017-04-19	12:57:23	Sound	Event	3	6 Sound Record 3
5	2017-04-19	12:57:27	Sound	Event	4	7 Sound Record 4
6	2017-04-19	12:57:42	Sound	Event	5	10 Sound Record 5
7	2017-04-19	12:57:59	Sound	Event	6	13 Sound Record 6
8	2017-04-19	12:58:07	Sound	Event	7	15 Sound Record 7
9	2017-04-19	12:58:12	Sound	Event	8	16 Sound Record 8
10	2017-04-19	12:58:16	Sound	Event	9	16 Sound Record 9
11	2017-04-19	12:58:20	Sound	Event	10	17 Sound Record 10
12	2017-04-19	12:58:22	Stop	Key	1	19
13	2017-04-19	12:58:34	Voice Annotation	Key	1	0 Voice Record 1
14	2017-04-19	12:58:56	Run	Key	2	20
15	2017-04-19	12:58:56	Sound	Measurement	11	21 Sound Record 11
16	2017-04-19	12:59:01	Sound	Event	12	22 Sound Record 12
17	2017-04-19	12:59:06	Sound	Event	13	23 Sound Record 13
18	2017-04-19	12:59:10	Sound	Event	14	24 Sound Record 14

Step 3. Enter the desired path for each of the following and click **Save**. These paths are required.

- Default Input Location of LDBIN Files to Export
- Default Output Location for Exported Files

TAKE NOTE Click Restore Defaults to revert paths to the user's "Documents\PCB Piezotronics\ldbin"

Step 4. Open your PC's Command Prompt.

Step 5. Using the prompt, navigate to the folder containing your "G4.exe" file.

TAKE NOTE The default location is "C:\Program Files\PCB Piezotronics\G4."

Step 6. Enter the export audio command line, with your chosen parameters, as shown in the following example:

```
G4 -ea parameter(s)
```

Parameters:

all
v (voice),
m (measurement),
e (event)

TRY THIS Use any single value or combination of v, m, and e separated by a comma.

TAKE NOTE G4 also

creates a log file, which contains details about the export process. The file is located in the user's "Documents\PCB Piezotronics\G4\Log Files" folder.

LEARN MORE For more information on exporting other file types by using the Command Line, see [3.8 Exporting Data to a Spreadsheet by Using the Command Line](#).

3.8 Exporting Data to a Spreadsheet by Using the Command Line

APPLIES TO SLMs and Spartan Dosimeter

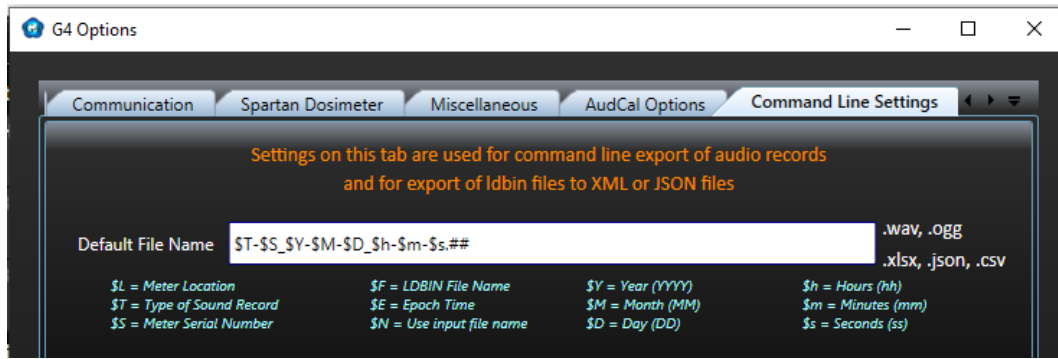
G4 enables you to export the contents of an LDBIN file to XLSX, XML, JSON, or CSV format.

Before you begin:

- Connect your instrument, and download the LDBIN file(s) you want to export.

Step 1. In G4, navigate to **Tools** → **Options**, and select the **Command Line Settings** tab.

Figure 3-16 Command Line Settings Tab



Step 2. For the **Default File Name**, enter the file name codes that describe your desired file name for the exported file(s). You may also use the default (displayed) value.

Example: “\$E_\$T.##” results in a file with the following name: 1497891141_Measurement-11.00.xlsx

Table 3.17 provides essential details for the listed file name codes.

Table 3.17 File Name Codes and Descriptions

Codes	Description	File Name Result
\$T	Indicates the file type, and is expressed as: “measurement-xx,” “event-xx,” or “voice-xx”	1497891141_Measurement-01.00.xlsx, where “Measurement-01” indicates the first measurement record, as shown in the Session Log column labeled “#”
##	Two-digit number that increases by one each time the same file name is exported.	<ul style="list-style-type: none"> 1497891141_Measurement-11.00.xlsx (first export) 1497891141_Measurement-11.01.xlsx (second export)
<any text>	Add any specific text you want to appear in the name. Text that isn’t already used as a file name code displays exactly as you enter it.	
<blank>		If Default File Name is blank, exported files use the “input” file name with the exported format extension.
\$L	Two-digit meter location id (“01_” to “39_”) For more information, see “Site Location ID” in the <i>SoundAdvisor 831C Manual</i> , Glossary.	03_1497891141_Measurement-11.00.xlsx

G4 Data view, Session Log Tab

Record #	Date	Time	Record Type	Cause	# TH Record	Sound Record
1	2017-04-19	12:57:02	Run	Key	1	1
2	2017-04-19	12:57:02	Sound	Measurement 1	2	Sound Record
3	2017-04-19	12:57:12	Sound	Event	2	4 Sound Record
4	2017-04-19	12:57:23	Sound	Event	3	6 Sound Record
5	2017-04-19	12:57:27	Sound	Event	4	7 Sound Record
6	2017-04-19	12:57:42	Sound	Event	5	10 Sound Record
7	2017-04-19	12:57:59	Sound	Event	6	13 Sound Record
8	2017-04-19	12:58:07	Sound	Event	7	15 Sound Record
9	2017-04-19	12:58:12	Sound	Event	8	16 Sound Record
10	2017-04-19	12:58:16	Sound	Event	9	16 Sound Record
11	2017-04-19	12:58:20	Sound	Event	10	17 Sound Record
12	2017-04-19	12:58:22	Stop	Key	1	19
13	2017-04-19	12:58:34	Voice Annotation	Key	1	0 Voice Record
14	2017-04-19	12:58:56	Run	Key	2	20
15	2017-04-19	12:58:56	Sound	Measurement	11	21 Sound Record
16	2017-04-19	12:59:01	Sound	Event	12	22 Sound Record
17	2017-04-19	12:59:06	Sound	Event	13	23 Sound Record
18	2017-04-19	12:59:10	Sound	Event	14	24 Sound Record

Step 3. Enter the desired path for each of the following and click **Save**. These paths are required.

- Default Input Location of LDBIN Files to Export
- Default Output Location for Exported Files

TAKE NOTE If you provide a folder path (without a specific file), all files in that folder are exported.

Step 4. Open your PC's Command Prompt.

Step 5. Using the prompt, navigate to the folder containing your "G4.exe" file.

TAKE NOTE The default location is "C:\Program Files\PCB Piezotronics\G4."

Step 6. Enter the export command line, with your chosen parameters (if applicable) from *Table 3.18*.

Table 3.18

Table 3.19

Export Type	Command Line	Parameter
LDBIN→XLSX	G4 -ex	none
LDBIN→XML	G4 -el <i>parameter</i>	Specify one of these: "xml" or "json"
LDBIN→CSV	G4 -ec	none

TAKE NOTE G4 creates a log file, which contains details about the export process. "CommandLineLog.txt" is located in the user's "Documents\PCB Piezotronics\G4\Log Files" folder.

LEARN MORE G4 also enables you to export recorded audio from an LDBIN file. For more information, see [**3.7.4 Exporting Audio Files by Using the Command Line**](#).

Module **4** Upgrading Software, Firmware, and Options


In addition to meter operation, the G4 LD Utility (G4) is also used to install firmware and option upgrades as shown in the following processes.

In this module:

4.1	Updating the G4 LD Utility	-40
4.2	Upgrading Meter Firmware	-41
4.2.1	Upgrading the SoundAdvisor 831C Firmware	
4.2.2	Upgrading the Model 831 and LxT Firmware	
4.2.3	Upgrading the Spartan 730 Dosimeter Firmware	
4.2.4	Upgrading the HVM200 Firmware	
4.3	Upgrading Firmware Options	-43
4.4	Enabling or Disabling Firmware Options for SLM	-44
4.5	Enabling or Disabling Firmware Options for Dosimeters	-44

4.1 Updating the G4 LD Utility

G4 is frequently released with new features and improved functionality. We recommend that you maintain the most current version by using the following process to upgrade.

- Step 1.** In a browser, navigate to www.LarsonDavis.com/G4.
- Step 2.** In the Software section, double-click on the appropriate version for your system to download it.
- Step 3.** Locate the downloaded folder on your system, then right-click, select **Extract All**, and follow the on-screen prompts.
- Step 4.** Open the new folder and run “**setup.exe**.”
- Step 5.** Follow the on-screen instructions to complete the upgrade.
- Step 6.** To launch G4, use the shortcut icon  on your Desktop, or select **G4 LD Utility** from the Start Menu.

4.2 Upgrading Meter Firmware

In this section:



- [4.2.1 Upgrading the SoundAdvisor 831C Firmware](#)
- [4.2.2 Upgrading the Model 831 and LxT Firmware](#)
- [4.2.3 Upgrading the Spartan 730 Dosimeter Firmware](#)
- [4.2.4 Upgrading the HVM200 Firmware](#)

4.2.1 Upgrading the SoundAdvisor 831C Firmware

In G4 version 4.5 or newer, you can upgrade SoundAdvisor™ Model 831C firmware for one or more meters simultaneously, as shown in the following process.


Before you begin:

- Power on and connect each meter you want to upgrade in G4.
- If you're using G4 network security, log into each meter you want to upgrade.

- Step 1.** In the Meters or Projects Panel, click the **menu icon**  in-line with a connected meter.
- Step 2.** Select **Upgrade Firmware** from the menu that appears. This opens the Upgrade Firmware window.
- Step 3.** Click **Choose Firmware File**. This opens the Windows Explorer to the default location for G4 firmware.
- Step 4.** Locate and select the firmware file you want to use, then click **Open**.
- Step 5.** The **Update All Selected Meters** checkbox is selected by default. If you're updating multiple meters, keep this checkbox selected. Then in the Meters or Projects Panel (far left), verify or edit the checkbox in-line with each meter. If you want to upgrade only one meter, deselect this checkbox.
- TAKE NOTE** If you're using G4 Security, the **caution icon**  displays in-line with each 831C you're not logged in to.
- Step 6.** In the Update Firmware window, click **Update All Selected Meters**.

4.2.2 Upgrading the Model 831 and LxT Firmware


Use the following process to upgrade your Model 831, or LxT (SoundExpert or SoundTrack) firmware. Please note that while the meter is upgrading, you will not be able to perform other actions in G4.

- Step 1.** In the G4 Meters or Projects Panel, click the **menu icon**  in-line with a connected meter.

- Step 2.** Select **Upgrade Firmware** from the menu that appears. This opens the File Explorer to the default firmware folder.
- Step 3.** Locate and select the firmware file you want to use in the File Explorer, then click **Open**.
- Step 4.** Read the warning, acknowledge that you have downloaded all files by selecting the checkbox, then click **OK** to continue.
- Step 5.** Click **Close** when the firmware upload is complete. The meter reboots and reconnects in G4 with current firmware.


4.2.3 Upgrading the Spartan 730 Dosimeter Firmware

Using this process for Spartan 730 or 730-IS dosimeter, you can begin upgrading one or more meters sequentially in G4.

- Step 1.** In the G4 Meters or Projects Panel, click the **menu icon**  in-line with a connected meter.
- Step 2.** Select **Upgrade Firmware** from the menu that appears. This opens the File Explorer to the default firmware folder.
- Step 3.** Locate and select the firmware file you want to use in the File Explorer, then click **Open**.
- Step 4.** Click **OK** to confirm the firmware version to upgrade to. The meter upgrades and reboots using current firmware.

4.2.4 Upgrading the HVM200 Firmware

Using this process for HVM200, you can begin upgrading one or more meters sequentially in G4.

- Step 1.** In the Meters or Projects Panel, click the **menu icon**  in-line with a connected meter.
- Step 2.** Select **Upgrade Firmware** from the menu that appears. This opens the Upgrade Firmware window.
- Step 3.** Click **Choose Firmware File**. This opens the Windows Explorer to the default location for G4 firmware.
- Step 4.** Locate and select the firmware file you want to use in the File Explorer, then click **Open**.
- Step 5.** Click **Upload Firmware**. The meter upgrades and reboots using current firmware.


TAKE NOTE If the HVM doesn't reconnect after a few minutes, click **Discover Meters**.

4.3 Upgrading Firmware Options

G4 allows you to easily upgrade or install purchased firmware options for Model 831C, Model 831, LxT, Spartan 730, and HVM200 meters.

Before you begin:

- When you purchase a meter upgrade or option, you receive the firmware option file as an email attachment from Larson Davis. Save this file to your PC on the Desktop.
- Power on your meter and establish a meter connection in G4.

Step 1. In the G4 Meters or Projects Panel, click the menu icon  in-line with a connected meter.

Step 2. Select **Upload Options** from the pop-up menu. This opens the Upgrade Firmware or Options window.




Step 3. Click **Choose Options File**. This opens the File Explorer to the default firmware folder.

Step 4. In the File Explorer, navigate to the Desktop (or to the location of the OP831C file you saved), select the file you want to install, and click **Open**.


Step 5. Confirm your choice by clicking **Upload Options**. A progress bar under the **Upload Options** button shows the status of your update and a series of progress screens.

Step 6. Confirm the installation.

To view installed SLM firmware options:

- a. Open the meter tab in G4, and select the  **Live View**.
- b. From the  **Tools menu**, select **About**.
- c. Press the **right arrow**  until the **Options** tab displays the **Installed Options** in blue.

To view installed Spartan dosimeter firmware options:


- a. Open the meter tab in G4, and select  **Tools** → **About**.
- b. Scroll down to view the **Options** section.

4.4 Enabling or Disabling Firmware Options for SLM

Once you download and install a firmware option, it's automatically enabled on your meter. To disable a firmware option, complete the process described in this section.

CAUTION If you attempt to edit firmware options during a measurement, the data will be lost.

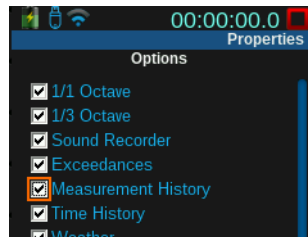
Step 1. In G4, click on the name of your connected meter in the Meters or Projects Panel. The meter tab opens on the right.


Step 2. Select the  **Live View**.

Step 3. From the **Tools menu** , choose **System Properties**.

Step 4. Press the **right arrow**  until the **Options** tab appears.

Step 5. Click to select or deselect the checkbox in-line with the option.



TAKE NOTE If you have unsaved data or are currently running a measurement, the meter notifies you that a reset is needed to save the Options settings. Select **OK** and press the **Reset**  button to clear the measurement.

Step 6. Click **Close** to save your options, then reboot your meter.

4.5 Enabling or Disabling Firmware Options for Dosimeters

Refer to the *Spartan 730 Dosimeter Manual*. In G4, go to **Help** → **Manuals** → **Spartan 730 Dosimeter Manual**.

Module **5** Managing Security in G4

G4 LD Utility (G4) software version 4.5 or newer provides the following security methods for your Larson Davis instruments:

Table 5.1

Instrument	Available Security
SoundAdvisor 831C	<input checked="" type="checkbox"/> meter lock <input checked="" type="checkbox"/> network (HTTPS)
Model 831	<input checked="" type="checkbox"/> meter lock <input type="checkbox"/> network (HTTPS)
LxT Models	<input checked="" type="checkbox"/> meter lock <input type="checkbox"/> network (HTTPS)
Spartan 730/730IS Dosimeter	<input checked="" type="checkbox"/> meter lock <input type="checkbox"/> network (HTTPS)

In this module:

5.1	Using the Meter Lock -----	45
5.1.1	Using the Meter Lock for 831C in G4	
5.1.2	Using the Meter Lock for 831/LxT in G4	
5.1.3	Using the Meter Lock for Spartan 730 Dosimeter in G4	
5.2	Using Network Security for 831C -----	50
5.2.1	Enabling Network Security in G4	
5.3	Uploading SSL Certificates to the 831C -----	52
5.3.1	Obtaining a Digital SSL Certificate	
5.3.2	Uploading a Digital SSL Certificate/Email Certificate	

5.1 Using the Meter Lock

If you are concerned about preventing unauthorized use or tampering with the physical meter, complete the process in this section to lock the meter display and buttons.

In this section:

- [5.1.1 Using the Meter Lock for 831C in G4](#)
- [5.1.2 Using the Meter Lock for 831/LxT in G4](#)
- [5.1.3 Using the Meter Lock for Spartan 730 Dosimeter in G4](#)

5.1.1 Using the Meter Lock for 831C in G4

In this section:

- [Locking the 831C in G4](#)
- [Unlocking the 831C in G4](#)

Locking the 831C in G4

Before you begin:

- Connect your meter in G4

Step 1. Click on the name of your connected meter in the Meters Panel (or Projects Panel). This opens the meter tab in the main tab display.

Step 2. Select the  **Manager** page, then the **Maintenance** tab.

Step 3. Click the **Lock/Unlock** button.

Step 4. In the window that opens, choose an option from the **Lock Mode** drop-down menu.

In each lock mode option, the meter displays differently, and certain meter operations are restricted. Refer to *Table 5.2* to understand which lock mode fits your measurement needs.

Table 5.2 Allowed Operations Per Lock Mode

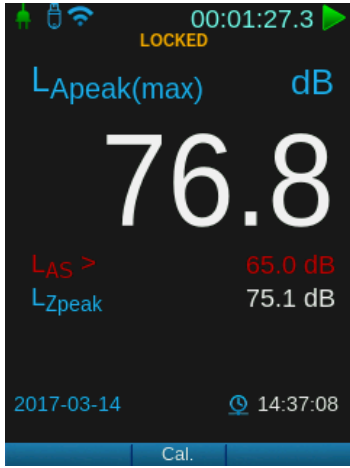
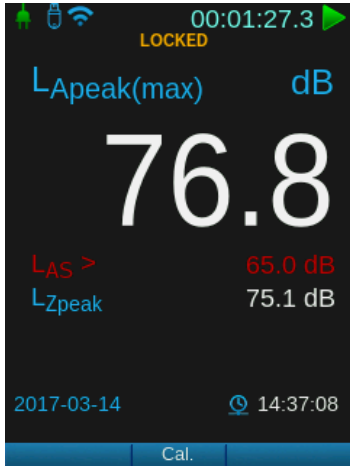
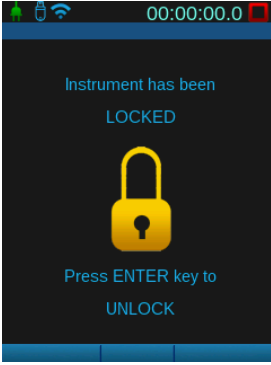
Lock Mode	Available Operations	Meter Display	File Store Notes
Lock with Auto Store: When the measurement is stopped, the “Measurement OK?” dialog box appears. Select Yes to save the measurement with an auto-generated file name. Select No to cause a reset without saving.	<input checked="" type="checkbox"/> Run <input type="checkbox"/> Pause <input checked="" type="checkbox"/> Stop <input checked="" type="checkbox"/> Reset <input checked="" type="checkbox"/> Calibration	Shows Live View page 1 only (Shown in Big Digit Format) 	If your System Properties indicate an Auto-Store prompt, you are prompted to change the file name and save the file. If you select No , the measurement stops and data remains unsaved on the meter.
Lock with Manual Store:	<input checked="" type="checkbox"/> Run <input type="checkbox"/> Pause <input checked="" type="checkbox"/> Stop <input checked="" type="checkbox"/> Reset <input checked="" type="checkbox"/> Calibration		If you use this mode, be sure to select an auto-store option in your current Setup. The measurement runs and stores as indicated in the Setup.

Table 5.2 Allowed Operations Per Lock Mode (Continued)

<p>Fully Locked:</p>	<p><input checked="" type="checkbox"/> Run</p> <p><input type="checkbox"/> Pause</p> <p><input type="checkbox"/> Stop</p> <p><input type="checkbox"/> Reset</p> <p><input checked="" type="checkbox"/> Calibration</p>	<p>Shows Lock screen only</p> 	<p>If you use this mode, be sure to select an auto-store option in your current Setup. The measurement runs and stores as indicated in the Setup.</p>
-----------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------

Step 5. Enter an **Unlock Code**. This code can be 1–4 digits. The first digit should not be a zero. If you set “0123” as your code, the meter saves it as “123”.

TAKE NOTE Please record your unlock code in a secure place.

Step 6. If desired, select the checkbox in-line with **Allow Calibration when Locked**. When you select this option, you can calibrate the 831C any time a measurement is not running, even when locked.

LEARN MORE For more information on calibrating the meter while locked, go to **Help** → **Manuals** → **SoundAdvisor 831C Manual**, Section 5.4.1.

Step 7. Click **Save**, then click **Upload**. The unlock code is uploaded to the meter and the meter is locked.

Unlocking the 831C in G4

Before you begin:

- Connect your meter in G4.

Step 1. Click on the name of your connected meter in the Meters Panel. This opens the meter tab on the right.

Step 2. Select the  **Manager** page, then the **Maintenance** tab.

Step 3. Click the **Lock/Unlock** button.

Step 4. From the **Lock Mode** drop-down, click **Unlock**, then click **Upload**.

TRY THIS If you have the meter in hand, you can also enter the **Unlock Code** shown in G4 directly into the Unlock Code dialogue on the meter using the meter buttons.

5.1.2 Using the Meter Lock for 831/LxT in G4

Locking the 831/LxT Model in G4

Before you begin:

- Connect your meter in G4

Step 1. Click on the name of your connected meter in the Meters Panel (or Projects Panel). This opens the meter tab on the right.

Step 2. Select the  **Manager** page, then the **Maintenance** tab.

Step 3. Click the **Lock/Unlock** button.

Step 4. In the window that opens, choose an option from the **Lock Mode** drop-down menu.

Unlocking the 831/LxT Model in G4

Before you begin:

- Connect your meter in G4.

Step 1. Click on the name of your connected meter in the Meters Panel. This opens the meter tab on the right.

Step 2. Select the  **Manager** page, then the **Maintenance** tab.

Step 3. Click the **Lock/Unlock** button.

Step 4. From the **Lock Mode** drop-down, click **Unlock**, then click **Upload**.

5.1.3 Using the Meter Lock for Spartan 730 Dosimeter in G4

APPLIES TO Model 730 and 730IS

Locking the 730 Dosimeter in G4

Before you begin:

- Connect your meter in G4

Step 1. Click on the name of your connected meter in the Meters Panel (or Projects Panel). This opens the meter tab on the right.

Step 2. Select the  **Tools** page, then click the **Lock** button.

Step 3. Enter a Lock Code, then click **Upload**. This code can be 1–4 digits. The first digit should not be a zero. If you set “0123” as your code, the meter saves it as “123”.


TAKE NOTE Please record your unlock code in a secure place.

Unlocking the 730 Dosimeter in G4

Before you begin:

- Connect your meter in G4.

Step 1. Click on the name of your connected meter in the Meters Panel. This opens the meter tab on the right.

Step 2. Select the  **Tools** page, then click the **Unlock** button.

Step 3. Enter the **Unlock Code**, then click **Upload**.

5.2 Using Network Security for 831C

The SoundAdvisor™ 831C network security feature is intended to protect a meter from unwanted interference or tampering when operating over a remote connection using G4, the LD Atlas app, or a browser (We recommend Google Chrome™¹).

There are 3 levels of 831C network security available. When enabled, meter communications use secure communication protocol (https, Port 443).

Secure (https)/ No Authentication

With this option enabled, users have full meter access to all features except the Accounts feature (and the 831C Scheduling feature, if installed). Access to accounts (and Accounts with Scheduling firmware) requires administrator credentials.

Secure (https)/ Authentication Open Guest


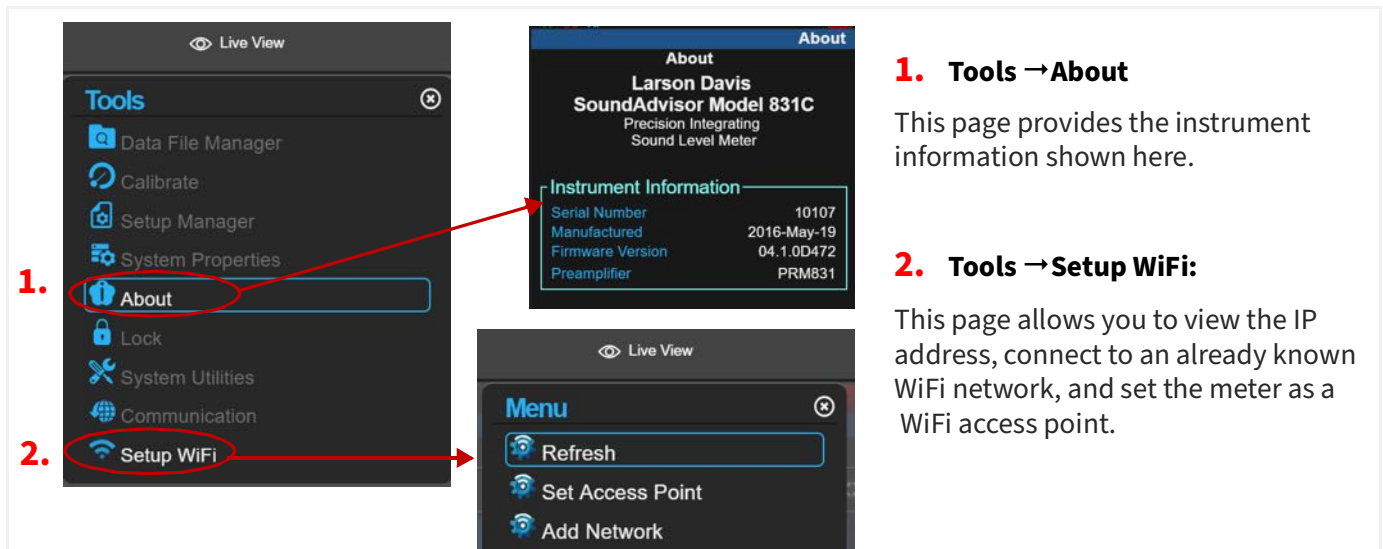
The Open Guest log in allows anyone to monitor the  **Live View** in G4. This option also provides access the following options from the Live View Tools menu, as shown in *Figure 5-3*.

Figure 5-3 Open Guest Account, Live View Tools Menu Available Options

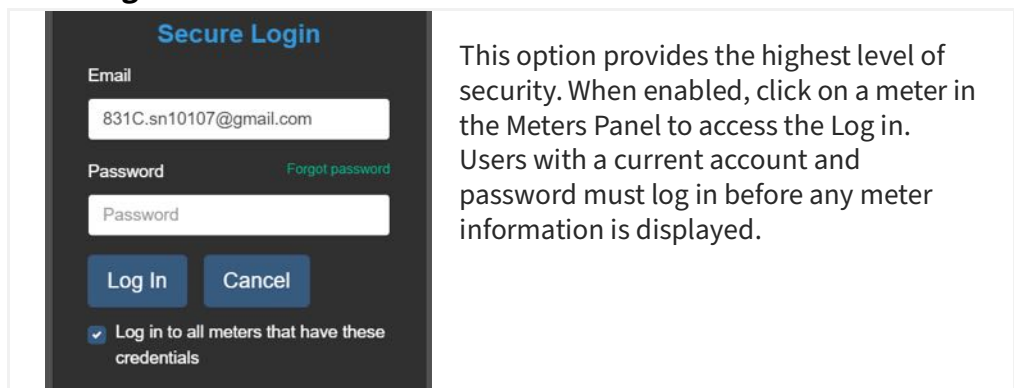


1. Tools → About
This page provides the instrument information shown here.

2. Tools → Setup WiFi:
This page allows you to view the IP address, connect to an already known WiFi network, and set the meter as a WiFi access point.

Secure (https)/ Authentication Log in Required

Figure 5-4



This option provides the highest level of security. When enabled, click on a meter in the Meters Panel to access the Log in. Users with a current account and password must log in before any meter information is displayed.

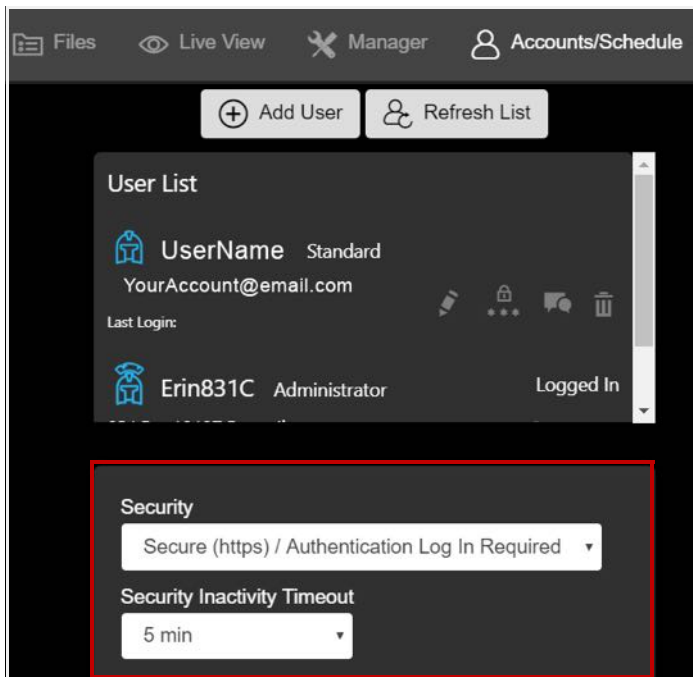
When you connect to a meter using the LD Atlas app or a browser using a security option that requires authentication, you are prompted to accept or decline the certificate. You must accept the certificate before proceeding. When using G4, you do not need to accept a certificate to connect to a meter securely.

1. Google Chrome is a trademark of Google, LLC.

5.2.1 Enabling Network Security in G4

To enable network security for a Larson Davis 831C, log in to the meter on an Administrator account, and select an option from the **Security** drop-down menu as shown in *Figure 5-5*.

Figure 5-5 Accounts/Schedule Page in G4



This method also enables you to choose a **Security Inactivity Timeout** value. If a connected meter doesn't receive activity from the user for a period greater than the selected value, the meter automatically logs the user out.

Available Inactivity Timeout Values are "5," "10," "30," or "60 mins."

For complete details on accounts and choosing a security option, see [6.1.2 "Creating a New 831C Account in G4" on page 56](#).

5.3 Uploading SSL Certificates to the 831C

TAKE NOTE We recommend this section on obtaining and uploading CA certificates for advanced security administrators. Also note that in this section, “SSL” and “TLS” are both referred to as “SSL.”

In addition to previous security methods in this module, full network security is achieved because all messages between communicating devices are encrypted using a digital certificate. The digital certificate includes a key, a matching certificate file, and matching CA bundle, which establishes trust by a known root Certification Authority (CA). With this method, only the intended recipient has all the requirements to decrypt the sent messages.

Working with digital certificates is simplified when you have a dedicated domain name associated to the meter IP. You may want to coordinate with your IT professional to set this up. Then you may choose to obtain your own digital certificate(s) from a Certifying Authority, as shown in this section.

Alternatively, the 831C (with firmware version 4.5 or newer) can generate a self-signed digital certificate. While this functions the same as a CA certificate, Internet browsers and clients won't recognize it as a secure connection by default. In this case, a pop up message prompts you to install or discard the certificate.

LEARN MORE 831C Digital Certificate Processing: If you obtain a digital certificate, the 831C attempts to verify the certificate/key pair using the provided CA bundle. If one is not provided, the 831C attempts to verify the cert/key pair by using the default CA bundles on the meter. The default bundles may not contain the CA bundle that matches the signature embedded in the certificate. In this case, a dialog prompts you to install or discard the certificate.

If the cert and key do not match (e.g. they were corrupted or compromised), a “certificate not valid” message displays and the certificate is rejected. If you choose, you may still install the meter's self-signed certificate (as shown in this section), and communicate with the meter.

If the cert and key match and pass CA bundle verification, a message displays that the certificate is installed and effective immediately.

Recommended Next Steps:

- [5.3.1 Obtaining a Digital SSL Certificate](#)
- [5.3.2 Uploading a Digital SSL Certificate/Email Certificate](#)

5.3.1 Obtaining a Digital SSL Certificate

You can obtain your own digital certificate by applying for one from a Certifying Authority (CA).

Before you begin:

- You must have a dedicated DNS for your meter to use this feature. See your IT professional for more information.


- Step 1.** Search for “Certifying Authority” on the Internet, and select one.
- Step 2.** Log in to the CA system, select your type of online entity, complete necessary details, provide proof of identity, address, and payment.
- Step 3.** Communicate with the CA to coordinate the certificate format. These two certificate file formats are compatible with 831C security:
 - A PEM file, which contains the certificate text, key text, and CA bundle text. When using this format, verify that the CA bundle text follows after the certificate text in the file.
 - A ZIP file, which contains these three files:
 - Certificate file, which must be named “certificate.crt”
 - Private Key file, which must be named “private.key”
 - CA file, which must be named “ca_bundle.crt”
- Step 4.** Ask your CA about details and restrictions on email encryption when using certain email providers.
- Step 5.** Receive a confirmation email and postal mail from the CA, which is used to retrieve your digital certificate.

5.3.2 Uploading a Digital SSL Certificate/Email Certificate

Complete the process in this section to upload your own digital certificate or email certificate to your meter.

Before you begin:

- If desired, you can simplify the digital certificate process by setting up a dedicated domain for your meter’s IP. Work with your IT professional to accomplish this.
- Complete [5.3.1 Obtaining a Digital SSL Certificate](#).
- Establish an active meter connection in G4.

- Step 1.** In G4, click on the name of your connected meter in the Meters Panel (or Project Panel).
- Step 2.** Select the  **Manager** to open the Meter Manager view.
- Step 3.** Choose **Upload Security Certificate** or **Upload Email Certificate**, depending on which file you’re using. This opens the File Explorer.
- Step 4.** In the File Explorer, select a file (PEM or ZIP) to upload, and click **Open**. G4 confirms the file has been uploaded to the meter.

Module **6** G4 Features for SoundAdvisor™ 831C

The following features in G4 are only available for the 831C. Some features require the purchase of optional firmware and may not be visible to all users.

In this module:

6.1	Getting Started With 831C Accounts in G4	-----54
6.1.1	Transitioning 831C Accounts to G4 Version 4.5	
6.1.2	Creating a New 831C Account in G4	
6.1.3	Editing an 831C Account in G4	
6.1.4	Copying 831C Accounts to Multiple Meters	
6.1.5	Understanding Alert Notifications	
6.1.6	Resetting an Account Password	
6.2	Configuring File Storage Preferences for 831C	-----62
6.2.1	Setting Up Remote (Cloud) Storage for 831C	
6.3	Utilizing Scheduling Firmware (831C-SCH)	-----63
6.3.1	Creating Schedule Blocks	
6.3.2	Copying Accounts/Schedule to Multiple Meters	
6.4	Utilizing G4 Security Features for 831C	-----69

6.1 Getting Started With 831C Accounts in G4

APPLIES TO 831C SLM with G4 version 4.5 or newer

If you plan to use alert notifications or meter security for your SoundAdvisor 831C, each person who uses the instrument should have a user account. If you don't plan to use these features, this section is optional.

There are 3 account types: Administrator, Standard, or Guest. Meters with accounts should have at least one **Administrator** account, which creates other users for that meter, sets alert notifications for each account, has access to operate the meter, enables network security (HTTPS) features, and receives alert notifications.

Standard accounts can log in to a meter to operate it remotely and receive alert notifications. **Guest** accounts are “read-only”. Guest users can log into a meter to view—but not edit—the meter display, and receive alert notifications.

With user accounts, when G4 network security (https) protocol is enabled for a meter by someone with an administrator account, only users with a valid user name and password can access the connected instrument to edit a measurement setup or view data. For more information on G4 security see, **Module 5 Managing Security in G4**.

Additionally, when used in conjunction with the firmware option, Scheduling for 831C (831C-SCH), users can schedule the following meter operations:

- Meter run time
- Periods during which they receive alert notifications from an instrument

- Sound exceedance and event triggers (when using measurement history, time history, event logging firmware options)
- Periods of modem low power for systems using a modem

If you had alert notifications for email or text set up on the meter before updating to version 4.5 or newer, each email address is imported as a standard user account, and each email/account continues to receive the same notifications they previously set. To finish transitioning accounts, begin with section **6.1.1 Transitioning 831C Accounts to G4 Version 4.5**.

If no alert notifications were previously set up on the meter, begin with **6.1.2 "Creating a New 831C Account in G4" on page 56**.

In this section:

- **6.1.1 Transitioning 831C Accounts to G4 Version 4.5**
- **6.1.2 Creating a New 831C Account in G4**
- **6.1.3 Editing an 831C Account in G4**
- **6.1.4 Copying 831C Accounts to Multiple Meters**
- **6.1.5 Understanding Alert Notifications**
- **6.1.6 Resetting an Account Password**


6.1.1 Transitioning 831C Accounts to G4 Version 4.5

If you have email or text alert notifications saved on the meter, upgrading G4 and your meter firmware automatically transitions your email and alert notification settings to a standard account. After the transition, notifications are specific to each account. Log in to an account to view or edit alert notifications as shown in this section.

Before you begin:

- Connect your meter in G4.
- If you plan to use network security for the 831C, review the 3 levels of security described in **5.2 "Using Network Security for 831C" on page 50**.

Step 1. In the Meters Panel, click on the name of your connected meter. This opens the meter tab on the right.

Step 2. Click the **Profile icon** , and select **Profile** from the drop-down menu. This opens the Accounts/Schedule page.

Step 3. In the User List, click the **pencil icon**  in-line with your account. This opens the Edit Account window.

Step 4. Verify or edit your account information in the following fields:

- Display Name

- **Log In** (email address)
- **Address for Texts** (this is optional)

TAKE NOTE If you want to use this option, contact your cellular provider for information about how to receive text messages to your phone using an email gateway (MM3 messaging). Some popular provider gateway addresses include:

Table 6.1

Verizon	"[your phone number]@vtext.com"
TMobile	"[your phone number]@tmomail.net"
Sprint	"[your phone number]@messaging.sprintpcs.com"
AT&T	"[your phone number]@text.att.net"
Virgin	"[your phone number]@vmobl.com"
Information in this table is subject to change without notice. Check with your provider for current details.	

- Password and Confirm password

TAKE NOTE If you don't plan to use security (https) for the meter, you may leave the password blank. For example: if the accounts are only used for email notifications and no security is required.

Step 5. Select **Administrator Account**, then click **Save**. The first account on each meter must be an Administrator account.

Step 6. G4 asks you to confirm this choice for Only This Meter, or for All Selected Meters (in the Meters Panel).

TAKE NOTE To edit the selected meters, select or deselect the checkbox in-line with each meter in the Meters Panel (or Projects Panel) on the far left.

Step 7. On the Accounts/Schedule page, edit or verify your **Security level**, and set a **Security Inactivity Timeout** value, if needed.

LEARN MORE See [5.2 "Using Network Security for 831C" on page 50](#).

Step 8. Select your meter in the Meters Panel (or Projects Panel). If G4 does not automatically reboot your meter, manually reboot your meter to save the changes.

Step 9. Finally, edit or verify the previously designated email server on the meter. See ["Connecting the 831C to an Email Server" on page A-19](#).

6.1.2 Creating a New 831C Account in G4

This section details the initial setup of accounts for one or more instruments in G4. An Admin user should complete this process.


Before you begin:


- Update your G4 software to version 4.5 or newer

- Connect your meter in G4. For help with this, see [2.3 "Connecting the Meter to G4" on page 10](#).

Step 1. In G4, click on the name of your connected meter in the Meters Panel.

Step 2. If you are prompted to log in (G4 security/HTTPS is enabled), log in with your **Username** and **Password** when prompted. This opens the meter tab on the right.

Step 3. In the meter tab that opens, click the **Profile icon**  in the top right. This opens the Accounts/Schedule page.

Step 4. On the Accounts/Schedule page, click  **Add User**. This opens the create New Account dialog.

Step 5. In the top half of the New Account dialog, enter your user information in the following text fields:

- Display Name
- Log In (email address)
- Address for Texts (this is optional)

TAKE NOTE If you want to use this option, contact your cellular provider for information about how to receive text messages to your phone using an email gateway (MM3 messaging). Some popular provider gateway addresses include:

Table 6.2

Verizon	"[your phone number]@vtext.com"
TMobile	"[your phone number]@tmomail.net"
Sprint	"[your phone number]@messaging.sprintpcs.com"
AT&T	"[your phone number]@text.att.net"
Virgin	"[your phone number]@vmobl.com"
Information in this table is subject to change without notice. Check with your provider for current details.	

- Password and Confirm password

TAKE NOTE If you don't plan to use security for the meter, you may leave the password blank. For example: if the accounts are only used for email notifications and no security is required.

Step 6. Below the password fields, select the checkbox in-line with the account type. The first account on a meter must be an Administrator account.

Step 7. In the table below the account type, select the checkbox for **Email** or **Text** in-line with each type of alert notification you would like to receive.

For details about when and how alert notifications are sent, see [6.1.5 "Understanding Alert Notifications" on page 59](#).

Step 8. If you have an Administrator account, edit or verify your **Security level**, and set a **Security Inactivity Timeout** value below the User List. This option is inactive for those with Standard and Guest accounts.

LEARN MORE See [5.2 "Using Network Security for 831C" on page 50](#).

Step 9. Click **Create New Account**. The screen name for the account appears in the User List.

Step 10. Finally, to receive alert notifications, add or verify a previously designated an email server on the meter. See ["Connecting the 831C to an Email Server" on page A-19](#).

6.1.3 Editing an 831C Account in G4

APPLIES TO 831C SLM with G4 version 4.5 or newer

Before you begin:

- Connect your meter in G4. (Connecting the meter to your PC via USB bypasses the log on and authentication process.)

Step 1. Click on the name of your connected meter in the Meters Panel.

Step 2. If you're prompted to log in (G4 security/HTTPS is enabled), log in with your **Username** and **Password**. This opens the meter tab on the right.


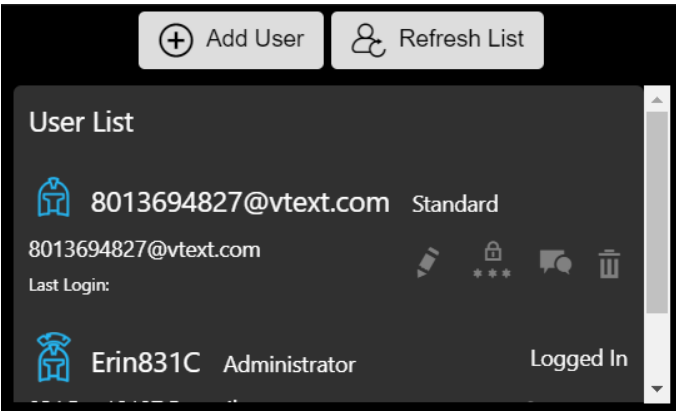




Step 3. In the meter tab that opens, click on the **Profile icon**  in the top right. This opens the Accounts/Schedule page.

Figure 6-3 Accounts/Schedule Page User List



The **User List** icons provide the following actions for each account:

-  **Edit Account:** Click here to edit your alert notifications.
-  **Edit/change Password**
-  **Message User:** This feature is not currently available.
-  **Delete Account**

6.1.4 Copying 831C Accounts to Multiple Meters

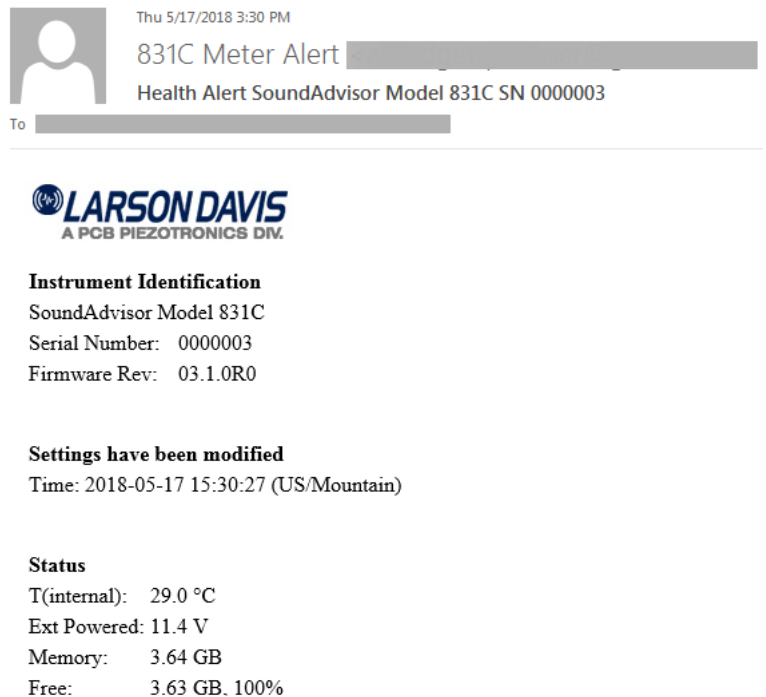
Once you have user accounts set up in G4, Admin users can copy and push accounts to other meters. In this way, users can have access to multiple instruments.

For details on this process, see [6.3.2 "Copying Accounts/Schedule to Multiple Meters" on page 68](#).

6.1.5 Understanding Alert Notifications

Through your 831C user account, you can enable email or text alert notifications for system events, such as when the instrument temperature changes, or when data storage capacity is getting low. When a GPS antenna is installed and enabled in the system properties, the notification email includes the GPS coordinates of the 831C in a click-able link. The link opens the location in Google Maps. This section describes each notification type and send/receive times.

Figure 6-4 Example Email Alert Notification



Settings Alert Notifications

When you edit settings or preferences on the meter, the 831C sends an alert notification with information about which settings changed.

Memory

The 831C sends an alert notification for Memory when the primary memory storage (free space) is 25%, 10%, and 0%. Primary memory storage can be internal or USB.

To prevent multiple messages: if a notification is sent, free memory space can raise up to 5% of the trigger level before another alert can be sent.

For information about setting the primary memory storage location, see [6.2 "Configuring File Storage Preferences for 831C" on page 62](#).

Temperature

A temperature alert notification with the instrument's current temperature is sent when the internal temperature of the meter is outside of 70°C and -40°C.

To prevent multiple messages: if a notification is sent, the temperature can rise above the trigger (-40°C) or fall below the trigger (70°C) multiple times until the temperature rises/falls at least 5°C. If the same conditions are met again, after that, another alert notification is sent.

Power

There are four available alert notifications for SLM power:

- Low external power: sent when power reaches External Shutoff Voltage + 0.6 V
- Meter is shutting down due to low external battery. This is sent 4 seconds prior to shut down
- Power from mains (AC or solar power) is lost, and meter is running on external battery for more than 30 minutes
- If power lost alert is sent, then power is restored to mains for at least 3 minutes, an alert is also sent

To prevent multiple messages: after an alert is sent, the voltage can rise up to 0.5 V before another alert can be sent if the conditions are met.

Run State

The Run State alert sends a notification for each Run, Stop, Pause, or Reset on the meter.

Certification

You can enable an alert notification during the meter's startup if the calibration date is expired, or if the reminder for calibration is due. This alert occurs once every 24 hours, when enabled.

LEARN MORE For more information, see the calibration section of your instrument manual.

Events and Event Start

When this is enabled you will receive an alert notification at the start of an event (when the sound level exceeds the Trigger Level you determined in the Setup (Event Triggers page), and when the event is complete. For details on events and using Event History, in G4 go to **Help** → **Manuals** → **SoundAdvisor 831C Manual**, Module 17.

Measurement History

When this is enabled, you will receive an alert notification if the sound level at the end of a measurement interval exceeds the Trigger Level you determined in the Setup (Control page). For details on using Measurement History, in G4 go to **Help** → **Manuals** → **SoundAdvisor 831C Manual**, Module 15.

Cloud Push Info

When this setting is enabled, you receive an alert notification when a file is saved to your SFTP or cloud storage account.

Cloud Push Failure

When this setting is enabled, you receive an alert notification when a file fails to save to your SFTP or cloud storage account.

GPS Movement Detected

When this notification is enabled, G4 sends an email alert notification if the 831C moves more than 165 ft (50 m) from the initial location. The email contains a click-able link, which opens the last recorded GPS location in Google Maps. Additional notifications are sent when the GPS location is more than 50 meters from the previous check.

Clear Queue

If a network connection is not available, the meter queues alert notifications to send once the connection is re established. If you don't want these older notifications to send, click the **Clear Queue** button to delete them.

TAKE NOTE The arrival time of a notification may be impacted by Internet performance.

Preventing Duplicate Alert Notifications and Spam

To protect recipients from receiving duplicate alert notifications for the same trigger when the state of the meter fluctuates around that trigger, the 831C has a hysteresis, or threshold, for multiple notifications that concern the following alert details:

- **Memory:** If a notification is sent, free memory space can raise up to 5% of the trigger level before another alert can be sent.
- **Temperature:** If a notification is sent, the temperature can rise above the trigger (-40°C) or fall below the trigger (70°C) multiple times until the temperature rises/falls at least 5°C. If the same conditions are met again, after that, another alert notification is sent.
- **Low external power:** After an alert is sent, the voltage can rise up to 0.5 V before another alert can be sent if the conditions are met.

6.1.6 Resetting an Account Password

There are two methods by which to update a forgotten password. First, the meter administrator has all access to user accounts on the meter and can log in using their account to update your password for you.

Otherwise, reset your password as shown in the following process.

Resetting an 831C Account Password by Using Email

If you'd prefer to request an email reset code, complete this process in this section.

- Step 1.** When logging into a meter, if you've forgotten your password, click **Forgot Password**. G4 sends you a password reset link.
- Step 2.** Enter a **New Password**, then enter it again in the **Confirm Password** field.
- Step 3.** Check your mail, enter the code you received in the **Code** field in G4, and click **Log In**. We recommend that you make note of your changed password.

6.2 Configuring File Storage Preferences for 831C

APPLIES TO SLM only

This section prepares your measurement to make the most of G4 settings and features.

Before you begin:

- Create the measurement Setup file, and set it as the Active Setup on the meter or in G4. For more information on creating the Setup, refer to the manual for your instrument.

Step 1. Choose how and where files are saved when a measurement stops. To do this, complete the process shown in **“Configuring System Properties in the Setup Manager” on page A-13**, and choose the **Setting Meter Storage Properties** option.

Step 2. Select a custom storage location for downloaded data files. The location of this setting is shown in the section **“Downloaded File Destination” in “File Options” on page A-3**.

Step 3. If desired, choose Auto-Download and Auto-Export settings. To do this, do the following:

Step 4. Prepare the necessary file storage for the upcoming measurement. To do this, do the following:

Calculating File Storage

The Live View Memory page includes a file storage calculator that can help you estimate the amount of storage an 831C measurement may require.


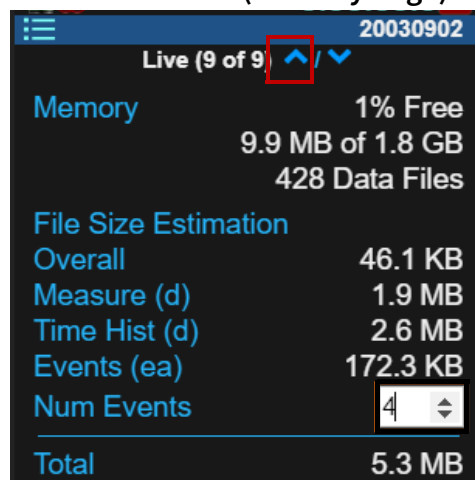
- a. In the G4 Meters Panel, click on the name of your connected meter.
- b. Select the  **Live View**, then click the **up arrow** to display the Memory page, which is the last page of the Live tab (see *Figure 6-5*)

Figure 6-5 Live View tab (Memory Page)



- c. If using Event History, enter the number of events you expect to occur during this measurement in the **Num Events** field.

Event Cal (ea) displays the amount of memory required for each event.

TAKE NOTE This value includes sound recordings, when enabled.

Time History: When two values display on this line, the first value is the amount of memory required to store each hour of time history data. The second, **Time Hist (d)**, is the amount of memory required to store each day of time history data.

- Step 5.** If desired, set up a remote storage connection (e.g. Dropbox^{TM1} or an SFTP account) for your 831C. To do this, refer to **“Configuring System Properties in the Setup Manager” on page A-13**, and choose the section **“Setting Cloud Storage Properties.”**

6.2.1 Setting Up Remote (Cloud) Storage for 831C

When the 831C saves a measurement data file, you can direct it to be saved on the meter, to a USB drive, or uploaded to a remote storage service such as a Dropbox account or SFTP server.

Saving to remote storage requires you to first configure the remote storage details with your provider, then indicate the storage account and path details in G4. This section demonstrates the latter.

Before you begin:

- Prepare a Dropbox account or SFTP server account.

Step 1. Configure the 831C network and communication preferences. To do this, do the following:

- Set a static IP address for the 831C, and complete other applicable processes in the *SoundAdvisor 831C Manual*, “13.2 Setting the Meter’s Network ID.”

Step 2. Complete the remote (cloud) storage setup, as shown in **A.5.11 (Optional) Setting Cloud Storage Properties.**

Step 3. We recommend making a test measurement to verify this setup.

6.3 Utilizing Scheduling Firmware (831C-SCH)

APPLIES TO 831C with purchased firmware option 831C-SCH

1. Dropbox is a registered trademark of Dropbox, Inc. in the US and other countries.

The optional G4 Scheduling firmware allows you to operate a meter based on a repeatable weekly schedule with schedule blocks for the following meter functions:

- Meter Run, Stop, Store
- Specific Measurement Trigger Levels
- Alert Notifications
- Modem Low Power (for NMS044/045 systems only)

In this section:

- [6.3.1 Creating Schedule Blocks](#)
- [6.3.2 Copying Accounts/Schedule to Multiple Meters](#)

6.3.1 Creating Schedule Blocks

Schedule blocks enable you to schedule meter run time, settings, and other features. Schedule blocks display on the meter schedule, which is in the form of a calendar week. This section demonstrates how to create schedule blocks on the meter schedule.

In this section:

- [Scheduling a Meter Run Block](#)
- [Scheduling a Measurement Triggers Block](#)
- [Scheduling a Modem Low Power Mode Block](#)
- [Scheduling an Exception Block](#)

Scheduling a Meter Run Block



Before you begin:

- Enable the Accounts/Schedule firmware option from Larson Davis, as shown in [6.3.2 Copying Accounts/Schedule to Multiple Meters](#).
- Use the Meters Panel to verify that your meter is connected to G4.
- If you're using Secure G4 (HTTPS), you must be logged in as an Administrator to continue. If you're scheduling for more than one meter, log in to each meter now. For more information on creating user accounts or creating an Administrator account, see [2.4 "Creating a Measurement Setup and Making a Measurement" on page 12](#).

Step 1. In the G4 Meters Panel, click on your connected meter. This opens the meter tab.

Step 2. Click  **Accounts/Schedule.**



TAKE NOTE If you are not logged in to the meter as an Administrator, click Log In Now, enter your credentials, and click Log In to proceed.


- Step 3.** Click  **Show Schedule**. The schedule displays on the **Active View** tab, which is a read-only view. No changes to the schedule can be made on this tab.
- Step 4.** To schedule measurement time for a meter, click  **Recurring Week**, and click and drag to select the desired meter run time.
- TAKE NOTE** Items are scheduled in 15 min increments.
- Step 5.** In the Run Block pop-up window, if needed, edit the **Start** and **Stop** time and select **Store on End**, then click **Save**.
- Step 6.** Next, make the schedule active. To do this, click the checkbox in-line with each schedule block type that should be active near the top of your screen, including the **Run** checkbox **RUN**, **Modem** checkbox **MODEM**, **Alerts** checkbox **ALERTS**, **Triggers** checkbox **TRIGGERS**.
- LEARN MORE** For more information about scheduling, including scheduling exceptions to the weekly recurring schedule, see [Scheduling an Exception Block](#).
- TRY THIS** To quickly duplicate schedule blocks, hold **CTRL**, then **click and drag** the copied schedule block to a new time slot.

Scheduling a Measurement Triggers Block

Before you begin:

- Enable the Accounts/Schedule firmware option from Larson Davis (831C-SCH), as shown in [6.1.2 Creating a New 831C Account in G4](#).
- Use the Meters Panel to verify that your meter is connected to G4.
- If you're using Secure G4 (https), you must be logged in as an Admin user to continue. If you're scheduling for more than one meter, log in to each meter now. For more information on creating user accounts, go to [Module 5 Managing Security in G4](#).

- Step 1.** In the G4 Meters Panel, click on your connected meter. This opens the meter tab.
- Step 2.** Click  **Accounts/Schedule**.
- TAKE NOTE** If you are not logged in to the meter as an Administrator, click Log In Now, enter your credentials, and click Log In to proceed.
- Step 3.** Click  **Show Schedule**. The schedule displays on the **Active View** tab, which is a read-only view. No changes to the schedule can be made on this tab.


Step 4. To schedule measurement time for a meter, click  **Recurring Week**, and click and drag to select the desired meter run time.

TAKE NOTE Items are scheduled in 15 min increments.

Step 5. In the Triggers Block pop-up window, select “Triggers” as the **Block Type**.





Step 6. Choose a **Triggers Setup** from the drop-down menu, or create a new Triggers Setup by completing the following process:

Creating a Triggers Setup

- a. Click the **plus icon**  to the right of the **Triggers Setup** drop-down menu, and enter a unique name in the **Setup Name** field.
- b. Select at least one **Trigger Source** from the drop-down menu, and enter the desired **Trigger Level** in dB.

TAKE NOTE You can enter up to 3 Trigger Sources with Trigger Levels for this Setup.

- c. If you have the OBA firmware option installed and enabled, select from available options for **Full Octave** and/or **Third Octave** data collection.
- d. Click **Save**. The new Triggers setup appears on the schedule.

Step 7. Next, make the schedule active. To do this, click the checkbox in-line with each schedule block type that should be active near the top of your screen, including the **Run** checkbox , **Modem** checkbox , **Alerts** checkbox , **Triggers** checkbox .

LEARN MORE For more information about scheduling, including scheduling exceptions to the weekly recurring schedule, see [Scheduling an Exception Block](#).

TRY THIS To quickly duplicate schedule blocks, hold **CTRL**, then **click and drag** the copied schedule block to a new time slot.

Scheduling a Modem Low Power Mode Block

APPLIES TO NMS044 or NMS045 with SoundAdvisor™ 831C

This option is available if you’re operating the NMS044 or NMS045 system with the Model 831C. This feature also has specific hardware requirements, which must be installed before using this feature. For complete information, consult your *NMS044 Manual*, section A.4.3.


Before you begin:


- Enable the Accounts/Schedule firmware option from Larson Davis (831C-SCH), as shown in [Module 4 Upgrading Software, Firmware, and Options](#).
- Establish an active meter connection in G4.
- If you secured your account with a password and you're scheduling for more than one meter, log in to each meter now. For more information on creating user accounts, go to [Module 5 Managing Security in G4](#).

Step 1. In the G4 Meters Panel, click on your connected meter. This opens the meter tab.

Step 2. Click  **Accounts/Schedule**.

TAKE NOTE If you are not logged in to the meter as an Administrator, click **Log In Now**, enter your credentials, and click **Log In** to proceed.





Step 3. Click  **Show Schedule**. The schedule displays on the **Active View** tab, which is a read-only view. No changes to the schedule can be made on this tab.

Step 4. To schedule measurement time for a meter, click  **Recurring Week**, and click and drag to select the desired meter run time.

TAKE NOTE Items are scheduled in 15 min increments.

Step 5. In the Run Block pop-up window, select a **Block Type**, **Start**, and **Stop** time, and then click **Save**.

TAKE NOTE If desired, select the checkbox in-line with Store on End.

Step 6. Next, make the schedule active. To do this, click the checkbox in-line with each schedule block type that should be active near the top of your screen, including the **Run** checkbox  **RUN**, **Modem** checkbox  **MODEM**, **Alerts** checkbox  **ALERTS**, **Triggers** checkbox  **TRIGGERS**.

LEARN MORE For more information about scheduling, including scheduling exceptions to the weekly recurring schedule, see [Scheduling an Exception Block](#).

TRY THIS To quickly duplicate schedule blocks, hold **CTRL**, then **click and drag** the copied schedule block to a new time slot.

Scheduling an Exception Block



Before you begin:


- Enable the Accounts/Schedule firmware option from Larson Davis, as shown in [Module 4 Upgrading Software, Firmware, and Options](#).
- Use the Meters Panel to verify that your meter is connected to G4.
- If you're using network security (HTTPS), you must be logged in as an Admin user to continue. If you're scheduling for more than one meter, log in to each meter now. For more information on creating user accounts, see [6.1.2 "Creating a New 831C Account in G4" on page 56](#).



Step 1. In the G4 Meters Panel, click on your connected meter. This opens the meter tab.

Step 2. Click  **Accounts/Schedule**.

TAKE NOTE If you are using network security (HTTPS) and you are not logged in to the meter as an Administrator, click **Log In Now**, enter your credentials, then click **Log In** to proceed.

Step 3. Click  **Recurring Week**, then click  **Exceptions** to edit the weekly schedule.

Step 4. Click  **Add Exception**, and select a date from the calendar drop-down menu.

Step 5. Set all applicable options for the type of schedule block, and click **Save**. The exception displays on the  **Active View** tab, with a  **star** on the date to indicate an exception to the recurring weekly schedule.

Step 6. Next, verify that the schedule block for the exception is active. To do this, click the checkbox in-line with each schedule block type that should be active near the top of your screen, including the **Run** checkbox **RUN**, **Modem** checkbox **MODEM**, **Alerts** checkbox **ALERTS**, **Triggers** checkbox **TRIGGERS**.


6.3.2 Copying Accounts/Schedule to Multiple Meters

APPLIES TO 831C with purchased option 831C-SCH.

Before you begin:

- Log in to each meter you want to copy to.


Step 1. In the G4 Meters Panel, click on the name of your connected meter. The meter tab opens on the right.

Step 2. Click  **Accounts/Schedule**, and log in to the meter when prompted.

Step 3. Click  **Show Schedule**.

Step 4. In the main window, select the checkbox in-line with each schedule block item that you want active when the schedule is copied, including the **Run** checkbox

RUN, **Modem** checkbox **MODEM**, **Alerts** checkbox **ALERTS**, **Triggers** checkbox **TRIGGERS**.

Step 5. Click  **Copy**. This opens the Copying to Meters window.

Step 6. In the Meters Panel, click the checkbox in-line with meters or Projects you want to push the current schedule and associated accounts to.

TAKE NOTE When using network security in G4, a warning icon appears in-line with meters you are not logged in to. Log in to those meters to continue.

Step 7. In the Copying to Meters window, click **Selected Meters**, then click **OK** to confirm.

TAKE NOTE When you create a new user and push a schedule to a new meter, passwords are not pushed to the meter. Log in to the meter to set a password. If the schedule fails to transfer, disconnect then reconnect your meter to G4 and repeat this process.

6.4 Utilizing G4 Security Features for 831C

G4 provides both meter security and network security for meters operating remotely. For more information on meter security features, see [5.1.1 "Using the Meter Lock for 831C in G4" on page 46](#). For information on network security features, see [5.2 "Using Network Security for 831C" on page 50](#).

Module **7** Environmental Noise Study

This module provides an example procedure for performing a sound level measurement and working with the resulting data by using the LD Model 831C with G4 in SLM mode. You can also follow these procedures when using these other instruments from Larson Davis:

- SoundAdvisor Model 831
- SoundExpert™ LxT®, SoundTrack LxT®, N/Forcer, or LXT1 Models (not all features will be available)

Features shown in this module appear when the following optional firmware packages are purchased and installed. For this reason, your display may differ from the example. For any step that does not apply to your package, we recommend that you move to the next step.

- 831C-OB3 (Octave Frequency Analysis)
- 831C-LOG (Automatic Data Logging)
- 831C-WTHR (Weather Data)
- 831C-ELA (Measurement History)
- 831C-SR (Sound Recording)

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7.1 Preparing the Measurement Equipment

Preparing the measurement equipment includes the following preparations:

- Powering and calibrating the 831C and the appropriate transducer for your type of data collection
- Establishing the 831C connection to G4
- Preparing the data storage location

Complete each section in the order it's presented.

7.1.1 Calibrating the Meter via G4


To achieve the best result, we recommend that you calibrate just before making an acoustic measurement.

For best results, use Larson Davis precision acoustic calibrators, microphones, and preamplifiers.

Before you begin:

- Verify the power source for the meter. Check power connections, or charge or install new batteries.
- Connect your instrument in G4. For more information, see [2.3 "Connecting the Meter to G4" on page 10](#).

Step 1. In G4, click on your connected meter in the Meters Panel. The meter tab opens in the main display.

Step 2. Select the  **Calibrate** view. For instructions when using Model 831 SLM, see the manual for that meter.

Step 3. Choose the appropriate calibrator and settings from the **Select Calibrator** drop-down, and then click **Calibrate** or **Do Calibration**.

Connecting and Calibrating a Hydrophone for 831C

- a. In G4, click the right arrow to show the Calibration Settings page.
- b. Select "Other" from the **Microphone** drop-down menu.
- c. Edit the Calibration Settings values on this page, create a new **Calibrator to Edit** entry, and complete the calibration as instructed in this FAQ article: [How Do I Connect a Hydrophone?](#)
- d. Proceed to Step 5.

Step 4. Press the power button on the calibrator, and then slowly place it over the microphone to avoid sudden pressure changes to the diaphragm. After a few seconds, G4 indicates any measured difference with a prompt to save the results.

Step 5. Click **Yes** to save the calibration, and then remove the calibrator from the microphone.

Recommended Next Steps:



- If you're using the PRM2103, perform a calibration check as shown in [7.1.2 Performing a Calibration Check in G4](#).
- [7.2 Creating a Measurement Setup in G4](#)

7.1.2 Performing a Calibration Check in G4

Complete this section only if you're using the Larson Davis 2103 precision microphone/preamplifier combination that supports calibration checking. Refer to your preamplifier product manual for specifics.

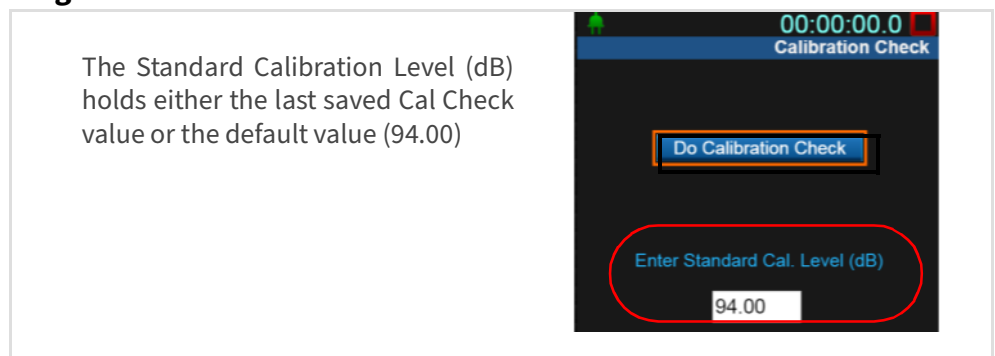
We recommend that you perform a calibration check after calibrating and just before making a sound measurement. This establishes the standard check level for the preamplifier.

Step 1. In G4, click on your connected meter in the Meters Panel.

Step 2. Click the  **Live View** button, click the **menu icon** , then select **Calibrate** from the menu that appears. For instructions using Model 831, see the manual for that meter.

Step 3. Click the lower-left tab twice to view the **Cal Check** tab.

Figure 7-1

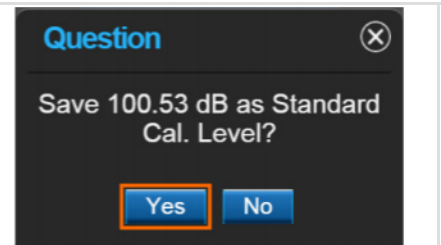


Step 4. Click **Do Calibration Check**. After a few seconds, the meter displays the following confirmation message, as shown in

Figure 7-2 Save Calibration Check

Select **Yes** to save the Cal Check value as the Standard Cal Level.

Select **No** to simply record the level in the Cal Check History.



Step 5. To exit the Calibration tabs, click **Close** near the bottom of your screen.

Step 6. To examine a meter’s cal check history, click **Calibration Histories** in the G4 top toolbar.

7.1.3 Setting a Data Storage Preference

Step 1. Complete the applicable sections of [6.2 "Configuring File Storage Preferences for 831C" on page 62.](#)

Recommended Next Steps:

- Create a measurement Setup as shown in [7.2 Creating a Measurement Setup in G4.](#)

7.2 Creating a Measurement Setup in G4

This section shows how to use the G4 Setup Manager to create an environmental noise measurement setup file. Some segments of this section make use of optional firmware packages that may not apply to your measurement. When this is the case, move to the next segment. In this manner, the content in section [7.2](#) is adapted to your particular application.

To create a setup that makes full use of the 831C, including all available optional firmware packages, complete all portions of this section in the order they are presented. The resulting Setup contains the following settings:

- A-Frequency weighting with Slow Detector and Z-peak weighting
- 1/3 Octave Band Analysis range set to “Low” with Spectral Ln Mode enabled (Firmware Option 831C-OB3)
- Continuous Run Mode with Measurement History enabled and taken in 1 hour increments with Interval Time Sync enabled (Firmware Option 831C-ELA)

- Time History enabled and set with 1 second periods and time history options marked for L_{Aeq} and L_{Zpeak} (Firmware Option 831C-LOG)
- Snapshot sound recordings for events (Firmware Option 831C-SR)
- Weather data taken using the optional SEN03x weather station (Firmware Option 831C-WTHR)

7.2.1 Naming the Setup

Before you begin:

- Connect your meter in G4.

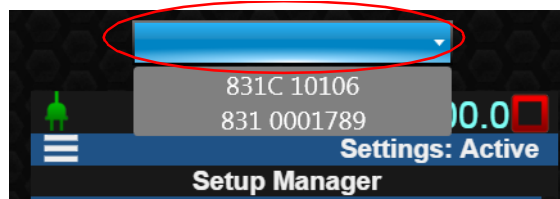
Step 1. In G4, click on the name of your connected meter in the Meter Panel (or Project Panel).

Step 2. Click **Setup Manager** in the top G4 toolbar. This opens the Setup Manager window. The left side shows setups on the PC; the right side shows setups on the meter you select from the blue drop-down menu.

Step 3. From the blue drop-down menu on the left (PC side), select **SoundAdvisor 831C Settings in PC**.

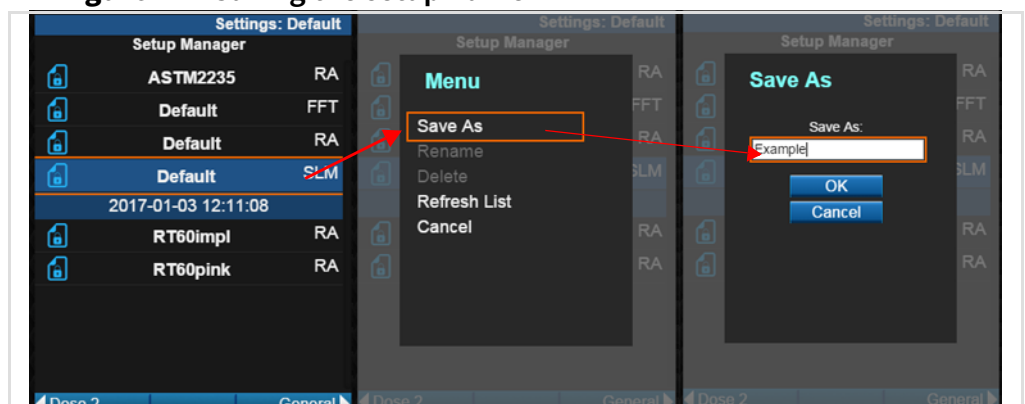
Step 4. If you have more than one instrument, select the model and serial # from the blue instrument drop-down menu on the right (meter side).

Figure 7-3 Setup Manager: select an instrument



Step 5. On the left (PC side), right-click on the **Default** SLM setup file on the **SoundAdvisor 831C Settings in PC** box, select **Save As**, and enter a descriptive name. (See Figure 7-4)

Figure 7-4 Saving the setup name




Recommended Next Steps:

- See **7.2.2 Choosing Measurement Weighting, Detection, and Integration Method**

7.2.2 Choosing Measurement Weighting, Detection, and Integration Method

Before you begin:

- Complete [7.2.1 "Naming the Setup" on page 74](#)

Step 1. On the left side (PC side) of the Setup Manager, click once to select the Setup you created, then click the **arrow icon**  to access the General tab.

TAKE NOTE If you return to the Setup Manager page after selecting the left or right pages, you are prompted to save settings. Click **Yes** to apply the changes to the setup.

Step 2. On the General tab in the **Default Data File** field, enter a descriptive prefix for the resulting data file name. Each data file created with this Setup will contain this prefix. For example, the prefix “EnvN_” will help identify environmental noise data files from others in a file list.


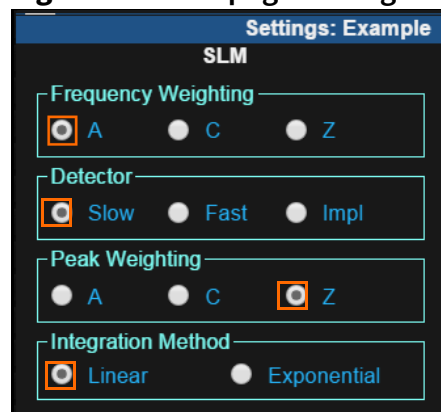
Step 3. Click the **arrow icon**  to access the **SLM** tab, and select settings as shown in *Figure 7-5*.

Figure 7-5 SLM page settings




Recommended Next Steps:

- If the Setup is complete, see [7.2.12 Moving the Setup to the Instrument](#)

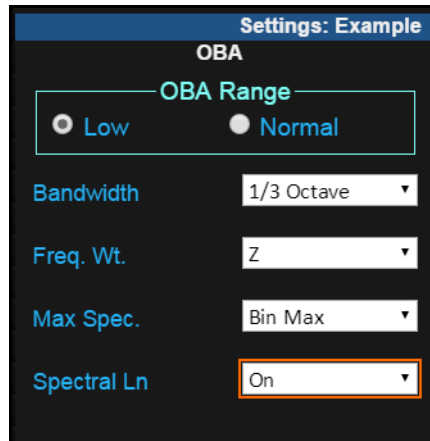
7.2.3 Choosing Octave Band Analysis Settings

Complete this section if you have purchased Octave Band Analysis firmware (831C-OB3). For more information, see the *SoundAdvisor 831C Reference Manual*.

Step 1. On the left side (PC side) of the Setup Manager, click the **arrow icon**  until the **OBA** page displays.

Step 2. On the OBA page, select the settings shown in *Figure 7-6*.

Figure 7-6 OBA page settings




Recommended Next Steps:

- If the Setup is complete, see [7.2.12 Moving the Setup to the Instrument](#).

7.2.4 Choosing Ln Values

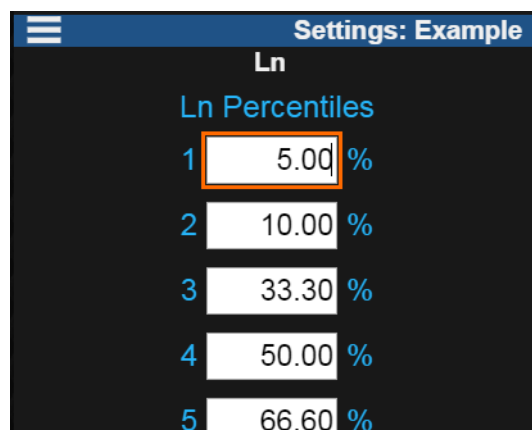
Ln statistical values are commonly used to describe the characteristics of non-steady sound such as environmental noise.

The Ln value is the measured sound level in decibels that was exceeded n% of the measurement time. For example: given a value of “L90 = 35 dB,” the measured sound level was above 35 dB for 90% of the measurement period.

Step 1. On the left side (PC side) of the Setup Manager, click the **arrow icon**  in the lower-right corner until the **Ln** page displays.

Step 2. For this example, keep the default values as shown in *Figure 7-7*.

Figure 7-7 Ln page values




Recommended Next Steps:

- If the Setup is complete, see [7.2.12 Moving the Setup to the Instrument](#).

7.2.5 Choosing Meter Control Settings

Because we are choosing Continuous mode for this example, when you start the measurement, the instrument continuously creates measurement records until you stop it.

Step 1. On the left side (PC side) of the Setup Manager, click the **arrow icon**  until the **Control** page appears.

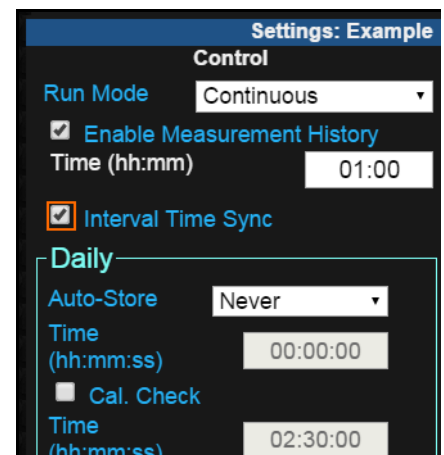
Step 2. On the Control page, choose “Continuous” from the **Run Mode** drop-down menu.

Step 3. Select the checkbox in-line with **Enable Measurement History**, and enter “01:00” as the **Time (hh:mm)** for the duration of each measurement record.

Step 4. Select the checkbox in-line with **Interval Time Sync**.

This sets the instrument to stop and start measurements at a time of day equal to a multiple of the duration you enter in the **Time** field, or 1 hour in this example). For example, if you press the Run button at 00:08:14 (hh:mm:ss format), the next measurement records begin at 09:00, 10:00, 11:00, etc.

Figure 7-8 Meter Control page




Recommended Next Steps:

- If the Setup is complete, see [7.2.12 Moving the Setup to the Instrument](#)

7.2.6 Choosing Time History Settings

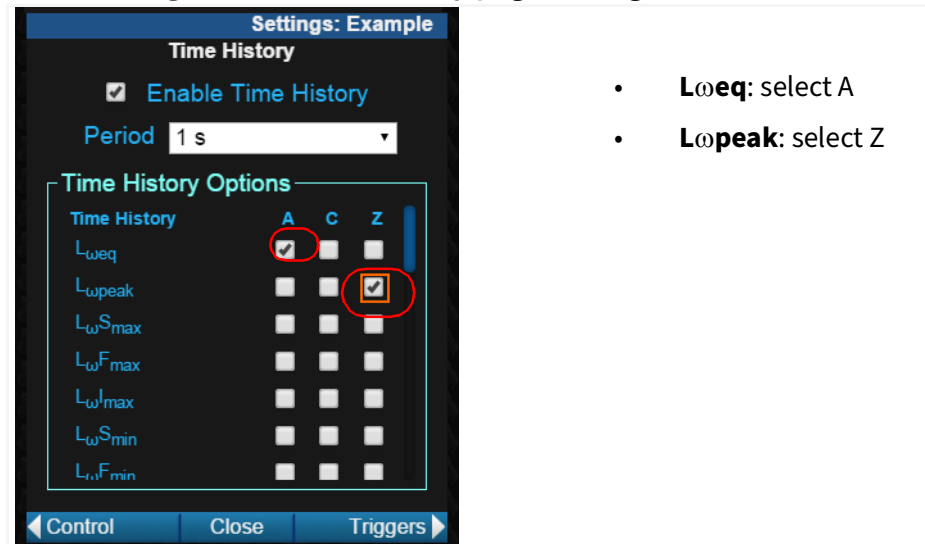
Complete this section if you have purchased Time History firmware (831C-ELA). For more information, see the instrument manual.

Step 1. On the left side (PC side) of the Setup Manager, click the **arrow icon**  until the **Time Hist** page displays

Step 2. On the Time History page, select the checkbox in-line with **Enable Time History**, and select “1 s” from the **Period** drop-down menu.

Step 3. Select the checkbox in-line with the following **Time History Options**:

Figure 7-9 Time History page settings



- **L_weq**: select A
- **L_wpeak**: select Z

Recommended Next Steps:

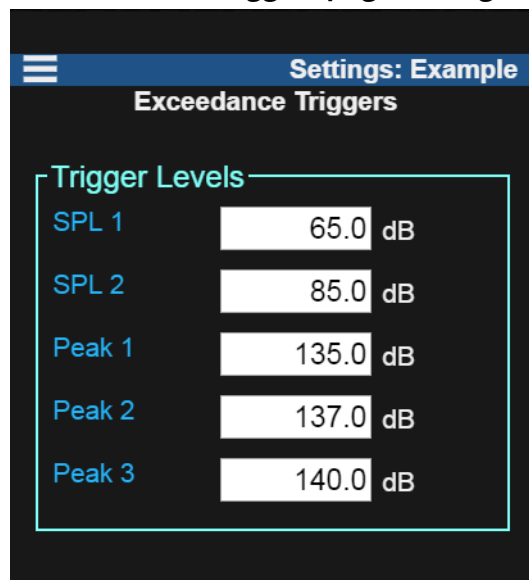
- If the Setup is complete, see [7.2.12 Moving the Setup to the Instrument](#)

7.2.7 Choosing Exceedance Level Values

Step 1. On the left side (PC side) of the Setup Manager, click the **arrow icon**  in the lower-right corner until the **Excd. Trigger** page displays.

Step 2. On the Exceedance Trigger page, enter the levels shown in *Figure 7-10*.

Figure 7-10 Exceedance Triggers page settings



Recommended Next Steps:

- If the Setup is complete, see [7.2.12 Moving the Setup to the Instrument](#).

7.2.8 Choosing Event History Options

Complete this segment to enable Event History and select from available Trigger options.


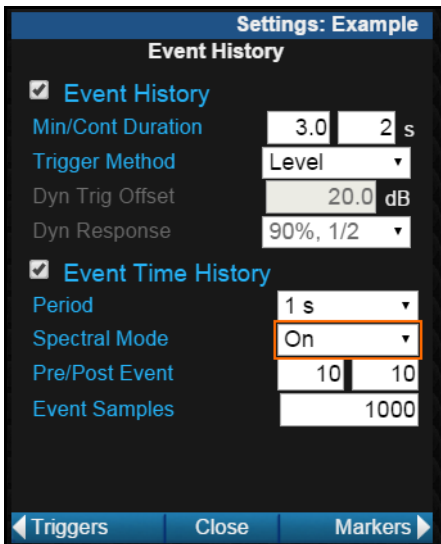

- Step 1.** On the left side (PC side) of the Setup Manager, click the **arrow icon**  in the lower-right corner until the **Event Hist** page displays.
- Step 2.** On the Event History page, select the checkbox in-line with **Event History**.
- Step 3.** Keep the default values for **Min/Cont Duration**, and **Trigger Method**.
- Step 4.** Select the **Event Time History** option, and select “On” from the **Spectral Mode** drop-down menu.
- Step 5.** All other settings on the Event History page should match settings shown in *Figure 7-11*.

Figure 7-11 Event History page settings



For the Model 831 (firmware 4.5 +), email/text alert notifications for sound events can only be managed by creating a user account in G4. For more information, see [6.1.3 "Editing an 831C Account in G4" on page 58](#).

- Step 6.** On the left side (PC side) of the Setup Manager, click the **arrow icon**  until the **Event Triggers** page displays.
- Step 7.** Select your chosen **Trigger Source** or “Not Used” from one or more source drop-down menus, and enter the dB **Trigger Level** for each active source.
- Step 8.** If applicable to your measurement, you may also select a **Full Octave** or **Third Octave** Spectrum trigger source from the drop-down menus, and then select “All” or “Any” values from those sources.

Recommended Next Steps:


- If the Setup is complete, see [7.2.12 Moving the Setup to the Instrument](#).

7.2.9 Recording Sound for Triggered Events

Complete this section to save sound record and pre-trigger time for each triggered sound event.

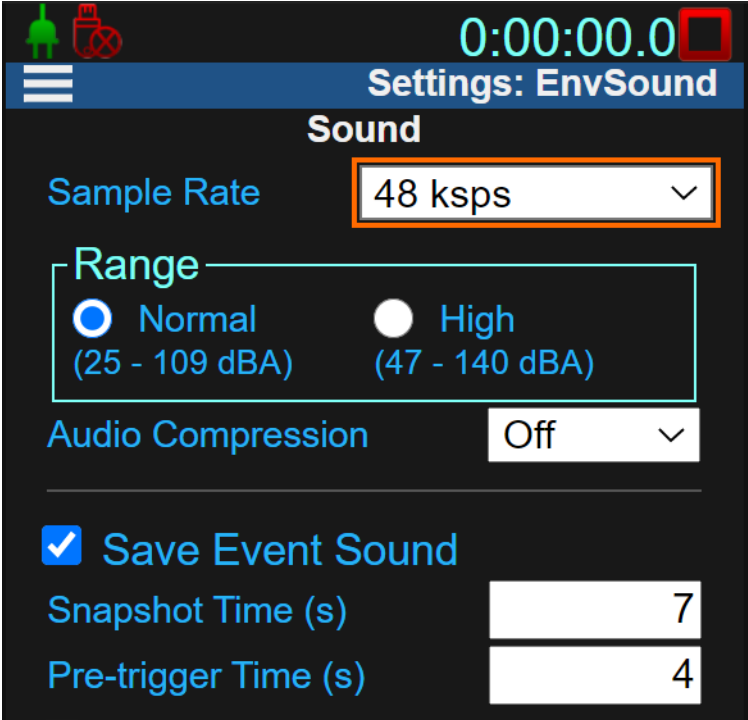
Before you begin:

- This segment requires the Larson Davis Sound Recording firmware option (831C-SR). More information is available in the instrument manual or from your representative.

Step 1. On the left side (PC side) of the Setup Manager, click the **arrow icon**  in the lower-right corner until the **Sound** page displays.

Step 2. On the Sound page, select the checkbox in-line with **Save Event Sound**, as shown in *Figure 7-12*, and keep all other default values.

Figure 7-12 Settings for recording sound events



For information about settings on this page when using the 831C, in G4 go to **Help → Manuals → SoundAdvisor 831C Manual**, 19.3 Making an Automated Event Sound Recording.”

Recommended Next Steps:


- If the Setup is complete, see **7.2.12 Moving the Setup to the Instrument**.

7.2.10 Recording Sound During the Measurement

Complete this section to save a sound record during each measurement history (MH) interval, or when utilizing the Marine Mammal Protection feature.

Before you begin:

- This segment requires the Larson Davis optional firmware packages for Measurement History (831C-ELA) and Sound Recording (831C-SR). More information is available in the SoundAdvisor 831C Manual, Module 19, or from your LD representative.

Step 1. On the left side (PC side) of the Setup Manager, click the **arrow icon**  in the lower-right corner until the **Sound** page displays.

Step 2. If you're making a Marine Mammal Protection measurement, select the exact sound values shown in *Figure 7-13*. Otherwise, on the Sound page, chose values for the following settings:

- **Sample Rate**

A higher sample rate creates a more accurate representation of the original sound. If frequency analysis is part of your process and you have sufficient file storage space, we recommend 48 ksp/s or higher.

- **Range**

For more information on selecting an appropriate Range, see *SoundAdvisor 831C Manual*, "19.1 Understanding 831C Recording Settings and Sound Quality."

- **Audio Compression**

Select "Off" to save the file in WAV (uncompressed) format. For more information on selecting an appropriate compression setting, see *SoundAdvisor 831C Manual*, "19.1 Understanding 831C Recording Settings and Sound Quality."

- **Save Event Sound**

When this checkbox is selected, the 831C creates a separate sound record for an "event" each time the sound level exceeds the MH Trigger Level (dB). (Set the Trigger Level on the Control page, MH section (See [7.2.5](#)).

- Snapshot Time (s)

Snapshot Time sets the period in seconds that is recorded after the triggering event.

- Pre-trigger Time (s)

Pre-trigger Time sets the period in seconds prior to the triggering event that you want included in the recording.

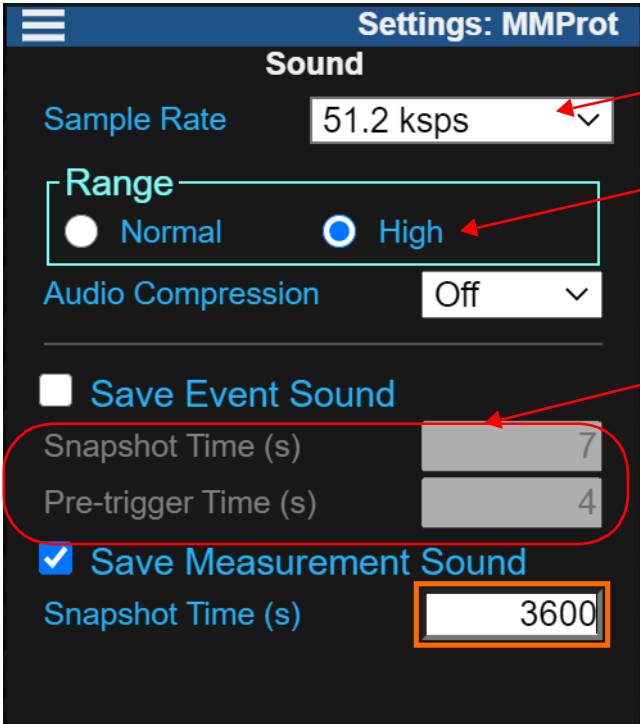
- **Save Measurement Sound**

When this checkbox is selected, the 831C begins recording the measured sound at the start of the MH interval.

- Snapshot Time (s)

Snapshot Time sets the length of the sound recording in seconds (Max "9,999" s ≈ 2.8 hours). If the Snapshot Time is longer than the period you set for the MH Interval, the recording always ends when the interval ends.

Figure 7-13 Marine Mammal Protection sound settings



Choose a very high Sample Rate, such as 51.2 ksp, or 48 ksp.

Select **High Range** if the recorded sound will be higher than 110 dBA. Otherwise, select **Normal**.

Select the checkbox in-line with Save Measurement Sound, and enter a Snapshot Time in seconds (3600 to create a new sound record each hour, or any value up to 9,999 seconds to create a sound record up to every 2.8 hours).

LEARN MORE For information about using **Audio Compression** on this page when using the 831C, go to **Help → Manuals → SoundAdvisor 831C Manual**, “19.3 Making an Automated Event Sound Recording”.

Recommended Next Steps:

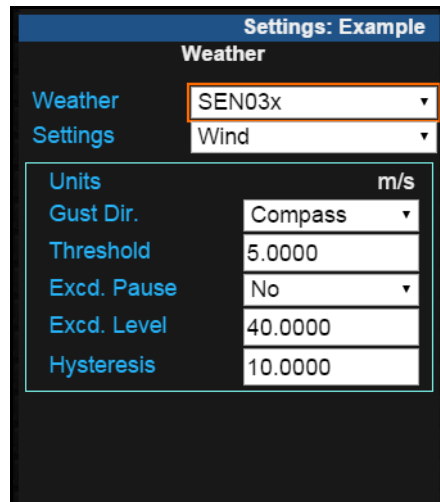
- If the Setup is complete, see **7.2.12 Moving the Setup to the Instrument**.

7.2.11 Setting Weather Options

Use the SEN03x weather station to complete this section.

- Step 1.** Click the **Weather** page, and select **SEN03x** (or **Weather-INT**) from the **Weather** drop-down menu.
- Step 2.** Keep all other default values as shown in *Figure 7-14*.

Figure 7-14 Setup Manager: weather page settings



LEARN MORE For more information about these settings in G4, go to **Help** → **Manuals** → **SoundAdvisor 831C Manual** → section 4.1.3 “Viewing Weather-Related Data”

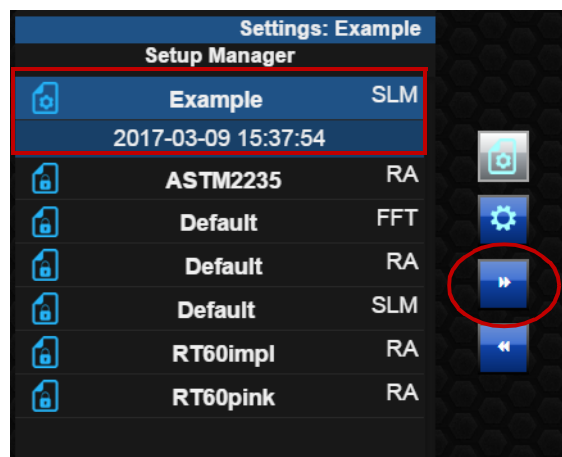
Recommended Next Step:

- [7.2.12 Moving the Setup to the Instrument](#)

7.2.12 Moving the Setup to the Instrument

- Step 1.** On the left side (PC side) of the Setup Manager, click **Close** and confirm to **Save** the setup file when prompted.
- Step 2.** In the Setup Manager file list, select the Setup file you created, then click the **right double-arrow button** to transfer the setup to the instrument.

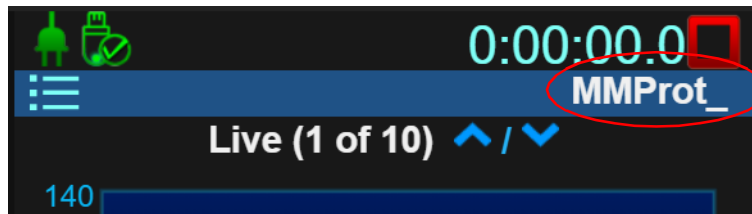
Figure 7-15 Moving setup to the meter and Set to Active



- Step 3.** If desired, enter a new file name and click **OK**. The Setup is saved on the meter.
- Step 4.** On the meter side (right side), right-click the name of the setup, and select **Set To Active** from the menu that appears.

TAKE NOTE You can see which setup is active on the instrument by viewing the heading bar on the instrument screen or in the Live View.

Figure 7-16 Example: Active setup in heading bar



7.3 Making the Measurement

This example monitors environmental sound levels in one location.

Before you begin:

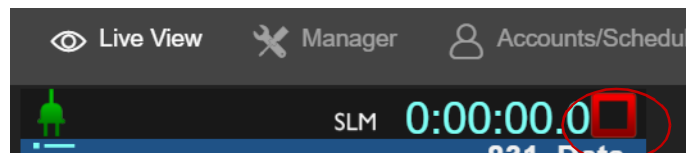
- Secure your SLM in the location you want to monitor with a tripod and other available environmental protection systems, which result in the most accurate measurement. For more information, in G4 go to **Help** → **Manuals** → *Model 831 SLM Reference Manual*.
- Connect your meter in G4, and verify that it has an active connection in the G4 Meters Panel.

Step 1. When you're ready to start the measurement, click on the name of your connected meter in the Meters Panel.

Step 2. If G4 security/HTTPS is enabled, you are prompted to log in with your **Username** and **Password**. The meter tab opens in the main tabs display.

Step 3. On the meter tab, click the  **Live view**, then click the **Run/Stop icon** in the top-right corner to begin the measurement, as shown in *Figure 7-17*.

Figure 7-17 Live View Run/Stop Icon in G4



Step 4. After an appropriate amount of time, click the **Run/Stop icon** again to end the measurement. The measurement stores according to your Auto-Store preference. If Auto-Store is set to None, press the **Run/Stop icon** again to store the measurement manually.

Step 5. Perform an acoustic calibration and calibration check to verify your measurement. For more information, see [7.1.1 "Calibrating the Meter via G4" on page 71](#), and [7.1.2 "Performing a Calibration Check in G4" on page 72](#).

Recommended Next Step:

- [7.4 Viewing the Measurement Data](#)

7.4 Viewing the Measurement Data

The Live View in G4, or the meter itself, displays many tabs and pages of measurement results data. Refer to the *SoundAdvisor Model 831C Manual*, Module 4 Using the Data Display for information on viewing data on the meter display.


In this section:

- [7.4.1 "Downloading the Measurement File" on page 85](#)
- [7.4.2 "Using the G4 Data View for Environmental Noise Measurements" on page 86](#)

7.4.1 Downloading the Measurement File

Before you begin:

- Connect your meter to your PC, and click **Discover Meters** in the toolbar. Your meter should display as active in the Meters Panel.

Step 1. In G4, click on your connected meter in the Meters Panel. The meter tab opens on the  **Files** view.

TAKE NOTE If you want to export data to a spreadsheet, select the checkbox in-line with **Export to .xlsx** in the Files page toolbar before downloading the data file from the meter.


Step 2. Double-click the file in the list, and the file begins downloading. G4 automatically saves the file in LDBIN format and opens it in a new tab.

TAKE NOTE If you also chose to export file to a spreadsheet, the XLSX file saves directly below the LDBIN file in the file directory.

Recommended Next Step:

- [7.4.2 Using the G4 Data View for Environmental Noise Measurements](#)

7.4.2 Using the G4 Data View for Environmental Noise Measurements

G4 Data view displays the resulting measurement data in tabs or sheets. Each sheet provides sound data according to the settings you specified in the setup. When you download and open a data file in G4 the file opens on the on the  **Data** view, which displays the following tabs or sheets:

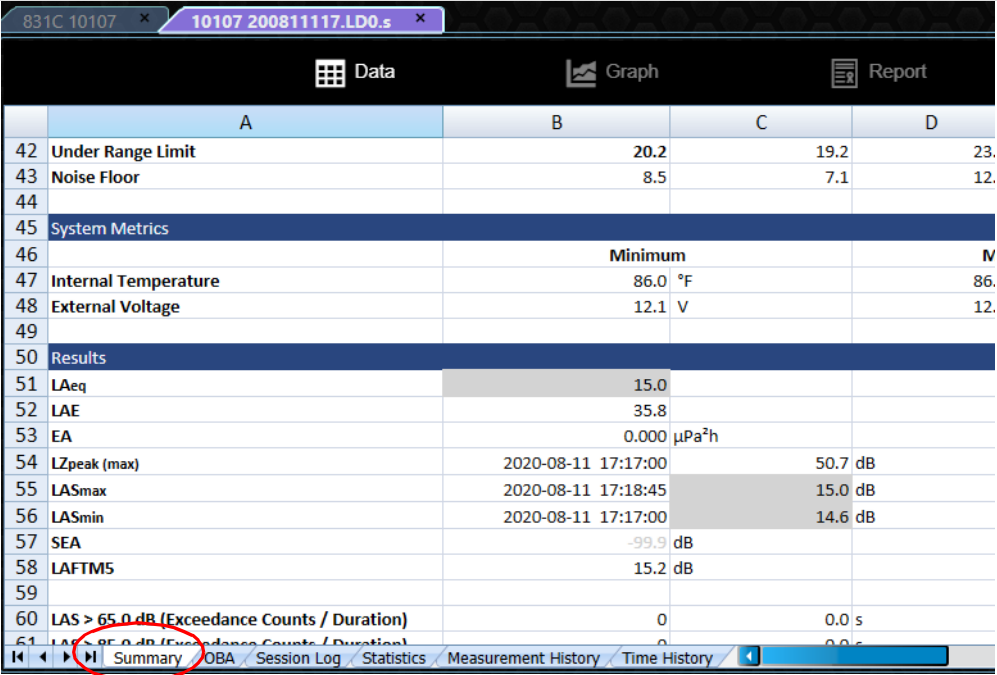
Data View Summary Sheet

The Summary sheet provides summarized results, such as L_{Aeq} , L_{Zpeak} , L_{Amax} , and Ln Percentiles, as well as exceedances, overloads, and weather information. The data on this sheet corresponds with the data on the Overall tab on the 831C. It represents all the data taken since the last measurement reset as shown in *Figure 7-18*.

Figure 7-18 Data View Summary Sheet

TRY THIS Use the right-click menu in G4 worksheets to cut, copy, paste, add comments, etc.

For more information on the meaning of specific data metrics and values, in G4 go to **Help → Manuals → SoundAdvisor 831C Reference Manual**, and select Appendix C Glossary.



	A	B	C	D
42	Under Range Limit	20.2	19.2	23.
43	Noise Floor	8.5	7.1	12.
44				
45	System Metrics			
46		Minimum		N
47	Internal Temperature	86.0 °F		86.
48	External Voltage	12.1 V		12.
49				
50	Results			
51	LAeq	15.0		
52	LAE	35.8		
53	EA	0.000 $\mu\text{Pa}^2\text{h}$		
54	LZpeak (max)	2020-08-11 17:17:00	50.7 dB	
55	LASmax	2020-08-11 17:18:45	15.0 dB	
56	LASmin	2020-08-11 17:17:00	14.6 dB	
57	SEA	-99.9 dB		
58	LAFTM5	15.2 dB		
59				
60	LAS > 65.0 dB (Exceedance Counts / Duration)	0	0.0 s	
61	LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s	

Figure 7-19 Data View, Summary Sheet, Ln Statistics Section

Statistics	
LA5.00	59.6 dB
LA10.00	57.8 dB
LA33.30	53.1 dB
LA50.00	50.1 dB
LA66.60	47.0 dB
LA90.00	39.8 dB

Figure 7-20 Weather Data on Summary Sheet

This data is available when you install a Weather sensor and choose Weather settings in the Setup.

Weather							
Avg Wind Speed	0.89 mi/h						
Gust Speed	1.12 mi/h						
Min Wind Speed	0.45 mi/h						
Gust Dir (Compass)	E						
Windy Dir	N	NE	E	SE	S	SW	W
	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Avg Temp	73.58 °F						
Max Temp	73.58 °F						
Min Temp	73.58 °F						
Avg Humidity	30.31 %RH						
Max Humidity	30.40 %RH						
Min Humidity	30.30 %RH						
Barometer Avg	861.20 hPa						
Barometer High	861.20 hPa						
Barometer Low	861.20 hPa						
Rain Accumulation	0.00 in						
Rain Max Rate	0.00 in/hr						
Rain Duration	0.00 s						

Data View OBA Sheet

As specified in the Setup, the OBA sheet shows data according to 1/3 Octave bandwidth with Z-weighted, Ln percentile data in spectral mode. In *Figure 7-21*, cells shaded in gray indicate under range values.

Figure 7-21 Example: OBA

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	
1	1/3 Octave																				
2	Frequency (Hz)	6.3	8.0	10.0	12.5	16.0	20.0	25.0	31.5	40.0	50.0	63.0	80.0	100	125	160	200	250	315	400	
3	Overall 1/3 Spectra	-15.7	-15.9	-14.4	-15.4	-15.1	-14.3	-14.6	-12.9	-13.0	-12.7	-1.1	-11.2	-10.1	-9.6	-8.6	-7.5	-6.9	-6.0	-4.9	
4	Max 1/3 Spectra	-10.7	-11.5	-10.0	-11.7	-10.6	-10.9	-11.5	-9.6	-10.5	-10.0	0.2	-9.0	-8.2	-8.1	-6.1	-6.1	-4.9	-5.1	-3.9	
5	Min 1/3 Spectra	-22.8	-24.7	-20.6	-19.9	-19.1	-22.1	-18.6	-18.0	-16.0	-16.6	-2.3	-13.9	-13.2	-11.4	-10.7	-13.8	-8.3	-7.6	-7.7	
6																					
7	L(20-200Hz)	2.1																			
8																					
9																					
10	1/3 OBA Ref. Spectra																				
11	Frequency (Hz)	6.3	8.0	10.0	12.5	16.0	20.0	25.0	31.5	40.0	50.0	63.0	80.0	100	125	160	200	250	315	400	
12		1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13		2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14		3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15		4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16																					
17																					
18	1/3 OBA Under Range																				
19	Frequency (Hz)	6.3	8.0	10.0	12.5	16.0	20.0	25.0	31.5	40.0	50.0	63.0	80.0	100	125	160	200	250	315	400	
20	Under Range Limit	-15.5	-15.1	-14.0	-13.4	-12.4	-11.2	-10.0	-9.2	-8.1	-7.3	-6.3	-5.4	-4.3	-3.4	-2.5	-1.5	-0.5	0.5	1.5	

Data View Session Log Sheet

The Session Log sheet displays entries for events when the sound level exceeds the trigger level for the specified minimum duration.

This sheet also includes snapshot sound recordings of events. Click on a sound record link to listen to the recording (requires sound recording firmware).

Figure 7-22 Example: Session Log sound record playback

Record #	Date	Time	Record Type	Cause	#	TH Record	Sound Record
1	2016-08-14	00:00:00	Run	Timer	1	0	
2	2016-08-14	02:02:47	Stop	IO	1	0	
3	2016-08-14	02:02:58	Run	IO	2	0	
4	2016-08-14	02:30:00	Pause	Timer	2	0	
5	2016-08-14	02:30:15	Calibration Check	Timer	93.9 dB	0	
6	2016-08-14	02:30:15	Resume	Timer	3	0	
7	2016-08-14	05:10:59	Sound	Event	1	1	Sound Record 1
8	2016-08-14	05:31:58	Sound	Event	2	1	Sound Record 2
9	2016-08-14	06:04:16	Sound	Event	3	1	Sound Record 3
10	2016-08-14	07:05:04	Sound	Event	4	1	Sound Record 4
11	2016-08-14	07:56:09	Sound	Event	5	1	Sound Record 5
12	2016-08-14	08:57:21	Sound	Event	6	1	Sound Record 6
13	2016-08-14	09:07:04	Sound	Event	7	1	Sound Record 7
14	2016-08-14	09:22:39	Sound	Event	8	1	Sound Record 8
15	2016-08-14	09:27:59	Sound	Event			
16	2016-08-14	10:03:14	Sound	Event			
17	2016-08-14	10:03:58	Sound	Event			
18	2016-08-14	10:21:42	Sound	Event			
19	2016-08-14	10:25:46	Sound	Event			
20	2016-08-14	10:28:01	Sound	Event			
21	2016-08-14	10:30:13	Sound	Event			
22	2016-08-14	10:32:18	Sound	Event			
23	2016-08-14	10:34:07	Sound	Event			
24	2016-08-14	10:35:04	Sound	Event			

Data View Measurement History Sheet

The Measurement History sheet shows records for the measurement with metrics and values you select in the Setup. For this example, Record 1 shows the values specified on the SLM tab in the measurement setup.

Figure 7-23 Measurement History Sheet

Record #	Date	Time	Run Duration	Run Time	Pause	LASeq	LASe	LASmin	LASmin Time	LASmax	LASr
1	2016-08-14	00:00:00	01:00:00.0	01:00:00.0	00:00:00.0	51.5	87.1	47.6	00:05:16	69.3	
2	2016-08-14	01:00:00	01:00:00.0	01:00:00.0	00:00:00.0	48.8	84.3	46.1	01:47:01	63.4	
3	2016-08-14	02:00:00	00:02:47.4	00:02:47.4	00:00:00.0	47.1	69.4	45.9	02:00:56	49.0	
4	2016-08-14	02:02:58	00:56:41.6	00:56:36.6	00:00:05.0	46.9	82.2	44.8	02:32:05	56.4	
5	2016-08-14	03:00:00	01:00:00.0	01:00:00.0	00:00:00.0	47.5	83.1	43.1	03:40:26	65.5	
6	2016-08-14	04:00:00	01:00:00.0	01:00:00.0	00:00:00.0	47.0	82.6	42.6	04:05:32	59.9	
7	2016-08-14	05:00:00	01:00:00.0	01:00:00.0	00:00:00.0	55.1	90.7	44.8	05:09:23	72.2	
8	2016-08-14	06:00:00	01:00:00.0	01:00:00.0	00:00:00.0	53.5	89.0	43.3	06:34:10	70.4	
9	2016-08-14	07:00:00	01:00:00.0	01:00:00.0	00:00:00.0	54.0	89.6	42.9	07:31:07	70.2	
10	2016-08-14	08:00:00	01:00:00.0	01:00:00.0	00:00:00.0	55.7	91.2	42.9	08:06:36	82.6	
11	2016-08-14	09:00:00	01:00:00.0	01:00:00.0	00:00:00.0	57.9	93.4	46.8	09:54:46	73.3	
12	2016-08-14	10:00:00	01:00:00.0	01:00:00.0	00:00:00.0	62.5	98.0	46.7	10:57:56	85.2	
13	2016-08-14	11:00:00	01:00:00.0	01:00:00.0	00:00:00.0	61.1	96.7	47.3	11:02:45	82.5	
14	2016-08-14	12:00:00	01:00:00.0	01:00:00.0	00:00:00.0	58.5	94.0	47.4	12:53:10	73.4	
15	2016-08-14	13:00:00	01:00:00.0	01:00:00.0	00:00:00.0	59.0	94.5	46.1	13:22:23	74.5	
16	2016-08-14	14:00:00	01:00:00.0	01:00:00.0	00:00:00.0	57.6	93.1	45.6	14:30:19	72.0	
17	2016-08-14	15:00:00	01:00:00.0	01:00:00.0	00:00:00.0	58.8	94.3	45.6	15:03:27	74.8	
18	2016-08-14	16:00:00	01:00:00.0	01:00:00.0	00:00:00.0	59.9	95.5	46.0	16:29:24	85.8	
19	2016-08-14	17:00:00	01:00:00.0	01:00:00.0	00:00:00.0	54.1	89.7	45.9	17:38:29	74.0	

TAKE NOTE In this example, we used Continuous Meter Control to create automatic measurement records. You can also create multiple measurement history records manually by pushing **Run/Pause** + **Stop/Store** multiple times.

Data View Event History Sheet

When the trigger level you specify in the Setup is exceeded for a the selected Minimum Duration, the Event History sheet describes the event in detail. In *Figure 7-24* and *Figure 7-25*, cells shaded in gray indicate under range values.

Figure 7-24 Example, Event History Sheet Example

Event	Record #	Time	LASeq	1/3 LASeq 6.3	1/3 LASeq 8.0	1/3 LASeq 10.0	1/3 LASeq 12.5	1/3 LASeq 16
Event 1	1	-10.0000	48.0	-17.4	-24.5	-22.5	-18.0	-1
1	2	-9.0000	49.0	-17.4	-24.5	-22.5	-17.4	-1
1	3	-8.0000	54.0	-17.4	-24.5	-22.5	-16.2	-
1	4	-7.0000	56.4	-17.4	-24.5	-21.9	-13.4	-1
1	5	-6.0000	58.8	-17.4	-24.5	-21.5	-14.9	-
1	6	-5.0000	60.9	-17.4	-24.5	-22.0	-17.8	-
1	7	-4.0000	63.7	-17.4	-24.5	-22.0	-16.7	-
1	8	-3.0000	64.1	-17.4	-24.5	-22.0	-18.7	-
1	9	-2.0000	65.6	-17.4	-24.5	-19.6	-19.3	-
1	10	-1.0000	65.7	-17.4	-24.5	-21.8	-16.2	-
1	11	0.0000	65.1	-17.4	-24.5	-24.6	-15.1	-
1	12	1.0000	65.9	-17.4	-24.5	-24.6	-12.4	-
1	13	2.0000	66.4	-17.4	-24.5	-25.2	-11.1	-
1	14	2.0000	67.2	-17.4	-24.5	-26.6	-10.1	-

Data View Event Time History Sheet

The event in this example with the highest Z-peak is Event 6 as shown in *Figure 7-25*. The Event Time History sheet shows the values for the metrics we chose in the measurement Setup.

Figure 7-25 Example, Event Time History Sheet

Event	Record #	Time	LAeq	1/3...	16.0	31.5	63.0	125	250	500	1000	2000	4000	8000	16000
Event 6	1	-10.0000	45.1	37.8	52.4	45.1	28.5	34.7	44.1	46.7	36.1	17.6	13.2	12.4	14.2
	2	-9.0000	40.9	52.9	55.0	42.8	28.6	34.3	46.3	39.1	32.2	25.7	17.1	13.9	14.8
	3	-8.0000	46.1	51.0	53.6	39.2	29.3	36.0	49.7	47.0	32.9	25.7	21.2	18.3	15.6
	4	-7.0000	45.8	50.7	54.7	40.9	28.7	32.6	52.6	46.5	30.5	20.4	18.0	16.3	17.1
	5	-6.0000	40.9	51.4	54.1	44.2	30.9	33.8	45.2	40.9	33.3	27.5	24.8	20.4	26.2
	6	-5.0000	36.7	52.9	53.9	42.5	28.8	30.8	40.5	30.2	27.3	28.2	28.7	25.3	22.6
	7	-4.0000	42.9	50.0	51.2	40.0	29.7	32.0	50.8	40.9	25.7	24.7	24.0	21.3	23.4
	8	-3.0000	54.0	56.5	52.3	42.3	34.0	39.0	54.9	54.0	45.1	33.1	29.9	25.2	20.9
	9	-2.0000	60.8	53.5	52.9	44.1	49.6	58.1	60.3	56.5	57.8	52.3	44.7	37.0	22.8
	10	-1.0000	57.5	47.4	53.5	45.1	40.8	52.3	52.7	52.9	54.6	48.0	44.1	38.3	24.8
	11	0.0000	80.9	47.9	52.3	43.8	73.4	83.0	79.6	74.5	69.8	76.1	66.1	57.2	45.7
	12	1.0000	85.0	49.9	60.3	63.1	43.4	77.5	76.2	74.9	77.1	81.6	69.2	61.7	48.8
	13	2.0000	46.6	55.7	60.0	59.9	70.8	67.3	54.8	45.7	37.3	36.4	24.6	19.6	15.6

Data View Time History Sheet

The Time History sheet includes the data for L_{Aeq} and L_{Zpeak} , as specified in the measurement setup.

Figure 7-26 Example, Time History Sheet

	A	B	C	D	E	F	G	H	I	J	K	
1	Record #	Record Type	Date	Time	Tms	LAeq	LCEq	LCpeak	LZpeak	OVLD	Marker	Comments
2	1	Run	2020-08-11	17:17:00								
3	2		2020-08-11	17:17:00	o	14.9	13.9	50.7	50.7	No		
4	3		2020-08-11	17:17:01	o	14.9	13.9	50.7	50.7	No		
5	4		2020-08-11	17:17:02	o	14.9	13.9	50.7	50.7	No		
6	5		2020-08-11	17:17:03	o	15.0	13.9	50.7	50.7	No		
7	6		2020-08-11	17:17:04	o	15.0	13.9	50.7	50.7	No		
8	7		2020-08-11	17:17:05	o	14.9	13.9	50.7	50.7	No		
9	8		2020-08-11	17:17:06	o	14.9	13.9	50.7	50.7	No		
10	9		2020-08-11	17:17:07	o	15.0	14.0	50.7	50.7	No		
11	10		2020-08-11	17:17:08	o	14.9	14.0	50.7	50.7	No		
12	11		2020-08-11	17:17:09	o	15.0	14.0	50.7	50.7	No		
13	12		2020-08-11	17:17:10	o	15.0	14.0	50.7	50.7	No		
14	13		2020-08-11	17:17:11	o	15.0	14.0	50.7	50.7	No		
15	14		2020-08-11	17:17:12	o	15.0	14.0	50.7	50.7	No		
16	15		2020-08-11	17:17:13	o	15.0	14.0	50.7	50.7	No		
17	16		2020-08-11	17:17:14	o	14.9	13.9	50.7	50.7	No		

7.5 Exporting the Data to a Spreadsheet

Step 1. To export data files from G4 to XLSX format, select the file tab, then click **File** → **Export to Spreadsheet**.

Step 2. Save the XLSX file to your PC when prompted.

LEARN MORE For more options when exporting files to a spreadsheet or other formats, see [2.6 Exporting Data to Other Formats](#).

7.6 Utilizing 831C Marine Mammal Protection

Background

G4 has been optimized to process audio metrics and sound records important to biologists studying the exposure of marine mammals to man-made sound (e.g. pile-driving, etc.). Utilizing the SoundAdvisor 831C acoustic meter and a hydrophone, G4 calculates these metrics and records noise events from the measured sound.

These metrics have the following definitions as applied to this purpose:

RMS: One method of describing the energy of a sampled waveform in terms of current or voltage. It is defined mathematically as the square root of the mean

value of the squared values of the sampled quantity taken over an interval. See also the *SoundAdvisor 831C Manual* → Glossary → “RMS Value.”

SEL: Sound Energy Level; the total sound energy during a measured event expressed in dB. Also the total sound energy during measurement expressed in decibels. See also *Cumulative SEL*

Peak: The maximum or highest value of the measured sound expressed in decibels.

RMS90%: The period of time during the measurement that energy in the sampled waveforms is between 5 percent and 95 percent of the total sampled energy.

Example Result: Viewing Marine Mammal Protection Data in G4

With the Marine Mammal Protection (MMP) feature enabled and the resulting measurement file open in G4, the Summary data worksheet displays Summary metrics in the Marine Mammal Protection section, as shown in *Figure 7-27*.

Figure 7-27 Data Summary, Marine Mammal Protection

Marine Mammals Protection				
	RMS	SEL	Peak	90% (s)
Maximum	173.8	155.5	182.7	0.1773
Mean	131.3	121.8	127.4	0.1289
Median	125.0	116.6	124.8	0.1454
Mammals Cumulative		184.5		
Fish Cumulative		184		
Count	10744			
	Trigger Level (dB)	Pre-peak Time (s)	Post-peak Time (s)	
Settings	100	30	150	

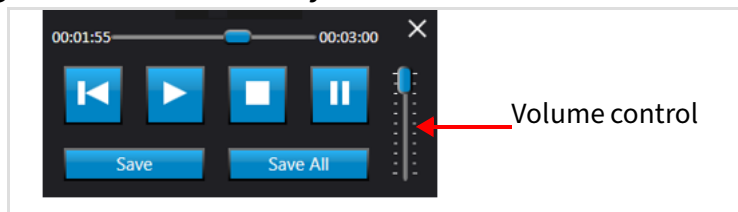
The MM Measurement History worksheet tab displays desired metrics and provides a link to play back the associated sound records in column H, as shown in *Figure 7-28*. The resulting sound records extract noise created by pile strikes or other man-made nuisance.

Figure 7-28 Measurement History Tab, Marine Mammal Protection

	A	B	C	D	E	F	G	H
1	Record #	Sound Record #	Offset in Sound Record (s)	MM RMS	MM SEL	MM Peak	MM 90% (s)	Sound Record
2	1	1	57.7	163.6	149.8	171.2	0.0418	Sound Record 0
3	2	1	98.0	164.4	150.8	171.7	0.0446	Sound Record 1
4	3	1	99.5	168.9	154.0	173.7	0.0329	Sound Record 2
5	4	1	100.9	169.7	154.5	180.8	0.0301	Sound Record 3
6	5	1	102.2	166.1	151.3	171.6	0.0334	Sound Record 4
7	6	1	103.5	165.6	150.8	176.7	0.0335	Sound Record 5
8	7	1	104.7	160.1	149.1	171.1	0.0784	Sound Record 6

To play a sound record, click on the Sound Record link in column H. This opens the G4 audio player, which plays the sound record via your PC audio or your connected headset.

Figure 7-29 G4 Audio Player



LEARN MORE For details on these metrics, and their calculation, see [7.6.1 "Reference for Calculating Marine Mammal Protection \(MMP\) Metrics" on page 94](#).

Procedure

This section provides specific details to make the best use of this feature, and references other helpful sections in this manual.

What you will need:

- G4 LD Utility (Includes instruction manuals for G4 and 831C)
- SoundAdvisor Model 831C SLM
- Firmware packages 831C-ELA (Measurement History or MH) and 831C-SR (Sound Recording)
- Hydrophone and associated adapters, cables, etc.


Step 1. Install G4 LD Utility on your PC and connect your meter in G4 as shown in [2.1 Installing G4](#) and [2.3 Connecting the Meter to G4](#).

Step 2. Complete [7.1.1 Calibrating the Meter via G4](#) and [7.1.3 Setting a Data Storage Preference](#).

Step 3. Prepare a Marine Mammal Protection measurement Setup file in G4. To do this, do the following:

- a. Complete section [7.2.1](#) and [7.2.2](#) to begin the setup.

Step 4. Choose how you will control the measurement by doing the following:

- a. On the left side (PC side) of the Setup Manager, click the **arrow icon**  until the **Control** page appears.
- b. Choose Option 1 **or** Option 2:

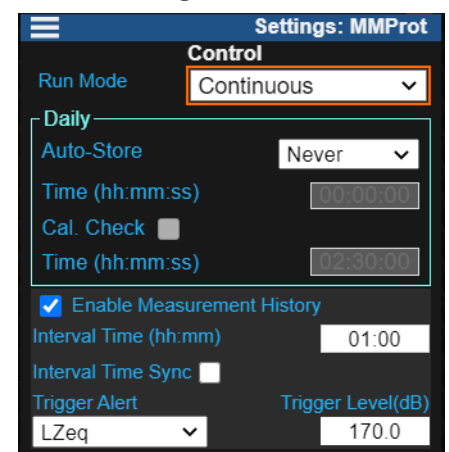
Option 1: Manual Run Mode

- Select “Manual Run/Stop” from the **Run Mode** drop-down menu to use the meter buttons on the 831C to start and stop the measurement, and to create MH intervals.
- Select “LZeq” from the **Trigger Alert** drop-down menu and enter “170” as the **Trigger Level (dB)** as shown in *Figure 7-30*.


Option 2: Continuous Run Mode

- Select settings on the Control page as shown in *Figure 7-30*. This results in a “Continuous” measurement with automatic one hour MH intervals.

Figure 7-30





Step 5. Verify Event History values by doing the following:

- a. Click the **arrow icon**  until the **Event History** page appears.
- b. On the Event History page, deselect the checkboxes in-line with **Event History** and **Event Time History**, or verify these are not selected.

Step 6. Select sound recording settings by doing the following:

- a. Complete section 7.2.10 to enable sound recording.
- b. Complete section 7.2.12 to transfer the setup to the meter.

Step 7. You are ready to make the measurement.

- To control a measurement using Option 1: Manual Run Mode, use the buttons on the 831C.
 - Press **Start/Pause**  to begin the measurement.
 - Press **Stop/Store**  to begin a new MH interval. You may choose to begin a new MH interval as you see fit. For example: a break in pile driving strikes, may also be a good time to begin a new interval.

7.6.1 Reference for Calculating Marine Mammal Protection (MMP) Metrics

G4 utilizes the following formulas to calculate MMP metrics and the resulting data file.

Working With Audio Data

audioData[i] =

ConvertToFloat(rawAudioData) x audioCalibrationConstant

- The raw audio data values are normalized audio data between -1 and 1
- The value used for the audio calibration constant is shown on the Data view Summary tab of the open measurement file
- The result of multiplying the data in the WAV file is a unitless number that represents the sound pressure level in Pascals divided by 20 μ Pa

Calculations for MMP

Sample Rate Conversion Factor (constant)

dt = 1/sample rate;

Running Total

runningTotal[0] = audioData[0]²

runningTotal[i] = audioData[i]² + runningTotal[i-1]

- // for i=1 to n-1, where n = the number of audioData elements

Sum of Squares

sumOfSquares = runningTotal[n-1]

- // the last value of runningTotal

Intermediate Values

peak = MAX(ABS(audioData[i]))

percent05 = 0.05 x sumOfSquares

percent95 = 0.95 x sumOfSquares

P05Index = audioData >= percent05 // first value

P95Index = audioData <= percent95 // last value

SELevent = The sound energy level of each measured event // when SEL is > 150 dB

Final Metrics

PEAK = 10 X log₁₀(peak²)

SEL = 10 x Log₁₀(dt x sumOfSquares)

PERCENT90 = dt x p95Index - dt x p05Index

RMS = SEL - 10 x Log₁₀(PERCENT90)

Summary Metrics

MAXIMUM = Maximum dB value in column

MEAN = average of dB values in column

MEDIAN = median of dB values in column

MAMMALS CUMULATIVE SEL = $10 \times \text{Log}_{10}(\text{Sum}(\text{DbToVolts}(\text{SELevent})))$

FISH CUMULATIVE SEL = $10 \times \text{Log}_{10}(\text{Sum}(\text{DbToVolts}(\text{SELevent} > 150)))$

COUNT = number of Events

Module 8 Room Acoustics Measurement

This example demonstrates features of RT-60 sound measurements using the Model 831 SLM in G4 LD Utility. For best results, complete the following sections in the order they're presented.

TAKE NOTE This example assumes that you have the 831-RT firmware option installed on the Model 831.

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8.1.2	Moving the Setup to the Instrument	
8.2	Making the Measurement	-99
8.3	Viewing Measurement Data	-100
8.3.1	Downloading the Measurement File	
8.3.2	Using G4 Files Manager for Room Acoustics Data	
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8.1 Setting Up the Measurement

Before you begin:

- Calibrate your instrument. For more information, see the *Model 831 SLM Reference Manual*, Chapter 8 "Calibration". To do this in G4, go to **Help** → **Manuals** → **Model 831**
- Verify that your instrument is connected in G4. For more information, see [2.3 "Connecting the Meter to G4" on page 10](#).

8.1.1 Creating a Setup File in G4

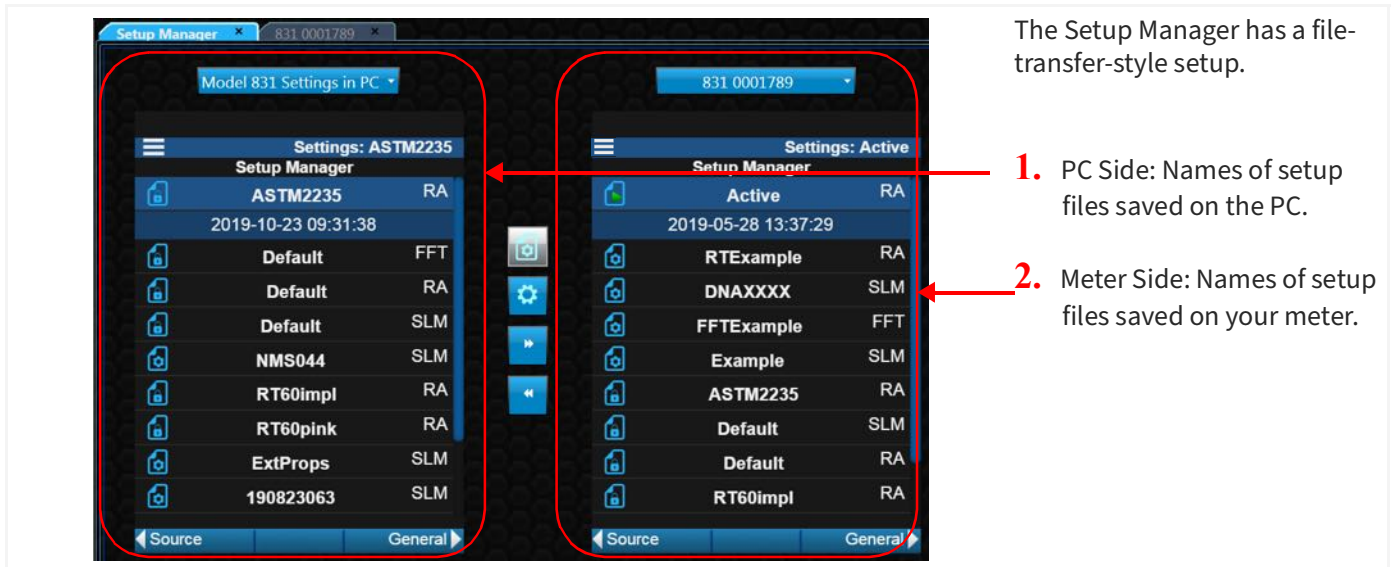
This example uses the G4 Setup Manager to create an RT-60 measurement on the PC with the following settings:

- **Low Filter** at 250.0 Hz and **High Filter** at 4.00 kHz, with an **Exit Time** of 10 seconds (default)
- **RT-60 Bandwidth** of 1/1, **Impulse Method**, 4.00kHz **Trigger Source**, 80.0 dB **Trigger Level**, and 3 **Decays** (default is 1)
- **Sample Period** of 5 ms, **Max Run Time** of 4 seconds with **Normal OBA Range** and all time series saved (default)

TAKE NOTE For more information on all the setup options, see *Model 831 SLM Reference Manual*, Chapter 15 "RT-60".

- Step 1.** In G4, select **Setup Manager** from the main menu. This opens the Setup Manager in the main tab display.

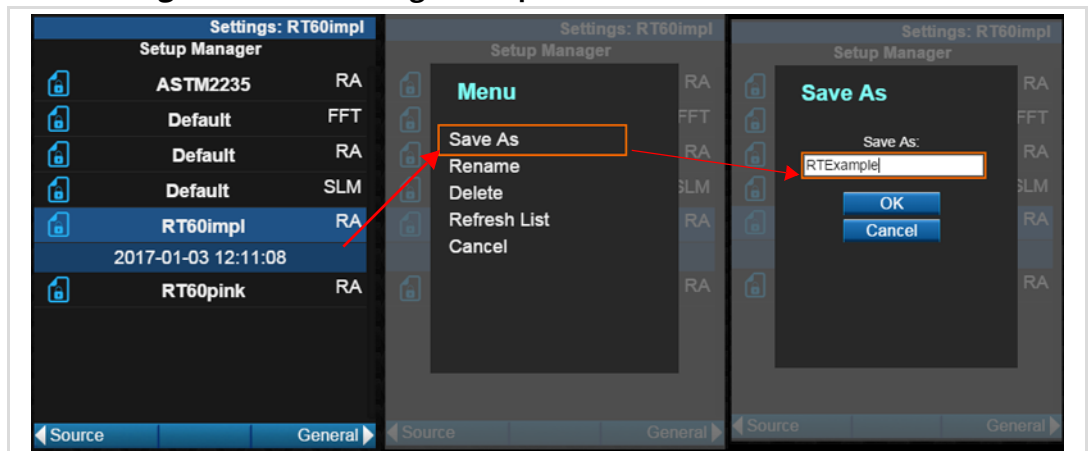
Figure 8-1 Setup Manager Layout



- Step 2.** Select **Model 831 Settings in PC** from the drop-down menu on the PC side, and select the name of your connected 831 SLM from the drop-down menu on the Meter side (see *Figure 8-1*).

- Step 3.** On the PC side, right-click the **RT60impl RA** setup file, select **Save As**. Enter “**RTExample**,” and click **OK**.

Figure 8-2 Renaming a Setup File



TAKE NOTE If you move to a different window, you are prompted to **Save settings?** Click **Yes** to apply the changes to the setup.


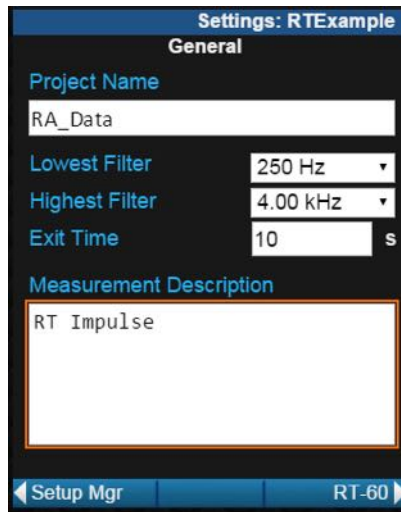
- Step 4.** In the Setup Manager (PC side), click to highlight the **RTExample** setup file you just created.
- Step 5.** Click the **right arrow**  until the **General** tab displays.
- Step 6.** In the **Measurement Description** field, enter “**RT60 Impulse**”. You can leave the other settings as shown in *Figure 8-3*.

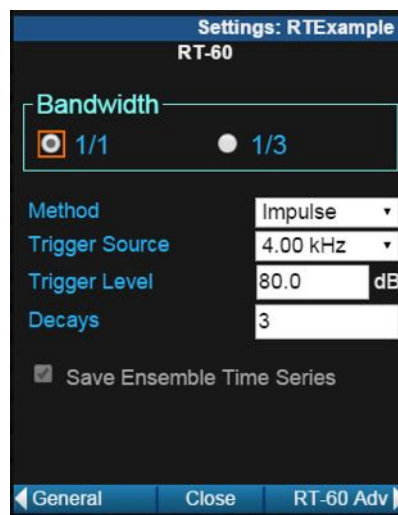
Figure 8-3 Measurement Setup, General Tab



Step 7. Navigate to the **RT-60** tab by using the **right arrow** .

Step 8. Enter “3” in the **Decays** field, and keep all other default settings as shown in *Figure 8-4*.

Figure 8-4 Measurement Setup, RT-60 Tab




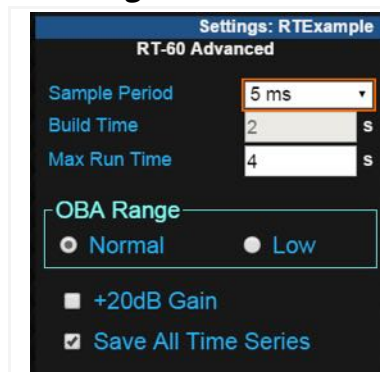
Step 9. Navigate to the **RT60 Adv** tab by using the **right arrow** . Make any desired changes, or choose to keep the default settings.

Figure 8-5



The **Build Time** field is disabled in this example, since it applies only to the Interrupted Method setting.

Step 10. When the setup file is configured, select **Close**, and save the file when prompted.

8.1.2 Moving the Setup to the Instrument


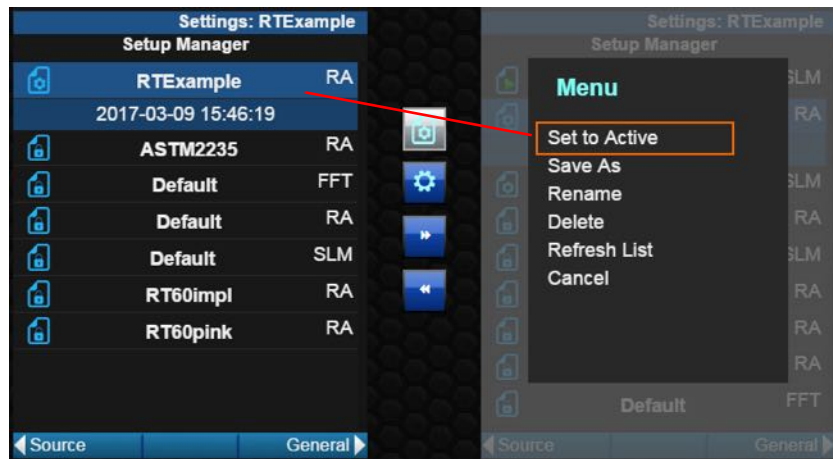
- Step 1.** In the Setup Manager on the Meter side (right side), select your meter from the blue instrument drop-down menu.
- Step 2.** On the PC side (left side), select **RTExample** in the setup list, then click the **right double-arrow**  to transfer the setup to the instrument.
- Step 3.** On the Meter side (right side), right-click the “RTExample” setup and choose **Set To Active**.

Figure 8-6 Set to Active



You can verify that the setup is active on the instrument by viewing the instrument screen or Live View.


TAKE NOTE G4 also enables you to transfer Setup files to multiple connected meters simultaneously. For more information, see [3.4.2 "Pushing a Measurement Setup to Multiple Meters for SLM" on page 26](#).

8.2 Making the Measurement


This example demonstrates making an RT-60 measurement using only one instrument. Typical RT-60 measurements should include measurement data from multiple instruments positioned in the same room.


Before you begin:


- Secure your Model 831 or microphone in the location you want to monitor. For best results, we recommend using tripods and standard impulse sources for proper RT-60 impulse measurements. For more information, search for “**Sound Sources**” at www.larsondavis.com.


Step 1. Press **Run/Pause**  on the meter. Or if you are still connected to G4, click the same button on the Live View in G4.

TAKE NOTE In the lower-left corner of the Live View, G4 provides the following prompt icons that guide you through the measurement process.


Step 2.  When the **exit icon** displays, step away from the microphone location.

Step 3.  The **background icon** indicates when the noise level is measured for 5 seconds. The resulting value is used for determining signal-to-noise ratio on successive decays.

Step 4.  The **pre icon** indicates the background noise measurement is complete and the pre-trigger buffer is filling.

Step 5.  Activate your impulse source each time the **ready icon** appears. If you're using the meter's internal noise source, it starts automatically.

The **ready icon** indicates the pre-trigger buffer is full and the source within the room is activated.

Step 6.  The **trig icon** indicates the measurement is triggered. If the **trig icon** appears after each source activation, your measurement is complete after 3 activations. If the **trig icon** doesn't appear after an activation, continue activating your impulse source until the trig icon appears.

Step 7. Press or click **Stop/Store**  twice to end the measurement and store it.

Step 8. Perform an acoustic calibration (and calibration check if indicated) to verify your measurement.


8.3 Viewing Measurement Data

To examine measurement data, download the file and use the G4 Files view as shown in this section. Additionally, the Live View in G4—or the meter itself—displays many pages of data results on the RT-60 tab. Refer to the Model 831 manual for information on viewing and understanding these pages.

8.3.1 Downloading the Measurement File

Before you begin:


- Establish an active meter connection in G4. If needed, click **Discover Meters** in the top toolbar.

Step 1. In G4, click on your connected meter in the Meters Panel. The meter tab opens on the  **Files** view.

LEARN MORE If you want to export data to a spreadsheet, select the checkbox in-line with **Export to .xlsx** in the **Files** view toolbar before downloading the data file from the meter.

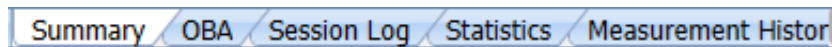
Step 2. Double-click the measurement data file in the list, and the file begins downloading. G4 automatically saves the file in LDBIN format and opens it in a new file tab.

8.3.2 Using G4 Files Manager for Room Acoustics Data

G4 opens your downloaded data file in a new file tab on the  **Data** view. The Data view organizes the resulting measurement data in tabs (near the bottom of the window). This section provides an overview of Room Acoustics data display.

Step 1. Room Acoustics data files contain the following tabs or sheets:

Figure 8-7 Data view tabs



Data Summary Sheet

The Summary sheet provides overall results from all 3 decays listed by frequency and includes quality indicator values for the measurement.

Quality indicator values for each frequency are shaded green (within limits), yellow (marginally within limits), or pink (outside the limits) as shown in *Figure 8-8*.

Figure 8-8 RT-60 Summary Data Sheet

For more information on specific data metrics, quality indicators, and values, refer to the RT-60 chapter of the *Model 831 Manual*.

	A	B	C	D	E	F	G	H	I
22	Ensemble	3							
23	Frequency (Hz)	Leq (dB)	Lmax (dB)	Lbk (dB)	T20 (ms)	BT:T20	BK:T20 (dB SNR)	NL:T20 (%)	Cu:T20
24	250 Hz	80.0	92.7	45.1	283	50.10	47.6	51.91	-9
25	500 Hz	85.4	97.1	41.2	1396	493.07	55.9	602.91	-4
26	1000 Hz	83.3	96.7	39.7	-99.94	-99.94	57.0	-99.94	-9
27	2000 Hz	82.2	98.9	40.7	1102	1549.23	58.2	773.90	-6
28	4000 Hz	80.0	101.6	44.3	-99.94	-99.94	57.3	-99.94	-9

RT60 Detail Sheet

The RT-60 Detail sheet provides metrics and quality indicators for each decay, listed by frequency as shown in *Figure 8-9*.

Figure 8-9 RT-60 Detail Sheet

Frequency (Hz)	T20 (ms)	BT:T20	BKT20 (dB SNR)	NL:T20 (%)	Cu:T20 (%)	Sd:T20 (%)	T30 (ms)	BT:T30	BK:T30 (dB SNR)	NL:T30 (%)	Cu:T30 (%)	Sd:T30 (%)
250.0	617	109.21	80.2	16.16	-5.88	9.19	581	102.78	80.2	7.47	-5.88	5.82
500.0	476	168.10	80.7	16.56	1.82	7.40	485	171.16	80.7	6.93	1.82	4.51
1000.0	288	203.08	73.0	6.66	8.33	6.74	312	220.00	73.0	5.50	8.33	3.98
2000.0	341	478.75	64.6	14.85	6.01	4.39	361	507.53	64.6	6.09	6.01	2.62
4000.0	338	948.82	49.0	12.46	11.14	3.12	376	1054.48	49.0	7.74	11.14	1.82
250.0	485	85.87	77.5	12.82	-0.96	10.36	481	85.04	77.5	4.22	-0.96	6.40
500.0	416	147.03	82.6	4.17	3.92	7.92	433	152.80	82.6	2.95	3.92	4.78
1000.0	295	207.98	83.2	15.15	6.12	6.66	313	220.71	83.2	7.05	6.12	3.97
2000.0	348	489.50	72.0	2.99	6.09	4.34	369	519.33	72.0	4.23	6.09	2.59
4000.0	326	914.44	62.6	5.07	19.14	3.17	388	1089.43	62.6	13.68	19.14	1.79
250.0	560	99.15	80.6	5.25	-8.13	9.64	515	91.09	80.6	6.39	-8.13	6.19
500.0	394	139.08	83.8	5.76	8.37	8.14	427	150.71	83.8	5.53	8.37	4.81
1000.0	335	236.07	79.6	12.48	-4.47	6.25	320	225.52	79.6	6.41	-4.47	3.93
2000.0	342	480.64	77.9	5.05	9.30	4.38	374	525.35	77.9	5.92	9.30	2.58
4000.0	334	937.33	68.9	7.26	13.11	3.14	378	1060.19	68.9	7.63	13.11	1.81

Ensemble RT60 Time Series

The Ensemble RT60 Time Series sheet provides a spectra of sound levels for each sample period before and after the impulse sound activation. Excluded decays are not represented on this sheet.

RT60 Detail Time Series

The RT60 Detail Time Series sheet displays individual sound levels for all sample periods for all decays as shown in *Figure 8-10*.

Figure 8-10 Time Series Data Sheets

The figure shows two tables. The top table has columns A-F and rows 1-4. The bottom table has columns A-H and rows 1-4. Red arrows labeled 1, 2, and 3 point from the text on the right to specific cells in the tables.

- 1. Ensemble Time Series** sheet includes summarized sound levels
- 2. Detail Time Series** sheet includes sound levels for individual decays
- 3. Sample periods** specified in Setup

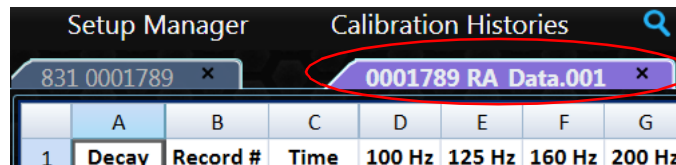
8.4 Exporting RT60 Data to a Spreadsheet

Before you begin:

- Open a data file in G4.

Step 1. In G4, select the file tab, and click **File** → **Export to Spreadsheet**.

Figure 8-11



Step 2. In the File Explorer window that opens, choose a location to save the file, enter a file name, and click **Save**.

LEARN MORE You can also accomplish this task on the meter tab → **Files** view by selecting **Export to.xlsx** before downloading the data file from the meter.

Module 9 FFT & Tonality Example

Using FFT mode on the SoundAdvisor 831C with G4 enables you to analyze the intensity and composition of measured sound.

This module provides an example procedure, which shows how to operate the SoundAdvisor™ 831C in G4 LD Utility to make an FFT and Tonality measurement, and analyze the resulting data file.

Review the sections in the order they're presented to complete the example measurement.

TAKE NOTE The FFT and tonality features demonstrated in this section are available when the firmware option 831C-FFT is purchased, installed, and enabled on your SoundAdvisor 831C. For help with this process in G4, see **Module 4 Upgrading Software, Firmware, and Options**. Or see **Module 14** in the *SoundAdvisor 831C Manual*.

Process Overview:

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9.1 Preparing the Equipment

Before you begin:



- Verify that your instrument is connected to G4 and active (blue icon) in the Meters Panel. For more information, see [2.3 "Connecting the Meter to G4" on page 10](#).

9.1.1 Performing a Calibration Check in G4

Complete this section only if you're using the Larson Davis 2103-FF precision microphone/preamplifier combination that supports calibration checking. Refer to your preamplifier product manual for specifics.

We recommend that you perform a calibration check after calibrating and just before making a sound measurement. This establishes the standard check level for the preamplifier.

Step 1. In G4, click on your connected meter in the Meters Panel.

Step 2. Click the  **Live View** button, click the menu icon , then select **Calibrate** from the menu that appears.

Step 3. Click the lower left tab twice to view the **Cal Check** tab.

The **Standard Calibration Level** (dB) holds either the last saved Cal Check value or the default value (94.00).

Step 4. Click **Do Calibration Check**. After a few seconds, the meter displays a confirmation message.

- Select **Yes** to save the Cal Check value as the Standard Cal Level.
- Select **No** to simply record the level in the Cal Check History.

Step 5. To exit the Calibration tabs, click **Close** near the bottom of your screen.

Step 6. To examine a meter's cal check history, click **Calibration Histories** in the G4 top toolbar.

9.1.2 Preparing the Transducer

G4 and the SoundAdvisor 831C can be used to perform an acoustic, vibration, or pressure measurement. Move to the segment in this section that applies to your chosen transducer. Complete steps in this section to perform an acoustic measurement.

Step 1. With your 831C connected in G4, switch the meter from SLM Mode to FFT Mode. To do this, do the following:




- a. Click on the meter in the Meters Panel, select  **Manager** in the meter tab on the right.
- b. Click the **FFT Mode** button, located in the bottom right of the screen.

Figure 9-1 Meter Manager and Calibrate Tab



Step 2. To select a transducer, do the following:

- a. Click **Settings**  to view the **Calibration Settings** page. (See step 2a. in Figure 9-1.)
- b. In this example, select **Microphone** from the **Transducer** drop-down menu. **LEARN MORE** For information about using other transducers, in G4 go to Help → Manuals → *SoundAdvisor 831C Manual* → Module 18.
- c. Select the model from the **Microphone** drop-down menu.
- d. Enter the sensitivity for **Nominal**, **Actual**, and **Self Noise**, then click **Save**. **TAKE NOTE** This information can be found on the mic certification document that came with it.

Step 3. Click **Calibrate**  to return to that page, and press **Do Calibration**. (See step 3. in Figure 9-1.)

LEARN MORE For more information on calibrating, in G4 go to **Help** → **Manuals** **SoundAdvisor 831C Manual**, and view Module 5.

9.2 Creating an FFT Setup File in G4


In this section, use the G4 Setup Manager to create an acoustic FFT-specific setup file, move it to the meter, and make it the Active Setup. If you plan to measure tonality, this section also includes instructions for creating a Setup that's fully compliant with ISO 1996-2 or ISO/PAS 20065.

Before you begin:

- Please note that any Mic Correction settings you enter (in System Properties → Preferences) are not applied to the meter while in FFT Mode.

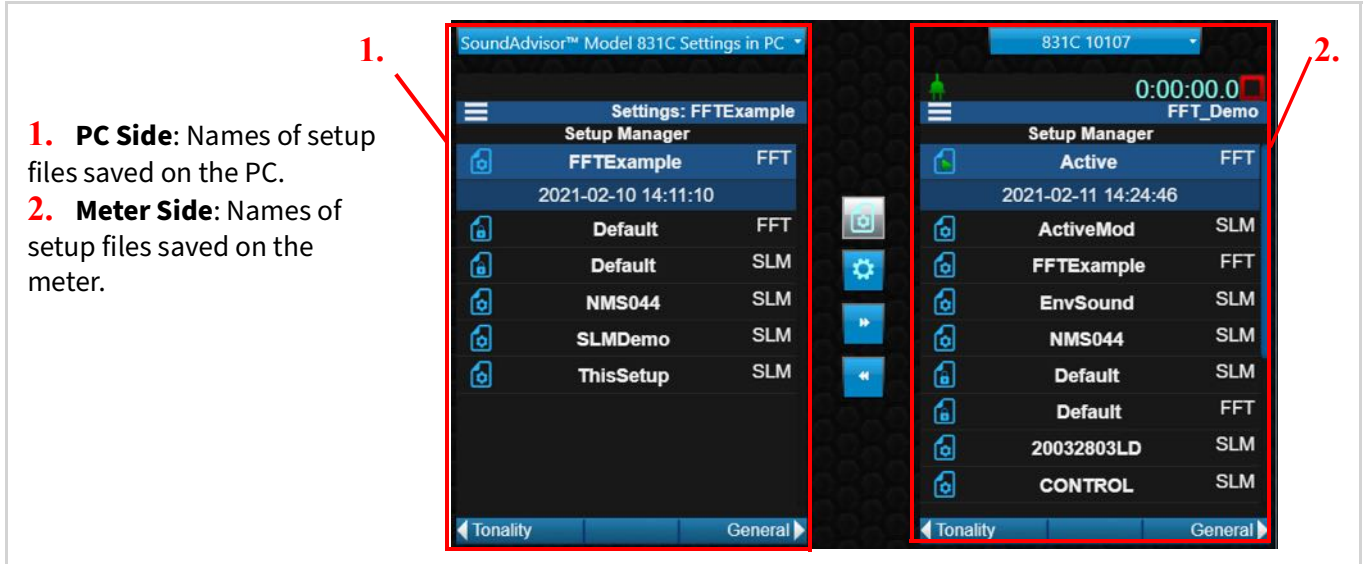
9.2.1 Naming the Setup

Before you begin:

- Verify that your meter is connected and displaying the **active blue icon**  in G4.

Step 1. In G4, select **Setup Manager** from the main menu. This opens the Setup Manager in the Tab Display, as shown in *Figure 9-2*.

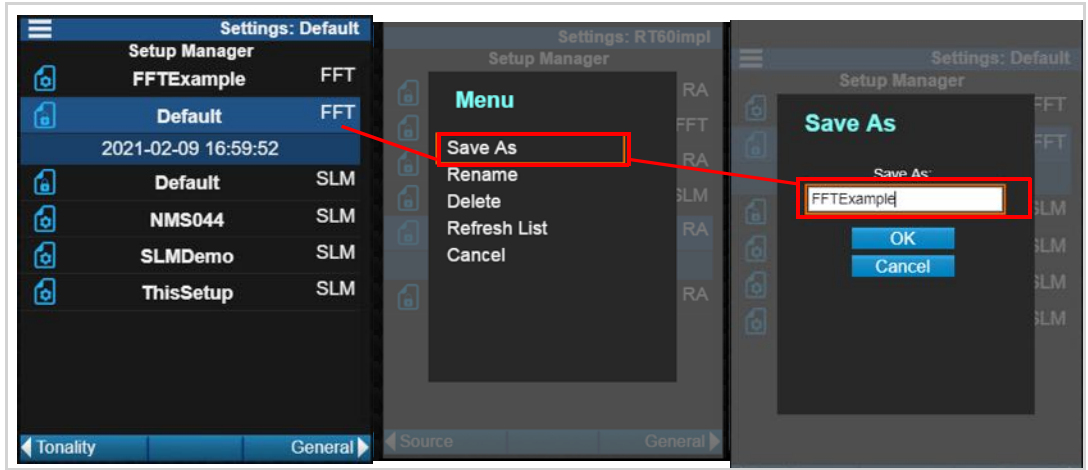
Figure 9-2 Setup Manager Layout



Step 2. (Meter side) If you have more than one instrument connected in G4, select the **SoundAdvisor 831C serial #** from the blue, drop-down menu.

Step 3. (PC side) Right-click the **“Default FFT”** setup file, select **Save As**, type **“FFTExample,”** and click **OK**.

Figure 9-3 Renaming a Setup File



Step 4. Choose measurement settings and save the Setup, as shown in [9.2.2](#).


9.2.2 Choosing Measurement Settings

The measurement settings determine measurement parameters, and which data and features appear in the resulting data file.


Before you begin:

- Verify that your meter is connected and displaying the blue, active icon in G4.

Step 1. On the Setup Manager **PC side**, select the name of the FFT Setup you just created from the list.

Step 2. Click the **right arrow**  choose your measurement properties on the General page.

Step 3. On the General page, the **Default Data File** name you enter here becomes a prefix for each measurement file generated by using this Setup.

Step 4. To create an ISO compliant measurement, use the **Measurement Description** field to enter a description of the measurement site, mic location, source location, etc., (See ISO/PAS 20065 and ISO 1996-2, section 12). You may also enter this information when viewing the resulting measurement data in G4 on the  **Data** view → **Summary** tab.

Step 5. Click the **right arrow**  to change settings on the **FFT** page.

Step 6. On the FFT tab, choose a **Frequency Span**. This specifies the upper end of the frequency spectrum that should be sampled.

Step 7. From the **Lines** drop-down menu, choose the number of Lines of sampled data to be collected for each frequency.

Your selection for Frequency Span and Lines results in the Frequency Resolution. This is done by dividing your selection for frequency span by the number of Lines, sometimes called “bins.” The

result is the bandwidth of each line (bin) in Hz per line. Also, note that selecting a greater number of lines increases the FFT computation time.

TAKE NOTE For your selected frequency resolution, the SoundAdvisor 831C calculates the FFT measurement accurately to within 0.1 dB.

Sampled Data and the Windowing Function

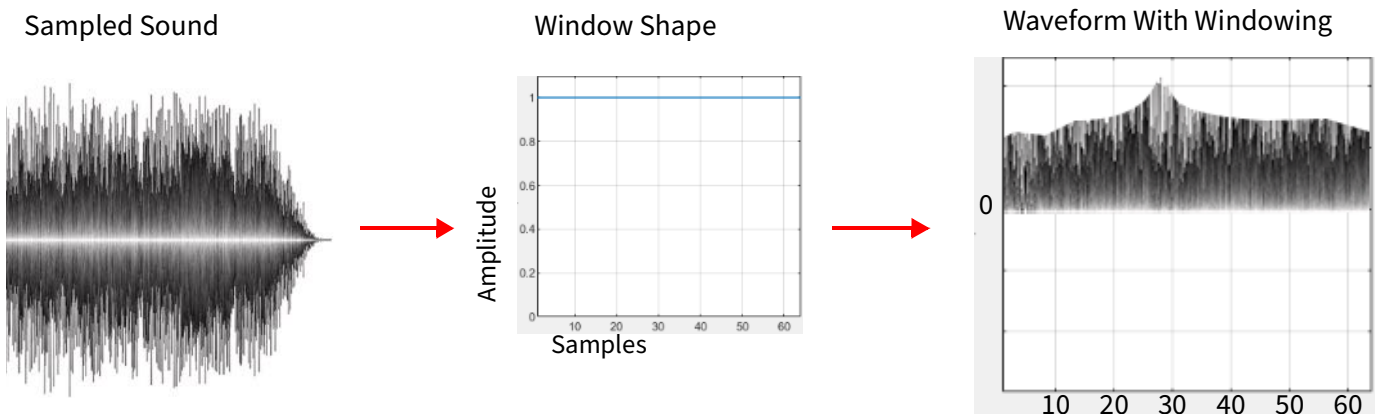
With Fast Fourier Transform mode, when the measured signal doesn't use up an even number of lines, or when the number of lines is not a multiple of the sampling frequency, the resulting data "smears" into the adjacent lines. This creates additional high-frequency data that was not part of the original signal (Spectral Leakage).

The Windowing function helps to account for spectral leakage, and results in a more accurate representation of the measured sound. It does this by zeroing the time domain function at the beginning and end of each record, and by representing the wave form in an alternative sine wave format. See the following figures for more detail.

Step 8. Choose a **Window** method from the drop-down menu. The following options are available:

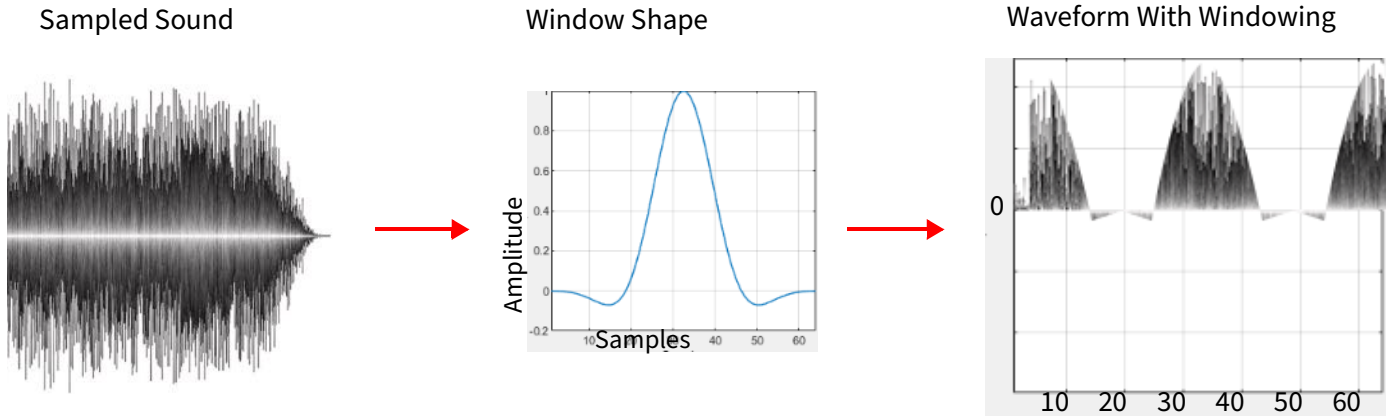
Rectangular: This windowing method distinguishes frequencies that are close together in the examined spectrum, but compromises on amplitude details. Use this method to view sound details within a narrow spectrum.

Figure 9-4 Example- Rectangular Windowing



Flat Top: The Flat Top window shape descends below zero at the end of each time record and allows for wider-spaced peaks in the frequency domain. As a result, this method may more accurately show the true amplitude of peaks, but possibly with less detail in the signal overall.

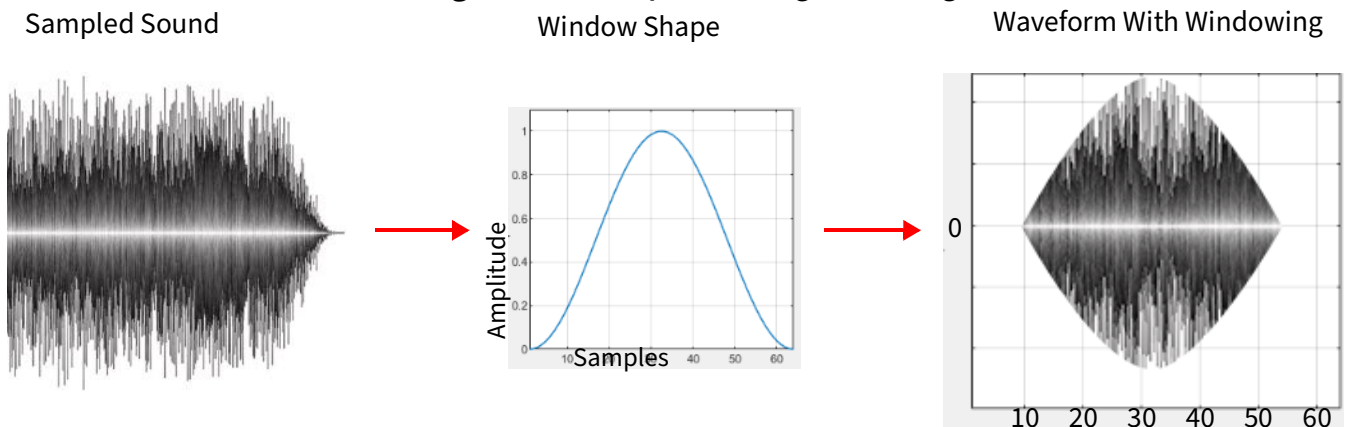
Figure 9-5 Example- Flat Top Windowing



Hanning: This windowing method forces the ends of the time record to zero and changes the waveform to a curve with side lobes to reduce any spectral leakage. (Example: when a sine wave signal is captured non-periodically.)

The Hanning window is the G4 default and the most commonly used method, because it provides the most accurate levels with the least spectral leakage. It is also the windowing method required to meet the ISO Tonality standards. If you're not sure which window to apply; choose Hanning.

Figure 9-6 Example- Hanning Windowing



- Step 9.** Choose a **Frequency Weighting** for the pre-FFT filter. This weighting is used to provide a broadband Leq and peak level, and is also applied to the SLM data. When you choose “A”, or “C” weighting, the result can be used to provide an approximation of how the sound is perceived by the human ear. If you don't want to apply a pre-FFT filter frequency weighting to this measurement, choose “Z”.

About the FFT Compute Times Table

G4 displays the minimum measurement time required to calculate the first FFT for your selected frequency resolution in the **FFT Compute Times (s)** table on the FFT tab.

The minimum measurement time has implications for the following meter control properties, which you can set on the Control page of the Setup Manager:

- When using a time-based meter control, the measurement duration (“Time”), must be longer than the minimum period in the table.

- The FFT History (measurement history for FFT) record Time (in hours, minutes, and seconds) must be longer than the minimum period in the table.
- The ISO standards for tonality measurements have specific frequency resolution requirements.

Measuring Tonality According to ISO 1996-2

Note that any combination of frequency span and FFT lines that produces a resolution of at least 3.3333 Hz/Line (with A-weighting and Hanning window) always meets the ISO 1996-2 tonality requirement. *Figure 9-7* illustrates the best choices for compliance.

Figure 9-7 Best choices for 1996-2 Compliance

FFT Compute Times (s)					
Lines:	6400	3200	1600	800	400
20 kHz	0.32	0.16	0.08	0.04	0.02
10 kHz	0.64	0.32	0.16	0.08	0.04
5 kHz	1.28	0.64	0.32	0.16	0.08
2 kHz	3.2	1.6	0.8	0.4	0.2
1 kHz	6.4	3.2	1.6	0.8	0.4
500 Hz	12.8	6.4	3.2	1.6	0.8
200 Hz	32	16	8	4	2
100 Hz	64	32	16	8	4

Measuring Tonality According to ISO/PAS 20065

Note that any combination of frequency span and FFT lines that produces a resolution between 1.9–4Hz/Line (with A-weighting and Hanning window) always meets the ISO 20065 tonality requirement. The best choices for compliance are circled in *Figure 9-8*.

Figure 9-8 Best Choices for 20065 Compliance



FFT Compute Times (s)					
Lines:	6400	3200	1600	800	400
20 kHz	0.32	0.16	0.08	0.04	0.02
10 kHz	0.64	0.32	0.16	0.08	0.04
5 kHz	1.28	0.64	0.32	0.16	0.08
2 kHz	3.2	1.6	0.8	0.4	0.2
1 kHz	6.4	3.2	1.6	0.8	0.4
500 Hz	12.8	6.4	3.2	1.6	0.8
200 Hz	32	16	8	4	2
100 Hz	64	32	16	8	4

Step 10. Click the **right arrow**  to choose settings on the **Control** page.




Step 11. On the Control page, select **Count Stop** from the **Run Mode** drop-down menu.

TAKE NOTE This example demonstrates how to use the Run on Trigger feature with Count Stop as the run mode. For details on other run modes, in G4 go to **Help** → **Manuals** → **SoundAdvisor 831C**, and view Module 18.

Using Count Stop

A Count Stop measurement begins when you press the  Run/Pause button and ends when the number of FFT averages calculated equals the value you set for FFTs in Average (or you press the  Stop/Store button).

- a. Enter a value for **FFTs in Average**.
Refer to the ISO/PAS 20065 standard for specifics on the number of averages required for your measurement purpose. The default value for FFTs in Average is 1, and the max value is 99,999.
- b. Select the checkbox in-line with **Enable FFT History**, and enter “4” for the **Record Count**. This is the number of records that should be saved in the measurement. The default value is 1.

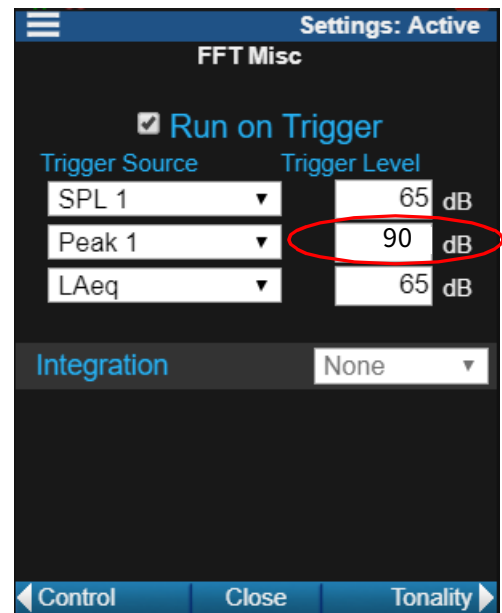
Step 12. Click the **right arrow**  to change settings on the **FFT Misc** page. In this example, enable the Run on Trigger feature, which signals the 831C to begin a measurement when the area sound level exceeds one or more of the selected levels. Please also note that when you stop a measurement—in G4, or by pressing  Stop/Store, or  Reset on the meter—Run on Trigger monitoring is delayed by 30 seconds. This allows you to make changes, if needed.


- a. Select the checkbox in-line with **Run on Trigger**.

Figure 9-9 FFT Misc tab

- b. Leave the first two Trigger Sources set to SPL 1 and Peak 1, then select “**LAeq**” as the third source.
- c. Set the **Peak 1 Trigger Level** to “**90**” dB.
- d. The Integration feature is not available for acoustic measurements.

LEARN MORE For more information on these integration options, look for them in the *SoundAdvisor 831C Manual*, Appendix C: Glossary on page C-1.



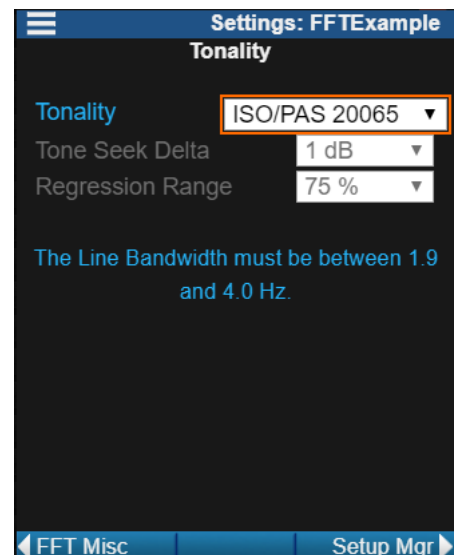
Step 13. Click the **right arrow**  to change settings on the **Tonality** page.




- a. Select **ISO/PAS 20065** standard from the **Tonality** drop-down menu:

Figure 9-10 Tonality Tab

For ISO/PAS 20065 compliance: the Line Bandwidth must be 1.9–4.0 Hz, etc. If your settings differ from the standard, G4 displays a prompt from which you can automatically choose standard-compliant settings. Refer to the standard for other specifics.

TAKE NOTE For details about ISO 1996-2 tonality, in G4 go to **Help** → **Manuals** → **SoundAdvisor 831C**, Module 18.



- Step 14.** Click **Close** and **Yes** to save the Setup. The PC side displays the setup file list.
- Step 15.** In the Setup Manager file list (PC side), select the “**FFTExample**” setup you just created, and click the **right double-arrow**  to transfer the setup to the meter. The **FFTExample** setup appears in the file list on the meter side.
- Step 16.** To make the Setup active on the meter, do the following:
 - a. Verify that the meter is stopped. If there is unsaved data on the meter, select **menu icon**  → **Store** to save it, or **menu icon**  → **Reset** to clear it.
 - b. In the Setup Manager file list (Meter side), right-click the file.
 - c. In the pop-up menu, select **Set To Active**.

9.2.3 (Optional) Enabling Alert Notifications

LEARN MORE For details on setting alert notifications, see [6.1.5 Understanding Alert Notifications](#).

9.2.4 Setting Data Storage Preferences

Once the measurement setup file is active, you can set meter and file storage preferences, and quickly find out how much storage space the resulting measurement file requires.



To do this, see [6.2 Configuring File Storage Preferences for 831C](#) before making the measurement.

9.3 Making the Measurement

This example demonstrates making an acoustic FFT measurement by using G4.

Before you begin:

- Secure your meter in the measurement location by using a tripod and any necessary environmental protection systems. For more information, see the *SoundAdvisor Model 831C Manual*.

Step 1. To begin a measurement using G4, click on your active, connected meter in the Meters Panel, select  **Live View** →  **menu icon**, and choose **Run**.

Step 2. From the G4 **Live View**, monitor the measurement in progress.

Step 3. For this example, the measurement ends when the number of FFT averages calculated equals the value you set for **FFTs in Average** multiplied by 4.

Step 4. When the meter stops, perform a post-measurement acoustic calibration (and calibration check, if applicable) to verify your measurement.

9.4 Viewing Measurement Data in G4



Complete this section to download the data file to G4 and examine the measurement by using the G4 visualization tools.

In this section:

- [9.4.1 Viewing Live FFT Data in G4](#)
- [9.4.2 Downloading the Measurement File](#)
- [9.4.3 Using G4 Data View for FFT Measurements](#)
- [9.4.4 Using G4 Graph View for FFT Measurements](#)

9.4.1 Viewing Live FFT Data in G4

During a measurement, monitor the Live View FFT data in G4 and customize display elements as shown in this section.

Step 1. In G4, click the  **Live View**. To advance from one tab to the next, click the **left arrow** .


Viewing Live SLM Data on the SLM Tab

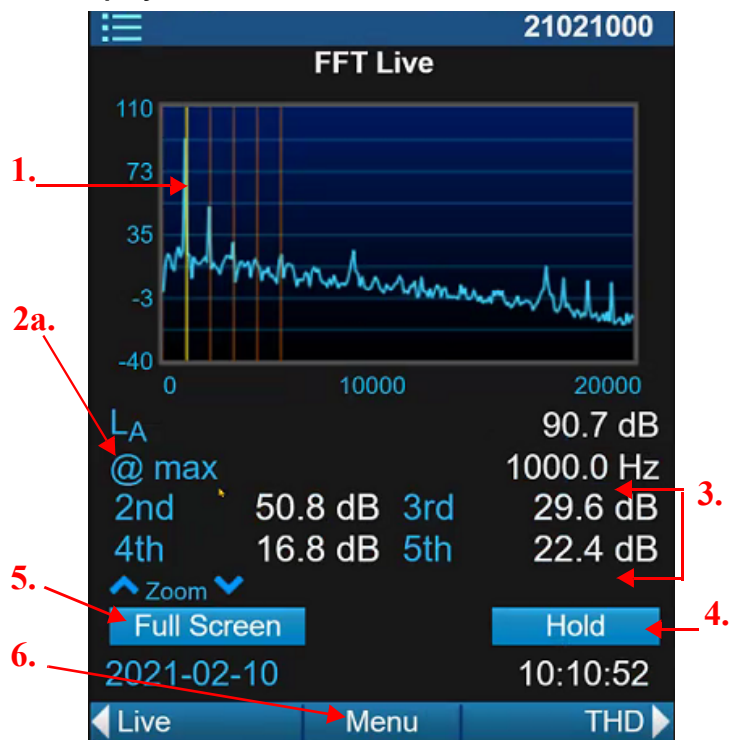
The Live tab continues to show SLM data even in FFT mode. For additional details on this tab and associated pages, in G4 go to **Help** → **Manuals** → **SoundAdvisor 831C**, and view 4.1.1 "Understanding the Live Tab."

Viewing Live Data On the FFT Live Tab

The FFT Live tab displays the current and recently measured sound. While the 831C measures FFT spectra for up to 6400 lines of resolution, the display resolution is much lower than this. As a result, each line in the FFT graph may contain more than one measured value. In this case, the amplitude and frequency displayed for a cursor position is determined by the maximum value of the multiple, overlapping FFT levels. *Figure 9-11 FFT Live Display With Harmonic Cursor* describes display elements and available adjustments.

Figure 9-11 FFT Live Display With Harmonic Cursor

1. Click on an area in the graph to advance the cursor (yellow line). To enable the Max-Tracking or Harmonic cursor (orange lines), click **Menu**, and choose **Cursor Type**.
2. Click the **Zoom arrow** () to zoom in on a frequency range. G4 allows zooming from the configured number of lines up to a 1:1 correspondence between displayed lines and FFT lines.
- 2a. “@ max” displays when Max-Tracking is enabled. Otherwise, the level and frequency at the cursor location displays.
3. When the Harmonic cursor is enabled, this section displays harmonic amplitudes.
4. Click **Hold** to pause the graph, while the measurement continues. Click **Resume** to un-pause the graph.
5. To view a full page graph of all sampled spectra, select **Full Screen**. See *Figure 9-12* for Full Screen view.
6. To edit the y-axis graph scale, choose **Menu** → **Adjust Graph**. Units displayed for the y-axis depend on the transducer; the default is “decibel” for sound or “g” when you selected a transducer other than a microphone. Set the “Other transducer” display units during the measurement setup. For details, in G4 go to **Help** → **Manuals** → **SoundAdvisor 831C**, and view Module 18.1.2.

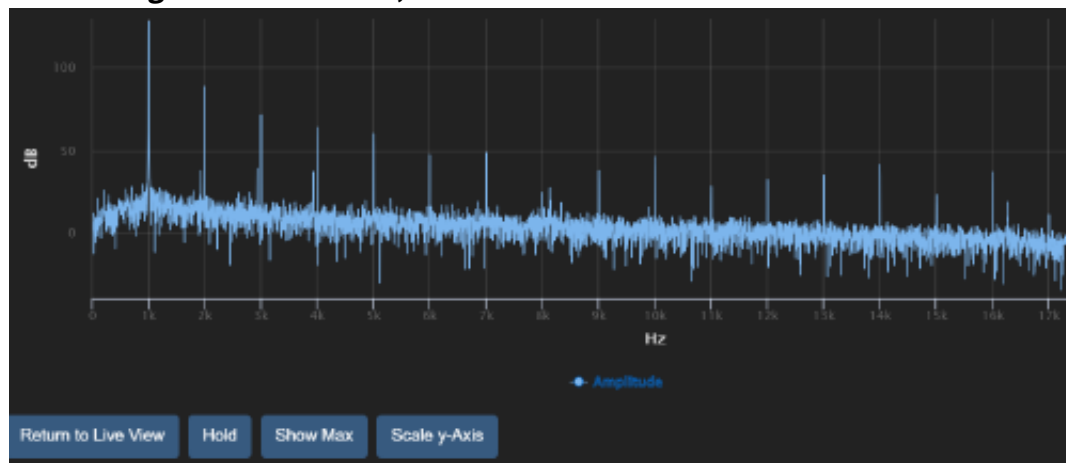


Full Screen View Features include:

- Hold/ Resume
- Show Max (Max-Tracking Cursor)

- Scale Y-axis
- Zoom
- Dark Mode On/Off
- Return to Live View

Figure 9-12 FFT Live, Full Screen View



Editing the Cursor

When viewing Live data you can select the cursor type. Select **Menu** → **Cursor Type**, then select Manual, or Max-Tracking from the Cursor drop-down menu. Each can be displayed with or without harmonics. Editing the cursor is also shown in *Figure 9-11 FFT Live Display With Harmonic Cursor*.

Position the Manual cursor by clicking in the graph

With Max-Tracking enabled, the cursor location is set automatically to the frequency band with the maximum amplitude. If the maximum is not within the display window when zoomed in, the window re-centers to display the max amplitude, as shown in *Figure 9-14 Overall Tab With Max-Tracking*.

THD Viewing Live Data On the THD Tab

Figure 9-13 THD Tab With Harmonics

The Total Harmonic Distortion tab displays fundamental amplitude, harmonic amplitude, and the percent distortion for each.

THD+N (noise) and THD are methods of examining the energy dispersion of the measured signal. The percent distortion shows how much of the signal energy is not based in the fundamental frequencies, and may be an indication of how inefficient a signal is.

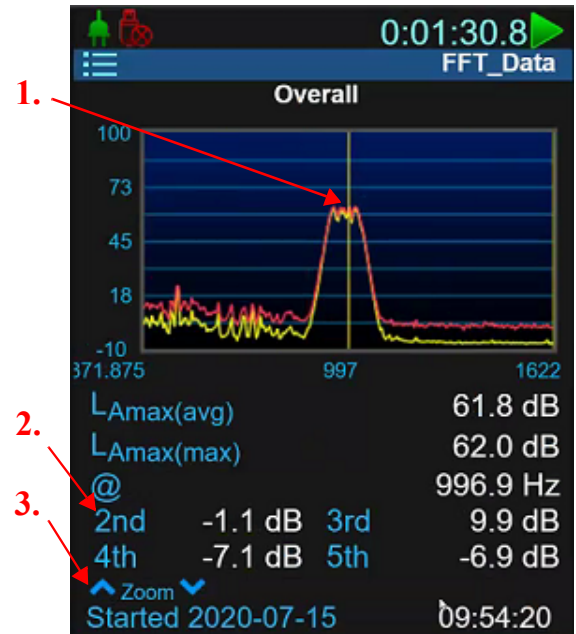
THD		FFT_Data
Fundamental		
Frequency		250.0 Hz
Amplitude		103.9 dB
THD+N		2.09 %
THD		2.00 %
Harmonics		
2nd	-48.0 dB	0.40 %
3rd	-34.4 dB	1.91 %
4th	-65.3 dB	0.05 %
5th	-48.6 dB	0.37 %

Overall ▶ Viewing Live Data On the Overall Tab

The G4 Overall tab displays levels as an average from the beginning of the measurement to the present, as shown in *Figure 9-14 Overall Tab With Max-Tracking*.

Figure 9-14 Overall Tab With Max-Tracking

1. The Max-Tracking cursor (yellow line) indicates the frequency with the highest amplitude. This display is zoomed in and has centered on the max amplitude.
2. The amplitude of 4 harmonics is shown in this area.
3. Click the **Zoom arrows** (↕) to closely examine a frequency range in the graph.

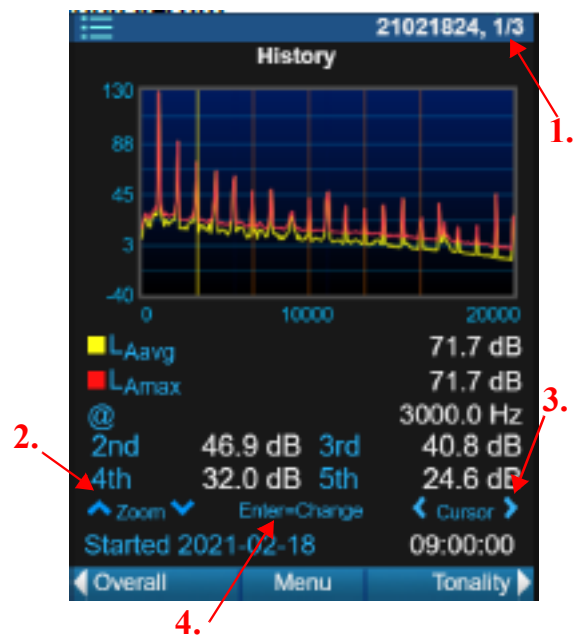


History ▶ Viewing Live Data On the History Tab

When FFT (Measurement) History is enabled, the History tab allows you to examine metrics and graphs for each measurement record.

Figure 9-15 FFT History Tab

1. Indicates this is record 1 of 3. Click here to advance to the next record.
2. Click the **Zoom arrows** (↕) to closely examine the graph.
3. Click the **Cursor arrows** (← →) to position the cursor (vertical yellow line)
4. Press **Enter** to use the cursor arrows to navigate records, or click on the record count, as shown in 1.



Tonality ▶ Viewing Data On the Live Tonality Tab

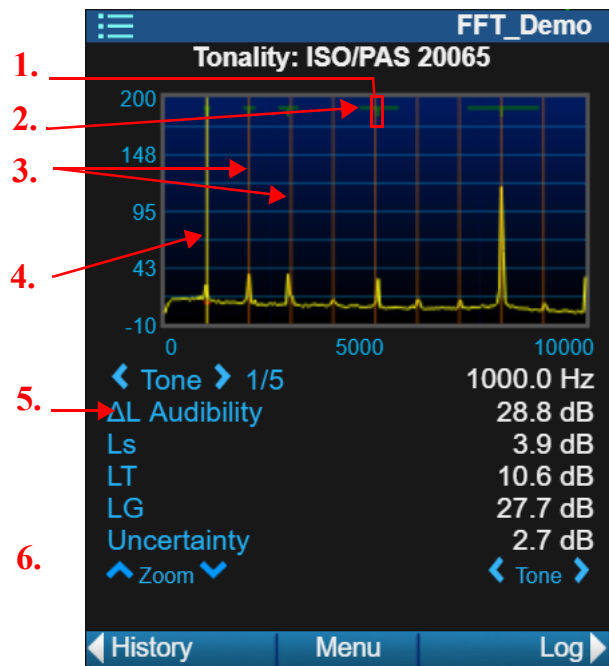
Tonality data on this tab updates every 3 seconds, and displays accurately within 0.1 dB.

For ISO 1996-2: tonality information begins displaying critical bandwidth, tone indicators, and linear regression data for noise on this tab. When FFT (Measurement) History is not enabled, tonality data displays after the current run stops. When FFT History is enabled, tonality details display only after the first FFT/measurement is complete. Additionally, this data is for viewing only. To navigate and examine the tonality information, please download and view the complete measurement results in G4, as shown in [9.4.2 Downloading the Measurement File](#).

For ISO 20065: The cursor displays on the first valid tone (or the tone at the lowest frequency), and the following details display: Delta L Audibility, Ls, LT, LG, and Tone Count. For details on each term, refer to the standard.

Figure 9-16 Navigating the Live Tonality Tab- ISO/PAS 20065

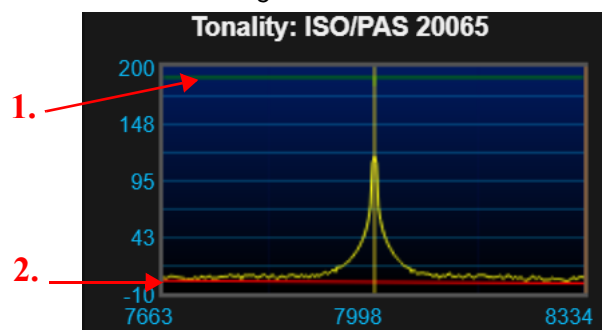
1. Tone indicator (green vertical bar)
2. Critical Bandwidth (green horizontal bar)
3. Harmonic cursors (orange vertical lines) In this figure, the Harmonic cursors sometimes correspond with the tone indicators.
4. Click on the **right or left arrows** (◀ ▶) to navigate the graph.
5. **ΔL Audibility:** the difference between the tone level and the masking threshold; **LS:** Energy mean value of all narrow band levels in a critical band. **LT:** the energy summation of the narrow-band level with the tone frequency of the spectral line (f_T), **LG:** Critical band level; **Uncertainty:** The extended uncertainty as described in the ISO/PAS 20065 standard.



6. Click the **Zoom arrows** (⏏ ⏏) to examine a critical band in the graph, as shown in *Figure 9-17*.

Figure 9-17 Zoomed in on the 5th tone from *Figure 9-16*

1. Critical Bandwidth (green horizontal bar above the tone)
2. Linear Regression indicator for noise data (red line)



Log ▶ Viewing the Live Session Log Tab

The Session Log tab is the same in FFT mode and in SLM mode. For display details, in G4 go to **Help** → **Manuals** → **SoundAdvisor 831C**, and view Module 4.1.4.

9.4.2 Downloading the Measurement File

Before you begin:

- Verify that your meter is connected and active in G4.

Step 1. In G4, click on your connected meter in the Meters Panel. The meter tab opens showing the **Files** view. If you're planning to export the file to a spreadsheet, see the note on Step 2 before continuing.

Step 2. Double-click the FFT measurement data file in the list, and the file begins downloading. G4 automatically saves the file in .LDBIN format and opens it in a new file tab.

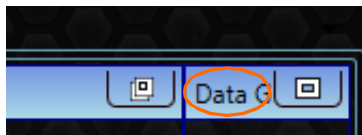
TAKE NOTE If you want to export data to a spreadsheet, select the checkbox in-line with **Export to .xlsx** in the Files view toolbar before downloading the data file from the meter. The downloaded .XLSX file is created with the .LDBIN file in the destination folder.

9.4.3 Using G4 Data View for FFT Measurements

G4 Data view displays the resulting measurement data in tabs. Each tab described here provides data according to the settings you specified in the Setup file.

Step 1. When you open an FFT file in G4, the file tab displays the **Graph** view or **Data** view. On your PC, press **Enter**, or click on the blue heading bar to expand the Data view.

Figure 9-18 Selecting the Data View



Step 2. Measurement data displays in the following tabs, organized by data type, along the bottom of the window. Click on a tab to view the measurement results for that type of data:

Summary Sheet

The Summary Sheet provides summarized results of the FFT measurement, including FFT overloads, if any.

Session Log Sheet

Displays noteworthy events in the measurement, such as run, stop, pause, and the source of those events.

FFT Overall Sheet

The FFT Overall Sheet provides the following details:

- FFT settings used to obtain the measurement

- Overloads (if any)
- Harmonic Distortion: the frequency and magnitude of the frequency-weighted average and frequency-weighted maximum, the total harmonic distortion, a Spectra Data table

FFT Measurement History (Avg) Sheet

The FFT History (Average) sheet displays the measurement details for frequency-weighted average values by record.

FFT Measurement History (Max) Sheet

The FFT History (Maximum) sheet displays the measurement details for frequency-weighted peak values by record.

FFT Tonality Sheet

When tonality is enabled for the measurement, the FFT Tonality sheet displays metrics from the chosen ISO standard under the Tone Data heading.

Recommended Next Steps:

- [9.4.4 Using G4 Graph View for FFT Measurements](#)
- [9.5 Exporting a File from G4](#)

9.4.4 Using G4 Graph View for FFT Measurements

The **Graph** view displays the resulting data as a graph, legend, and detail inset, as shown in this section.

Figure 9-19 G4 Graph View for FFT Files With or Without Tonality

1. Measurement History panel

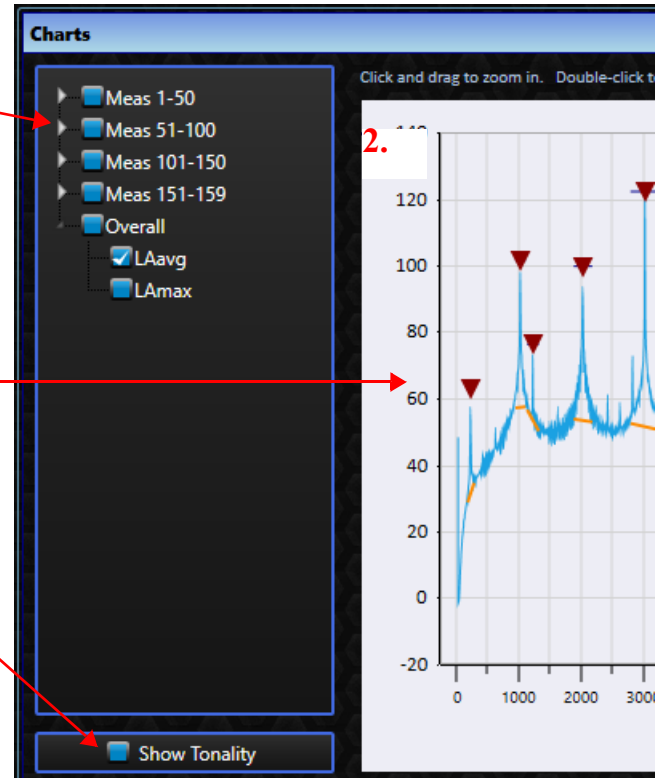
In the history panel select the checkboxes in-line with the elements you want to show in the graph panel. Also, if FFT (Measurement) History was enabled for the measurement, click the expansion triangle to expand a group of measurement records. If desired, select one or more individual records (or metrics) to examine in the graph panel.

2. Graph panel

The Graph panel displays the measurements and metrics selected in the history panel.

3. Tonality panel

Select the checkbox in-line with **Show Tonality** to expand the tonality panel options, settings, and tonality detail inset.



TAKE NOTE Selecting a different ISO standard in this panel only affects the displayed graph. Measurement data always follows the standard selected in the Setup.

Figure 9-20 FFT Graph With Tonality Detail Inset

This figure shows the **Graph** view zoomed in to examine a critical bandwidth. Click + drag in the graph to zoom in.

1. Tone indicator
2. Graph Legend
3. Tonality detail inset
4. Critical bandwidth
5. Linear regression line of the noise level for that tone

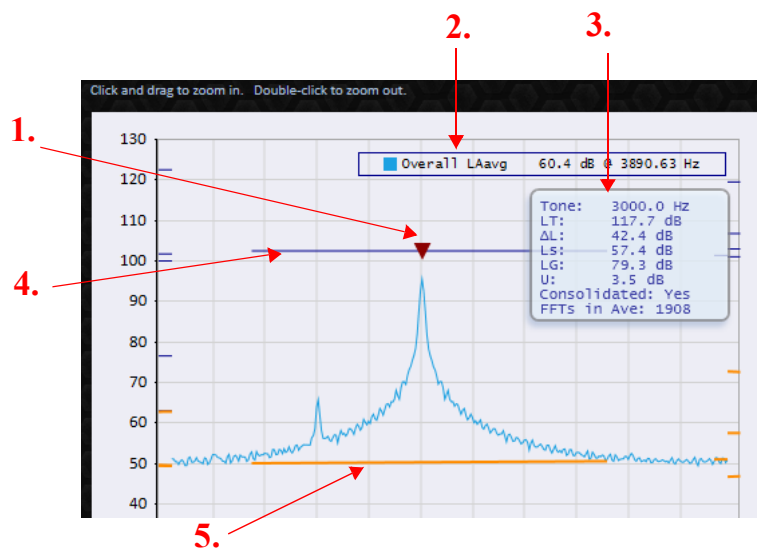
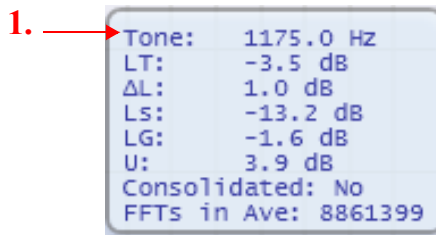


Figure 9-21 Tonality Detail Inset (ISO/PAS 20065 Standard)

Hover over a tone in the graph to view the tonality metrics for the standard you selected in the Setup.

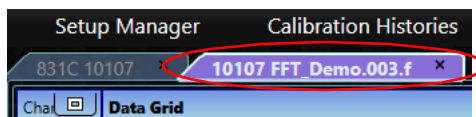
1. Tonality metrics from the standard.
Please refer to the standard for specific details.



9.5 Exporting a File from G4

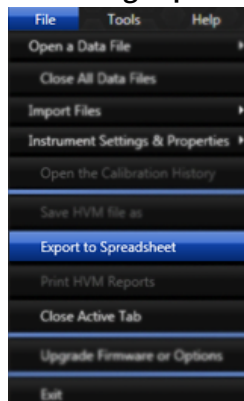
- Step 1. In G4 with the file tab open, click to select the file tab (make it the active tab).

Figure 9-22 Active File Tab



- Step 2. In the G4 toolbar, click **File**, and choose **Export to Spreadsheet/Export to JSON/Export to CSV** from the drop-down menu. G4 prompts you to choose the file location and save the XLSX file.

Figure 9-23 File Menu: Selecting Export To Spreadsheets



LEARN MORE You can also choose to export the file to a spreadsheet when downloading the file from the meter. For details, see [9.4.2 Downloading the Measurement File](#).

Module 10 Spartan Dosimeter Example

G4 LD Utility (G4) provides enhanced data-viewing, and remote operation—among other features—for the Spartan 730 Dosimeter. The example in this module can also be completed by using the LD Atlas app.

Process Overview:

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10.1 Creating a Measurement Configuration File in G4

In this example, the dosimeter wearer is exposed to very loud music in close proximity to the sound source speaker. For demonstration only, this example shows how to edit the default settings to produce a custom configuration based on conservative exposure standards.

LEARN MORE This example demonstrates some, but not all, of the Spartan 730 default configurations. For full details, in G4 go to **Help** → **Manuals** → **Spartan Dosimeter**, Section 3.

Before you begin:

- Verify the dosimeter is connected to your PC. For more information, see [Connecting the Meter to G4 on page 10](#).
- In G4, set a location for your downloaded files. For help with this, see [A.2.1 File Options](#).
- The Setup options you choose here determine what information is available in the resulting data file. To create a setup with the end result in mind, we

recommend that you review section [10.5 "Viewing Measurement Results in G4" on page 129](#).

10.1.1 Naming the Setup File and Setting Dosimeter Configurations

This section shows how to configure a Spartan Dosimeter in G4 with all available firmware options installed. Options on your meter may differ. If a feature isn't available to you, move to the next step.

Step 1. In G4, select your connected dosimeter in the Meters panel. This opens the dosimeter tab in the main window.

Step 2. Click  **Settings** to configure a measurement.

TAKE NOTE As you scroll down, this page allows you to select measurement configurations and properties for Dosimeters 1–4. For this example, we will utilize the default configurations for dosimeters 2–4, and customize the default configuration for Dosimeter 1.

Step 3. In the **Dosimeter 1** section, skip down to the **Threshold** field, and enter “85.”

TAKE NOTE Notice the **Configuration** and **Title** fields automatically adjust.

Step 4. Click inside the **Title** field and enter “730Demo.”

Step 5. Scroll down to the **Dosimeter 1 Alarm 1** section, click the slider in-line with **Enable Alarm**, and **LED Indication**.

- **LED Indication:** When enabled, the LED alarm lights on the Spartan dosimeter provide exposure feedback to the wearer based on the Source metric, and the Action, and Limit Levels you set. In an alarm state, the lights display a range of yellow (action) to red (limit).


Step 6. For this example, leave the default setting for **Source**; make the **Action Level** “70” and the **Limit Level** “85.”

- **Action Level (dB or percentage):** When LED Indication is enabled, the dosimeter LED lights power on when exposure reaches the level you enter here.
- **Limit Level (dB or percentage):** The Limit Level value displays as a line in the measurement results on the Time History graph as labeled in *Figure 10-11*. Also, when **LED Indication** is enabled, the dosimeter LED lights are red when exposure reaches the level you enter here.

Step 7. Dosimeter 1 Alarm 2 is enabled by default, deselect the **Enable Alarm** slider to disable it.

Step 8. Use the default settings for Dosimeter 2–4.

10.1.2 Enabling Firmware Options, Exceedance Triggers, and Timers in the Setup

- Step 1.** Scroll down to the Meter section, and, if desired, enter a custom **Device Name**. The value you enter here is visible only in the resulting measurement data.
- Step 2.** If you purchased Time History and Octave Band Analysis firmware, verify that the **Time History**, and **Octave Band (OBA)** sliders are enabled.
- LEARN MORE** For more information on these options, in G4 go to **Help** → **Manuals** → **Spartan Dosimeter**, “3.1.1 Enabling Firmware Options for a Measurement.”
- Step 3.** To prevent other G4 users from editing this Setup file, enter a **Pass Code**.
- TAKE NOTE** Pass Code does not prevent users from editing the Setup on the dosimeter. For this purpose, we recommend that you lock the meter. To do this in G4, go to  **Tools** → **Lock Meter**.
- Step 4.** For this example, in the **Exceedance Triggers** section, edit the values as follows:
- **SPL1 (dB)** to “68”
 - **SPL2 (dB)** to “80”
 - **Peak 1 (dB)** to “68”
 - **Peak 2 (dB)** to “90”
 - **Peak 3 (dB)** to “100”
- Step 5.** If you purchased the Sound Recording firmware option (730-SR), scroll down to Event Sound Recording and edit the values as follows:
- **Trigger Source:** “LCS”
 - **Trigger Level:** “80”
 - **Minimum Interval** (seconds): “15”
- Step 6.** Scroll down to **Timers**, select **Timed Stop** from the **Timer Mode** drop-down, and enter “00:5:00” minutes (h:mm:ss format) in the **Duration** field.

10.1.3 Saving the Setup File in G4

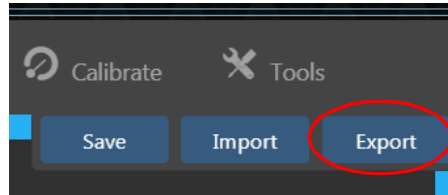
- Step 1.** When your configuration is complete, choose one of the following ways to save the Setup:

To save the configuration directly to the meter:

- a. Click **Save** in the top right. The file is saved to the meter.

To save the configuration for reuse:

- a. Click **Export** in the top right. This opens the Save As window on your PC.



- b. Verify the location you want to save the setup file. (We recommend saving to “G4 > Setups > spartan.”)

TAKE NOTE Make note of the location of this saved setup file.

- c. Enter “730Example” as the File name for this Setup file and click **Save**. The setup file appears in the destination folder with the file extension “.sps.”

Recommended Next Step:

- **10.4 Monitoring the Measurement in G4**

10.2 Importing a Configuration Setup File

This section shows how to import a previously saved configuration file into G4, instead of creating a new dosimeter file.

Before you begin:

- Verify the dosimeter is connected to your PC. If needed, click **Discover Meters** to refresh an inactive connection.

Step 1. In G4, select your connected dosimeter in the Meters panel. This opens the dosimeter tab on the right.

Step 2. Click **Settings**  to open the Settings page.

Step 3. Click **Import**. This opens the File Explorer window.

Step 4. Select a configuration setup file (SPS format) from your PC, and click **Open**. The

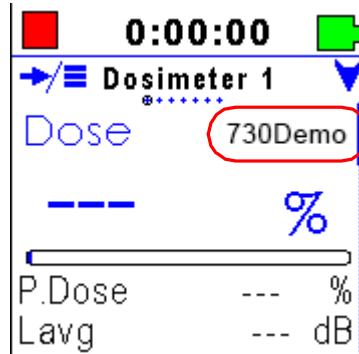
Settings page displays the saved configuration.

Step 5. Choose one of the following methods to save the setup file:

To save directly to the meter:

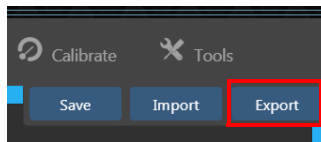
- a. Click **Save** in the top right. The file is saved to the meter.

Figure 10-1 Dosimeter Display Shows the Saved Setup



To save the Setup for reuse:

- a. Make any necessary changes to the Setup, then click **Export** in the top right. This opens the **Save As** window.



- b. Verify the location you want to save the setup file. (We recommend saving to the user's "...Documents\PCB Piezotronics\G4\Setups\Spartan" folder.)

TAKE NOTE Make note of the location of this saved setup file.

- c. Enter "730Example" as the **File Name** and click **Save**.

Recommended Next Steps:

- [10.3 Pushing a Setup File to Multiple Dosimeters](#)
- [10.4 Monitoring the Measurement in G4](#)

10.3 Pushing a Setup File to Multiple Dosimeters

Once your measurement setup is saved on your PC, complete steps in this section to "push" it to one or more connected meters.

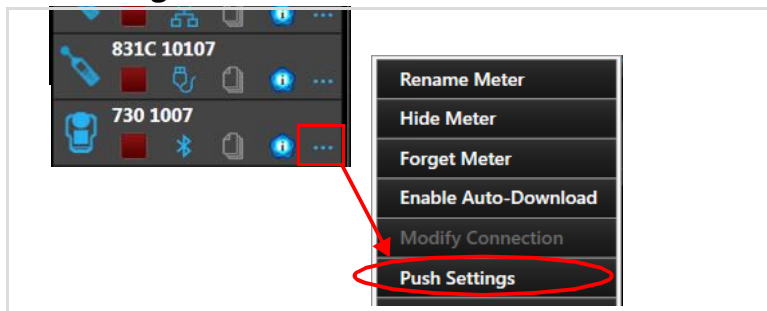
Before you begin:

- Save a settings file to your PC. For more information, see [10.1 Creating a Measurement Configuration File in G4](#), or [10.2 Importing a Configuration Setup File](#).

- Verify that your meter connection is active. If needed, click **Discover Meters** to refresh an inactive connection.

Step 1. From the G4 Meters Panel, click the **meter menu** icon, and select **Push Settings**.

Figure 10-2

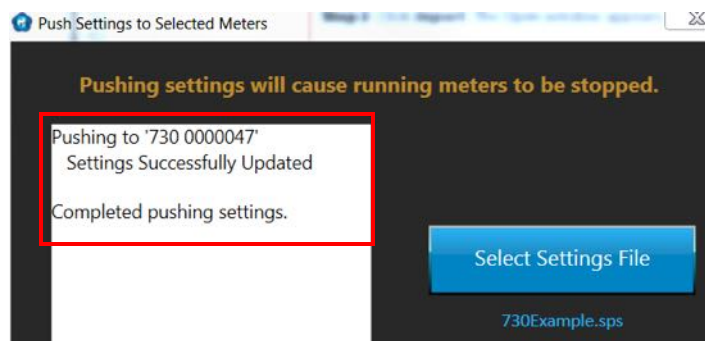


Step 2. In the Push Settings to Selected Meters window, select the checkbox in-line with one or more meters, then click **Select Settings File**.

Step 3. In the File Explorer window that opens, select the setup file (SPS) and click **Open**.

Step 4. Select **Push to Meters**. Depending on your connection type, this process may take a few seconds. The G4 status window indicates when the process is complete, as shown in *Figure 10-3*.

Figure 10-3 G4 Push Settings Status



Recommended Next Steps:

- Make a measurement using the new setup file. See **Help** → **Manuals** → **Spartan 730**, “Section 4 Making a Measurement.”
- If you’re using the LD Atlas app (or G4) and the dosimeter is within Bluetooth range, see **10.4 Monitoring the Measurement in G4**.

10.4 Monitoring the Measurement in G4

When the dosimeter is within Bluetooth range, G4 (or LD Atlas app) allows you to monitor a measurement in progress.

Before you begin:

- Establish an active connection to the meter in G4 (or LD Atlas). If needed, click **Discover Meters** to refresh an inactive connection.

Step 1. In G4, click on your connected meter in the Meters Panel.

Step 2. Select the  **Live View**, as shown in *Figure 10-4*.

Step 3. Click the icon to start, stop, or pause a measurement.

Figure 10-4 730 Dosimeter Live View in G4



10.5 Viewing Measurement Results in G4

Following a measurement, Spartan 730 Dosimeter data files automatically download to your PC when the meter re-establishes a Bluetooth connection with the PC. This is usually when the meter and PC are in the same room.

TAKE NOTE For information on disabling Auto-Download, see [A.2.3 "Auto Download Options"](#) on page 4.

In this section:


- [10.5.1 Downloading Measurement Results](#)


- [10.5.2 Viewing Measurement Data](#)
- [10.5.3 Viewing Measurement Graphs](#)
- [10.6 Creating a Report](#)

10.5.1 Downloading Measurement Results

Before you begin:


- Establish an active connection to the meter in G4 (or LD Atlas). If needed, click **Discover Meters** to refresh an inactive connection.

Step 1. Select your connected meter in the Meters panel. This opens the dosimeter tab to the  **Files** view.

Step 2. Double-click the measurement file you want to view; the file opens in a new tab on the  **Data** view.

TAKE NOTE If auto -download is not enabled, the file downloads when you double-click. Double-click the file again to open the data file on a new tab.

Other options:

- To select all files in the list to download or open, click the checkbox above the file list.
- To cancel a download in progress, click the  **cancel download** icon.

10.5.2 Viewing Measurement Data

When you download and open a data file, G4 displays the data spreadsheet. The data sheet is organized into the following tabbed sections:

- [Summary Tab on page 130](#)
- [Settings Data Tab on page 131](#)
- [Session Log Tab on page 132](#)
- [OBA Tab on page 132](#)
- [Time History Tab on page 132](#)

Summary Tab

The Summary tab displays the following items:

- General measurement information such as dosimeter user, measurement location, or other notes

- Overall results for Dosimeter 1, and virtual Dosimeters 2, 3, and 4
- “Any Level” data
- Selected event trigger levels and the count and duration of each
- Any instances of instrument Overload
- Records of any (optional) modified data you create using the edit band graphing tool. See [10.7.2 "Creating and Viewing Modified Results" on page 137](#)
- It also contains the Measurement Summary section. This section allows you to enter the following general information or meta data about the measurement and circumstances, which may be historically important.
 - User (1 line)
 - Location (1 line)
 - Job Description (1 line)
 - Note (up to 2 lines. Use ALT+ENTER to enter the second line.)

Figure 10-5 Measurement Notes/General Information

	A	B	C
1	Spartan 730 Summary		
2	Measurement Notes		
3	User	Manfred W.	
4	Location	North Mill	
5	Job Description	The best job	
6	Note	If I want to return a line here, I need Alt +Enter This is the second and final line I'll type.	
7			

Your entries display at the top of the official report, as part of the report heading. You can also enter this information in the Search bar on the Data view to locate data files. For more information, see [2.5.3 "Adding General Information to Create Search-able Data Files" on page 16](#).

Figure 10-6



Settings Data Tab

With the data file open in G4, click the settings tab near the bottom of your screen. This opens the record of the settings used for the measurement.

This tab displays:

- Current System Settings
- Measurement settings saved in the setup file for each virtual dosimeter
- Alarm status, Action and Limit Level
- Features and Firmware Options enabled for the measurement

- Exceedance Threshold settings
- Detailed Timer or Run Time Settings used to create the measurement

Figure 10-7 Settings Tab Example

Measurement Settings			
Virtual Dosimeters	1	2	
Enable	Enabled	Disabled	
Mode	ISO	DOSE	
Title	ISO 9612	OSHA-HC	
Frequency Weighting	A	A	
Time Weighting	FAST	SLOW	
Peak Weighting	C	C	
Exchange Rate	3 dB	5 dB	
Threshold	90.0 dB	80.0 dB	
Criterion Level	85.0 dB	85.0 dB	
Shift Time	8 hours	8 hours	

Session Log Tab

From the open data file in G4, click the Session Log tab near the bottom of your screen. This opens the record of all meter actions (run, stop, pause, and the action source), and each sound event recorded. (Only when option 730-ESR is installed. For details about this option, see section [3.7.1 "Accessing Your Dosimeter Sound Recording Files" on page 32.](#))

Figure 10-8 Session Log Tab Example

Date/Time	Record Type	Cause	Sound Record
2019/06/04 13:00:00	Run	Timer	
2019/06/04 15:47:14	Sound Record	Event	Sound Record 1
2019/06/04 17:00:00	Stop	Timer	

OBA Tab

When the Octave Band Analysis option (730-OB1) is purchased and enabled for your Spartan 730, from the open data file in G4, click the OBA tab near the bottom of your screen. This opens a summary of recorded metrics for 9 octave frequencies as shown in *Figure 10-9*.

Figure 10-9 OBA Tab Example

Metrics	32	63	125	250	500	1000	2000	4000	8000	Hz
OBA LZeq	58.9	53.5	50.2	57.3	53.1	49.1	44.8	44.0	44.1	dB
OBA LASmax	66.5	76.0	77.3	79.0	77.4	77.0	82.1	82.6	81.1	dB
OBA LASmin	44.0	39.5	42.8	43.7	37.8	31.1	29.5	30.9	33.4	dB

Time History Tab

When you select Time History as part of the measurement setup file, the Time History tab displays one entry for each period (1 second or 1 minute) you selected in the Time History section of the measurement configuration. Each entry contains the following:

- A record of the Time History (TH) metrics you selected
- Periods when the subject was in motion


- Any “bump” data, or records of when the meter was jolted, dropped, or otherwise bumped
- Periods when an input overload or under range error occurred and the meter could not accurately measure noise exposure

Figure 10-10 Time History Example

Record Type	Date/Time	LAeq	LCpeak	LCeq	LASMax	LAFMax	LZpeak
Start	2019-06-04 13:00:00	43.6	25.6	58.4	60.9	21.0	4.2
	2019-06-04 13:00:01	46.1	25.6	59.3	56.7	22.0	4.2
	2019-06-04 13:00:02	42.0	25.6	59.6	52.8	22.0	4.2
	2019-06-04 13:00:03	41.9	25.6	58.5	49.0	21.0	4.2
	2019-06-04 13:00:04	44.8	25.6	59.2	45.9	21.0	4.2

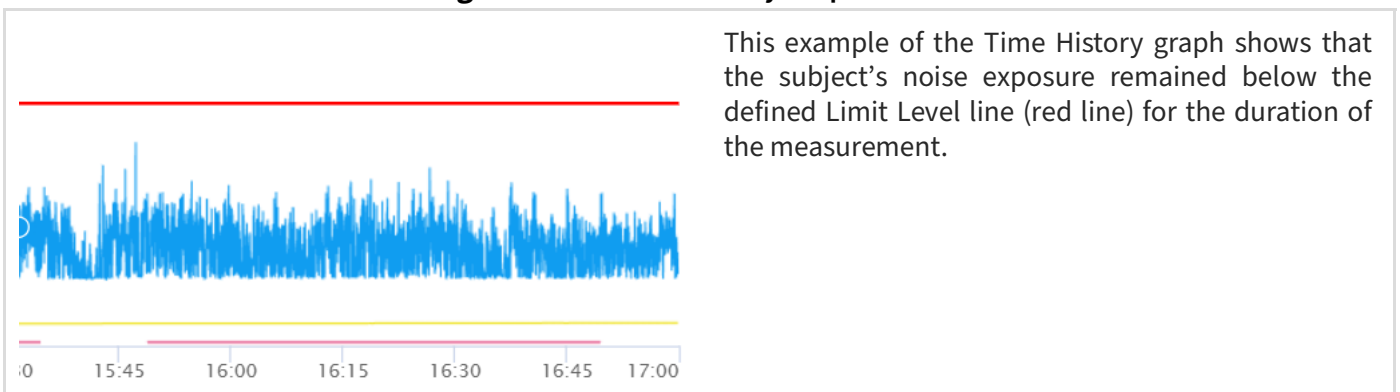
Time History records taken in regular intervals also enable G4 to graph the subject’s exposure level for the duration of the measurement as shown in section [10.5.3](#).

10.5.3 Viewing Measurement Graphs

Step 1. In G4, download and open the data file, then choose the  **Graph** view.

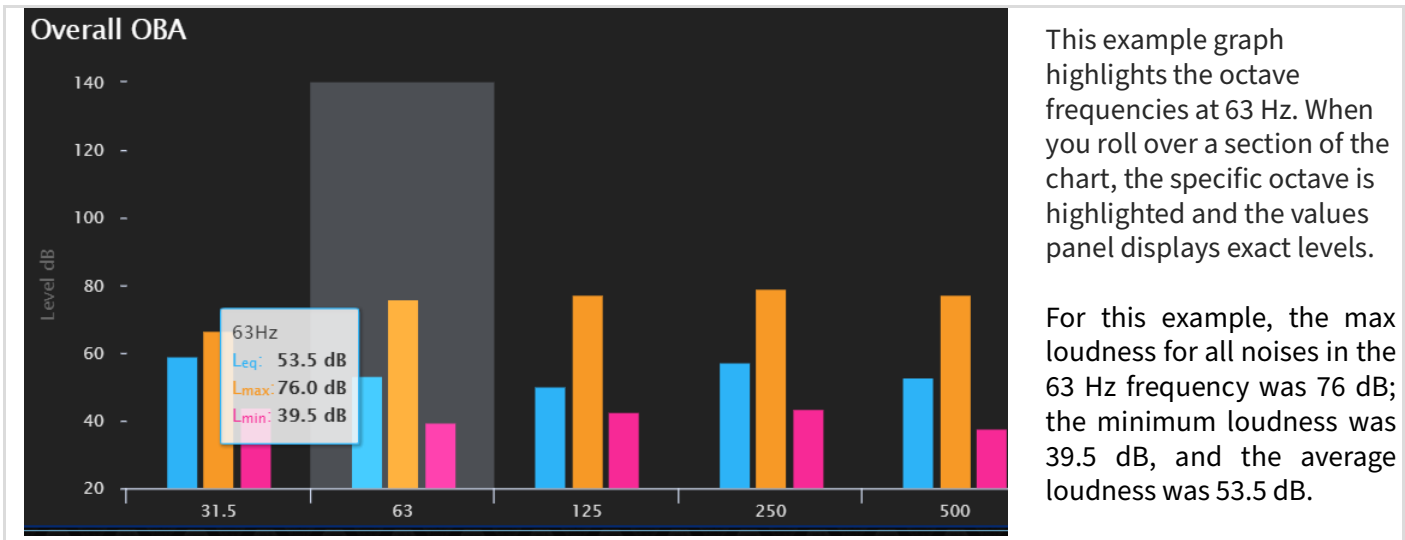
Time History records taken in regular intervals allow G4 to graph the subject’s exposure level for the duration of the measurement. In the Setup file, Time History is often defined with a 1 second period. With this setting, exposure levels are recorded in terms of a table of metrics with a new entry for each second. The graph of these values displays as shown in *Figure 10-11*.

Figure 10-11 Time History Graph With Limit Line



When the OBA feature is enabled for your dosimeter, the Graph section also shows the Overall OBA bar graph.


Figure 10-12 Overall OBA Graph Example



Recommended Next Steps:

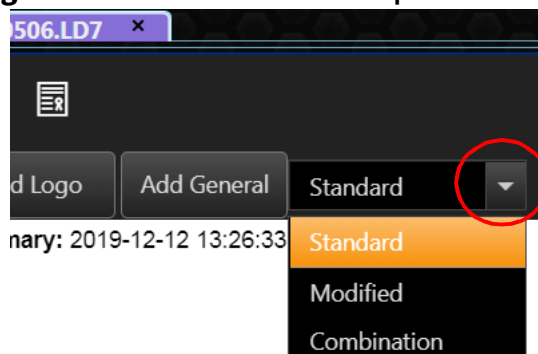
- If you plan to modify the resulting data, see [10.7.2 "Creating and Viewing Modified Results" on page 137](#)
- If you're ready to report the measurement results, see [10.6 "Creating a Report" on page 134](#).

10.6 Creating a Report

Step 1. Download and open the data file in G4, then choose the  **Report** view. G4 creates a report PDF with all details required by IEC 61252 Ed. 1.2.

Step 2. If you've created modified data using the Edit Band tool, select the dataset you want to report on from the **Standard** drop-down menu in the top right as shown in *Figure 10-13*.

Figure 10-13 Select Dataset Drop-down Menu



Step 3. (Optional) To add Measurement Notes, click **Add General**. Skip this if you entered Measurement Notes on the Data Summary spreadsheet.

Step 4. (Optional) To customize the report with your logo, click **Add Logo**. This feature is not currently available in the LD Atlas app.

Adding a Custom Logo

- a. In the Add Logo window, click **Import**.
- b. Select your logo image from your PC, and click **Open**. Your logo is reduced to 800 x 100 px.
- c. If the logo displays appropriately, click **Save**. To choose a different file, click **Import**.

Figure 10-14 Report Example With Custom Logo and Measurement Notes



- Step 5.** To exclude virtual dosimeters from the report, select the checkboxes above Dosimeters 2–4, or you can disable each dosimeter in the meter settings, prior to the measurement.
- Step 6.** Select a format to share the report:
- Click **View PDF** to open the report in your local PDF viewer.
 - Click **Email PDF** to open the report in your default mail client.

10.7 Creating Modified Results

G4 enables you to view, modify, and examine your measurement results as shown in the following sections.

10.7.1 Using Time History Graph Tools

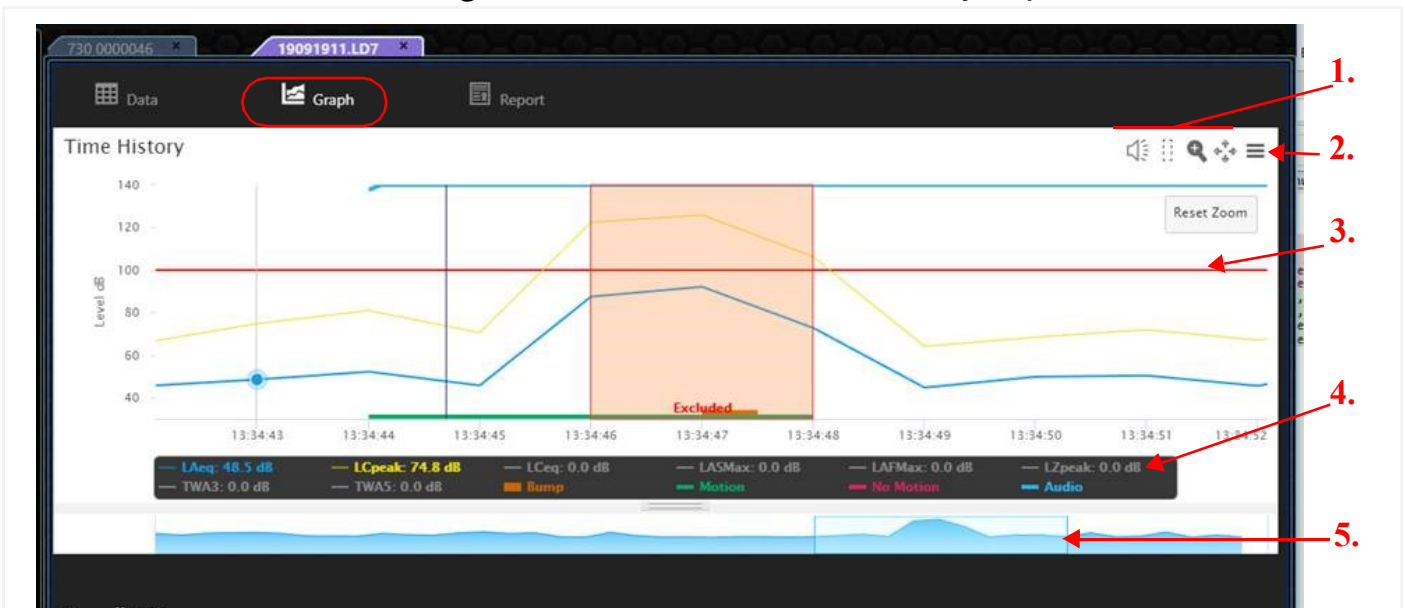
The views and tools on the Time History graph in G4 are helpful for organizing and analyzing measurement results.

- Step 1.** Select your connected dosimeter in the meters panel. This opens the dosimeter tab on the Files view.
- Step 2.** In the file list, double-click the data file you want to graph. This opens the file in

a new tab showing the Data view.

Step 3. Click the **Graph** view to display the Time History graph as shown in *Figure 10-15*.

Figure 10-15 Features of the Time History Graph



1. The **Graphing Tools** are demonstrated in [10.7.2 Creating and Viewing Modified Results](#).
2. **Graph Menu**: Available options as shown in *Figure 10-17*.
3. Exposure Limit Level: as set in the configuration.
4. **Legend**: Click on a label in the legend to show or hide that metric in the graph.
5. **Graph Navigator**: Select the portion of the measurement you want to focus on in the graph window.

Figure 10-16

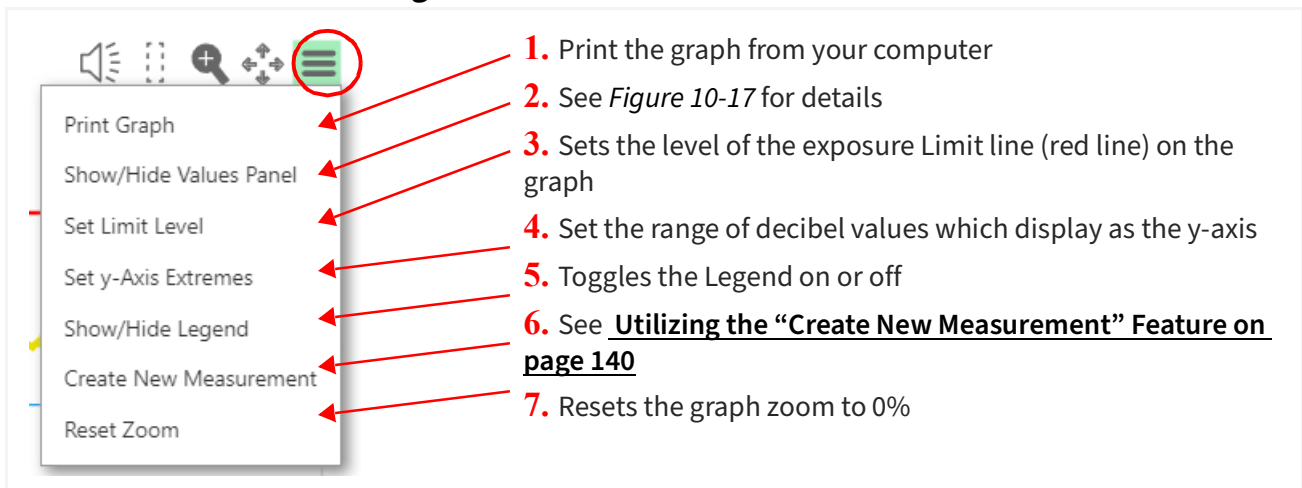
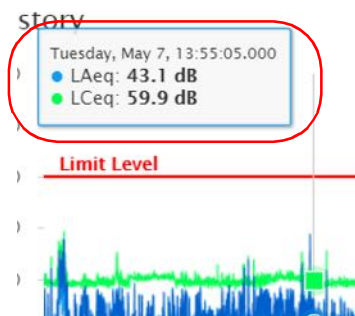


Figure 10-17 Time History Graph Menu Time History Values Panel



The Values Panel is disabled by default. When enabled, it displays the sound level wherever you place the mouse pointer on the graph. To enable it, click the Graph Menu icon in the top right and select **Show Values Panel**; to disable it, select **Hide Values Panel**.

Click on a metric label in the chart key to display it in the Values Panel; click again to hide it.

10.7.2 Creating and Viewing Modified Results

The G4 Edit Band and Crop Measurement features allow you to exclude one or more segments of a measurement.

In this section:

- [Using Automatic Exclusion for Bump Events in G4 on page 137](#)
- [Creating an Edit Band Exclusion in G4 on page 138](#)
- [Utilizing the “Create New Measurement” Feature on page 140](#)

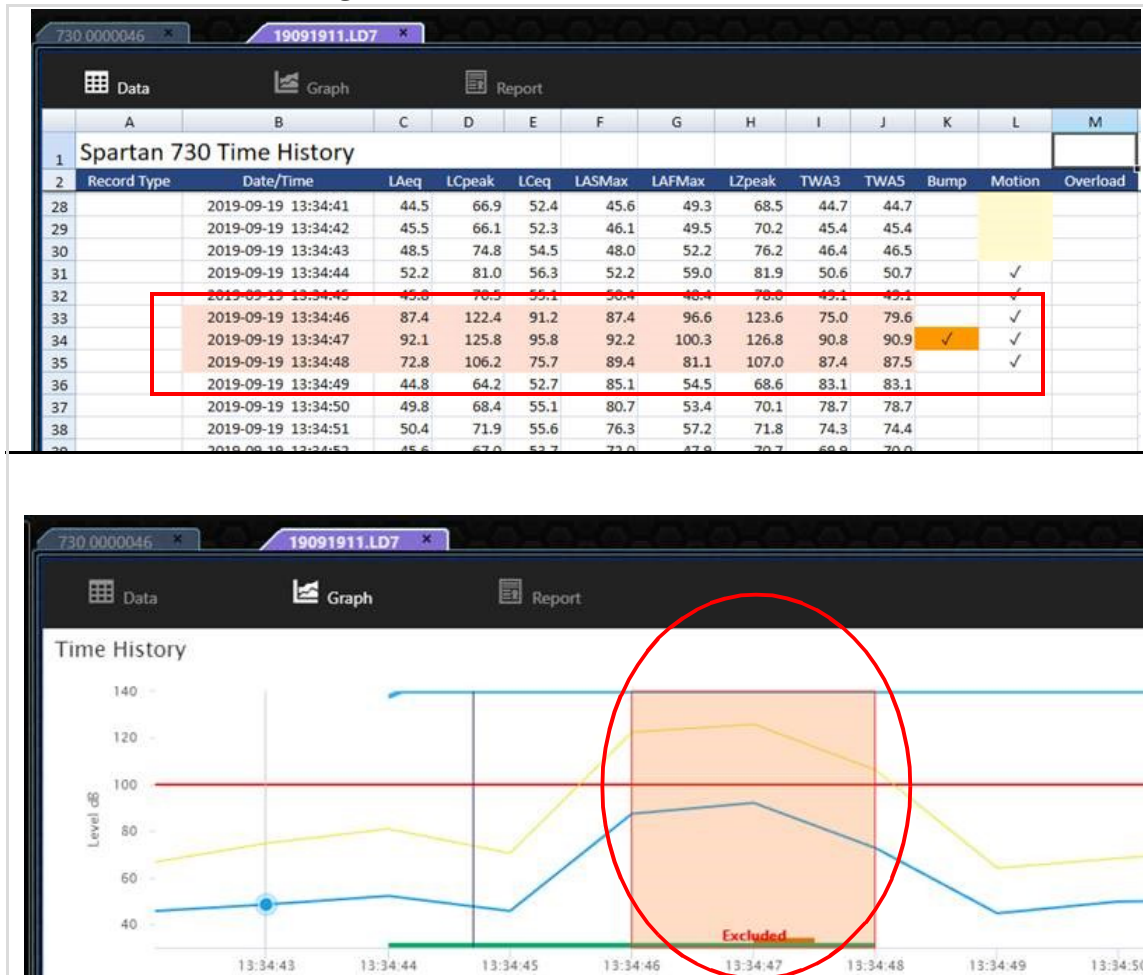
Using Automatic Exclusion for Bump Events in G4

When you download Spartan dosimeter data files, G4 automatically creates an exclusion band for all bump events. This feature allows you to exclude unusual data resulting from an interruption, or a “bump” event when the dosimeter is accidentally bumped or dropped. You can also disable this automatic feature.

LEARN MORE For more information on disabling Automatic Exclusion for Bump Events in G4, see [**A.2.5 "Spartan Dosimeter Options" on page 5**](#).

G4 calculates a bump event by taking the average of the 10 most recent L_{Cpeak} values and comparing it to the previous average. If this value is significantly higher, the Time History Data tab indicates the bump event in orange as shown in the top section of *Figure 10-18*. The Time History Graph (Time History Graph Tab) also shows the exclusion band in orange as shown in the bottom section of *Figure 10-18*.

Figure 10-18 Bump Event in Time History Data and Time History Graph



Creating an Edit Band Exclusion in G4


APPLIES TO Spartan dosimeter and SoundAdvisor™ 831C SLM.


This example shows noise exposure data that was interrupted by the subject’s heavy coat brushing the microphone. The following steps demonstrate how to use G4’s edit band tool to exclude data that is not representative of the actual noise exposure or measured sound.

TAKE NOTE When modifying your data using edit bands, no changes are made to the original data. You can view both the original results and the modified results in separate sections on the open data File’s **Summary** sheet.

Before you begin:

- Create a measurement file that includes Time History.
- Open the data file in G4.

Step 1. Select the tab of the open data file in G4, and click the  **Graph** view.

Step 2. Select the  **Edit Band** tool, then click and drag to highlight the section (or

sections) to exclude. This opens the Edit Band window.

Step 3. Adjust the edit band selection using the arrow buttons, if needed, then click **Exclude Data**.

Figure 10-19 Adjusting the Edit Band Selection

In either the **Begin** or **End** section, click the **single arrow** to expand the selection by 1 sample. (Click the **double arrow** to expand the selection by 10 samples.)

When you use the edit band tool the modified results typically have a margin of error of <1.5% with continuously changing levels over 8 hours.

Step 4. To exclude additional areas, repeat steps 2–3.

Step 5. To view the modified data, click the **Data** view and scroll down to the **Modified Results** section, as shown in *Figure 10-20*.

Figure 10-20 Modified Results Section of the Data View

70	LAI > 95 dB		0
71	LAPk > 125 dB		0
72	LAPk > 135 dB		0
73	LAPk > 137 dB		0
74			
75			
76			
77			
78	Modified Results		
79			
80	Virtual Dosimeters		
81			1
82			ISO 9612
83	Dose		---%
84	Projected Dose		---%

G4 creates a copy of the data, applies your edits, and calculates exposure statistics. The result displays in the Modified Results section below the original measurement data.

Modified results using TWA values stored in Time History are always calculated using the Slow detector, regardless of the setup selection.

Step 6. When you're finished, simply close the file. G4 prompts you to save it. The file saves both original and modified data at the location you set for your downloaded files. (G4's default location is the user's Documents\PCB Piezotronics\G4 folder.)

Recommended Next Step:

- ["Utilizing the "Create New Measurement" Feature" on page 140](#)
- [10.6 "Creating a Report" on page 134](#)

Utilizing the “Create New Measurement” Feature

When you create an edit band, G4 recalculates the measurement statistics and metrics based on your selection. These modified results display in a separate section of the Data view, and are used in a variety of circumstances, including:


- to examine possible noise exposure scenarios (“what if” scenarios)
- to determine the result of applying a noise reduction factor, such as earplugs or headphones


Additionally, when you use the Create New Measurement feature, all portions of the measurement outside the selected area (and all exclusion bands within the selected area) are removed from the Modified Results data sheets and the Time History graph.

In this example we will create a new measurement based on the modified results. This application will show the subject’s noise exposure if they were wearing industrial earplugs with a 20 dB noise reduction rating (NRR).

Before you begin:

- Understand how to create an edit band exclusion as shown in ["Creating an Edit Band Exclusion in G4" on page 138.](#)
- Open a data file in G4.

Step 1. Select the tab of the open data file in G4, and click the  **Graph** view to open the Time History graph.

Step 2. In this example, we want to indicate the expected noise exposure as a limit line on the graph. To do this, click the  **Graph menu icon**, and select **Set Limit Level**.

Step 3. In the window that opens, enter “**110 dB**”, and click **OK**. The red limit level line displays at the 110 dB level on the graph.


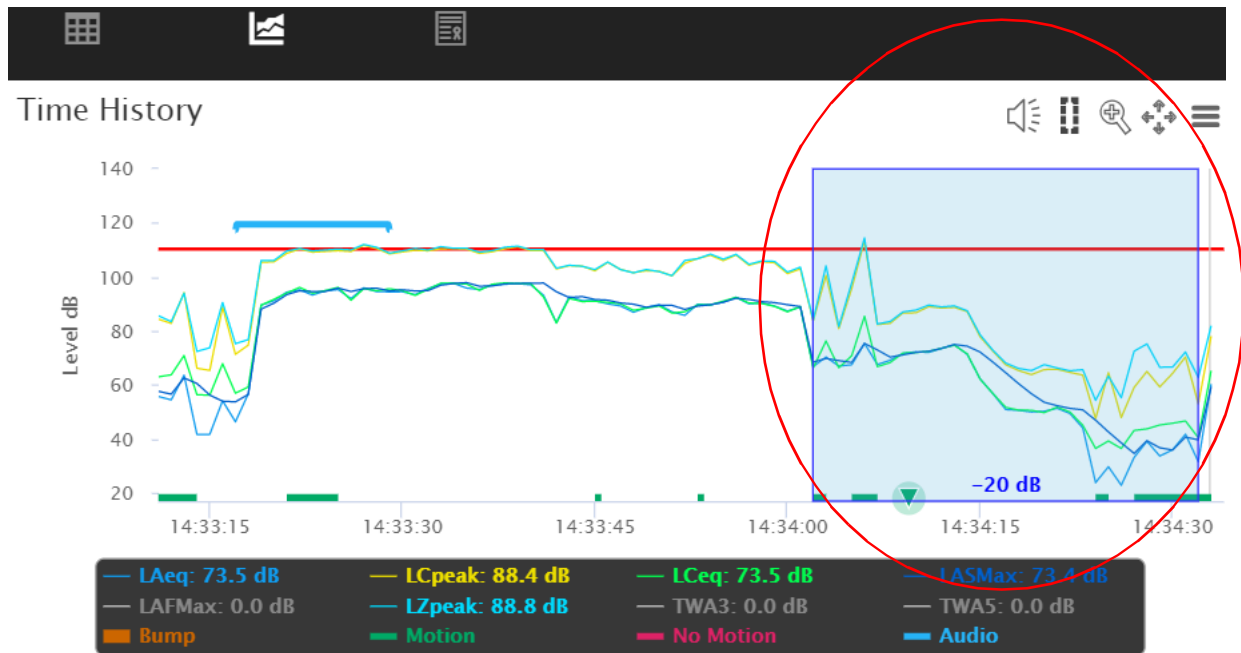



Step 4. Create an edit band using the  **edit band tool**, enter “-20” as the **Offset**, and click **Apply Offset**. The edited segment is labeled and highlighted in blue as shown in *Figure 10-21*.

Figure 10-21 Measurement Data With -20 dB Offset Applied



TAKE NOTE When you create an edit band, G4 displays the modified data in the Modified Results section below the original data.

- Step 5.** Click the  **Graph menu icon**, and select **Create New Measurement**.
- Step 6.** Highlight the portion of the measurement you want to include in the newly calculated exposure statistics. This opens the Create New Measurement window.
- Step 7.** If needed, use the **Begin** and **End** arrows to adjust the selection boundaries, then click **Create**.
TAKE NOTE Any Exclusion bands within the selected area are also removed from the recalculation.
- Step 8.** To view the results, select the  **Data view**, and scroll down to the **Modified Results** section. You can also view results from the  **Report view**, and scroll down to the **Modified Results** section. This view also displays the modified Time History graph.

Module **11** Human Vibration Meter Example

This example demonstrates the enhanced data-viewing features G4 LD Utility provides for the Larson Davis HVM200.

In G4, HVM200 users can view reports. To make full use of G4 features, contact Larson Davis to obtain a license for your meter.

Process Overview:

11.1	G4 LD Utility for HVM200	142
11.1.1	Connecting and Setting Up the Measurement	
11.1.2	Downloading the Measurement File	
11.1.3	Viewing HVM200 Data Files in G4 LD Utility	
11.1.4	Editing Data in G4	
11.2	Creating a Report	147

11.1 G4 LD Utility for HVM200

In this section:

- **11.1.1 Connecting and Setting Up the Measurement**
- **11.1.2 Downloading the Measurement File**
- **11.1.3 Viewing HVM200 Data Files in G4 LD Utility**

11.1.1 Connecting and Setting Up the Measurement

For specific instruction on connecting the instrument, and setting up and making a measurement, in G4 go to **Help** → **Manuals** → **HVM200** → **Module 2 Getting Started**.

TAKE NOTE Instructions for connecting, and setting up and making a measurement in G4 also apply when using the LD Atlas app.

11.1.2 Downloading the Measurement File

G4 LD Utility provides helpful data management, visualization, and reporting features for HVM200 users. This section reviews all features available when downloading measurement files from the HVM200.

Before you begin:

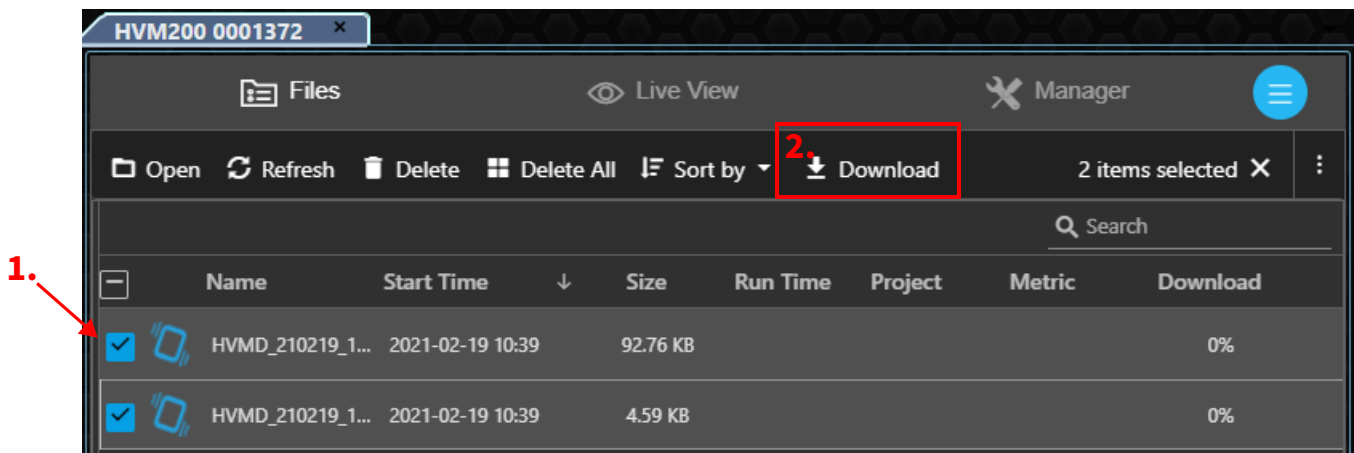
- Connect your instrument to a PC and in G4 as indicated in **11.1.1 "Connecting and Setting Up the Measurement" on page 142.**

Step 1. In G4, click on the name of your connected meter in the Meters Panel (or Projects Panel). This opens the meter tab on the right.

TAKE NOTE If you want to add a note or measurement details to the data file, see 2.5.3 "Adding General Information to Create Search-able Data Files" on page 16.

Step 2. In the Files view, select the checkbox in-line with HVM files you want to download, and choose **Download** from the menu bar.

FIGURE 11-1 G4 Files View Menu Bar Download



Step 3. When the download is finished, double-click the file you want to open.

11.1.3 Viewing HVM200 Data Files in G4 LD Utility

When opening an HVM200 data file, G4 displays a file tab in the Main View for each opened file. Measurement data displays in 3 views: Summary, Graph, and Report, which are shown in this section.

Before you begin:

- Download the completed measurement file, as shown in **11.1.2 Downloading the Measurement File**

Viewing Data in Summary View


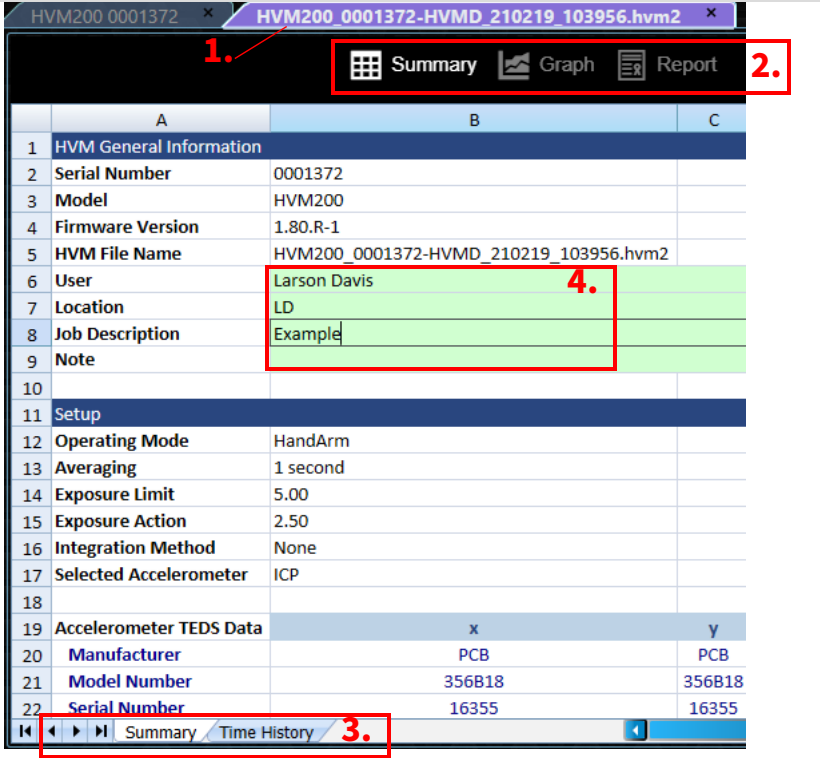
The active measurement file opens in the  **Summary** view.

FIGURE 11-2 File Summary View



- 1.** The active (selected) file tab displays in purple.
- 2.** Measurement data displays in 3 views: **Summary**, **Graph**, and **Report**.
- 3.** In this example, there are 2 data tabs in the Summary view. Select a tab to display Time History, or other measurement results when firmware options are enabled.
- 4.** Cells shaded in green can be edited.



The screenshot shows a software interface with two tabs at the top: 'HVM200 0001372' (inactive) and 'HVM200 0001372-HVMD 210219 103956.hvm2' (active, highlighted in purple). Below the tabs is a navigation bar with three icons: a grid icon for 'Summary', a line graph for 'Graph', and a document icon for 'Report'. The main area is a spreadsheet with columns A, B, and C. The spreadsheet is divided into sections: 'HVM General Information' (rows 1-10), 'Setup' (rows 11-18), and 'Accelerometer TEDS Data' (rows 19-22). The 'User' field (row 6) is highlighted in green and contains 'Larson Davis'. The 'Location' field (row 7) is highlighted in green and contains 'LD'. The 'Job Description' field (row 8) is highlighted in green and contains 'Example'. The 'Serial Number' field (row 22) is highlighted in green and contains '16355'. At the bottom, there are two tabs: 'Summary' (active) and 'Time History' (inactive). Red callout boxes with numbers 1 through 4 point to the active tab, the navigation bar, the 'Time History' tab, and the green-shaded cells, respectively.

Additional Information On Spreadsheets:

- Accelerometer overload values are displayed in red cells. If an overload occurs, an additional column in the spreadsheet displays the axis where the overload occurs.
- Accelerometer under-range values occur when noise floor levels are at or near the measured values. These values are displayed in gray cells. An additional column in the spreadsheet displays the axis where the under-range measurement occurs.

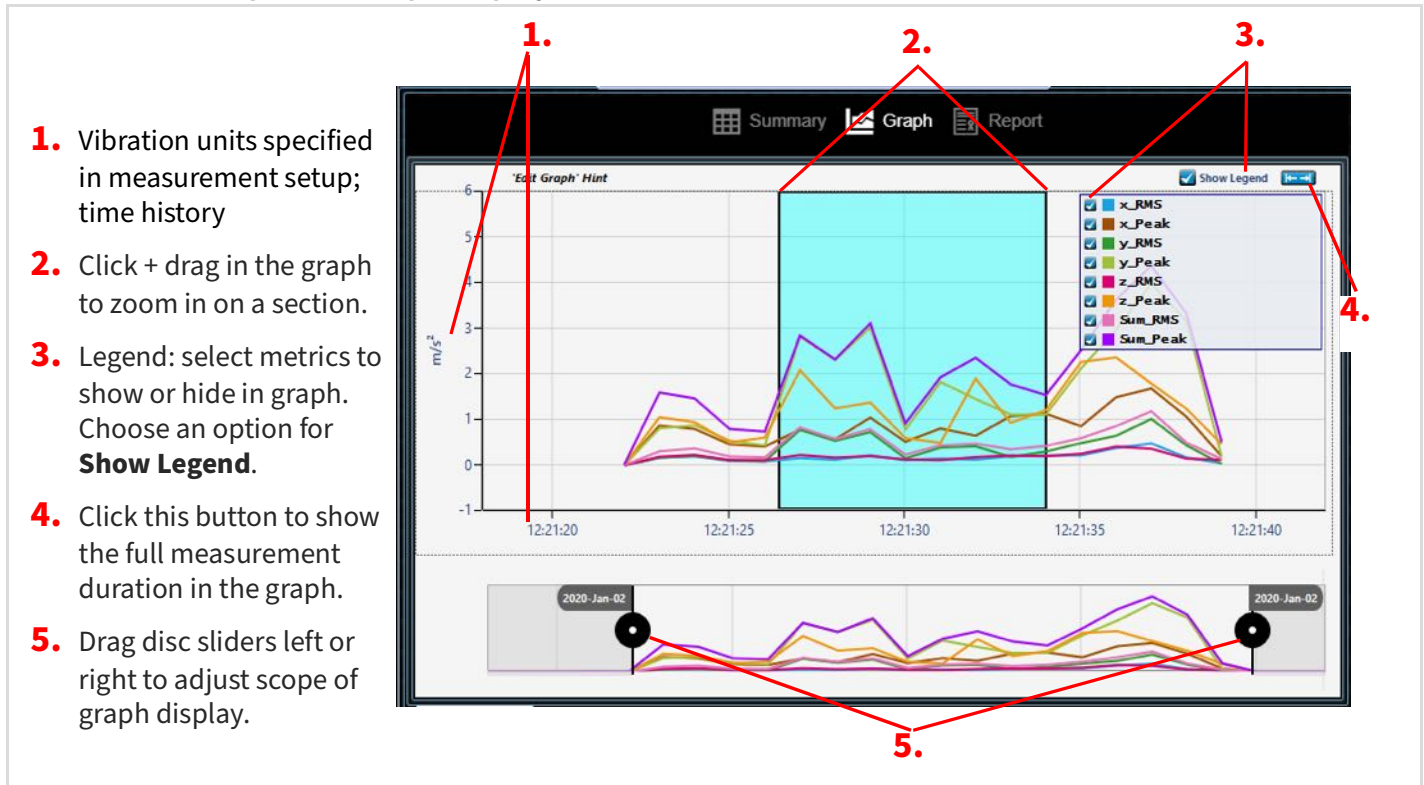
TRY THIS Select the meter tab, then choose  **Live View** →  **menu icon** → **About** to view the sensor connection status.

- If both an overload and an under-range measurement occur at the same interval on the same axis, the value is displayed in a red cell. This usually indicates a sensor error and if it occurs for more than eight seconds, it may be an indication that the sensor is disconnected.
- Calibration check information is displayed on the **Summary** tab, if previously performed.


Viewing Data in Graph View

Expanding the graphical view provides a full screen display and easier access to specific data characteristics, as shown in *Figure 11-3*.

FIGURE 11-3 Expanded Graph Display

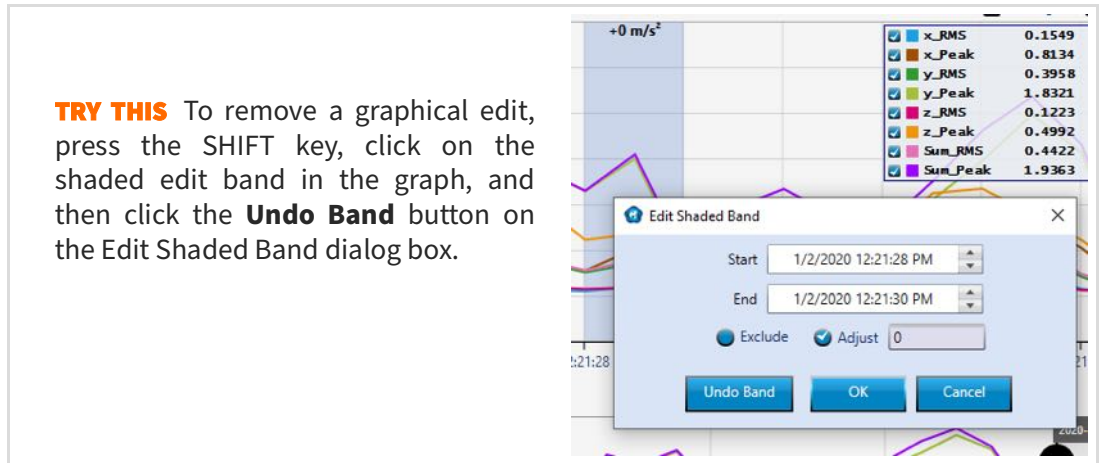


11.1.4 Editing Data in G4

In the G4  **Summary** view, you can edit the graph to view alternatives, and save your edits in the data file. The original data is not modified in this process. Instead, the original data appears in the Overall Data heading, while your edited tabular and graphic results are displayed under the Modified Data heading.

Step 1. Press the **Shift** key, and click + drag on the graph to highlight the section you want to modify. This opens the Edit Shaded Band dialog.

FIGURE 11-4 Shaded Area Shows the Edit Band Selection



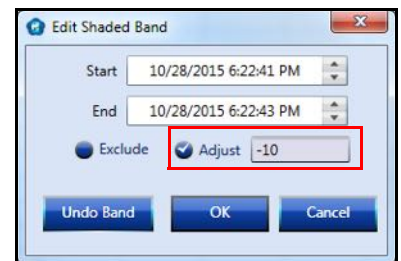
TRY THIS To remove a graphical edit, press the SHIFT key, click on the shaded edit band in the graph, and then click the **Undo Band** button on the Edit Shaded Band dialog box.

Step 2. If you need to refine the selected area, edit the **Start** or **End** times in the dialog.

Step 3. To edit the level/amplitude within the selected area, do the following:

- a. Select the checkbox in-line with **Adjust**.
- b. Enter a positive or negative value to add to or subtract from values within the selected area, and click **OK**.

FIGURE 11-5



The resulting graph displays the modified plots within the shaded band. The edits also appear in the **Summary** view tabular data under the heading of **Modified Overall Data**. In the Time History tab, edits appear with a blue background. The original measurement values remain unchanged in the Overall Data section of the Summary view.

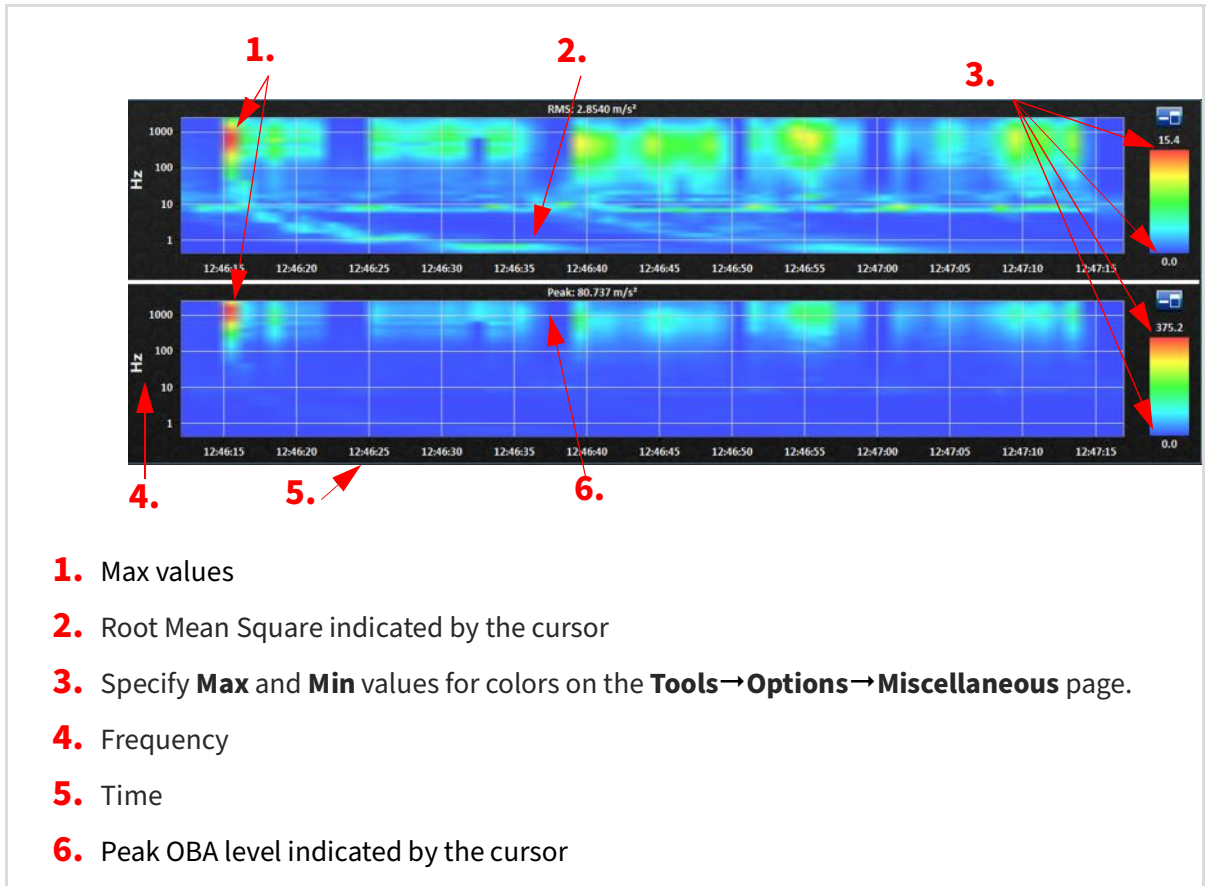
FIGURE 11-6 Example: Edited Value in Summary View, Modified Overall Data

Modified Overall Data						
45	Start Date and Time	2015-Oct-28 18:21:47				
46	Run Time (hh:mm:ss)	00:01:00				
47						
48		x	y	z	Sum	Units
49	a _{RMS}	1.5616	1.7425	2.4108	3.3596	m/s ²
50	MTVV	4.3953	4.2789	3.7877	7.1856	m/s ²
51	a _{PEAK}	10.8732	8.9452	10.0040	20.3764	m/s ²
52	a _{MIN}	0.0000	0.0000	0.0000	0.0000	m/s ²
53	A(1)	0.2016	0.2250	0.3112	0.4337	m/s ²
54	A(2)	0.1426	0.1591	0.2201	0.3067	m/s ²
55	A(4)	0.1008	0.1125	0.1556	0.2169	m/s ²
56	A(8)	0.0713	0.0795	0.1100	0.1533	m/s ²
57	A(8) Act.	20.503	16.467	8.603	4.430	Hours
58	A(8) Exp.	>24 Hours	>24 Hours	>24 Hours	17.720	Hours
59	Exposure Points				0	Points

Viewing OBA Data

When Octave Band Analysis is selected in the measurement setup, the OBA graphs show the resulting data. Both frequency and time are shown on a heat map where color indicates the amplitude of the vibration.

FIGURE 11-7 Example: OBA Graph



11.2 Creating a Report

Select Report view to create a one-page PDF report, which includes the general information, setup settings, overall data, and graph for this measurement.


Step 1. Download and open the data file in G4, then choose the  **Report** view. G4 creates a report PDF.

FIGURE 11-8 Example: HVM Report View

Print Preview

HVM Summary Report

HVM General Information

Serial Number 0000057
 Model HVM200
 Firmware Version 1.8.1R3
 HVM File Name HVM200_0000057-200102_FromBrent.00.hvm2
 User
 Location
 Job Description
 Note

Setup

Operating Mode HandArm
 Averaging 1 second
 Exposure Limit 5.00
 Exposure Action 2.50
 Integration Method None
 Selected Accelerometer ICP

Accelerometer TEDS Data	x	y	z
Manufacturer	PCB	PCB	PCB
Model Number	356818	356818	356818
Serial Number	16389	16389	16389
Sensitivity [mV/(m/s ²)]	95.7	95.6	96.8

Weighting Wh Wh Wh

Overall Data

Start Time 2020-Jan-02 12:21:17
 Run Time (hh:mm:ss) 00:00:25

	x	y	z	Sum	Units
a _{RMS}	0.1796	0.3980	0.1820	0.4730	m/s ²
MTVV	0.4639	0.9730	0.3937	1.1451	m/s ²
a _{PKX}	1.6885	3.9865	2.3699	4.3791	m/s ²
a _{MIN}	0.0023	0.0022	0.0031	0.0045	m/s ²
A(1)	0.0150	0.0332	0.0152	0.0394	m/s ²
A(2)	0.0106	0.0235	0.0107	0.0279	m/s ²
A(4)	0.0075	0.0166	0.0076	0.0197	m/s ²

Appendix **A** G4 Settings Reference

This module is a reference for G4 settings. When settings are changed, you must restart G4 before the new setting applies.

In this module:

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A.2.2	Displayed Metric Options	
A.2.3	Auto Download Options	
A.2.4	Communication Options	
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A.1 File Menu Settings

In G4, click the **File** menu to view the following options:

Open a data file

Use this option to open any of the following file (or folder) types: LDBIN, LD7, HVM, S, XLSX.

Close all data files

Use this option to close all open data files, but leave the Meter Manager, etc. open.

Import Files

From USB Drive or Legacy SLMdl

Instrument settings & properties

Import to PC, Export from PC, Extract Property File

Setup Manager

Export to JSON/XML

Save HVM file as

Save Spartan file

Save SLM file

Export to spreadsheet

Print HVM reports

Generate SLM report

Close active tab

Exit

A.2 Tools Menu Settings

In this section:

- [“File Options” on page A-3](#)
- [“Auto Download Options” on page A-4](#)
- [“Communication Options” on page A-5](#)
- [“Spartan Dosimeter Options” on page A-5](#)
- [“Miscellaneous Options” on page A-6](#)
- [“AudCal Options” on page A-6](#)
- [“Command Line Settings Options” on page A-7](#)
- [“Security Options” on page A-8](#)
- [“Changing UI Language” on page A-9](#)
- [“User Experience” on page A-8](#)
- [“Import Legacy AUDit Database Tools” on page A-9](#)
- [“Specifying Reference Spectra Properties” on page A-21](#)

A.2.1 File Options

To access the following selections in G4, go to **Tools → Options**, and select the **File Options** tab.

Downloaded files base path

The path you enter here is the location of your downloaded data files. At this location, G4 also creates a folder named after the meter (or project) from which files are downloaded. For example: if I enter “C:\Users\Public\Documents\Temp” as the base folder and download files from meter “831C 115032,” the complete file path is “C:\Users\Public\Documents\Temp\Meters\831C 115032.”

An example when utilizing meter Projects: if I enter “C:\Users\Public\Documents\Temp” as the base path, and download files from meter “831C 115032” in the “North Mill” project, the complete path to the downloaded file is “C:\Users\Public\Documents\Temp\Projects\North Mill\831C 115032.”

Clicking the **Restore Defaults** button sets the base path to: “C:\Users\Public\Documents\PCB Piezotronics\G4.”

Configuration files folder

The path you enter here is the location of your saved or downloaded configuration (measurement setup) files. For example: if you want configuration files to be available to multiple users, this location may be on a local network.

Clicking the **Restore Defaults** button sets this path to: “C:\Users\Public\Documents\PCB Piezotronics\G4.”

Export on download to

With an option selected here, each downloaded file is also exported to the format you select:

- XLSX (File export location is with the downloaded file, under the name of the meter.)
- JSON (File export location is with the downloaded file, under the name of the meter.)
- CSV (File export location is under the name of the meter in a subfolder named after the downloaded file.)
- Sound Records (File export location is under the name of the meter in a subfolder named after the downloaded file.)

To set a different location for exported files, see [A.2.8 Command Line Settings Options](#).

Always prompt to delete files from meter

When this checkbox is selected, G4 always displays a confirmation window, which requires you to confirm your choice, before deleting files from the meter.

Restore Defaults

Save/Cancel

A.2.2 Displayed Metric Options

The Displayed Metric tab in the G4 Options window enables you to customize the Metric column in the Files view on your meter's open tab.

Metrics are selectable for each applicable instrument and for the 3 modes available to the SoundAdvisor 831C. For Spartan dosimeters, a single metric is available for each mode, which is selectable in the measurement setup.

To edit the displayed metrics in the Files view in G4, go to **Tools → Options**, and select the **Displayed Metric** tab.

To force the displayed metric of previously downloaded files to display your selected metric, click **Force Refresh of Old Files**.

Save/Cancel

A.2.3 Auto Download Options

APPLIES TO SLM and Spartan dosimeter

In G4, go to **Tools → Options** and select the **Auto Download** tab to access the following selections.

Automatically download from all Spartan dosimeters and SLMs not listed below

Select the checkbox in-line with this setting to enable auto-download for all connected dosimeters except those in the list.

Add individual case

If you want to exclude one or more meters from auto download, you can use this feature to create an exception.

Save/Cancel

TAKE NOTE Your instrument may have additional auto-download settings. See the instrument manual for more detail.

A.2.4 Communication Options

In G4, go to **Tools → Options**, and select the **Communication** tab to access the following selections.

Update meter status every

This setting enables you to know what operation a remote instrument is working on when you enable Meter Status email alert notifications in the **Accounts/Schedule** view. You can set this option to send an email alert notification containing the meter status when the meter status changes, or to send an alert notification after a specific period of time.

Check for new TCP/IP connections every

Make a selection from the drop-down menu to enable this setting to scan for new connections according to your selection. Selections include a variety from 1 to 30 seconds, followed by 1, 5, or 10 minutes. You may also manually scan for new connections at any time by selecting **Discover Meters** in the G4 top menu bar.

Starting TCP/IP port

Pick available TCP/IP ports for the localhost loopback

Restore Ports

Save/Cancel

A.2.5 Spartan Dosimeter Options

In G4, go to **Tools → Options**, and select the **Spartan Dosimeter** tab to access the following selections. Select or deselect the checkbox in-line with the following features.

Set no motion idle period

When bumped, exclude data from time history

Enable BLE communication

Save/Cancel

A.2.6 Miscellaneous Options

In G4, go to **Tools → Options**, and select the **Miscellaneous** tab to access the following selections.

Amplify sound for session log audio record playback

(HVM only) OBA spectrograms set scale automatically/manually

- Set Max Value
- Set Min Value

Group similar time history metrics together in fixed columns

Use this setting to organize the resulting measurement data columns.

- Group Similar Metrics
- Pin Columns (This option is only available when Group Metrics is selected.)

Show all user feedback dialog boxes (Deselect “Don’t Show in the Future” messages)

Select the checkbox in-line with **Show All Dialogs**.

Reset G4 window to default size on startup

Select G4 color theme- Dark/Light

TAKE NOTE When you apply the light theme, the Live View for HVM200, SLM Model 831C, and 831 also appear light.

Marine Mammal Protection

Select the checkbox in-line with this setting. See [7.6 Utilizing 831C Marine Mammal Protection](#).

Save/Cancel

Saves, or cancels your chosen settings and closes the tab.

A.2.7 AudCal Options

In G4, go to **Tools → Options**, and select the **AudCal Options** tab to access the following selections.

Enable AudCal in G4

Select this option to activate the Open AudCal menu item on the File menu.

Automatically open AudCal tab

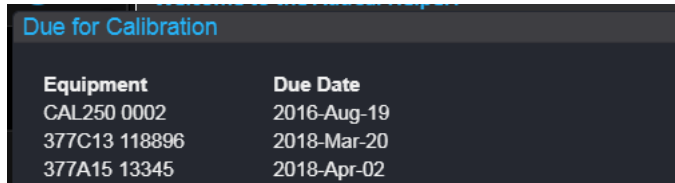
Select this option when G4 is used exclusively for AudCal.

Automatically sync AudCal database when connecting to meter

Notify of audiometers due for calibrations within [select] days

After the database is synced, audiometers due for calibration display when AudCal is opened, as shown in *Figure A-1*.

FIGURE A-1



Equipment	Due Date
CAL250 0002	2016-Aug-19
377C13 118896	2018-Mar-20
377A15 13345	2018-Apr-02

Set AudCal DB path

Leave this field blank to save the database in the default location, which is “C:\ProgramData\PCB Piezotronics\G4\Data”.

Import legacy AUDit database

TAKE NOTE This option is also available from the Tools menu.

Sync with backup

This option updates the database and creates a new backup database file.

A.2.8 Command Line Settings Options

In G4, go to **Tools → Options**, and select the **Command Line Settings** tab to access the following selections.

Use the following options on this tab to export audio records from an LDBIN file, or to export LDBIN files to another format after the file is downloaded. To export files at the time of download, see [“File Options” on page A-3](#).

Set default file name

Set default input location of LDBIN files to export

Set default output location for exported files

Restore Defaults

Save/Cancel

LEARN MORE For more information on using Command Line file extraction, see [3.7.4 "Exporting Audio Files by Using the Command Line" on page 35.](#)

A.2.9 Security Options

In G4, go to **Tools → Options**, and select the **Security Options** tab to access the following selections.

Use secure (https) communication by default

Enabling this setting requires G4 to communicate with all connected devices using HTTPS and Port 443.

To select a communication protocol HTTPS (secure) or HTTP (non-secure/standard) for the meter, an Admin user should choose a security option on the Account page as shown in [6.1.2 "Creating a New 831C Account in G4" on page 6-56.](#)

Save/Cancel

A.2.10 User Experience

Through the services available on this tab, the meter connections and auto-download from enabled meters continues, even when G4 is not running.

Step 1. To make selections on this tab, close G4 and select **Run As Administrator** when relaunching.

Step 2. In G4, go to **Tools → Options**, and select the **User Experience** tab to access the following selections:

- Monitor connections even when G4 is not running
- Allow Auto-download from available, configured meters when G4 is not running

TAKE NOTE This option is not selectable unless the “Monitor connections” option is also selected.

No other Tools → Options settings are available at this time.

A.2.11 Changing UI Language

G4 is available in Czech, French, French Canadian, Italian, German, Spanish, Russian, Portuguese, Thai, English, or in the language currently configured on your PC.

To change the language, navigate to **Tools** → **Language**, select a language, and restart G4 to complete the change.

A.2.12 Import Legacy AUDit Database Tools

In G4, go to **Tools** → **Import Legacy AUDit Databases** to make older databases accessible to G4.

A.3 Help Menu Settings

In G4, go to **Help** to view the following settings.

A.3.1 Open Help

This menu option opens the Help tab with access to descriptions of recently added or updated features.

A.3.2 About

Displays the software version, release date, and a list of currently installed licenses.

A.3.3 Manuals

Access manuals, links to online product support, and product-specific release history.

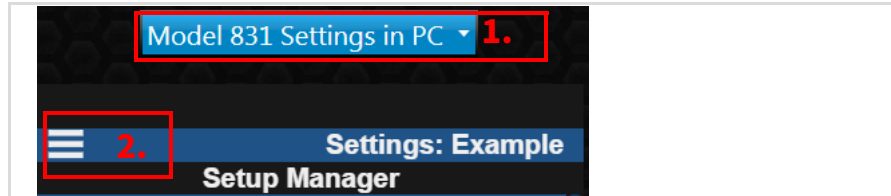
A.4 Setup Manager Settings

In G4, go to Setup Manager to access the following settings.

A.4.1 Settings in PC (Left Side of Screen)

The left side of the Setup Manager displays only setups and properties saved on your PC.

FIGURE A-2



1. Measurement Setup-Settings in PC

From the left drop-down menu, select an instrument type to access and edit measurement setups and properties stored on your PC:

- Model 831 Settings in PC
- SoundAdvisor™ Model 831C Settings in PC
- SoundExpert® LxT Settings in PC
- SoundTrack LxT® Settings in PC
- HVM200 Settings in PC

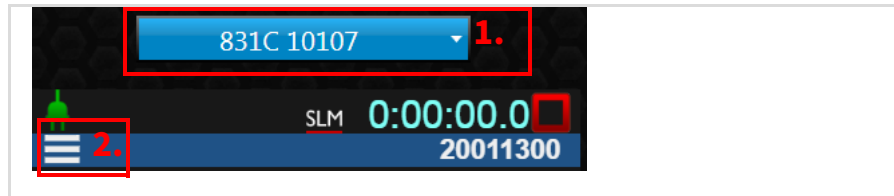
2. Measurement Setup Menu in PC

From the menu icon on the PC side, access the following measurement setup tabs: Setup Manager, General, SLM, OBA, Ln, Control, Time History, Exceedance Triggers, Event History. (Note: Depending on the features installed, your tabs may vary.)

A.4.2 Settings in Meter (Right Side of Screen)

The right side of the Setup Manager displays only setups and properties saved in your active, connected meter.

FIGURE A-3



1. Measurement Setup-Settings in Meter

When connected to one or more instruments, select an instrument from the right -side drop-down menu to access and edit information stored in that instrument.

2. Measurement Setup Menu in Meter

From the menu icon on the meter side), access the following measurement setup tabs: Setup Manager, General, SLM, OBA, Ln, Control, Time History, Exceedance Triggers, Event History.

A.5 Configuring System Properties in the Setup Manager

APPLIES TO SLM only (831, 831C, and LxT). Depending on your meter model, some settings may not be available. Model 831C is shown in this example.

To set system properties for a single instrument, complete the following process.

Before you begin:

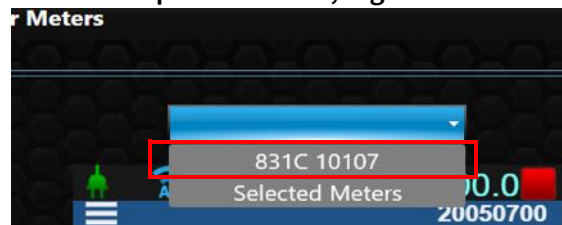
- Establish an active meter connection in G4

Step 1. Click on the name of your connected instrument in the Meters Panel. This opens the meter tab on the right.

Step 2. Click **Setup Manager** in the top toolbar.

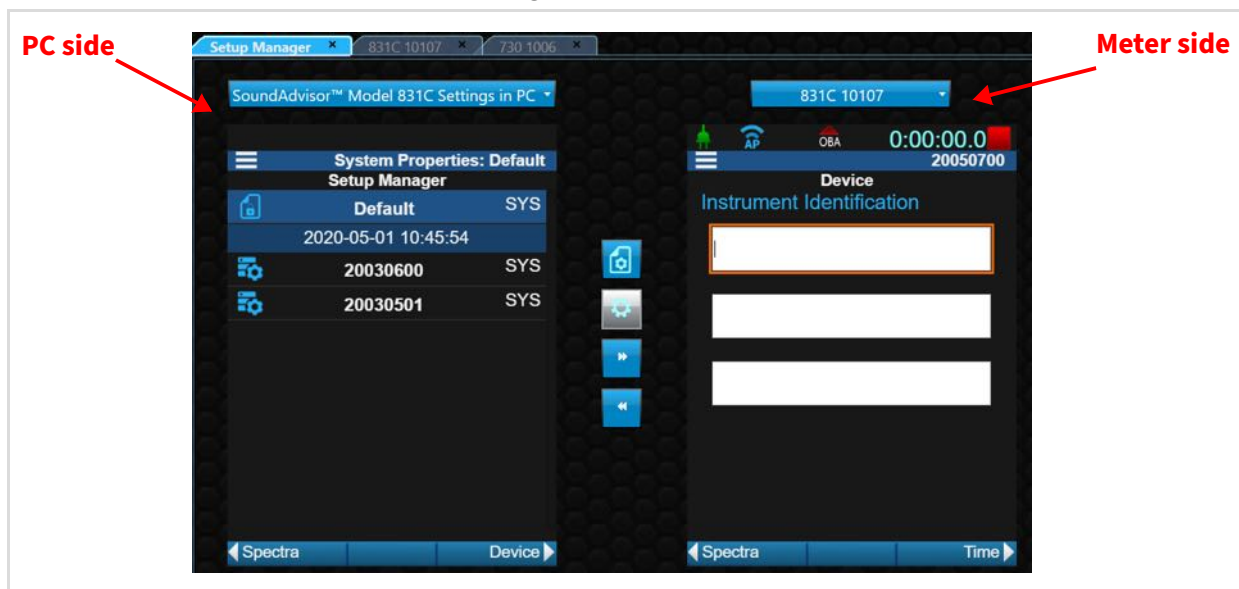
Step 3. From the blue meter selection drop-down on the right, select the name of your connected meter as shown in *Figure A-4*.




FIGURE A-4 Meter Selection drop-down menu, Right-side



Step 4. Click the **system properties button**  located in the center of the window.

FIGURE A-5 Setup Manager Views



Step 5. On the **Meter side**, click the menu icon , then choose the system property page you want to edit. You can also click the **left or right arrows**   to step through each system property page sequentially.

Step 6. Refer to the applicable section below to view available settings and resources on each page.

- [A.5.1 Setting Device Properties](#)
- [A.5.2 Setting Time Properties](#)
- [A.5.3 Setting NTP Properties](#)
- [A.5.4 Setting Power Properties](#)
- [A.5.5 Setting Meter Storage Properties](#)
- [A.5.6 Setting Locale Properties](#)
- [A.5.7 Choosing Visible/Hidden Meter Pages](#)
- [A.5.8 Display Firmware Options Properties](#)
- [A.5.9 Setting Network Properties](#)
- [A.5.10 Connecting the 831C to an Email Server](#)
- [A.5.11 \(Optional\) Setting Cloud Storage Properties](#)
- [A.5.12 Settings On the Other Properties Page](#)
- [A.5.13 Specifying Reference Spectra Properties](#)

A.5.1 Setting Device Properties

Information entered here displays in alert notification emails (when this feature is installed and enabled). Edit the text field, then click **Close** (near the bottom of the screen) to save your changes.

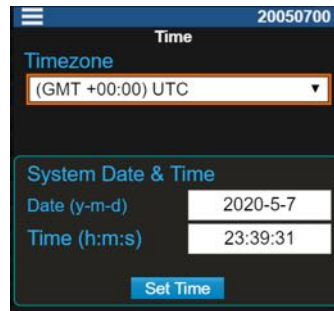
FIGURE A-6 Device Properties/ Instrument Identification



A.5.2 Setting Time Properties

Use this page to set the time zone and to sync the system date and time with the meter. Choose an option from the related drop-down menu then click **Close** (near the bottom of the screen) to save your changes. Some settings require you to reboot the meter.

FIGURE A-7 Time Properties Page



A.5.3 Setting NTP Properties

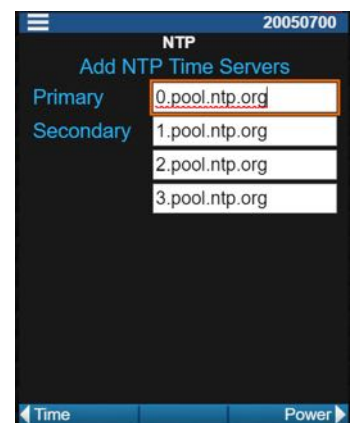
NTP (Network Time Protocol) is a clock synchronization Internet protocol intended to synchronize all participating computers to within a few milliseconds of Coordinated Universal Time (UTC).

Before designating NTP servers, set the correct Time Zone on your meter as shown in [A.5.2 Setting Time Properties](#).

For details and server addresses, see the [NIST Physical Laboratory Time Frequency Services](#) website.

FIGURE A-8 NTP Properties Page

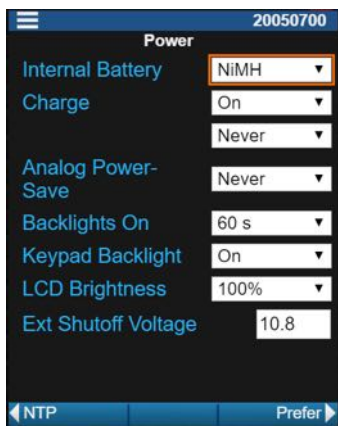
Enter the appropriate server addresses, then click **Close** (near the bottom of the screen) to save your changes. Some settings require you to reboot the meter.



A.5.4 Setting Power Properties

Choose an option from the related drop-down menu then click **Close** (near the bottom of the screen) to save your changes. Some settings require you to reboot the meter.

FIGURE A-9 Power Properties Page



Settings on this page help you prioritize how display features use battery power, and determine when the battery charges. Setting the Internal Battery type and the External Shutoff Voltage are essential safety settings for which there is no shortcut.

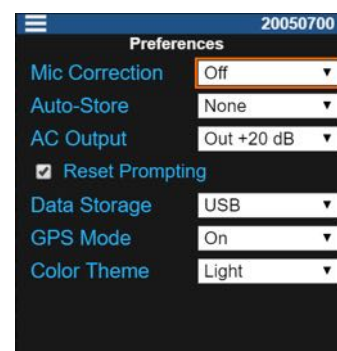
Details about when to apply each setting are available in the manual for your specific meter.

Choose an option from the related drop-down menu then click **Close** (near the bottom of the screen) to save your changes. Some settings require you to reboot the meter.

A.5.5 Setting Meter Storage Properties

Choose an option from the related drop-down menu, as shown in *Figure A-10*. Some settings require you to reboot the meter.


FIGURE A-10 Available Meter Storage Properties



Step 1. From the **Auto-Store** drop-down menu, choose one of the following values:

- None
After a measurement, the system properties do not save or prompt you to save the measurement data. Choose this setting if you plan to use an auto store option in the setup file instead.
- Prompt
After a measurement ends, the meter system properties displays a dialog where you can choose to store the measurement or cancel.
- Store
After a measurement ends, the meter system properties automatically store the data file.

Step 2. From the **Data Storage** drop-down menu, choose one of the following options:

- Internal
When the amount of internal memory reaches 10 MB available, the 831C stops automatically. If the remaining unsaved data is less than 800 kB, press **Stop/Store**  to save it. Before you begin another measurement,

download all internal data to an external drive or PC by using the Data File Manager or G4 LD Utility.

- USB

With this option, data files saved manually (and by the meter's auto-store preference) save to the inserted USB drive. If there's no USB drive available, the USB not available icon displays in the top status bar, and data files save to the 831C internal memory.

- USB Backup

With this option, data files save to both the 831C internal memory and the inserted USB drive as a backup copy. If the internal memory becomes full, data files save to the USB drive.

For each option, a meter reset is required. Click **OK** to confirm a reset.

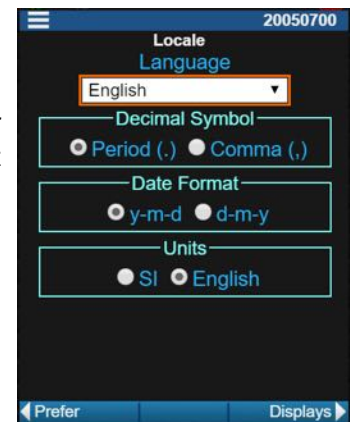
Step 3. Click **Close** to save your changes.

A.5.6 Setting Locale Properties

Step 1. On the **System Properties**→ **Locale** page, choose an option from the **Language** drop-down menu.

FIGURE A-11

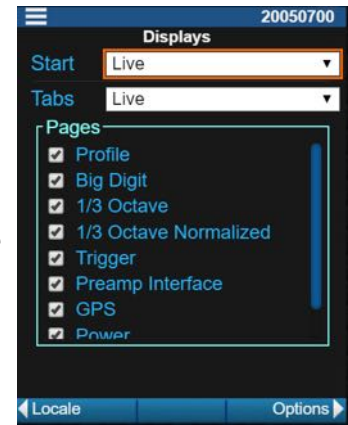
Step 2. Select the applicable settings, then click **Close** (near the bottom of the screen) to save your changes. Some settings require you to reboot the meter.



A.5.7 Choosing Visible/Hidden Meter Pages

Step 1. On the **System Properties**→ **Displays** page, choose an option from the **Start** drop-down menu.

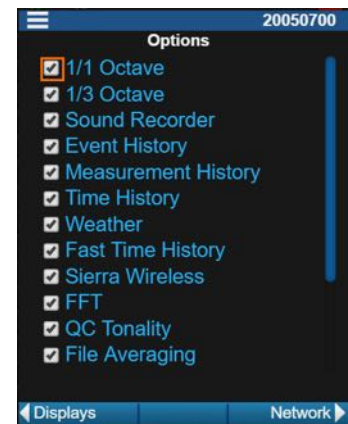
- Step 2.** Select the checkbox in-line with each page you want to visible on the Live tab.
- Step 3.** Select another item from the Tabs drop-down menu and repeat step 2 for that tab.
- Step 4.** When you've enabled/hidden pages for each item in the Tabs drop-down menu, click **Close** to save your changes. Some settings require you to reboot the meter.



A.5.8 Display Firmware Options Properties

Select the checkbox in-line with the option you want the meter to display, then click **Close** (near the bottom of the screen) to save your changes. Some settings require you to reboot the meter. Options that are not selected are hidden from the meter display.

FIGURE A-13 Which Firmware Options to Display



A.5.9 Setting Network Properties

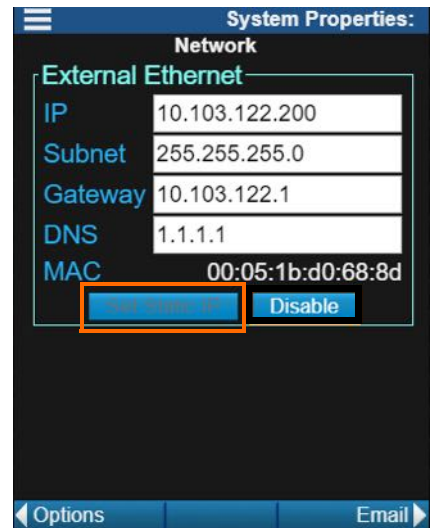
- Step 1.** On the **System Properties**→**Network** page, click **Set Static IP**.

FIGURE A-14 System Properties→Network

Step 2. Enter your **IP**, **Subnet**, and **Gateway**, or **DNS** addresses. Coordinate with your IT professional if you need more information.

TAKE NOTE If you want to return the meter to using a dynamically-assigned IP address, navigate to the **System Properties**→**Network** page, and click the **Disable** button.

Step 3. Reboot the meter for these settings to take effect.



A.5.10 Connecting the 831C to an Email Server

Before you begin:

- If using Google® G-Mail™¹, we recommend that you use 2-Step Verification. In G4 go to Help→Manuals→*831C SLM Reference Manual*→section 9.15 for more information.
- To avoid sending alert notifications to a spam folder, add the host email addresses to your contact list.
- If you want the meter to connect via a static IP address, you need to set up your network settings as shown in [A.5.9 Setting Network Properties](#).

Step 1. Enter information in each field, as shown in *Figure A-15*.

FIGURE A-15

To clear all unsent alert notifications from the meter queue, press **Clear Queue**.

Step 2. Press **Send Test Email** to verify the information.



A.5.11 (Optional) Setting Cloud Storage Properties

In this section:

1. For trademark details, see [Trademarks](#).

- [Using Dropbox for Cloud Storage](#)
- [Using SFTP for Cloud Storage](#)

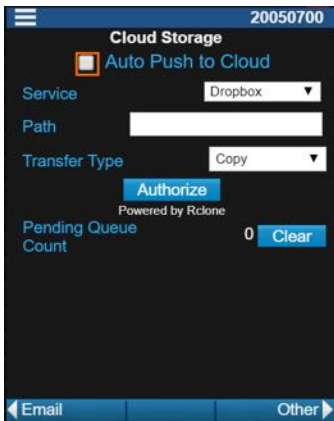
Before you begin:

- Configure an account with the cloud storage provider of your choice or determine the SFTP path for your storage location.

Step 1. If using cloud storage, navigate to the Cloud Storage page.

Step 2. Select the checkbox in-line with **Auto Push to Cloud**. We recommend that you enable this setting if you plan to “auto-store” measurement data.

FIGURE A-16



Using Dropbox for Cloud Storage

a. Enter or select values for the following items:

- **Service:** Select “Dropbox” from the drop-down menu.
- **Path:** Enter the storage location on the cloud storage server. In addition to the location you enter in the Path field, G4 creates a folder named according to the meter’s model and serial number (Ex: [Your path here]/[Meter-ModelSN]). This is where your cloud storage files are uploaded. Please note that when using Dropbox, files are stored in the following location: “Apps/G4DataFiles/[Your path here]/[Meter ModelSN]”
- **Transfer Type:** Select one of the following items from the drop-down menu:

“Move”-Files are not stored to the meter’s internal memory; only to the cloud storage location.

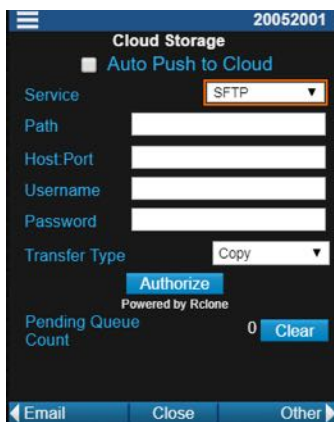
“Copy”-Files are stored both in the meter and to the cloud storage location.

b. Click the **Authorize** button, and log in to your account using the Authenticate window that appears. G4 attempts to connect to verify the service is available.

c. Complete the verification puzzle.

d. Choose **Allow** when Dropbox asks you to approve access to the “Apps > G4DataFiles” folder. When confirmed, Dropbox sends you a confirmation email.

FIGURE A-17



Using SFTP for Cloud Storage

a. Enter or select values for the following items:

- **Service:** Select “SFTP” from the drop-down menu.
- **Path:** Enter the storage location on the cloud storage server. In addition to the location you enter here, G4 creates a folder named according to the meter’s model and serial number (Ex: [Your path here]/[MeterModelSN]). This is the final location.
- **Host: Port:** Include a port number here only if your system does not use standard port 22.
- **Username**
- **Password**
- **Transfer Type** Select one of the following items from the drop-down menu:

“Move”- Files are not stored to the meter’s internal memory; only to the cloud storage location.

“Copy”- Files are stored both in the meter and to the cloud storage location.

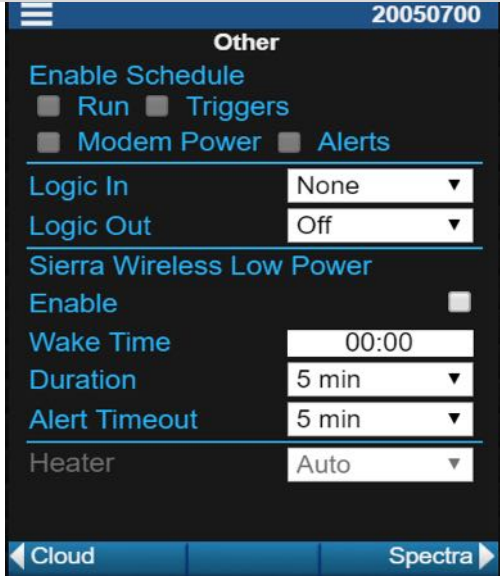
- b.** Click the **Authorize** button, and log in to your account using the Authenticate window that appears. G4 attempts to connect to verify the service is available.

Step 3. Click **Confirm** on the authentication success message to continue in G4.

A.5.12 Settings On the Other Properties Page

Select the applicable properties and values, then click **Close** (near the bottom of the screen) to save your changes. Some settings require you to reboot the meter.

FIGURE A-18 Settings On the Other Properties Page




- Enable Schedule is only available when you purchase and install firmware option 831C-SCH. This feature is accessed via the G4 Schedule/Accounts tab.
- For more information on Logic In/Out, go to Help → Manuals → SoundAdvisor 831C → 9.12 Utilizing the Logic In or Logic Out Feature.
- Sierra Wireless Low Power is discussed in the NMS system manual.


For more information on the heater option, go to **Help → Manuals → SoundAdvisor 831C → 9.13 Choosing Preamp Heater Options.**

A.5.13 Specifying Reference Spectra Properties

TAKE NOTE This feature is supported for Model 831C, 831, and LxT only.

When you apply octave band data, you have the option to choose a negative or positive A-, or C-weighting, or you can define up to four unique reference spectra as shown in the following process. To include reference spectra in setups and measurements, follow these steps.

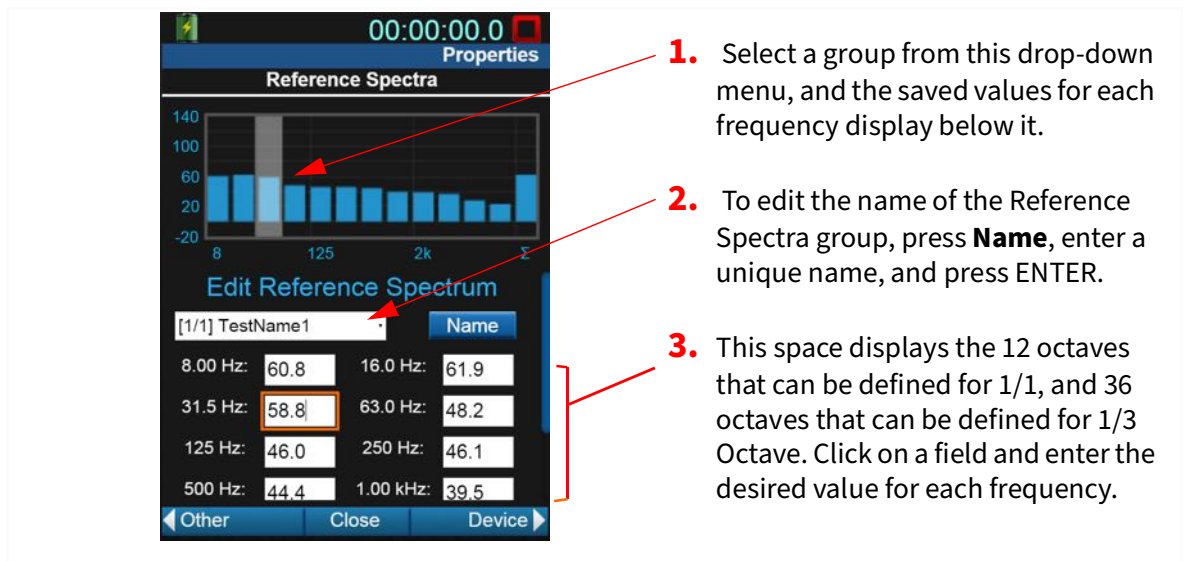
Step 1. Click the **Setup Manager** tab, and then click the **System Properties** icon .

Step 2. On the right side of your screen (meter side), click the menu icon , and select **Ref Spectra** from the drop-down menu.

Step 3. On the Reference Spectra tab, enter the desired values.

Step 4. Use any of the methods shown in *Figure A-2* to define reference spectra values.

FIGURE A-19 Setting Reference Spectra Values



Step 5. When finished editing, press **Close** and confirm it to save your changes.

TRY THIS If desired, you can view these reference values on the following meter displays:

- Live view. For details, see the *SoundAdvisor 831C Manual* → 4.1.4 About the Normalized Octave Band Page (Live Page 4).
- Overall view. For details, see the *SoundAdvisor 831C Manual* → 4.2.5 About the Normalized Octave Band Page (Overall Page).
- Overall OBA page. For details, see the *SoundAdvisor 831C Manual* → 4.2.4 About the Octave Band Analyzer Page (Overall Page).

Step 6. After making a measurement, click **Live View** in G4 to observe the spectra data on the Live Normalized Octave Band page, or the Overall OBA page.

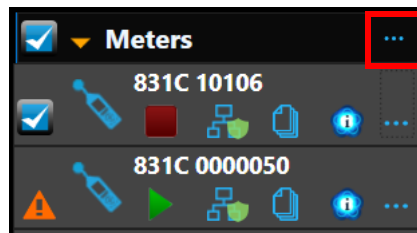
LEARN MORE For more information about using data on these pages, see Module 4 of the *SoundAdvisor 831C Manual*.

A.6 Meters Panel Settings and Options


The **Meters Panel** → **Menu** button is in-line with the Meters Panel heading. From here, access the following G4 menu items:

A.6.1 Meters Panel Menu Items


FIGURE A-20 Meters Panel Menu Icon



Add Meter

To locate this menu item in G4, click the button with 3 dots . Add Meter allows you to add a TCP/IP connected meter, such as an 831 INT-ET using a secure or unsecured connection.

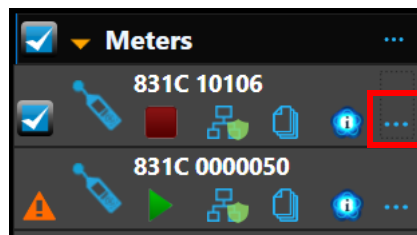
UnHide/Forget Hidden Meters

To locate this menu item in G4, click the button with 3 dots . Use this setting to open the Hidden Meters list. Click **Unhide** to make a meter discoverable in the Meters Panel. Click **Forget** to remove a meter from known meters.


A.6.2 Menu Items for Your Selected Meter

The menu for a specific meter, displays in-line with the name of your meter in the Meters Panel. Select this to access the following menu items for the selected meter only.

FIGURE A-21 Selected Meter Menu Icon



Rename Meter

To locate this menu item in G4: on the Meters Panel in-line with your selected meter, click the button with 3 dots  to access the following menu items for the selected meter only.

Click here and enter a nickname for this meter. The nickname is used throughout G4 only.

Hide Meter

To locate this menu item in G4: on the Meters Panel in-line with your selected meter, click the button with 3 dots to access the following menu items for the selected meter only.

Select this option to temporarily hide an inactive meter from the Meters Panel. Click this menu item again and select Unhide to display it once again.

Forget Meter

To locate this menu item in G4: on the Meters Panel in-line with your selected meter, click the icon with 3 dots , then select **Forget Meter** from the menu that appears.


Select this option to remove a meter that you won't be using from the Meters or Projects Panel. To reverse this action, simply connect the meter to G4 again.

Modify Connection

To locate this menu item in G4: on the Meters Panel in-line with your selected meter, click the icon with 3 dots , then select **Modify Connection** from the menu that appears.

Select this option to connect your meter to G4 by using an INT-ET, or to set a static IP address for your meter. For more information, in G4 go to **Help** → **Manuals** → **SoundAdvisor Model 831C** → Module 13.3 Setting a Static IP Address.

Upgrade Firmware

To locate the Upgrade Firmware menu item in G4: on the Meters Panel in-line with your selected meter, click the icon with 3 dots , then select **Upgrade Firmware** from the menu that appears.

LEARN MORE For help with this process, see [4.2 Upgrading Meter Firmware](#).

Upload Options

To locate this menu item in G4: on the Meters Panel in-line with your selected meter, click the button with 3 dots , then select **Upload Options** from the menu that appears.

When you purchase and receive an Options file from Larson Davis, use this menu item to enable that option in G4.

LEARN MORE For help with the process, see [4.3 Upgrading Firmware Options](#).



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G4 LD Utility Reference Manual

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