



# SOUNDADVISOR™ SOUND LEVEL METER & KITS

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 **LARSON DAVIS**  
A PCB DIVISION

[larsondavis.com/soundadvisor](http://larsondavis.com/soundadvisor)



# SOUNDADVISOR™

- Environmental noise assessment
- Noise reduction validation
- Product quality control
- Spectral noise analysis
- In-situ sound power measurements
- Code enforcement

## SOUNDADVISOR™

MODEL 831C SOUND LEVEL METER

The Model 831C SoundAdvisor is designed to make noise measurement easy. Due to its color display, connectivity, extensive software features, and small form factor the SoundAdvisor is an ideal choice for handheld operation. Attended measurements are simplified, with the ability to control and monitor data via any PC or mobile device with a standard web interface. Designed with the acoustic professional in mind, the SoundAdvisor offers an elegant solution for complex needs in an easy-to-use system.

### MEASUREMENTS SIMPLIFIED

- **Connectivity Is Key** – Cellular, WiFi, and wired networking are all available to you when using the SoundAdvisor. The meter can even serve as its own WiFi hotspot.
- **Many Platforms, Same Controls** – Whether you are setting up a test on the meter, checking in remotely from your laptop, or receiving an alert to your smartphone, you'll be working with the same interface and menus across all platforms.
- **Customizable for Your Application** – From complete outdoor monitoring kits to a low noise option to automatic event detection, the SoundAdvisor is designed to help meet your testing needs.
- **LCD Color Interface** – A full-color user interface allows you to interpret data more easily, right from the meter.



### TECHNICALLY OPTIMIZED

As with any device from Larson Davis, a thoughtful design process ensures that your needs are met, from international standards to functionality.

- IEC 61672-1:2013, ANSI S1.4-2014 Class 1 integrating sound level meter
- Real-time frequency analysis in 1/1 and 1/3 octave bands, compliant with IEC 61260:2014 and ANSI S1.11-2014 Class 1
- >120 dB dynamic range
- 2 GB internal memory, expandable by USB
- Full range AC output
- Available low noise option (831C-LOWN)

**CLASS 1**





## SOLVING YOUR CHALLENGES

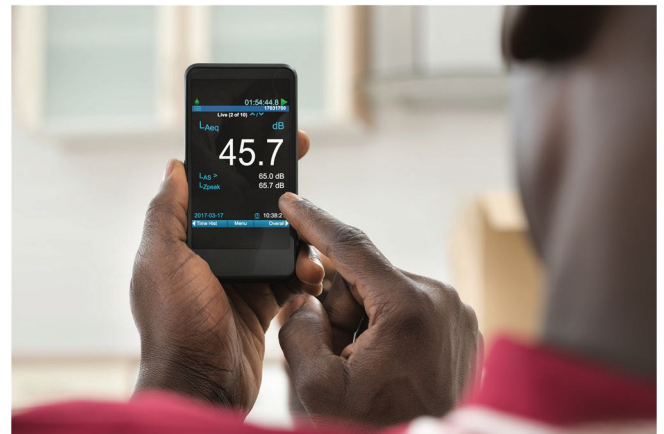
The Larson Davis SoundAdvisor Sound Level Meter is extremely versatile, performing the functions of several instruments. It puts the combined features of a precision Class 1 sound level meter, environmental noise analyzer, and a real-time frequency analyzer in the palm of your hand or on a network. It expands upon the Larson Davis tradition of delivering value, innovation, and function in a rugged, single-handed, expandable package and is backed by a 2-year factory warranty, 24-hour application support, total customer satisfaction, and accredited factory service/calibration.

### SOLUTIONS WITH YOUR METER

- **Easy Setup and Data Download** – SoundAdvisor offers setup directly on the meter’s keypad, touchscreen, or via web interface, plus streamlined export of data to Excel®.
- **ANY LEVEL™** – Never miss a key sound metric with the ability to view and store multiple time weightings (Slow, Fast, and Impulse) and frequency weightings (A, C, and Z) simultaneously.
- **Flexibility for Integration** – Designed to allow integration into a larger or customized solution, SoundAdvisor allows connection of accessories, internal clock for accurate data synchronization, and local language compatibility.

### SOLUTIONS WITH YOUR OUTDOOR KIT

- **Data on Demand** – Access the meter from any location to make modifications to the setup, view current noise levels, and modify alerts.
- **Instant Alerts** – Receive immediate notification of noise events and use the recorded sound files to evaluate the cause.
- **Long Term Remote Power** – Lithium Iron Phosphate batteries paired with a solar panel offer a continuous, sustainable means to keep your measurements running.
- **Avoid Trips To the Field** – With access to measurements, event alerts, and continuous power, you can spend time in the office, rather than traveling to reach remote locations.



Cellular



WiFi



Ethernet



USB

### CONNECTIVITY

- **Cellular, WiFi, or Wired Networking** – Select your network by choosing what to plug into the USB port. You can choose cellular by using a Sierra Wireless gateway for mobile or permanent applications, WiFi for close proximity wireless, and wired (Ethernet) for permanent locations. A USB hub can be used to support multiple USB devices.
- **Expandable USB Memory** – Easily expand the 831C memory by adding a USB memory stick. Data is written directly to the USB memory so it's always available and the data is protected if the USB memory is accidentally removed.

# SOUNDADVISOR™ NOISE MONITORING SYSTEMS

## PORTABLE NOISE MONITORING

MODEL NMS044

The SoundAdvisor™ Portable Noise Monitoring System Model NMS044 is a completely wireless solution designed to run indefinitely on solar power, allowing you to both take measurements and view them 24 hours a day, seven days a week. A rugged, portable Pelican® case houses the Model 831C sound level meter, 12 V battery, power supply, and gateway (modem) as well as a pole supporting your microphone. Wherever remote noise monitoring takes you, Model NMS044 offers a range of capabilities in a portable package.

With decades of experience in creating outdoor noise monitoring solutions, Larson Davis has created the NMS044 as a system for applications such as:

- **Consultancy Projects** – The portability of NMS044 offers an ideal solution for consultants performing noise studies for different customers in different locations on a regular basis
- **Short-Term Airport Noise Monitoring** – Airport noise is frequently a complaint for those living nearby and in landing patterns. The NMS044 allows airports to monitor noise issues as they arise in specific locations.
- **Short-Term Construction Noise Monitoring** – Monitoring during a building period is often of a short-term commitment that recurs with each new project. When one job is complete, pack up the NMS044 and move to the next location.

OPTIONS DETAIL BATTERY AND SOLAR PANEL POWER CHOICES		
Model Number <sup>[1]</sup>	Batteries	Portable Solar Panel
NMS044-SLA60	35 Ah SLA battery (lower cost)	60 W
NMS044-SLA100		100 W
NMS044-LFP60	45 Ah LiFePo <sup>[2]</sup> battery (lighter weight)	60 W
NMS044-LFP100		100 W

[1] For use in North America add "-U" to model, for Rest of World add "-E" to model  
 [2] LiFePo battery cannot be shipped by common carrier without a hazardous material shipping license

Larson Davis Noise Monitoring Systems offer you access to measurements and event alerts from any Internet connected device, allowing you to spend time in the office rather than traveling to remote locations. For the life of your system, as part of our commitment to Total Customer Satisfaction, we offer you free firmware upgrades to keep your system up-to-date as well as support from our team of trained application engineers. We know what it takes to make your measurements.



NMS044 INCLUDES	
SoundAdvisor 831C	Sound level meter, class 1
831C-LOG	Data logging firmware option
831C-ELA	Event processing option
831C-SW	USB driver for gateway
EPS044	Weatherproof outdoor hard case
COM-RV50X	4G LTE gateway
PRM2103-FF	Outdoor preamplifier with calibration check
EPS2116	Outdoor microphone and preamplifier protection
SLP001 or SLP002	60 W or 100 W solar panel
BAT019 or BAT020	45 Ah LiFePro battery or 35 Ah SLA battery
PSA039	AC power supply
Misc	Cables and accessories
Communication	4G LTE and optional WiFi or Ethernet
Software	G4 LD Utility



- **24/7 Network Access** – Log in from your computer, smartphone, or other mobile device to engage directly with the meter at your remote location. Make updates, receive alerts, change test parameters, check microphone calibration, and download data with ease.
- **Remote Power** – Either solar panel or line power offers continuous, sustainable means to keep your measurements running

- **Time Matters** – Each system automatically syncs with Internet-based time sources, keeping your data accurate with time zone or Daylight Savings Time changes
- **Real-Time Alerts** – Receive email or texts with data and sound recordings when set noise limits are exceeded. Allows quick response to compliance concerns and listening to sounds for source identification.

## PERMANENT, LONG-TERM NOISE MONITORING

MODEL NMS045

The SoundAdvisor Permanent Noise Monitoring System Model NMS045 is available in a variety of configurations to meet your long-term monitoring needs. Model NMS045 shares many of the same benefits as the Model NMS044, from 24/7 connectivity to continuous power capabilities, designed to simplify your testing. Now, the key elements of the portable system are available in a permanent setup, encased in a fiberglass enclosure mounted to a permanently placed pole. When you need to monitor the same location long-term, the NMS045 is the right choice for you. Larson Davis knows permanent noise monitoring requirements vary. We have made the NMS045 highly flexible yet still easy to use. It is ideal for applications such as:

- **Permanent Airport Noise Monitoring** – NMS045 allows airports to meet their requirements for long term noise monitoring, delivering a broad scope of measurement data continuously
- **Long-Term Construction Noise Monitoring** – When construction will be a long term long project, NMS045 is a permanent monitoring solution offering durability and protection against vandalism and damage, so your measurements can continue uninterrupted
- **Permanent City Noise Monitoring** – Whether you are monitoring near a bridge, busy street, factory, or nightclub, NMS045 helps you continuously measure noise levels, providing the data to create a more pleasant and ordinance-compliant community



CONFIGURABLE OPTIONS	
Power	Weather sensor
Battery	1 or 2 batteries (12 V) can be either <ul style="list-style-type: none"> <li>• 45 Ah LiFePo (BAT019-045)</li> <li>• 35 Ah SLA (BAT020-045)</li> </ul>
Mounting	Tilt-down pole (TR019), wooden pole, or wall
Communication	4G LTE gateway, Ethernet or WiFi
Weather sensor	Optional wind or full meteorological sensor

NMS045 INCLUDES	
SoundAdvisor 831C	Sound level meter, class 1
831C-LOG	Data logging firmware option
831C-ELA	Event processing option
831C-SW	USB driver for gateway
EPS045	Weatherproof outdoor hard case
PRM2103-FF	Outdoor preamplifier with calibration check
EPS2116	Outdoor microphone and preamplifier protection
Misc	Cables and accessories
Communication	4G LTE and optional WiFi or Ethernet
Software	G4 LD Utility



Complete multi-point factory calibrations

# USING THE SOUNDADVISOR™



## STANDARD FEATURES

- **Web Interface** – Control the SoundAdvisor and view data from any device that runs a web browser.
- **NTP Time Sync and GPS** – Network Time Protocol automatically selects the most accurate clock from several sources and synchronizes the meter for accurate measurement times.
- **External Batteries** – Power directly from 12 V batteries for efficient power usage and long run times.
- **Built-In Power Management** – Safely power the meter off based upon battery voltage. Compatible with solar systems.
- **ANY LEVEL™** – Measure levels simultaneously.
- **Run Modes** – Control how and when the SoundAdvisor will operate to best match measurement conditions. Choices include a manual mode; stop after a predetermined period of time; run continuously with automatic calibration check and file save; and defined timers.

## SUPPORTED PC SOFTWARE

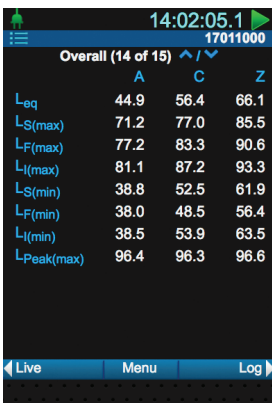
- **G4 LD Utility [INCLUDED]** – PC software that fully supports SoundAdvisor features, including sound level meter control, in-the-field firmware and option upgrades, graphical view of time history, data export to spreadsheet, and audio playback.
- **DNA [OPTIONAL]** – The analysis, post-processing, and reporting tool for sound and vibration measurements. DNA delivers enhanced analysis capability, sound playback, and graphical reporting. Graphs can be annotated and shared amongst multiple users working with DNA reader software.
- **Software Development Kit (SDK) [OPTIONAL]** – Toolkit for developing custom applications in Microsoft Windows® or Linux® for the Model 831C

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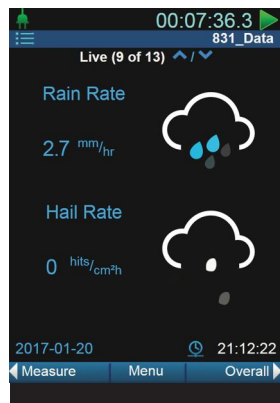
## COMMON FIRMWARE OPTIONS

When performing noise surveys, it is important to have a fully capable sound level meter at your fingertips to capture all of the essential data. SoundAdvisor is available with a variety of firmware options to help you achieve your testing goals the first time.

- **Octave Band Analysis 831C-OB3** – Simultaneous real-time measurement of 1/1 and 1/3 octave Leq, Lmax, Lmin along with broadband parameters.
- **Logging 831C-LOG** – Select Time History logging periods as short as 2.5 ms to a full 24 hours. Additional parameters such as battery condition, microphone performance, and meteorological data (831C-WTHR) can be recorded.
- **Event Detection and Measurement History 831C-ELA** – Define an Event in terms of threshold level, duration, hysteresis, and continuation period.
- **Sound Recording 831C-SR** – Record audio files in a raw or compressed format to determine the source of the noise event.
- **Direct USB Support for RV50X Gateway 831C-SW** – Connect the SoundAdvisor by USB to a wireless gateway to create a highly portable noise monitor.
- **Scheduling Tools 831C-SCH** – Take control of your meter by scheduling run times, modem usage, and triggers. Control who gets alerts and notifications and when.
- **Fast Fourier Transform 831C-FFT** – Connect your meter to a microphone or uniaxial accelerometer to perform FFT Analysis for sound and vibration. Useful in identifying key frequencies of a signal, FFT is ideal for machinery troubleshooting, tone detection, and noise source identification.
- **Reverberation Time Measurements 831C-RA** – Make Reverberation Time measurements in compliance with ISO 3382-2 or ASTM 2235-04 standards. Automatic measurement grading and quality indicators offer confidence in your measurement data.



ANY LEVEL parameter display



831C-WTHR Datalogging

# SOUNDADVISOR™ OPTIONS

## OCTAVE BAND ANALYSIS

831C-OB3

In many applications, it is important to acquire both the broadband level and spectral content of noise data. With spectral information, the source and content of the measured level can be better understood. Constant percentage bandwidth filters (1/1 or 1/3 octave) best approximate human perception of sound.

Option 831C-OB3 firmware enables simultaneous real-time measurement of 1/1 and 1/3 octave Leq, Lmax, Lmin along with all the ANY LEVEL™ broadband parameters. Option 831C-OB3 is compliant with IEC 61260:2014 Class 1 and ANSI S1.11-2014 Class 1 standards covering the entire frequency range of human hearing: 6.3 Hz to 20 kHz for 1/3 octave bands.

When 831C-OB3 is combined with Time History Logging (831C-LOG) or Automatic Event Detection and Event History (831C-ELA), it is possible to review the frequency content of logged data or specific events.

## LOGGING

831C-LOG

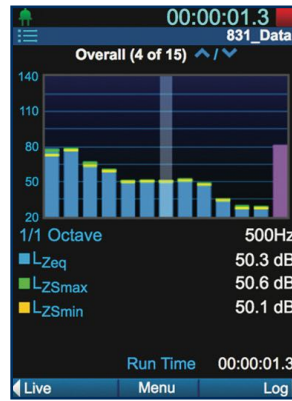
The Model 831C can be used to record the evolution of sound pressure level over time as a Time History (TH). The Time History is then used to profile the observation period, which can vary from several seconds to continuous monitoring.

With the addition of Time History Logging Firmware (831C-LOG), users can pre-select from logging periods as small as 20 ms to a full 24 hours. Parameter selections consist of familiar acoustic metrics as well as non-acoustic metrics, such as battery condition, outdoor microphone performance, and meteorological data (831C-WTHR).

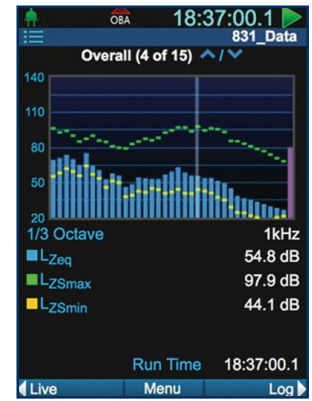
### LOGGED FOR OBA FILTER

(Selected Frequency and Time Weighting Parameters for 1/1 and 1/3 Octaves)

- Leq
- Lmin
- Lmax
- SPL



1/1 Octave Display



1/3 Octave Display

### LOGGED FOR A, C, AND Z WEIGHTINGS (VARIABLE W)

- Lweq
- LwImax
- LwS
- Lwpeak
- LwSmin
- LwF
- LwSmax
- LwFmin
- LwI
- LwFmax
- LwImin

### OTHER PARAMETERS

- LCeg - LAeg
- External Power
- Max Temp
- LIeg - LAeg
- Wind Speed
- Min Temp
- Statistics (Ln)
- Gust Direction
- Avg Humidity
- Battery
- Gust Speed
- Max Humidity
- Temperature
- Avg Temp
- Min Humidity

## MEASUREMENT HISTORY

831C-ELA

While Time Histories are typically logged at one sample per second, longer-term averages are often useful to see trends, e.g., 10 minute or hourly averages. 831C-ELA firmware enables Measurement History (MH) and logs these parameters similar to Time History (TH) over a longer interval time. MH and TH can run together simultaneously or independently.

Data for each measurement or location is saved in a unique MH record and may include the Leq, Lmax, Lmin, SPL, and statistical distribution of the SPL (Ln). A complete set of MH records then can be stored in a single measurement that keeps all the noise survey data in a single file. Finally, an automated sound recording at the beginning of each MH period can be achieved with 831C-SR firmware.

DATA	PARAMETERS		NOTES	
Averages	Leq	LE		
Sound	Lmax	Lmin	Lpeak	
Occurrence Date & Time	Lmax	Lmin	Lpeak	
Temperature	Avg	Max	Min	
Relative Humidity	Avg	Max	Min	
Wind Speed	Avg	Max	Min	
1/3 Octaves	Leq	Lmax	Lmin	w/ 831C-OB3
1/1 Octaves	Leq	Lmax	Lmin	w/ 831C-OB3
Date & Time	Date	Time		
Measurement Time	Run Duration	Run Time	Pause Time	
GPS	Lat	Lon	Elevation	w/ 831-GPS
Other	Exceedance	6 Ln		

## AUTOMATIC EVENT DETECTION AND ALERTS

831C-ELA

In the Model 831C, events are defined as one of the following:

- Exceedance of a fixed threshold level for a minimum duration
- Exceedance of a dynamic threshold level for a minimum duration
- External trigger set by the digital input signal

With 831C-ELA firmware, event definition is defined by you – including threshold level, duration, and event continuation period when the SPL drops below the threshold level for a specific period of time. Triggering status icons identify event progression and qualification (see graph above).

The Model 831C can automatically generate an email alert to provide fast notice of any noise exceedance. The event alerts can be sent to a user configurable list of email addresses or by text message using an email to MMS gateway. Email event sound recording in conjunction with option 831C-SR.

ADDED FUNCTIONALITY WITH 831C-ELA OPTION	
With Option	Description
831C-OB3	Frequency analysis of the event
831C-LOG	Record an independent time history of the event including filters when combined with 831C-OB3
831C-SR	Record event audio in .wav or compressed file

## SCHEDULING TOOLS

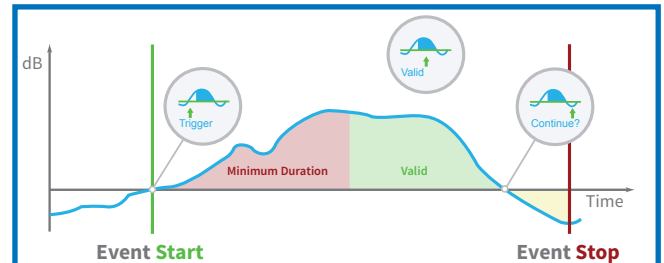
831C-SCH

Data and alerts are often needed only on certain days or specific times. With 831C-SCH firmware, schedule run/stop times, modem usage, and alert type and recipient. Together with the optional event feature, 831C-ELA, trigger levels and alert recipient can be adjusted for time of day or day of the week. In conjunction with 831C-SW firmware, schedule power to the modem - conserve power when the modem is not needed.

With the graphical interface in G4 LD Utility software, easily configure SoundAdvisor to measure and report only what you need, even when those needs change.



Example of an 831C-SCH schedule with daily Run/Save times (green), two alert recipients on weekdays (orange), three alert levels (red), a special weekend schedule, and the modem “waking up from” low power consumption mode every weekday evening (purple).



Event Definition on the SoundAdvisor

## CELLULAR COMMUNICATION

831C-SW

We understand how beneficial it can be to have access to your noise monitor at any time of the day. Due to the remoteness or need to setup contracts and get permits, connecting a noise monitor to a wired network or main power just isn't feasible.

With option 831C-SW you can connect the SoundAdvisor by USB directly to a Sierra Wireless gateway and get a highly portable noise monitor that can easily be powered by battery and/or solar. We recommend the Sierra Wireless model RV50X because of its low power usage and industrial design.



## MEASURED SOUND RECORDING

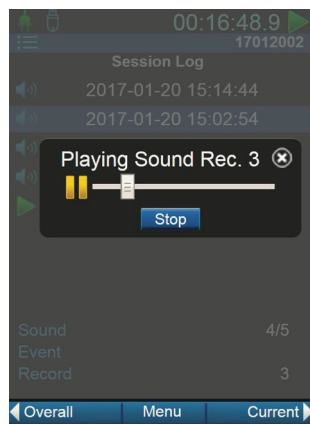
831C-SR

Measuring sound levels is a well-accepted way to objectively quantify the noise radiated by a product in an environmental survey. Rather than rely simply on the objective data, why not record a sample of the sound to truly determine the source of the noise?

The 831C-SR option enables the SoundAdvisor to record audio files in a raw format (.wav) for lossless recording or with .ogg compression to reduce file size. Listen live or to recordings from the meter, or listen to recordings from G4 LD Utility Software or LD Atlas Mobile App. Record audio of automatically triggered events, at the beginning of each Measurement history, manually, or with logic level input.



A recording icon (●) will turn red on the Model 831C display when recordings are being made.



Listen to audio recordings while they are still on the 831C

## FFT SOUND AND VIBRATION ANALYSIS

831C-FFT

When higher frequency resolution than 1/3 octaves is needed, FFT Frequency Analysis Model 831C-FFT is the ideal solution. The narrow-band filtering provided by Fast Fourier Transform (FFT) Analysis of single-channel acoustic or vibration sources is useful for machinery analysis, product development, source detection, tonality measurement, fault analysis, and vibration troubleshooting. Offering precision spectral analysis of signals, FFT acquisition settings can be adjusted to visualize specific acoustic and vibration phenomena. Using FFT on the handheld SoundAdvisor Sound Level Meter is a convenient way to achieve an objective measurement of tones or vibration phenomena in the field.

Tonality Standards Supported

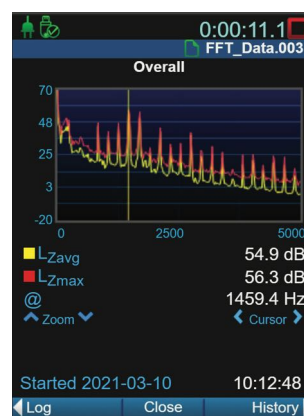
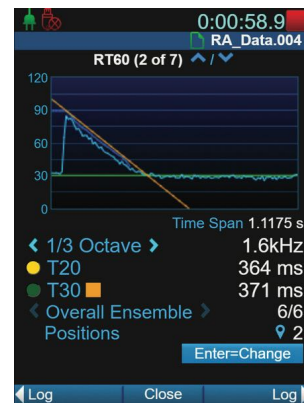
- ISO/PAS 20065:2016
- ISO 1996-2:2007 Annex C
- ISO 1996-2:2017 (ISO/PAS 20065)

## REVERBERATION TIME

831C-RA

Reverberation times are used in architectural acoustics applications ranging from simple experimental reverberation time determination for room performance, to calculating absorption coefficients for material performance. SoundAdvisor with 831C-RA measures decays and then computes reverberation time according to ISO or ASTM standards. When using the Interrupted Noise method, the SoundAdvisor not only triggers the data acquisition, but its built-in Noise Generator can be used to drive the omni-directional sound source. Integrated Impulse method is also available. Measurements can be made using 1/3 octaves or full octave bands. The meter computes the decay times automatically, shows the T20 and T30 spectra superimposed, computes seven (7) quality indicators per frequency, and grades the measurement data.

The resulting data and decays can be exported to the G4 LD Utility or can be processed further in DNA for reverberation time, absorption coefficients, or sound insulation calculations.



Option 831C-FFT

# SOFTWARE SOLUTIONS

## G4 LD UTILITY

The G4 LD Utility program is easy-to-use Windows® software for the Model 831C providing configuration set-up, data download, and remote access.

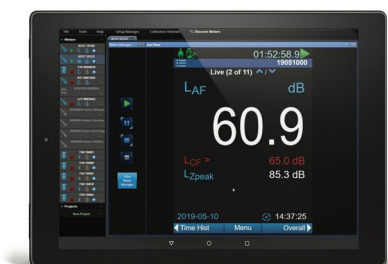
- Store measurement set-ups for use on one or more Sound Level Meters
- Download data to PC and export to Excel® for further analysis
- Connect to 831C-based meters and noise monitoring systems via USB, Ethernet, or cellular connection
- Manage multiple noise meters and systems with simple and convenient project and file management
- View time history data in graphical format
- Listen to audio recordings
- View Sound Level Meter screen on your PC – ideal for presentations or training

## DATA NAVIGATION AND ANALYSIS SOFTWARE

SWW-DNA

Data Navigation and Analysis Software (SWW-DNA) is designed to analyze and report environmental noise, worker exposure, and architectural acoustic measurements with an interactive graphical interface. With many sound studies being similar in nature, a drag-and-drop feature places new data in an existing layout that allows for quick, professional-looking reports. DNA can either retrieve existing files from Model 831C, or can drive the 831C as a data acquisition front-end.

- Remote network access
- Interactive graphs with data: zoom, overlay Time History and spectrogram with playable event sound recordings, advanced event analysis, mapping, industrial hygiene, and more.
- Template-based operation with customizable options



The Model 831C has numerous on-board capabilities, yet often further processing, visualization, or reporting needs exist. For this purpose the Model 831C can be used as a portable instrument and retrieve the data, work as a data acquisition front-end, or in combination with other products.



The Software Development Kit is available for advanced users looking to integrate the SoundAdvisor into an existing application.

## SOFTWARE DEVELOPMENT KIT

831C-SDK

Build your own software or integrate the SoundAdvisor into your existing application using our Software Development Kit (SDK).

The Software Development Kit for the Model 831C interfaces smoothly and directly with Microsoft® or Linux® programming environments supporting Excel®, HTML5, Javascript, Visual C++, or C# programming languages. The SDK provides functionality to connect and fully control the Model 831C over USB, network, or wireless gateway (modem) connections. File download is supported and the SDK includes documentation and software for extracting data from files. With JSON (JavaScript Object Notification), the SDK makes it easy to create modern, web-based applications with minimal effort.

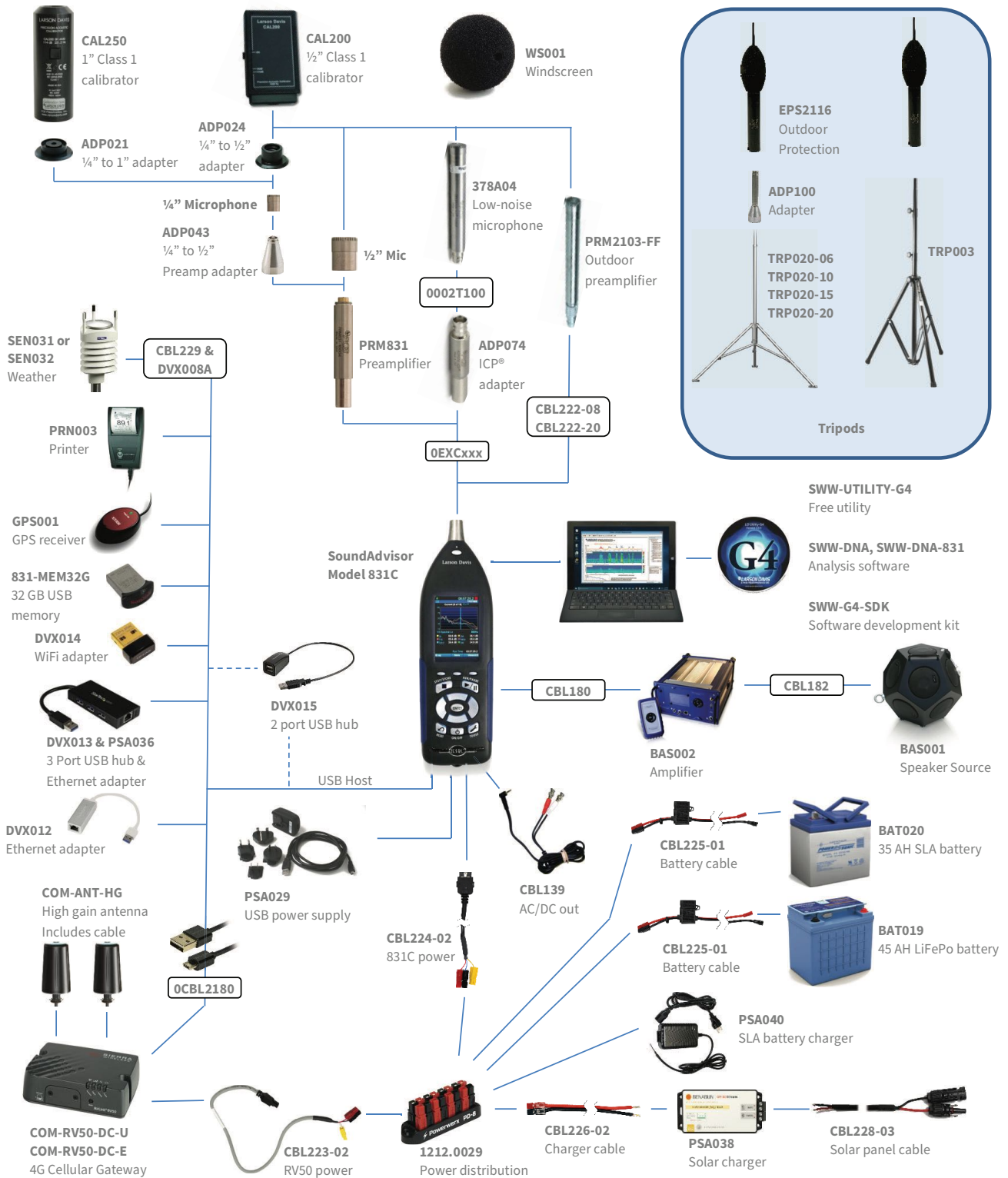
## MOBILE DEVICE APPLICATION

LD Atlas™ App

LD Atlas™ app is a free mobile app for use with your new Larson Davis equipment. Install LD Atlas on your phone or tablet – available for both iOS® and Android™ – and connect to your SoundAdvisor. Use LD Atlas to set up measurements and see a live view of your meter.

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# SYSTEMS AT-A-GLANCE





## STANDARDS, FEATURES, AND SPECIFICATIONS

STANDARDS MET BY MODEL 831C	
The Model 831C meets the specifications of the following standards:	
<b>Sound Level Meter Standards</b>	
IEC61672-1 Ed. 2.0 (2013) Class 1	
IEC60651 Ed 1.2 (2001) and IEC60804 (2000-10) Type 1	
ANSI S1.4-2014 Class 1	
ANSI S1.43-1997 Type 1	
<b>Octave Filter Standards (Option 831C- OB3)</b>	
IEC61260 Ed. 2.0 (2014) Class 1	
ANSI S1.11-2014 Class 1	
<b>Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use</b>	
2014/35/EU Low Voltage Safety Directive	
IEC 61010-1 Ed. 3.0 (2010-06)	
2011/65/EU RoHS Directive	
<b>Sound Level Meter Specifications</b>	
Averaging (Integration Method)	Linear or Exponential
Time Weightings	Slow, Fast, or Impulse
Frequency Weightings	A, C, and Z
Peak Detector Frequency Weighting	A, C, or Z
Gain	0 dB or +20 dB
Sample Rate	51,200 Hz
Peak Rise Time	30 $\mu$ s
Metrics Measured	Leq, Lmax, Lmin, Lpeak, Ln (6 values), LDN, LDEN, LCEq – LAeq
<b>Physical Characteristics</b>	
Length with Microphone and Preamp	11.35 in 29.0 cm
Length, Instrument Body Only	8.8 in 22.4 cm
Width	2.8 in 7.1 cm
Depth	1.6 in 4.1 cm
Weight with Batteries, No Preamp or Microphone	17.3 oz 490 g
GENERAL SPECIFICATIONS	
Reference Level	114.0 dB re. 20 $\mu$ Pa
Reference Level Range	Single large range for SLM measurements
Reference Frequency	1000 Hz
Reference Direction	0° is perpendicular to the microphone diaphragm
Operating Temperature	$\pm 0.5$ dB error between -22°F to +122 °F (-30 °C to 50 °C)
Storage Temperature	-40 °F to 176 °F (-40 °C to 80 °C)
Humidity	$\leq \pm 0.5$ dB error from 10% to 99% relative humidity (non-condensing)
Equivalent Microphone Capacitance	12 pF
Effect of an Extension Cable	None up to 200 ft (61 m) with EXCxxx cable
Approvals	CE, ROHS, WEEE
Extended Weather Options	-40 °F to +158 °F (-40 °C to +70 °C) operation with CER-831-E
<b>Resolution Specifications</b>	
Levels	0.1 dB
Elapsed Time	0.1 s
Real Time Clock	1 s
<b>Integration Time</b>	
Time Averaged Levels and Sound Exposure Levels	
Minimum	0.1 s
Maximum with Daily Autostore Enabled	Unlimited
Maximum with Daily Autostore Disabled	> 23 days with error < 0.5 dB

GENERAL SPECIFICATIONS (CONTINUED)	
<b>Ln Statistics</b>	
Number of Selectable Parameters	6 in xx.xx% format
Spectral Statistics	Requires Octave Analysis option (831C-OB3)
<b>Markers</b>	
Number of Markers	10
Prenamed Markers	Truck, Automobile, Motorcycle, Aircraft, Exclude
<b>Back Erase</b>	
Back Erase Time	5 or 10 s
<b>Measurement Control Modes</b>	
Available Modes	Manual Stop, Timed Stop, Stop when Stable, Continuous, Single Block Timer, Daily Block Timer
Timed Stop	Time in hh:mm:ss
Stop When Stable	Delta level in xx.x dB and time in hh:mm:ss
Continuous with Daily Auto-Store	1, 2, 4, 6, 12, 24, 48, 96 or 144 files per day, automated file numbering "yymmddnn.LD0"
Restart after Power Failure	Automatic if powered by 12 VDC and continuous run mode
Single Block Timer	Start date and time to end date and time
Daily Block Timer	Up to 3 blocks between each start and end date
<b>Clock Stability</b>	
< 1 sec in 24 hours, at 75 °F (+24 °C)	
< 10 sec in 30 days, at -40 °F to +158 °F (-40 °C to +70 °C)	
< 1 s when using NTP	
<b>Microphone Input</b>	
Connector	Latching 5-pin connector
Input Impedance	100 k $\Omega$ and 300 pF
Full Scale Input (0 dB gain)	14 Vpeak
ICP Current (requires ADP074)	4 mA
<b>AC/DC Output</b>	
Jack	2.5 mm (32 in) female
AC Output Voltage Range	$\pm 14$ Vpeak (preamp output)
	$\pm 2.1$ Vpeak with 0, 20 or 40 dB gain (for LINE inputs)
AC Output Recommended Load	10 k $\Omega$ or greater
DC Output Voltage Scale	10 mV per dB, 0 V for 0 dB, 1 V = 100 dB
DC Output Frequency & Time Weighting	Follows SLM Settings: A, C, or Z and S, F, or I
<b>Power Supply</b>	
Batteries	4-AA (LR6) NiMH, 1.5 V Lithium or Alkaline cells (supplied with 2500 mAh NiMH)
External Power (5 V from USB)	USB Mini-B connector to * USB interface from computer * PSA029 AC to DC power adaptor
External Power	I/O connector: 10 to 25 VDC (Use cable CBL140)
Operating Time (with power save options)	> 18 hours (1.5 V Lithium batteries)
	> 8 hours (Alkaline or NiMH batteries)
Power Consumption with PRIM831	1.1 W (backlight off, running)
	$\leq 2$ W (with DVX012)
	5 W (maximum)
<b>Memory Retention</b>	
Data Memory	Non-volatile flash memory, backup performed every minute
Real-time Clock	$\geq 1$ year with batteries removed

## GENERAL SPECIFICATIONS (CONTINUED)

Broadband Noise Levels				
Self-generated Electrical Noise	0 dB Gain		20 dB Gain	
	Typical (dB)	Max (dB)	Typical (dB)	Max (dB)
Weighting				
A	10	12	6	9
C	13	16	12	15
Z	22	25	22	25
Self-generated Total Noise	0 dB Gain		20 dB Gain	
	Typical (dB)	Max (dB)	Typical (dB)	Max (dB)
Weighting				
A	16	19	16	17
C	17	20	16	19
Z	23	26	23	26

Note: Combination of the electronic noise and the thermal noise of the 377B02 microphone at 68 °F (20 °C) measured in a sealed and vibration isolated cavity with an averaging time of 60 seconds. Electronic noise of the instrument with an ADP090 (12 pF) in place of the microphone highest anticipated self-generated noise.

## MODEL 831C WITH PRM831 AND 377B02 MICROPHONE

		0 dB Gain		20 dB Gain	
Dynamic Range	A	17 dB - 140 dB	16 - 120 dB		
	C	17 dB - 140 dB	17 - 120 dB		
	Z	24 dB - 140 dB	23 - 120 dB		
Measurement Range <sup>(1)</sup>	A	24 dB - 140 dB	20 - 120 dB		
	C	26 dB - 140 dB	25 - 120 dB		
	Z	36 dB - 140 dB	33 - 120 dB		
Peak Range	A	65 dB - 143 dB	44 - 123 dB		
	C	66 dB - 143 dB	45 - 123 dB		
	Z	68 dB - 143 dB	59 - 123 dB		
Max Level	SPL	140 dB	120 dB		
	PEAK	143 dB	123 dB		

[1] As defined in IEC 61672-1. Microphone and electrical self-noise included

## OPTIONS AT-A-GLANCE

SPECTRAL ANALYSIS	
<b>Octave Analysis (with Option 831C-OB3)</b>	
1/1 Octave Filters	8 Hz to 16 kHz
1/3 Octave Filters	6.3 Hz to 20 kHz
<b>Octave Analysis Parameters</b>	
Filters	None, 1/1 octave, 1/3 octave, or 1/1 and 1/3 octaves
Frequency Weighting	A, C, or Z (independent of broadband weighting)
Maximum Spectrum	Maximum in each band or Spectrum at broadband Lmax
Spectral Statistics	6 percentiles per filter
Octave Band Logging Capability	Time History (see 831C-LOG) Measurement History (see 831C-ELA) Event History (see 831C-ELA)
<b>Normalized Spectrum</b>	
View Modes	SPL, Leq, Lmax, or Lmin; absolute or relative
Predefined Curves	A, C, -A, -C
User-Defined Curves	Four named for 1/1 octave and four for 1/3 octaves bands
<b>FFT Analysis (with option 831C-FFT)</b>	
FFT Lines	400, 800, 1600, 3200, & 6400
Bandwidth (Hz)	100, 200, 500, 1k, 2k, 5k, 10k, & 20k
Window	Hanning, Flat-top, and Rectangular
Overlap	Fixed 33%

## SPECTRAL ANALYSIS (CONTINUED)

Units	dB re 20 uPa, m/s <sup>2</sup> , cm/s <sup>2</sup> , mm/s <sup>2</sup> , g, ft/s <sup>2</sup> , in/s <sup>2</sup> , custom
Y-axis	Linear or log
Cursor	Max tracking with harmonic cursors
Supported Sensors	Microphone or ICP® accelerometer (with ADP074)
Integration	Frequency domain to velocity and displacement
Acoustic Weighting	A, C, or Z (none)
<b>PROFILING WITH TIME HISTORY LOGGING, MEASUREMENT HISTORY, AND EVENT HISTORY</b>	
<b>Time History Logging (with option 831C-LOG)</b>	
Record Period	Selections from 2.5 ms to 24 hr
Logging Parameters	Any combination of available broadband and spectral AnyData plus non sound metrics
<b>Measurement History Logging (with option 831C-ELA)</b>	
Interval	1 min to 99 hr
Logging Parameters	Same as Overall Measurements Ln Statistics + Spectral Ln (if OB1 or OB3 enabled)
Sound Record Tagging	At start of each interval (required to enable SR)
Logging Period	20 ms to 5 s (independent of TH or MH)
Logging Parameters	Leq, Lmax, Lpeak, Date and Time, Duration, Exposure in dB and Pa2s, and available spectral Leq and maximum. Event Time History is also available with broadband and spectral levels.
Sound Record Tagging	Required to enable SR at 8 ksp/s or 16 ksp/s
SEL	Yes (LAE)
<b>Sound Recording (831C-SR)</b>	
Data Format	Mono wave file (.wav) or compressed (.ogg)
Listening Options	On Model 831C using USB headset with Utility program, DNA, or using standard wave file player
Sample Rate	8, 16, 24, 48, or 51.2 ksp/s
Storage Requirement	1 MB/min at 8 ksp/s to 6 MB/min at 48 ksp/s for .wav file
Sound Recording Modes	Manual, coupled to marker, at measurement interval start, upon event
Pretrigger	Variable depending upon sample rate; up to 60 s
Duration	Max 9999 s
Sound Streaming	Streaming to host
<b>ROOM AND BUILDING ACOUSTICS</b>	
<b>Reverberation Time (with option 831C-RA)</b>	
Methods	Impulse Excitation and Interrupted Noise
Filters	1/1 (63 Hz to 8 kHz) and 1/3 (50 Hz to 10 kHz)
Sample Time	2.5, 5, 10 or 20 ms
Measurements	T20, T30 and ISO 3382-2 quality indicators
<b>WEATHER (METEOROLOGICAL PARAMETERS)</b>	
<b>Combined Meteorological Unit (with sensor SEN031)</b>	
Measured Parameters	Wind speed and direction, temperature, relative humidity, rain, and hail
Sensor Model	SEN031 (requires CBL167 & DVX008A)
Sensor Noise Level	30 dB A-weighted at 2 ft (61 cm)
<b>Ultrasonic Anemometer – Wind Sensor (with sensor SEN032)</b>	
Measured Parameters	Wind speed and direction
Sensor Model	SEN032 (requires CBL167 & DVX008A)
Sensor Noise Level	30 dB A-weighted at 2 ft (61 cm)
<b>COMMUNICATION OPTIONS</b>	
<b>Direct USB to Sierra Wireless (831C-SW)</b>	
Sierra Wireless RV50(X)	4G cellular gateway
Power	3.2 W with power save configuration

## ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
<b>Sound Level Meter</b>	
831C-FF	SoundAdvisor Model 831C sound level meter with Class-1 free-field, pre-polarized precision condenser microphone (50 mV/pa), preamplifier (PRM831), accessory kit (831C-ACC)
831C-FF-KIT1	831C-FF with DVX012 and firmware options 831C-LOG, 831C-OB3, 831C-ELA & 831C-SR
831C-FF-KIT2	SoundAdvisor Model 831C-FF with firmware options 831C-LOG & 831C-OB3
831C-RI	SoundAdvisor Model 831C sound level meter with Class-1 random-incidence pre-polarized condenser microphone (50 mV/Pa), preamplifier (PRM831), accessory kit (831C-ACC)
831C-RI-KIT1	SoundAdvisor Model 831C-RI with DVX012 and firmware options 831C-LOG, 831C-OB3, 831C-ELA & 831C-SR
831C-LOWN	SoundAdvisor Model 831C sound level meter with 378A04 low noise, ICP microphone and preamplifier (450 mV/Pa), accessory kit (831C-ACC) and ICP adapter (ADP074)
831C	SoundAdvisor Model 831C sound level meter for environmental and community noise without microphone or preamplifier
<b>Firmware Options</b>	
831C-LOG	Upgrade Model 831C with logging of time histories with periods from 20 ms to 24 hr
831C-OB3	Upgrade Model 831C with Real-time 1/1 & 1/3 octave filter set
831C-ELA	Upgrade Model 831C with event, interval, and daily histories logging
831C-SR	Upgrade Model 831C to record compressed and uncompressed audio
831C-MSR	Upgrade Model 831C to add Measurement History and sound recording
831C-SW	Upgrade Model 831C to add direct USB communication with Sierra Wireless RV50(X) gateway
831C-SCH	Upgrade Model 831C to add scheduling for measurements, communication options, and alert levels
831C-ELX	Upgrade Model 831C to add the exceedance based logging features of 831C-ELA plus the integrated scheduling features of 831C-SCH
831C-FFT	Upgrade Model 831C to add FFT Analysis and tonality assessment
831C-RA	Upgrade Model 831C to add Reverberation Time measurements and analysis
<b>Calibration</b>	
CER-831	ISO 17025 compliant calibration and certification of 831C (SLM, preamplifier with microphone) and 831C-RPT
CER-831-E	Environmental certification Model 831C for [-40,+158] °F ([-40,+70] °C) range. Includes calibration of 831C and PRM831, 831-RPT, environmental test of microphone. Microphone calibration not included.
CER-MIC	Calibration and certification for microphone
CER-PRM2103-E	Environmental Certification Model PRM2103 for [-40,+158] °F ([-40,+70] °C) range; (no microphone certification); environmental test of microphone
831C-RPT	Model 831C Sound Level Meter certification test report. Certificate for SLM, preamplifier, and microphone.

## ORDERING INFORMATION (CONTINUED)

<b>Microphones and Preamplifiers</b>	
377B02	0.5inch free-field, prepolarized condenser microphone, typical sensitivity = 50 mV/Pa, 3.15 Hz to 20 kHz (±2 dB)
377C20	0.5 inch random incidence, prepolarized condenser microphone 50 mV/Pa, 3.15 Hz to 16 kHz (±2 dB)
377C10	0.25 inch pressure, prepolarized condenser microphone typical sensitivity = 1.6 mV/Pa, 4 Hz to 70 kHz (±2 dB)
378A04	ICP® Low noise microphone & preamplifier system, 6.5 dB A-weighted typical noise
ADP043	0.25 inch microphone to 0.5 inch preamplifier adaptor
PRM831	Model 831C Sound Level Meter preamplifier for 0.5 in free-field or random incidence prepolarized microphones
PRM2103-FF	Permanent Outdoor Preamplifier with free-field microphone with Remote Calibration Check, humidity reading and heater, for pre-polarized microphone. Random or 90 degree response can be selected on the Model 831C.
<b>Software</b>	
SWW-DNA	Basic software and dongle (USB) for evaluation and reporting of data downloaded from the Larson Davis instruments, requires an instrument driver
SWW-DNA-831	Instrument driver for instrument control, set-up, live display, data translation, and data download for Model 831C & 831 sound level meter
SWW-DNA-EV	DNA option for Events tracking: PNL and PNLT Event Time History and EPNL Event
SWW-DNA-BA	DNA software Building Acoustics, allows calculation of transmission loss and sound insulation calculations
SWW-DNA-REMOTE	DNA software for monitoring a remote location when using 820, 824, 870, or 831C Models. Uses modem connection for communication and data download.
<b>Calibrators</b>	
CAL200	Class 1 acoustic calibrator with user selectable output of 94 or 114 dB at 1 kHz. ½ inch opening (no adaptor)
CAL250	Class 1 microphone calibrator, output 114 dB at 251.2 Hz. 1 inch opening with ½ inch (ADP019) adaptor. ¾ inch (ADP020) and ¼ inch (ADP021) adaptors available



## ORDERING INFORMATION (CONTINUED)

### Noise Monitoring System Components

<b>COM-RV50X</b>	Sierra Wireless Model RV50X cellular gateway to add Internet connectivity through cellular network to 831C. Choose suffix NA/EMEA for North America, Europe, Middle East & Africa. Choose suffix APAC for rest of world. Requires option (831C-SW for direct USB connection).
<b>EPS030-831</b>	Case for Model 831C Sound Level Meter including (1) 21 Ah battery, charger (PSA032), internal preamplifier cable (CBL141), and power distribution cable (CBL151)
<b>EPS036-831</b>	Case on wheels (CCS035) to enclose Model 831C with (2)x 21 Ah batteries (BAT011). Includes CBL166 & CBL168 to power Model 831C
<b>EPS037-831</b>	Case on wheels (CCS035) to enclose Model 831C with 100 Ah batteries (BAT012). Includes CBL166 & CBL168 to power Model 831C
<b>EPS044</b>	Noise monitor enclosure for 831C including CCS051, CCS052, ACC009, PSA038, CBL224-02, CBL225-01, CBL226-02 & CBL228-03
<b>EPS044-SLA</b>	Noise monitor enclosure for 831C including CCS051, CCS052, BAT020 35 Ah SLA battery, ACC009, PSA038, CBL224-02, CBL225-01, CBL226-02 & CBL228-03
<b>EPS044-LFP</b>	Noise monitor enclosure for 831C including CCS051, CCS052, BAT019 45 Ah LiFePo battery, ACC009, PSA038, CBL224-02, CBL225-01, CBL226-02 & CBL228-03. License required to ship battery
<b>EPS2116</b>	Environmental protection for ½ inch preamplifiers with windscreen, bird spikes, desiccants, and universal mounting
<b>SEN031</b>	Combined weather sensor: wind speed and direction (no moving parts), temperature, humidity, pressure, rainfall (requires CBL167 cable + DVX008A)
<b>TRP001</b>	Instrumentation tripod with ADP032 preamplifier to tripod interface
<b>TRP003</b>	Support tripod, maximum height 8 ft (2.4 m) used in portable NMS systems
<b>CBL174</b>	Waterproof cable connecting EPS030-831 to external PC, 2 m USB A-to-B
<b>ACC009</b>	Monopole for use in EPS044 and NMS044 systems
<b>BAT019</b> [2]	45 Ah 12V LiFePo battery. Weighs 12.8 pounds (5.8 kg)
<b>BAT020</b>	35 Ah 12V SLA battery. Weighs 24.7 pounds (11.2 kg)
<b>CBL218</b>	Cable, USB-A to micro-B, 3 ft (1 m)
<b>CBL222-08</b>	Cable connecting 831C or 831 to PRM2103 with Anderson Powerpole® connectors for 12V power. (8 ft / 2.4 m)
<b>CBL222-20</b>	Cable connecting 831C or 831 to PRM2103 with Anderson Powerpole® connectors for 12V power. (20 ft / 6 m)
<b>CBL223-02</b>	Power cable for Sierra Wireless with sense line and Anderson Powerpole® connectors for 12V power (2 ft / 0.6 m)
<b>CBL224-02</b>	Power cable for 831C or 831 with Anderson Powerpole® connectors for 12V power (2 ft / 0.6 m)
<b>CBL225-01</b>	Power cable for battery with spade connectors and Anderson Powerpole® connectors for 12V power (1 ft / 0.3 m)
<b>CBL226-02</b>	Power cable with Anderson Powerpole® connectors to bare wires (2 ft / 0.6 m)
<b>CBL228-03</b>	Cable, 1m, with MC-4 connectors for solar and bare wires for use with solar charge controllers
<b>CCS051</b>	Base enclosure for EPS044 and NMS044 systems that includes mounting plate, glands and mount for ACC009
<b>CCS052</b>	Canvas bag with zipper and handles. 19 x 9 x 6 in (48 x 23 x 15 cm)

## ORDERING INFORMATION (CONTINUED)

### Noise Monitoring System Components (Continued)

<b>COM-ANT-GPS</b>	GPS antenna with SMA connector and cable for use Sierra Wireless modem like RV50X
<b>SLP001</b>	Portable folding 60 Watt solar panel with integrated stand and carrying case
<b>SLP002</b>	Portable folding 100 Watt solar panel with integrated stand and carrying case
<b>PSA038</b>	Solar charge controller, 10 A, used in EPS044 and NMS044 configurations with SLA batteries
<b>PSA039</b>	AC power supply, 15 V, 90 W, with MC4 connectors for use with EPS044 & NMS044
<b>PSA040</b>	Battery Charger for SLA batteries with Anderson Powerpole connectors. Input: 100–240 VAC, 50–60 Hz, 0.80–035 A. Output: 14.7 VDC, 3 A, Output cable length 1 ft (30 cm)
<b>PSA043</b>	Battery Charger for LiFePo batteries with Anderson Powerpole connectors. Input: 100–240 VAC, 50–60 Hz. Output: 3 A, cable length 1 ft (30 cm)
<b>PSA044</b>	Solar charge controller, 10 A, used in EPS044 and NMS044 configurations with LiFePo batteries
<b>Permanent Noise Monitoring Systems</b>	
<b>NMS044-LFP60-E</b> [2]	Complete NMS for use outside US including Model 831C with 831C-LOG, 831C-ELA, 831C-SW, EPS044-LFP, COM-RV50X-APAC, 2 ea. COM-ANT-HG, PRM2103-FF, EPS2116, SLP001, PSA039 & necessary cables. For use when solar insolation > 2 kW•h/m2/day
<b>NMS044-LFP60-U</b> [2]	Complete NMS for use in US including Model 831C with 831C-LOG, 831C-ELA, 831C-SW, EPS044-LFP, COM-RV50X-NA/EMEA, 2 ea. COM-ANT-HG, PRM2103-FF, EPS2116, SLP001, PSA039 & necessary cables. For use when solar insolation > 2 kW•h/m2/day
<b>NMS044-LFP100-E</b> [2]	Complete NMS for use outside US including Model 831C with 831C-LOG, 831C-ELA, 831C-SW, EPS044-LFP, COM-RV50X-APAC, 2 ea. COM-ANT-HG, PRM2103-FF, EPS2116, SLP002, PSA039 & necessary cables. For use when solar insolation > 1 kW•h/m2/day
<b>NMS044-LFP100-U</b> [2]	Complete NMS for use in US including Model 831C with 831C-LOG, 831C-ELA, 831C-SW, EPS044-LFP, COM-RV50X-NA/EMEA, 2 ea. COM-ANT-HG, PRM2103-FF, EPS2116, SLP002, PSA039 & necessary cables. For use when solar insolation > 1 kW•h/m2/day
<b>NMS044-SLA60-E</b>	Complete NMS for use outside US including Model 831C with 831C-LOG, 831C-ELA, 831C-SW, EPS044-SLA, COM-RV50X-APAC, 2 ea. COM-ANT-HG, PRM2103-FF, EPS2116, SLP001, PSA039 & necessary cables. For use when solar insolation > 2 kW•h/m2/day
<b>NMS044-SLA60-U</b>	Complete NMS for use in US including Model 831C with 831C-LOG, 831C-ELA, 831C-SW, EPS044-SLA, COM-RV50X-NA/EMEA, 2 ea. COM-ANT-HG, PRM2103-FF, EPS2116, SLP001, PSA039 & necessary cables. For use when solar insolation > 2 kW•h/m2/day
<b>NMS044-SLA100-E</b>	Complete NMS for use outside US including Model 831C with 831C-LOG, 831C-ELA, 831C-SW, EPS044-SLA, COM-RV50X-APAC, 2 ea. COM-ANT-HG, PRM2103-FF, EPS2116, SLP002, PSA039 & necessary cables. For use when solar insolation > 1 kW•h/m2/day
<b>NMS044-LFP100-U</b>	Complete NMS for use in US including Model 831C with 831C-LOG, 831C-ELA, 831C-SW, EPS044-LFP, COM-RV50X-NA/EMEA, 2 ea. COM-ANT-HG, PRM2103-FF, EPS2116, SLP002, PSA039 & necessary cables. For use when solar insolation > 1 kW•h/m2/day

[2] Hazardous materials shipping license required to ship LiFePo battery by common carrier. Battery not allowed on passenger aircraft



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