831

Sound Level Meter
for Building Acoustics
& Environmental Noise

LARSON DAVIS
A PCB PIEZOTRONICS DIV.

www.larsondavis.com

Model 831
Sound Level Meter

Applications:

- Class 1 sound measurements to the latest international standards
- Environmental noise assessment and monitoring
- Reverberation time measurement and building acoustics
- Tonality
- Occupational noise evaluation
- HPD selection
- Noise reduction validation
- Product quality control
- NVH correlation
- In-Situ sound power measurements
- Real-time analysis of sound in 1/1 and 1/3-octave bands
- Code enforcement

Features & Benefits:

- IEC 61672-1:2002, ANSI S1.4, ANSI S1.43 Class 1 integrating sound level meter
- Real-time frequency analysis in 1/1 and 1/3-octave bands, compliant with IEC 61260:2001 and ANSI S1.11-2004 Class 1
- Large, high-resolution screen, easily readable in bright sunlight
- Robust battery life (24 hours on 4 X AA Lithium batteries)
- Simplified system and measurement setup through a "mobile phone like" interface
- Lightweight, ergonometric design
- Soft keypad for 1-handed operation
- Standard USB interface
- Dynamic range in excess of 120 dB
- Logging of broadband and spectral data to obtain time, measurement and event histories on the instrument
- Sound recording in .wav format for event, manual or time based trigger
- Utility software included for setup, archiving, export and reporting
- Supplied with heavy-duty Pelican® carrying case

Fig.1
Model 831 Layout

Standard 1/2 in FF of RI Microphone

Integrated Preamplifier Collar to elimate reflections

Large High Resolution Display

One-button Access to Measurement Set-up

Run/Pause Control
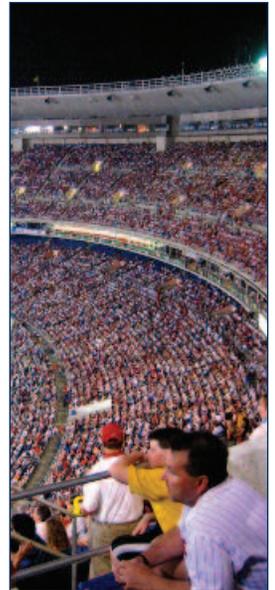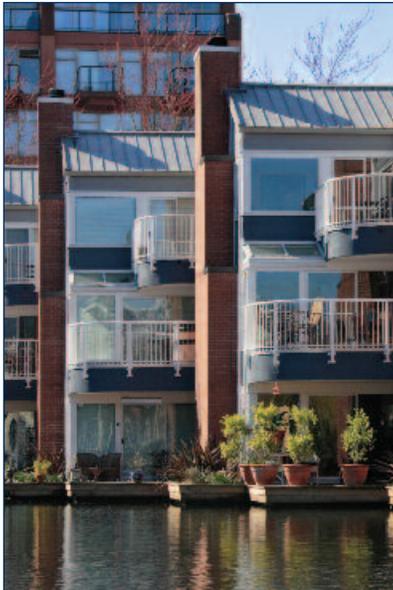
Back-lit Navigational Keypad

System Set-up Access

Display Navigation

Dual Purpose Start/Stop

Reset/Clear Memory

Recessed On/Off Button

USB Host (Thumb Drive Storage, GPS Receiver)

Headphone Jack/Noise Source Control

USB Power

Master Power Toggle

Multi-function Connector (External Power, Weather Sensor Input)

Introduction

Thank you for your interest in the Larson Davis Model 831 Class 1 Sound Level Meter. This versatile instrument, with high definition display, performs the functions of several instruments. It puts the combined features of a precision Class 1 sound level meter, environmental noise analyzer, personal noise dosimeter, and a real-time frequency analyzer in the palm of your hand. The Larson Davis Model 831 is a fifth generation Larson Davis sound level meter, designed for simple single handed operation, yet is fully featured, smart and versatile with an ever expanding firmware platform. The design of the Model 831 was based on countless inputs from our customers. It expands upon the Larson Davis tradition of delivering value, innovation and function in a rugged single-handed expandable package and is backed by our 2-year Factory Warranty, 24-hour application support and accredited factory service/calibration.

The Model 831 Standard Features:

- IEC 61672-1:2002, ANSI S1.4, ANSI S1.43 Class 1 integrating sound level meter
- Voice Annotation
- ANY LEVEL Display
- User programmable run modes
- Six user selectable statistics (Ln)
- Threshold exceedance data
- Community Noise Calculations (Lden, CNEL)
- GPS Global Positioning Support
- Back Erase Functionality
- Normalized Spectrum
- User-selectable screen layout and lockable setup protection
- Remote access and field upgradable
- Wide variety of non-proprietary powering options including – 4XAA internal batteries, AC, USB and external batteries.

Model 831 Firmware Options:

Code	Description
831-OB3	1/1 and 1/3, Class 1, Octave band Spectral Analysis
831-SR	Sound Recording to ".wav" files at 8, 16, 24 or 48 kHz
831-LOG	Time History Logging at periods from 24 hrs to 20 ms
831-FST	Fast Time History Logging at 2.5, 5 or 10 ms periods
831-ELA	Automatic event detection and event history Measurement History (1 min to 99 hours intervals) Combine with 831-LOG for event time history and 831-SR for event sound recording.
831-RT	Reverberation time measurement, computation and display
831-FFT	Fast Fourier Transform up to 6400 lines
831-COMM	Advanced Digital Communications via cellular modem
831-MDM	Analog Modem w/ RS232 connectivity
831-WTHR	Weather parameter logging in parallel with acoustic parameters
831-IH	Industrial Hygiene or personal noise dosimetry

Supported PC Software:

- SLM Utility-G3 – PC software supplied standard with Model 831 that supports full sound level meter control, in the field firmware and option upgrades, data export to MS Excel®, and includes an integrated "Screen Grabber" to display the SLM screen live on a PC.
- DNA – 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 using DNA Reader software.
- Software Development Kit (SDK) – toolkit for developing custom applications for Model 831.
- 3rd Party – Model 831 has been integrated into various 3rd party software packages including ITT AirScene for Airport Noise Management.

As you can see from the array of firmware and software, Model 831 offers a complete solution for noise measurement. Whether in the office or in the field, Model 831 can handle your sound measurement needs.
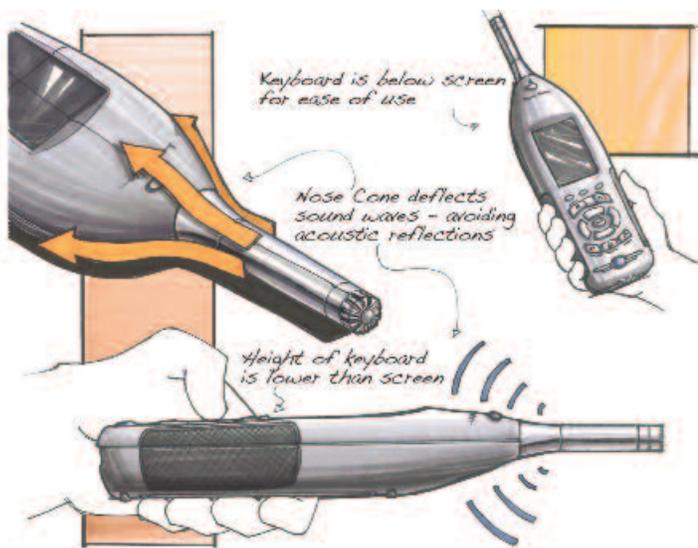
DID YOU KNOW…

…We Carefully Considered Every Design Element

Keyboard Features:

Much care was taken when designing the Model 831 keyboard. To reduce extraneous noise, the keys are manufactured of silicone to eliminate audible "clicks". In addition, the ON/OFF button is slightly recessed to avoid accidental power off. Together with the backlit display the illuminated keyboard permits nightly operation indoors as well as outdoors. Finally, a raised thumbrest allows for careful positioning during measurements.

Silent Keyboard

Thumbrest for robust grip during operation

Lit Keyboard for night operation

Recessed Power Off Button

Keyboard is below screen for ease of use

Nose Cone deflects sound waves – avoiding acoustic reflections

Height of keyboard is lower than screen

Avoid Acoustic Reflections

To reduce noise reflections further, a noise cone was added between pre-amplifier and sound level meter body. The keypad is situated below the screen for ease of use and is slightly lower in height which positions the users hand lower on the body allowing a free flow of acoustic waves. The preamplifier connection, the bulkier head, and lowered keypad all contribute to Model 831's Class 1 designation.

Material Features:

When selecting manufacturing materials, the day-to-day operation was taken into account. Advanced sound level meters like Model 831 are often used outside. The display with high readability in all lighting conditions is protected by a scratch resistant cover. A high impact plastic housing supports wear and tear easily.

Access Features:

The large battery access panel allows for easy exchange of batteries. Extra connections are grouped at the bottom of the instrument with PC control and power supply combined via a single cable.
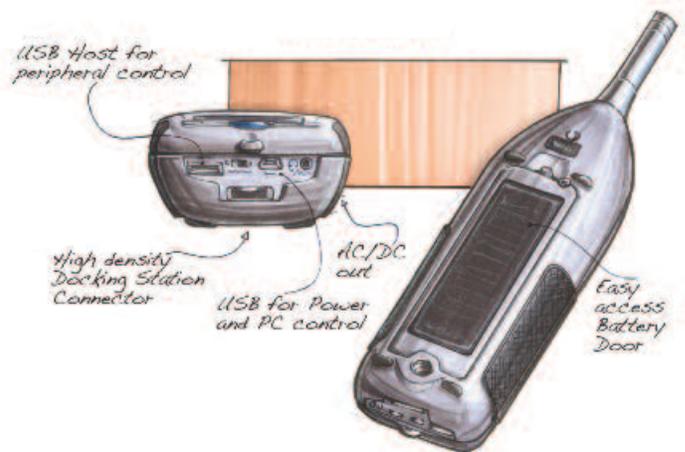
Handling & Grip for 1-hand Operation:

To reduce acoustic reflections during measurement, Model 831 was designed with 1-hand operation in mind. The soft grips combined with the overall inverted cone shape allow the meter to easily fit in the hand, without permanent finger pressure or user attention. For extra security a lanyard is provided as a standard accessory.
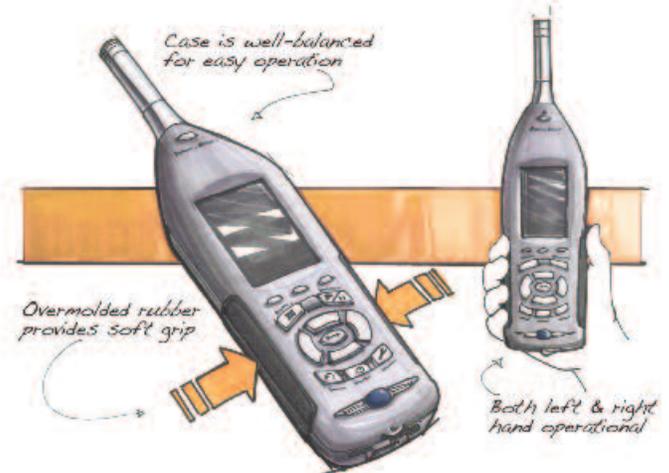
Model EPS031/032
Fiberglass NMS enclosure (AC/Solar power)

Standard Features

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. How many times have you brought along additional equipment to log information such as GPS location, temperature, wind speed, and other environmental parameters? Then, how much time did you spend after the test merging that non acoustic data into a report? Have you ever lost your measurement notes, or worse, forgot to log the information properly and then had to either go back and re-aquire the data altogether or simply not report it? At Larson Davis, we recognize the value of measuring non-acoustic parameters in parallel with the acoustic data. Model 831 firmware allows you to connect a variety of external sensors to log these non acoustic parameters.

Never without power

Having a variety of powering options allows for great flexibility when out in the field. There is no need to worry about proprietary batteries, cables, etc. since most power options are "off-the-shelf items". Great care was taken during the design of the Model 831 to ensure low power consumption, further extending measurement time. With (4) Lithium AA batteries, up to 24 hours of 1 second LAeq with 1/3 Octave data can be measured.

Options include:

- AA batteries: Alkaline, NiMH rechargeable or 1.5V Lithium
- USB power from a universal AC power supply (PSA027), from your PC or a powered USB hub.
- 12 VDC from a DC power adapter, 12 VDC battery, or car power connector.

When using 12 VDC the Model 831 can sense a low voltage condition and shut itself down automatically then restart automatically upon power restoration to protect external batteries from damage due to over-discharge.

Any Level

The Larson Davis Model 831 provides ANY LEVEL to preview & review acquired sound field measurements utilizing multiple time weightings (Slow, Fast & Impulsive) and frequency weightings (A, C & Z). This feature allows the operator to easily view and acquire measurement data with the desired settings and ensures the correct values are measured. With the 831-LOG option all of the various measurement parameters are available and can simply be selected for storage and download. Pre-selected detector and frequency weighting are used to determine the metric sampled for statistical and event data.

6 Different Run Modes

The Model 831 has (6) measurement control modes to accommodate a variety of field situations.

- **MANUAL** – typically used for walk around surveys. Ideally used with the Measurement History (MH) to give a quick overview of the averages, the min-max values, and store multiple measurements into a single file.
- **TIMED STOP** – Model 831 runs for a specified period.
- **CONTINUOUS** – typically used for longer term monitoring, it allows storage of data files daily or even multiple times during the day. In this mode the Model 831 will start automatically upon powering, this is required for instances of power failure in remote locations.
- **STOP WHEN STABLE** – typically used to assess workplace noise exposure, it stops when the LAeq is stabilized in a narrow range.
- **SINGLE BLOCK** – a start and stop timer controls the acquisition.
- **MULTI-BLOCK** – 3 separate time periods of which one can cross the dateline.

Live	A	C	Z
$L_{EQ,1s}$	✓	✓	✓
L_{wS}	✓	✓	✓
L_{wF}	✓	✓	✓
L_{wI}	✓	✓	✓
L_{PEAK}	✓	✓	✓

Overall	A	C	Z
L_{EQ}	✓	✓	✓
$L_{wS,Max}$	✓	✓	✓
$L_{wF,Max}$	✓	✓	✓
$L_{wI,Max}$	✓	✓	✓
$L_{wS,Min}$	✓	✓	✓
$L_{wF,Min}$	✓	✓	✓
$L_{wI,Min}$	✓	✓	✓
L_{wS}	✓	✓	✓
L_{wF}	✓	✓	✓
L_{wI}	✓	✓	✓
L_{PEAK}	✓	✓	✓

Available Broadband Metrics

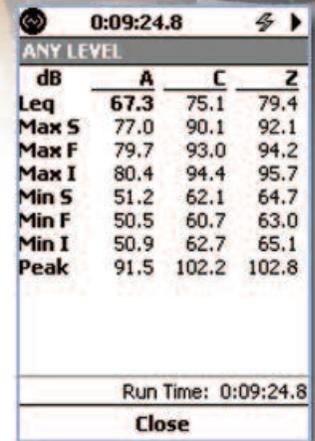| dB	A	C	Z
Leq	67.3	75.1	79.4
Max S	77.0	90.1	92.1
Max F	79.7	93.0	94.2
Max I	80.4	94.4	95.7
Min S	51.2	62.1	64.7
Min F	50.5	60.7	63.0
Min I	50.9	62.7	65.1
Peak	91.5	102.2	102.8

Run Time: 0:09:24.8

Fig. 1
ANYLEVEL allows the display of all acoustic parameters simultaneously

NoiseTutor Environmental Noise Monitoring System

Fig. 2
Live Display of Triggers during Measurement

Normalized Spectrum

831-OB3 Frequency Analysis Firmware allows the user to compare the frequency content of various measurements using the Normalized Spectrum function. You can apply inverse A and C weighting filters as well as user defined curves to current measurements and graph them relative to each other. For example, when comparing the noise signatures of various machines, a reference measurement can be saved such that subsequent measurements can easily be compared to it.
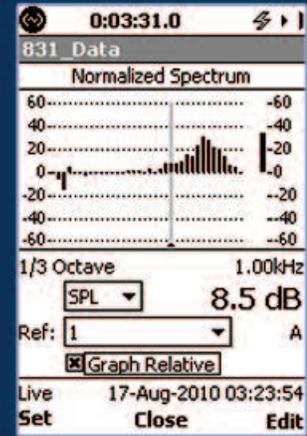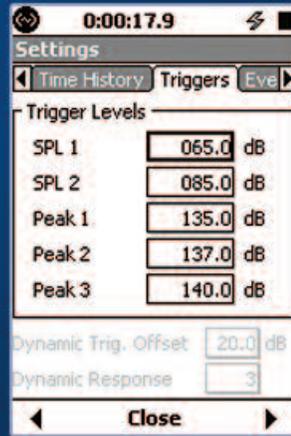

Fig. 3
Normalized Spectrum Display

Fig. 4
Trigger Levels

2 RMS and 3 Peak Threashold Triggers

Another standard feature of the base Model 831 is the ability to define up to (2) RMS and (3) PEAK threshold levels. During operation, Model 831 will count the number of threshold exceedances as well as the cumulative time of exceedance. This information is available real-time on the instrument display as well as included on any measurement files transferred to software. This is an ideal way to keep track of limit and action values according to EU Directive 2003/10/EC.

Back Erase

Simple transient noises such as an ambulance siren or dog bark can erroneously contribute to an outdoor measurement. Model 831 includes a Back Erase feature allowing you to remove the last 5 or 10 seconds of a measurement and recalculate the measurement parameters automatically. To ensure proper bookkeeping, the data is annotated so it can easily be identified post test.
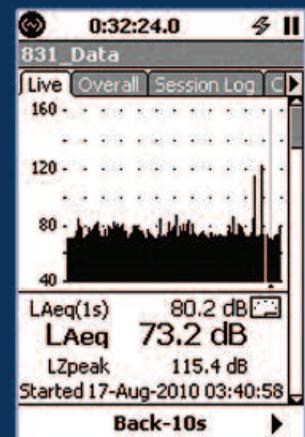

Fig. 5
Back Erase Display

Fig. 6
Voice Annotation

Voice Annotation

Want to add a quick voice memo to your data? Model 831 allows you to annotate your noise measurements with a voice memo via a headset plugged into the AC/DC output jack or directly through the condenser microphone. Information can be played back through a headset directly connected to the instrument or by downloading the data file to a PC.

10 Annotation Markers

To further annotate data in the field, Model 831 allows the user to enter (10) user-defined Markers which are easily accessed through the main measurement screen. For example, during a traffic noise measurement, markers such as "TRUCK" or "MOTORCYCLE" can be queued such that they are quickly ready to identify certain events. Time history data is then tagged with this Marker for ease of reporting. When equipped with the optional 831-SR Sound Recording Firmware, Model 831 will also automatically take a .wav file sound recording when a Marker is engaged.
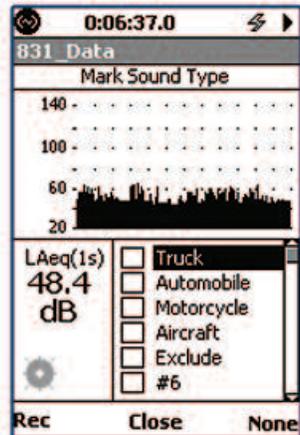

Fig. 7
Model 831 with optional 831-SR Sound Recording Firmware. One screen access to manual sound recordings and exceedance markers

User-selectable Screen Layout

The powerful Model 831 user interface can be tailored for a wide-variety of end users. While the acoustical consultant may like to see all data parameters, a code enforcement officer may simply like to read the Leq or Peak dB level. In addition, the sound level meter may be utilized by untrained personnel who are unfamiliar with the setup of the instrument. In this situation, the Model 831 provides a lock feature so that setup parameters cannot be modified without entering a security code. Modifying the user interface of the Model 831 is easily done via the keypad or SLM G3 Utility Software. Various setups and configurations can be created within G3 and transferred to the sound level meter such that they are easily accessible.
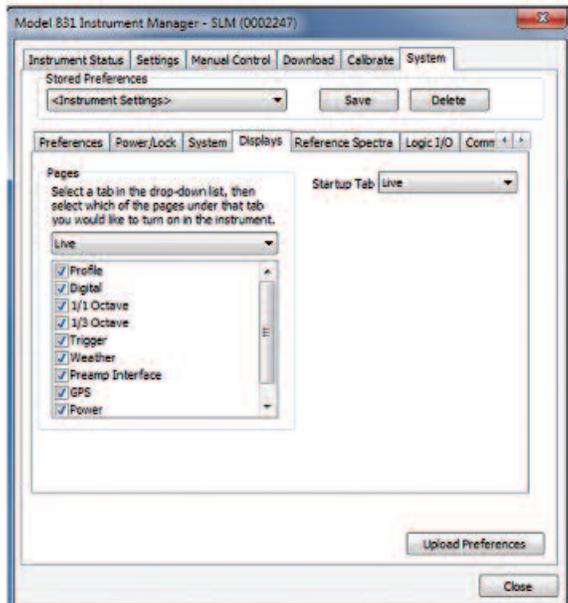

Fig. 8

Customizing Model 831 Instrument Displays utilizing SLM-UTILITY-G3 Software

Weather Measurements

With 831-WTHR Firmware, Model 831 can be configured to log weather parameter data in the Time History along with all of the normal acoustic parameters at rates up to 1 sps (sample per second). A wide range of meteorological parameters are available including wind speed, wind direction, temperature, humidity and rain fall.

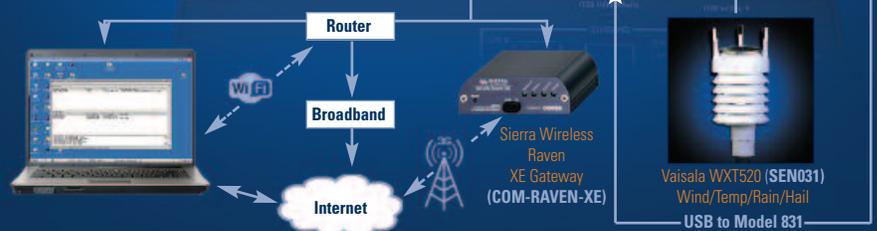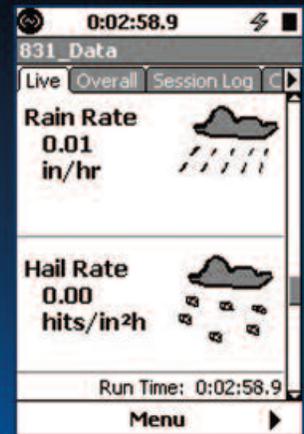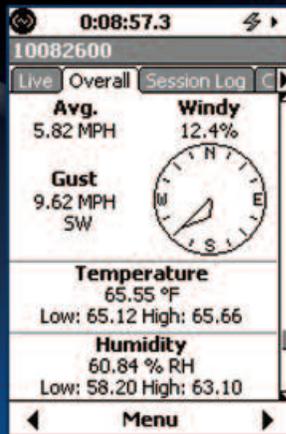| Combined Meteorological Unit (SEN031 Vaisala WXT520)	
Measurement method	Digitized sensors with ultrasonic wind sensors over serial port to USB
Connectivity	Model 831-INT Docking station
Measured Parameters	Wind speed and direction, temperature, relative humidity, barometric pressure, rain fall and hail

Fig. 9
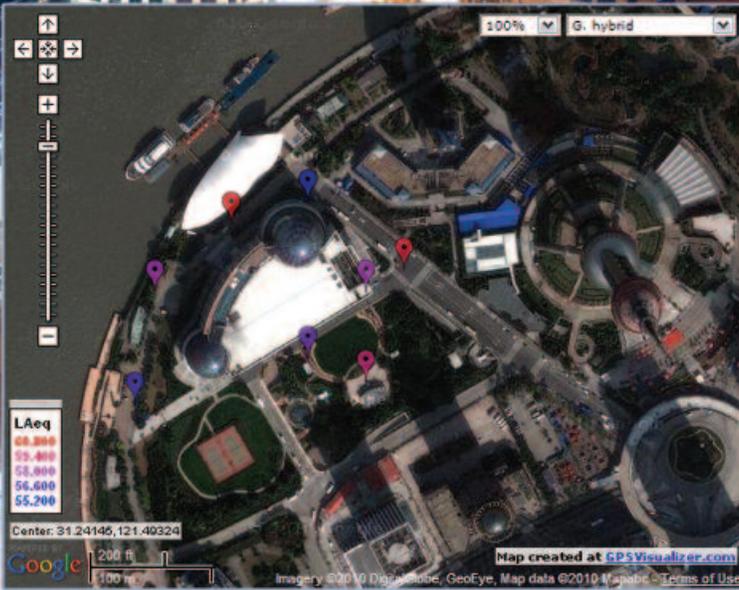*Model 831-INT Docking Station – Configuration*

Fig. 10
Noise map created by GPSVisualizer.com

Global Positioning System (GPS)

Commonly users want the ability to use GPS to log the location for each measurement, which is very beneficial when performing environmental noise surveys that require multiple points around large buildings or when mapping noise along a roadway. To meet this need every Model 831 Sound Level Meter comes standard with firmware to decode and log GPS position information from an optional external GPS antenna (GPS001). When enabled, the GPS will log position automatically at the beginning of each measurement run (831-ELA). In addition, the GPS signal also includes a highly accurate clock that the Model 831 can use to automatically update its internal clock as needed. Once the data is downloaded to a PC the location information can be easily imported into mapping software like Google Maps to create in seconds a very powerful report showing exactly where noise measurements were made.

Location and Timestamp with GPS001	
Time Synchronisation	Automatically Performed with Daily Auto-store
Location	Latitude, Longitude and Altitude with Measurement History

Model GPS001

Fig. 11
You can export the "Measurement History" tab directly into a web application like GPS Visualizer (shown above).
This tool will retrieve the appropriate map and add the acoustic parameters to the map automatically

Model 831 Options:

Octave Band Analysis (831-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 overall level can be better understood. Constant percentage bandwidth filters (1/1 or 1/3 octave) best approximate human perception to sound. 831-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. 831-OB3 is compliant with IEC 61260:2001 Class 1 and ANSI S1.11-2004 Class 1 standards and covers the entire frequency range of human hearing: 6.3 Hz to 20 kHz for 1/3 octave bands. When 831-OB3 is combined with Time History Logging (831-LOG) or Automatic Event Detection and Event History (831-ELA) it is possible to review the frequency content of logged data or specific events.

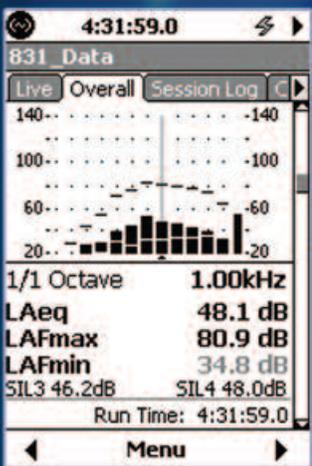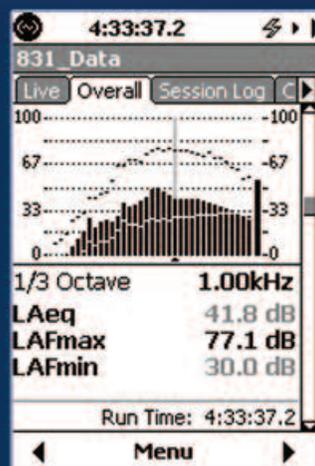**Fig. 12**
1/1 Octave Display

Fig. 13
1/3 Octave Display

Spectrogram of Helicopter Passby
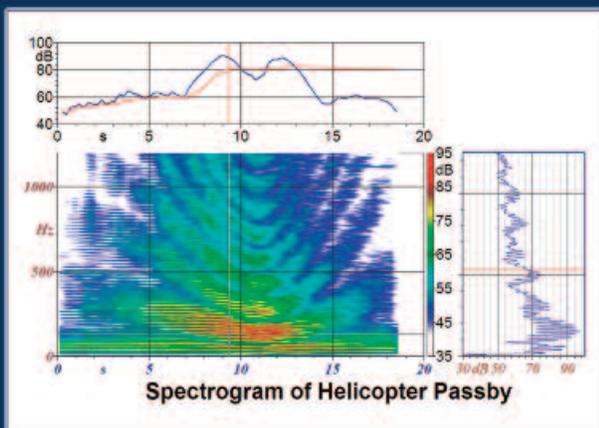
Fig. 14
Spectrogram Plot from DNA Software

Spectrogram of Helicopter Passby
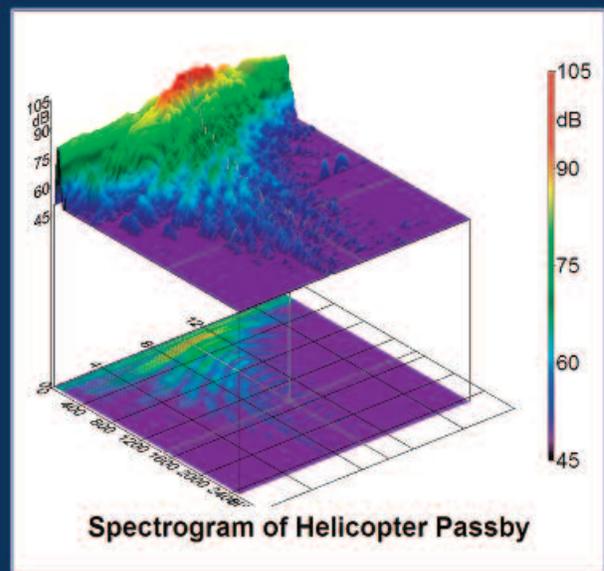
Fig. 15
Spectrogram Waterfall Plot from DNA Software

Industrial Hygiene (831-IH)

The Model 831 is available with 2 virtual noise dosimeters compliant with ANSI S1.5 and IEC 61252:2001, each with programmable threshold levels. This is very convenient when performing worker noise exposure assessment when coupled with the 1/1 Octave Band spectral analysis for hearing protection device selection. Typically the characteristics of the hearing protectors are stored as one of the four reference curves on the Model 831 for easy on-site "what-if" measurements.

Logging (831-LOG) & Fast Logging (831-FST)
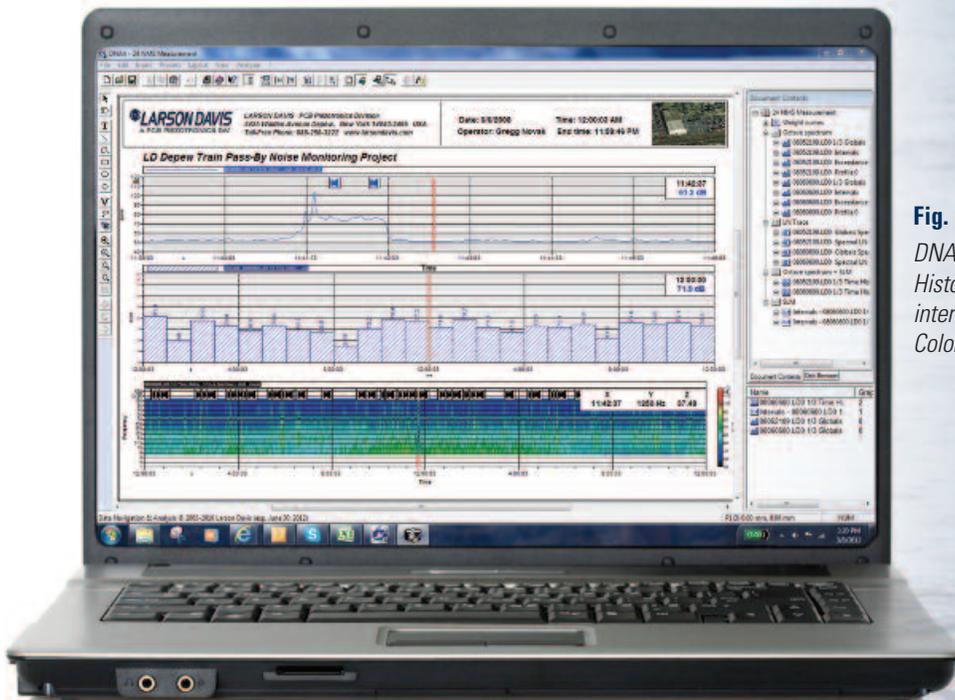
Fig. 16

DNA Software Time History and Hourly interval Graph with Color Spectrogram

The Model 831 integrating precision sound level meter 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 a couple of seconds to continuous monitoring.

Larson Davis delivers on this need by enhancing the versatility of the Model 831 Sound Level Meter with the addition of Time History Logging Firmware (831-LOG). Users can pre-select from logging periods as small as 20 ms to a full 24-hours. With time periods greater than or equal to 100 ms, up to 58 selectable parameters can be chosen. Selections consist of familiar acoustic metrics as well as non acoustic metric such as battery condition, outdoor microphone performance and meteorological data (831-WTHR).

Special acquisition circumstances may require the user to acquire time based data swifter than 20 ms. For these occasions Larson Davis offers 831-FST Firmware, which adds the additional sampling rate options of 10, 5 and 2.5 ms.
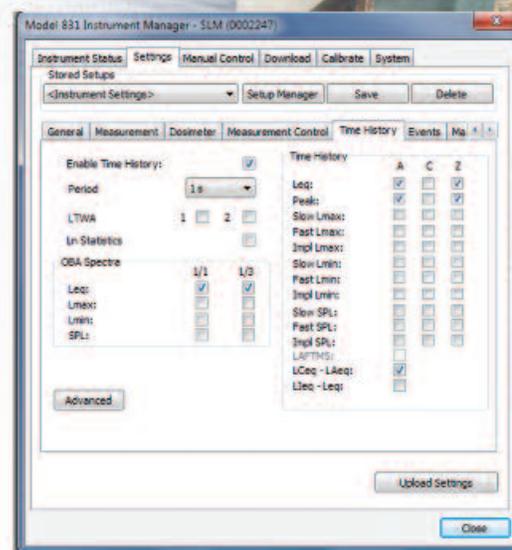
Fig. 17

Time History Parameter Selection in SLM-UTILITY-G3

Measurement History (831-ELA)

While time histories are typically logged at 1 sample per second, it is convenient to view longer term averages of measurement data to more easily ascertain trends. For example, you may want to compute 10 min or 1 hour averages of various noise parameters. 831-ELA Firmware enables Measurement History (MH) which logs parameters similar to the Time History (TH) yet looks at the average, minimum and maximum over the selected interval time. MH and TH can be run in parallel or independently.

When the Model 831 is set to MANUAL RUN mode, MH history can be used to construct a noise survey. Data for each measurement or location is saved individually and may include the Leq, maximum and minimum SPL and statistical distribution of the SPL (Ln).

MH records are available for easy review on the Model 831. The current measurement is visible on the "CURRENT" display tab, while completed measurements can be browsed in the "MEASUREMENTS" tab. When combined with 831-LOG, the time history detail of each measurement can be viewed quickly using keypad shortcuts. Finally, an automated sound recording at the beginning of each measurement can be achieved with 831-SR firmware.

MH records are time based when run mode = continuous but in other run modes like manual they are not. One of the benefits of MH history is the ability to make a series of smaller measurements, MH records, and combine those measurement automatically into a single composite measurement, overall, and put everything into one file.
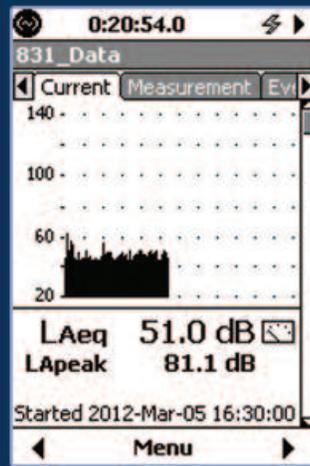
Fig. 18 *Current Measurement Display*
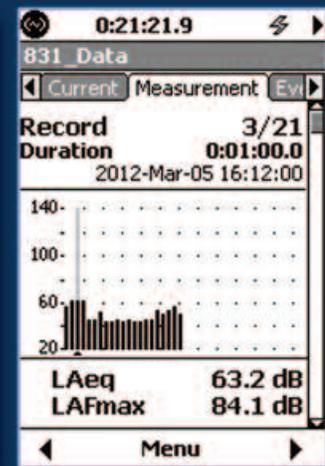
Fig. 19 *Measurement History Summary Display*

Automatic Event Detection and Event History (831-ELA)

In the Model 831 events are defined as either:

- 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
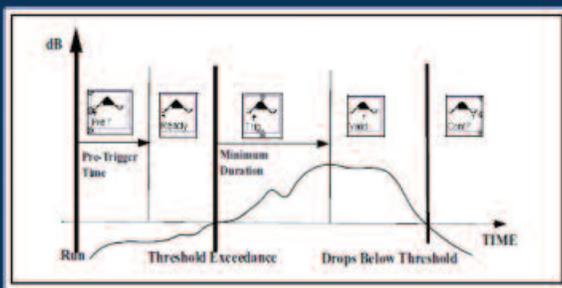
Fig. 20 *Event Definition on Model 831*

Fig. 21 *DNA Software – TH with embedded .wav files on event, color spectrogram, L_{95} and 1/3 octave frequency analysis.*

The standard Model 831 includes basic exceedance logging functionality (see "Threshold Triggers"). However, only the number of exceedances and cumulative time above threshold values is provided. With 831-ELA firmware, you are able to define the attributes of an event including threshold level, duration and hysteresis. An event is considered "VALID" when it meets these criteria and ends when the SPL drops below the threshold level for a specific period of time (CONTINUATION PERIOD). The user is provided triggering status updates via triggering icon graphics, helping to identify event progression and qualification (see graph above).

The "EVENT" tab contains detailed information on each event including:

- Time and duration of Event
- Leq, MIN, MAX and PEAK SPL
- Frequency analysis of event (with 831-OB3)
- .wav format sound recording for source characterization (with 831-SR)
- Event time history (with 831-LOG). Time history period can be different then that used in overall TH measurement.

A DYNAMIC trigger method can also be selected in Model 831. The dynamic trigger is set to trigger when L85, L90 or L95 is exceeded by a predetermined number of decibels. A rise time can also be specified to determine how quickly the meter responds to changes in the background noise level. By utilizing the dynamic trigger, the number of false triggers is reduced and events (significant noise above background level) are better determined.

Fig. 22 *Event Detection Display on Model 831*

'Hear' the Sound You Measure... (831-SR)

Measuring sound levels is a well-accepted way to objectively quantify the noise radiated by a product in an environmental survey. But a sound pressure level or octave data only provides part of the overall acoustic picture. How many times were you asked "are you sure that the spike in the data is actually the noise of the product or the actual environmental event of interest?" Rather than rely simply on the 'objective' data why not record a sample of the sound to truly determine if that elevated noise level was a police car driving past with its sirens on or a noisy dog barking at the mailman.

For times when you need to record raw time samples for playback you can add the 831-SR firmware option. This option allows you to make high fidelity recordings at up to 48 kHz sampling with your 831 either manually or automatically based on an array of triggering options.

Standard 831-SR Features include:
User Initiated Recordings:

- **Manual Sound Recording -** User controlled recording duration, acquired during operation, up to 48 kHz resolution.
- **Marker Based Sound Recording -** User initiated with user defined duration, acquired during operation, up to 48 kHz resolution.

Automatic Recording Mode:

When the 831-SR option is combined with other advanced logging functionality in the 831 it is possible to start and stop recordings based on a number of advanced measurement events. This allows the user to only record sounds associated with specific noises as they occur rather than recording many hours of data and having to 'find' these events after the fact in post processing software.

831-ELA Option required

- **Event History Sound Recordings** - Acquired upon events meeting preset conditions with fixed or dynamic triggering available.
- **Measurement History Sound Recordings** - Automated sound recording at the beginning of each Measurement History.

Note: Event & Measurement Sound Recordings can be enabled at the same time.

These recordings can then be downloaded to a PC and stored as .wav files using the included G3 Utility software or the DNA advanced post processing and reporting tool.

Instrument Gain	0 dB	0 dB	20 dB	20 dB
Range	High	Low	High	Low
Peak Overload Level	143 dB	110 dB	123 dB	90 dB
Lower Level of A/D Range	50 dB	17 dB	30 dB	-7 dB
Instrument Noise Floor	23 dB	23 dB	21 dB	21 dB
Sound Recording Range	50 - 143 dB	23 - 110 dB	30 - 123 dB	21 - 90 dB

Table 1-1 Sound Recording Range Calculation: Microphone Sensitivity of 50 mV/Pa
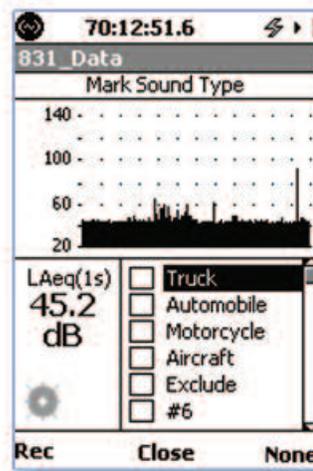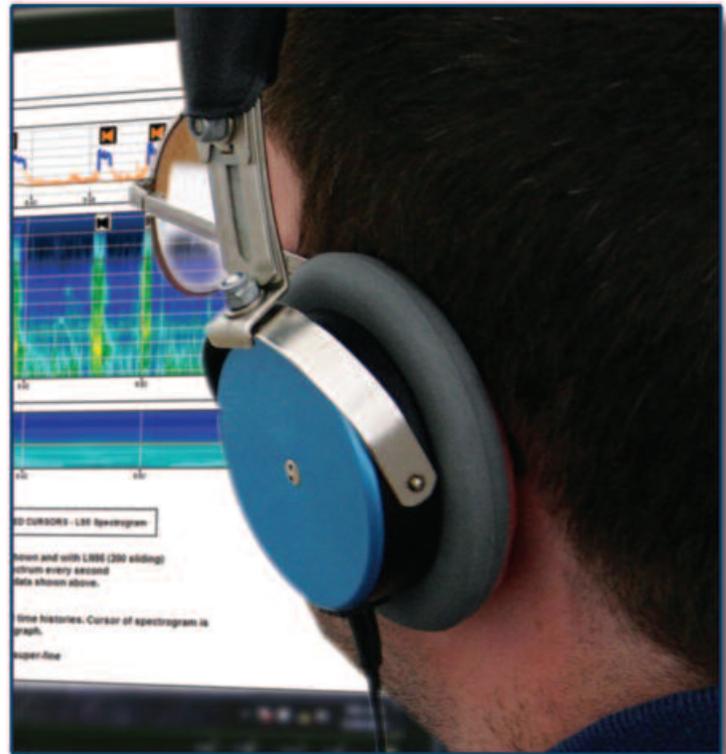
Fig. 23

Sound recording is simple with the Model 831. A recording icon will appear in the 831's display when recordings are being made.
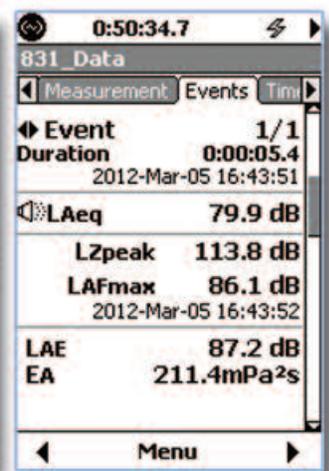
Fig. 24

Event Indication Display on Model 831
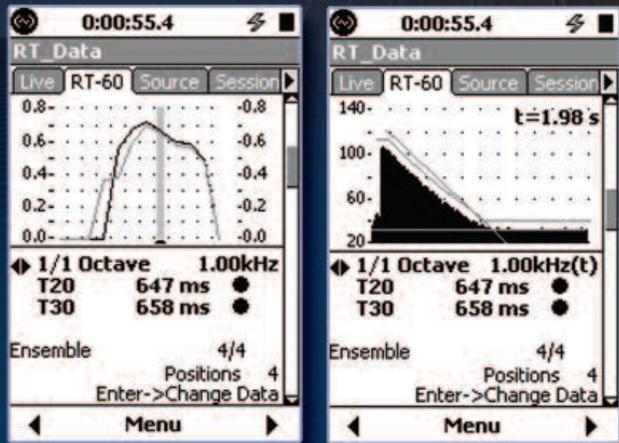
Fig. 25
RT Displays of Decay Curves
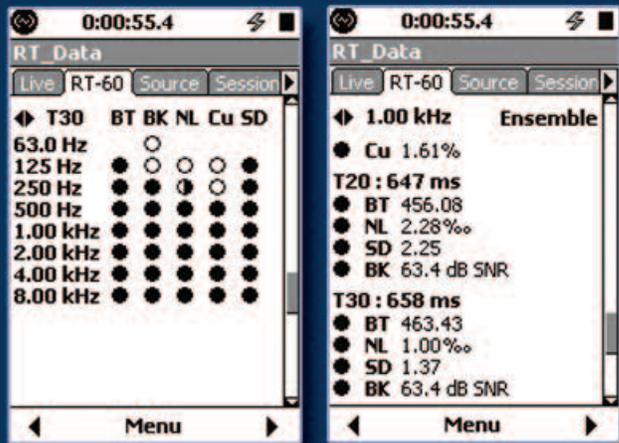
Fig. 26
Quality and Measurement Grade Indicators

Reverberation Time (831-RT)

Reverberation times are used in multiple architectural acoustics applications ranging from simple experimental reverberation time determination for room performance, to calculating absorption coefficients for material performance. Most of the time, these measurements are dictated by various international standards.

Model 831 measures the decays and then computes the reverberation time according to ISO 3382-2 or ASTM 2235-04 standards. When using the Interrupted Noise method, the Model 831 not only triggers the data acquisition, but its built-in Noise Generator can be used to drive the omni-directional sound source. Recent trends show that the Integrated Impulse method is gaining popularity and Model 831 handles the acquisition of the decays and the subsequent T20 or T30 calculations completely and with ease.

While the use of 1/3 octave bands is the most common method on the Model 831, the user can elect to work either with 1/3 octaves or full octave bands.

Helping the user in the field assess his measurement results the Model 831 computes the decay times automatically, shows the T20 and T30 spectra superimposed, computes 7 quality indicators per frequency as well as grades the measurement data. All these indicators are immediately available saving considerable time.

Easy-to-read screen and keyboard indicators help guide the user through the measurement. For example, a flashing red LED on the 831 indicates to the user when they need to create the impulsive noise, for example, with a starter pistol or a balloon.

The resulting data and decays can be exported to the SLM-UTILITY-G3 or can be processed further in DNA for reverberation time, absorption coefficients or sound insulation calculations. Using DNA software, a full array of building acoustic measurements are possible as defined in ISO 10140, 140, 717 and ASTM standards.
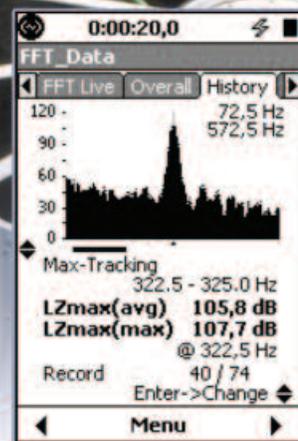
Fig. 27
FFT Max-tracking on Model 831
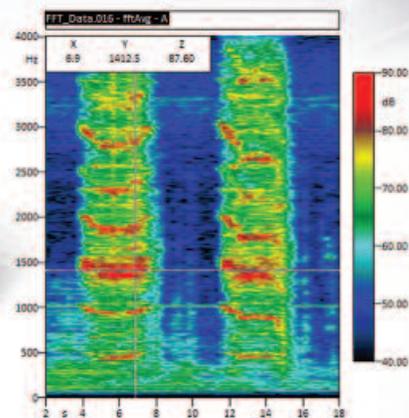
Fig. 28
DNA Software FFT-spectrogram of stone-cutting operation

FFT Analysis (831-FFT)

When you need more frequency resolution than 1/3rd octave band spectral analysis can provide, Model 831 FFT Frequency Analysis is the ideal solution. The Fast Fourier Transform (FFT) algorithm is implemented in the Model 831 for precision spectral analysis of acoustic signals. By utilizing a variety of frequency span and resolution settings, FFT acquisition settings can be adjusted to tune into specific acoustic and vibration phenomena.

Model 831-FFT has 3 operational modes serving the different applications. "Count" mode accumulates the average spectrum and maximum for a fixed number of FFT spectra. The "Timed" mode repeats the count mode for a given period of time and accumulates the spectra in a history. The "Timed" mode is best suited for transient signals while the "Manual" mode is typically used for steady state measurements. In manual mode the number of averages is open and each Start-Stop sequence adds an entry to the history table.

Up to 6400 lines of resolution are available with Model 831-FFT allowing for detailed measurement analysis.

The FFT option has been further enhanced in version 2.2 firmware with the addition of onboard computation of tonality as described in ISO 1996-2 Annex C. Tone level, masking noise level, audibility and quality indicators are all automatically computed and displayed in a simple to use interface that makes object measurement of tones in the field easy to do.
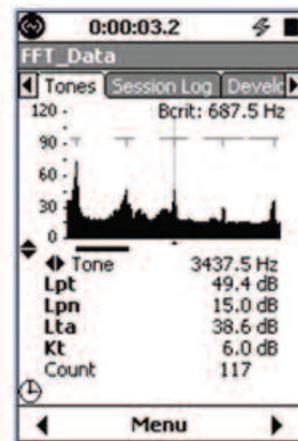
Fig. 29
Model 831 Tonality Calculation
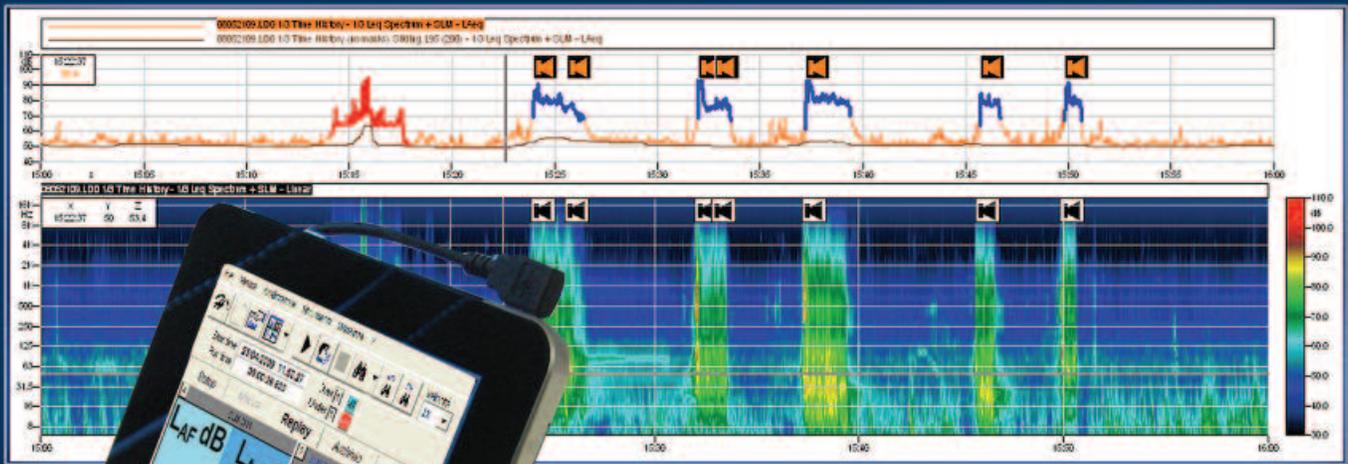
Data Navigation and Analysis Software (SWW-DNA)

Data Navigation and Analysis Software (DNA) is designed to analyze and report environmental noise, worker exposure and architectural acoustic measurements with an interactive graphical interface.

DNA and Model 831 can be used in 2 ways: DNA retrieves files from the Model 831 or DNA uses Model 831 as a data acquisition front-end.

Features include:

- Remote access over modem or network
- Interactive graphs with data: zoom, evaluate processing for events, masking automated placement of speaker icon on time history and running cursor with sound replay on TH linked cursors over several graphs.
- Template based operation with customizable templates

A major differentiating concept of DNA is the principle of separation of data and graphical layout. This allows for drag-and-drop functionality of new data in the same layout. With many environmental studies being similar in nature, this feature allows for quick professional looking reports.

Software Development Kit (831-SDK)

The Software Development Kit for Model 831 interfaces smoothly and directly with the Microsoft programming environment, either for MS Excel VBA or Visual Studio C++ programming. The SDK consists of 2 main parts: SLMServer and the SLMTranslator.

The SLMtranslator is the library allowing reading of data files. This is typically used for automated processing applications. The SLMServer is the component providing on-line SLM access and control. The SLMServer support communication over USB, Ethernet, analog modem, Edge modem and serial devices The SDK kit integrates completely and seamlessly into the Microsoft® programming environment with the included files, and interfaces. Just like SLM-UTILITY-G3 software evolves with Model 831 functions and features, the SDK revisions are up-to-date at all times giving programmers access to new functions and features.

Software Solutions

Model 831 has enormous on board capabilities, yet often time further processing, visualization or reporting needs exist. For this purpose you can work with Model 831 as a portable instrument and retrieve the data, work as a data acquisition front-end, or in combination.

SLM Utility-G3

The SLM-UTILITY-G3 program is an easy-to-use utility for managing the Model 831 providing configuration setup, data download and remote access. The Screengrabber feature emulates the SLM screen on your PC, convenient for presenting data stored on the Model 831 or for teaching classes. Measurement setups can be stored on the PC and exchanged with one or more Model 831 sound level meters. Data can be downloaded into the PC and easily exported to MS Excel for further analysis. Finally, SLM-UTILITY-G3 can access remote 831-based noise monitoring stations via modem and Ethernet support.

System At A Glance

Model CAL250
Calibrator

Model CAL200
Calibrator

Model EPS2106
Environmental Shroud

Model ADP021
1" – 1/4"
Calibration Adapter

Model ADP024
1/2" – 1/4"
Calibration Adapter

Model WS001
Windscreen

Model ADP034
Tripod Adapter

Model EPS2108
Environmental Shroud

1/4" free-field
1/4" random incidence
1/4" pressure

Model TRP003
Tripod

Model ADP043
1/2" – 1/4" Preamp Adapter

1/2" free-field
1/2" random incidence
1/2" pressure

Model TRP001
Tripod

Model ADP074
ICP® Sensor Adapter

Model PRM831
Preamplifier

EXCXXX

Model PRM003
Printer

CBL138

Model BAS001
Speaker Source

Model SEN031
Weather Station

CBL167 &
DVX008A

AA Alkaline

AA e-Lithium

AA NiMH

Model GPS001
GPS

Tripod

CBL182

Model BAS002
Amplifier

SLM-Utility-G3

CBL180

PC

Model PSH-12180 FR
12V Battery

CBL140

SDK

Model PSH-12180 FR
12V Battery

CBL143/168

CBL138

Model EPS030
Environment Kit

DNA

Model PSA031
AC Adapter

Model 831-INT
Environment Kit

Model 831 Standards Met, Features & Specifications

Standards Met by Model 831

The Model 831 meets the specifications of the following standards:

Sound Level Meter Standards

IEC61672-1 Ed. 1.0 (2002-05) Class 1, Group X

IEC60651 Ed 1.2 (2001) plus Amendment 1 (1993-02) and Amendment 2 (2000-10) Type 1, Group X

IEC60804 (2000-10) Type 1, Group X

ANSI S1.4-1983 (R 2006) plus Amendment S1.4A-1985 (R 2006) Type 1

ANSI S1.43-1997 (R 2007), Type 1

Octave Filter Standards (Option 831- OB3)

IEC61260 Ed. 1.0 (1995-08) plus Amendment 1 (2001-09), 1/1 and 1/3-octave Bands, Class 1, Group X, all filters

ANSI S1.11-2004 Class 1

Personal Noise Dosimeter Standards (Option 831-IH)

IEC61252 Ed. 1.1 (2002-03) Type 1

ANSI S1.25-1991 Class 1

Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use

IEC61010-1 Ed. 2.0 (2001-02)

EMC Immunity and Emission

89/336/EEC The Electromagnetic Compatibility Directive and its amending directives

EN 50081-1 (1992) - Electromagnetic compatibility - Generic emission standard Part 1. Residential, commercial, and light industry.

EN 50082-2 (1995) - Electromagnetic compatibility - Generic immunity standard Part 2. Industrial environment.

Model 831 General Features and Characteristics

Class 1 Precision Integrating Sound Level Meter with real-time 1/1 and 1/3 Octave Filters.

Non-Volatile Memory

High contrast 1/8th VGA LCD display with white LED backlight; sunlight readable

Icon-driven graphic user interface

Soft rubber backlit keys

Large dynamic range

Time weightings: Slow, Fast, Impulse, Integration and Peak simultaneously

Frequency weightings: A, C, Z simultaneously

1/1 and 1/3 octave frequency analysis available

Voice message annotation and sound recording

Ln statistics (L0.01 through L99.9 available)

SLM Utility software available for setup, control and high speed data download with export to MS Excel

Multi-tasking processor allows measuring while viewing data or transferring data

Data Secure Feature saves data to permanent memory every minute

AC/DC outputs to recorder

Long battery life; > 16 hours continuous measurement

Multiple Language Support: English, German, Italian, Spanish, Portuguese, Swedish, French

Field-upgradable firmware: keeps instrument current with the latest measurement features

Two-year limited warranty

Sound Level Meter Specifications

Averaging (Integration method)	Linear or Exponential
RMS Time weighting	Slow, Fast or Impulse
Frequency Weightings	A, C or Z
Peak detector Frequency weighting	A, C or Z
Reference range	0 dB or 20dB
Exchange rates	3, 4, 5, or 6 dB with optional 831-IH
Sample rate	51,200 Hz
Peak rise time	30 µs

Physical Characteristics

Length with microphone and preamplifier	11.35 in	29,0 cm
Length, instrument body only	8.8 in	22,4 cm
Width	2.8 in	7,10 cm
Depth	1.6 in	4,10 cm
Weight with batteries, no preamplifier or microphone	13.6 oz	390 g
Weight with batteries, preamplifer and microphone	1.2 lb	550 g

General Specifications

Reference level	114.0 dB SPL
Reference level range	Single large range for SLM Normal for OBA option
Reference frequency	1000 Hz
Reference direction	0° is perpendicular to the microphone diaphragm
Temperature ≤ ± 0.5 dB error between	≤ ± 0.5 dB error between -10° C and 50°C
Storage temperature	-20°C to 70°C
Humidity	≤ ± 0.5 dB error from 30% and 90% relative humidity at 40°C
Equivalent microphone impedance	12 pF for Larson Davis 1/2" microphone
Range level error (OBA option)	≤ ± 0.1 dB relative to the reference range
Digital Display Update Rate	Four times per second (0.25 sec between updates). First display indication is available 0.25 seconds after initiation of a measurement
Effect of an extension cable	None (up to 300 feet or 100 m with EXCxxx cable)
Electrostatic Discharges	The instrument is not adversely affected by electrostatic discharges
Extended weather options	-40 °C to +70 °C operation with CER-831-E

Resolution Specifications

Levels	0.1 dB
Dose	0.1%
Elapsed time	0.1 second
Real time clock	1 second
Calendar	01 Jan 2008 - 31 Dec 2038

Integration Time

Time averaged Levels and Sound Exposure Levels (s)	
Minimum	0.1 second
Maximum with daily autostore enabled	Unlimited
Maximum with daily autostore disabled	> 23 days with error > 0.5 dB
Dosimeter Metrics: TWA, Dose (s)	
Minimum	0.1 second
Maximum	Unlimited

Ln Statistics

Number of selectable parameters	6 in xx.xx% format, visible on Model 831
Storage of complete table	0.01% steps
Spectral Statistics	Requires enabling octave analysis (831-OB3) and Measurement History (831-ELA)

Markers

Number of markers	10
Prenamed markers	5, Truck, Automobile, Motorcycle, Aircraft, Exclude
Link Marker to automatic Sound Recording	Yes, requires to enable Sound Recording (831-SR)

Back Erase

Number of markers	0, 5 or 10 seconds
Supported modes	Manual

Measurement Control Modes

Available modes	Manual stop, Timed Stop, Stop when stable, Continuous, Single Block Timer, Daily Block Timer
Available modes with measurement history	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 autostore	1, 2, 4, 6, 12 or 24 files per day, automated file numbering "yymmddnn.LD0"
Continuous restart on power failure	Automatic if powered by 12VDC
Single Block Timer	Start date and time to End data and time
Daily Block Timer	Up to 3 blocks with each start and end date, blocks can cross midnight line

Clock Stability

	< 1 sec in 24 hours at 24 C
	< 1 sec in 24 hours at 24 C

Digital Voice Annotation

Annotate recordings	Use headset (ACC003) or measurement microphone
Recording frequency	8 kHz
Listening options	On Model 831 or using processing software for WAV files

AC/DC Output, Power Supply, Memory Retention, Broadband Noise Level & Preamplifiers

426E01
Preamplifier

377B02
Microphone

AC/DC Output

Jack (Fem)	2.5 mm, see CBL139 cable
AC Output Voltage Range	± 2.3Vpeak maximum output, 0.5mV to 1.6Vrms sine
AC Output Recommended Load	Headset with ≥ 16 W speaker impedance
DC Output Voltage Range	0 V for 0dB, 1 V for 100dB
DC Output Freq & Time Weighting	Follows SLM Detector: F,S, or I and A, C, or Z
Tee-off preamplifier signal Alternative	Use ADP015 and EXC006

Power Supply

Batteries	4-AA (LR6) NiMH, Lithium or Alkaline cells (supplied with 2500 mAh NiMH)
External Power (5V from USB)	USB Mini-B connector to * USB interface from computer * PSA029 AC to DC Power Adapter * USB Hub * PSA031 12VDC to USB Adaptor
External Power	Power through I/O connector: 10 to 15.5 Vdc. Use cable
	CBL140, CBL154 or Model 831-INT Interface Unit
Operating time on E-Lithium	> 24 hours with power save options, 1 sec Leq logging
Power consumption with PRM831	1.1 W (backlight off, running)

Memory Retention

Data Memory	Non-volatile flash memory every minute update
Real-time clock	≥ 10 minutes

Broadband Noise Levels

Self-Generated Electrical Noise

Weighting		0 dB Gain		20 dB Gain	
		typical (dB)	max (dB)	typical (dB)	max (dB)
	A	13	15	6	10
	C	15	22	12	16
	Z	22	25	19	26

Self-Generated Total Noise

Weighting		0 dB Gain		20 dB Gain	
		typical (dB)	max (dB)	typical (dB)	max (dB)
	A	18	19	17	17
	C	18	23	17	19
	Z	23	26	21	26

Combination of the electronic noise and the thermal noise of the 377B02 microphone at 20 °C measured in a sealed cavity and vibration isolated 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 831 Preamplifiers

Model 831 Preamplifier Specification (PRM831)

Frequency response with respect to the response at 1 kHz with 1 Volts rms input and 12 pF equivalent microphone.

8 Hz to 16 Hz	+0.1, -0.2 dB
16 Hz to 100 kHz	+0.1, -0.1 dB
Lower -3 dB limit	< 1.5 Hz
Attenuation	0.1 dB (typical)
Input Impedance	10 G W // 0.16 pF
Output Impedance	50 W
Maximum Output	28 Vpp
	143 dB peak for microphones with 50 mV/Pa sensitivity
Maximum Output Current	12 mA peak
Distortion	
Harmonics	<-70 dBC with 8 Volt rms output at 1 kHz
Output Slew Rate	2 V/ sec (typical)
Electronic Noise	1.8 µV typical A-weighted (2.4 µV max)
With 12 pF equivalent microphone	4.3 µV typical Flat 20 Hz to 20 kHz (5.0 µV max)
Power Supply Voltage	15 to 36 Volts
DC Output Level	~1/2 power supply voltage
Power Supply Current	1.9 mA typical
Temperature Sensitivity	<±0.05 dB from -40° to +80 °C (14° to +176 °F)
Humidity Sensitivity	<±0.05 dB from 0 to 90% RH, non-condensing at 50 °C (122 °F)
Dimensions	12.7 mm diameter x 73 mm length (0.50" diameter x 2.88" length)
Microphone Thread	11.7 mm - 60 UNS (0.4606 - 60 UNS)
Cable Driving Capability	Model 831 SLM (10 V rms output signal) To 20 kHz with 300' (91 m) cable
Test Conditions	All values are at 23 °C, 50% RH, 35 Volt supply, 3 m (10') cable and equivalent microphone of 12 pF unless otherwise stated.
Output Connector	Switchcraft TA5M (5-pin male)
Compatibility (to IEC61094-4)	Use with 1/2" microphone, typical 50 mV/Pa sensitivity
	Use ADP043 for use with 1/4" microphones

PRM831 with 377B02 microphone

		0 dB	20 dB
Gain			
Dynamic Range	A	18 - 140 dB	17 - 140 dB
	C	18 - 140 dB	17 - 140 dB
	Z	23 - 140 dB	21 - 140 dB
Measurement Range [1]	A	28 - 140 dB	26 - 120 dB
	C	29 - 140 dB	27 - 120 dB
	Z	35 - 140 dB	34 - 120 dB
Linearity Range [2]	A	≥ 115 dB	≥ 101 dB
		24 to 140 dB	19 to 120 dB
	C	≥ 114 dB	≥ 96 dB
		25 to 140 dB	23 to 120 dB
	Z	≥ 106 dB	≥ 86 dB
		32 to 140 dB	32 to 120 dB
Peak Range	A	66 - 143 dB	46 - 123 dB
	C	66 - 143 dB	46 - 123 dB
	Z	77 - 143 dB	59 - 123 dB
SPL Max Level		140 dB	120 dB
		143 dB	123 dB

Microphone and electrical self-noise included

Electrical Measurements

Permanent Outdoor Preamplifiers and Microphones

Model 426A12	
Model PRM2103	

Notes

[1] As defined in IEC 61672-1. [2] As defined in ANSI S1.4

Model 831 Options at a Glance

Spectral Analysis with Octave Bands	
Octave Analysis (Option OB3)	
Frequency Range	
1/1 Octave Filters:	8 Hz to 16 kHz
1/3 Octave Filters:	6.3 Hz to 20 kHz
Octave filter self generation noise at 1 kHz	
1/1 Octave Filters:	2.0 dB @ Low Range (0.2 dB in Low range w/ 20 dB gain)
1/3 Octave Filters:	-3.1 dB @ Low Range (-4.9 dB in Low range w/ 20 dB gain)
Octave Analysis Parameters	
Filters	None, 1/1 octave, 1/3 octave, or 1/1 and 1/3 octaves
Frequency Weighting (independent of overall)	A, C or Z
Maximum Spectrum	Maximum in each band or Spectrum at Lmax
Spectral Statistics	With Measurement History (831-ELA)
Octave Band Logging Capability	Time History (see 831-LOG) Measurement History (see 831-ELA) Event History (see 831-ELA)
Normalized Spectrum	
View modes	SPL or relative
Predefined filters	A, C, -A, -C
User defined filters	4 named for 1/1 Octave and 4 for 1/3 octaves bands
Profiling with Time History Logging, Measurement History and Event History	
Time History "TH" Logging (831-LOG)	
Logging speed	20 msec to 24 hour
Measurement History "MH" Logging (831-ELA)	
Interval time	1 minute to 99 hours
Logging parameters	Same as Time History Ln Statistics + Spectral Ln (if OB1 or OB3 enabled)
Sound Record Tagging	At start of each interval (requires to enable SR)
Event History "EH" Logging (831-ELA)	
Logging speed	20 msec to 24 hour (independent of TH or MH)
Logging parameters	Same as Time History Ln Statistics + Spectral Ln (if OB1 or OB3 enabled)
Sound Record Tagging	Requires to enable SR at 8 or 16 kHz
SEL	Yes (L_{AE})
Sound Recording (831-SR)	
Data format	Mono wave file (.WAV)
Listening options	On Model 831 using headset, with Utility program, DNA or using standard media tools like MSMedia Player.
Storage options	8, 16, 24 or 48 kHz
Storage rates	1 MB/min at 8 kHz to 6 MB/min at 48 kHz
Sound Recording modes	Manual, Coupled to Marker, at measurement interval begin, upon exceedance event
Pretrigger	up to 9 secs
Duration	max 9999 seconds
Sound Streaming	Streaming to host requires USB communication line (831 V1.6 or later)
Dosimetry (831-IH)	
Dosimeters	2 in parallel
Pre-configured settings	OSHA-1, OSHA-2, ACGIH, NIOSH, IEC
Exchange rate	3, 4, 5, or 6 dB (independently selectable per dosimeter)
Treshold	Selectable level
Criterion duration and time	Numeric input

BAS003
Directional Speaker

| Communication	
Analog modem and Serial Communication (831-MDM)	
Analog modem support	Requires fax line quality line (no VOIP-like data compression allowed) and analog modem on server
Analog modem protocol	Z-Modem
Analog modem model	MDMUSB-A
Analog modem power requirement	Powered USB Hub or 831-INT Docking Station
Analog modem control	Model 831 USB port as host controller
Analog modem data rate	2 to 3 kB/s typical
Serial Communication prerequisite	USB to serial bridge (DVX008A)
Serial Communication protocol	Z-Modem
Serial Communication control	Model 831 USB port as host controller
Wireless modem (831-COMM) over Internet	
Wireless modem support	GSM-GPRS Edge technology over internet Dynamic IP address support via server initiated call Static IP address support when allowed by ISP provider (does not require modem on server)
Wireless modem protocol	Z-Modem over TCP/IP
Wireless modem model	MDMUSB-E (Quad-band)
Wireless modem power requirement	Powered USB Hub or 831-INT Docking Station
Wireless modem control	Model 831 USB port as host controller
Wireless modem data rate	2 to 3 kB/s typical
USB Communication	
Standard cable	Up to 6 ft (CBL138)
Extended cable	66 m or 200 ft with USB Extender 100 m or 330 ft with ICRON
Weather (Meteorological parameters)	
Combined Meteorological Unit (SEN031)	
Measurement method	Digitized over serial port to USB
Preferred sensor models	SEN031 with CBL167 and DVX008A
Connectivity	Model 831-INT Docking station, or CBL170 break-out cable
Measured Parameters	Wind speed and direction, temperature, relative humidity, rain and hail

Ordering Information

Model Number	Description
Sound Level Meter	
831	Model 831 sound level meter for Environmental / Community Noise including Any-Data and Voice Annotation, without microphone or preamplifier
831-FF	Model 831 sound level meter with Class-1 free-field pre-polarized precision condenser microphone (50mV/pa), preamplifier (PRM831), accessory kit (831-ACC)
831-RI	Model 831 sound level meter with Class-1 random-incidence pre-polarized condenser microphone (50mV/Pa), preamplifier (PRM831), accessory kit (831-ACC)
Firmware	
831-LOG	Upgrade Model 831 sound level meter with logging of time histories with interval from 20 msec to 24hrs
831-ELA	Upgrade for Model 831 sound level meter. Exceedance based logging analysis with event, interval and daily histories
831-OB3	Upgrade Model 831 sound level meter with Real-time 1/1 & 1/3 octave filter set
831-SR	Upgrade Model 831 sound level meter with sound recording. Adds sound snapshot on demand Intervals with 831-ELA or on events
831-FST	Upgrade Model 831 sound level meter to logging of time histories with interval from 2.5 msec to 24hrs (requires 831-LOG & 831-OB3)
831-IH	Upgrade Model 831 sound level meter. Industrial Hygiene feature
831-COMM	Upgrade Model 831 sound level meter. Advanced Communication Option controls the EDGE modem (MDMUSB-E)
831-MDM	Option for Model 831 sound level meter. Modem Option controls the analog modem (MDMUSB-A) and the serial port communication (requires DVX008A+CBL117)
831-WTHR	Upgrade Model 831 sound level meter to logging of weather parameters, consult factory to determine field upgrade feasibility
831-RT	Upgrade Model 831 sound level meter with Reverberation Time Analysis
831-FFT	Upgrade Model 831 sound level meter with FFT Analysis
Handheld Accessories	
WS001	3 1/2" diameter windscreen for 1/2" microphone
831-ACC	Accessory kit for Model 831 sound level meter, which includes case (831-CCS), battery (4-AA), power supply w/ USB cable (PSA029) and windscreen (WS001)
831-CCS	Hard shell case for Model 831 Sound Level Meter
ACC003	Headset with microphone boom, 2.5mm micro-jack
ADP074	ICP® cable adaptor for Model 831 sound level meter
CBL138	CABLE USB A to Mini-B 1.8 Meter
CBL139	CABLE 2.5mm AC/DC out to BNC or RCA
CCS032	Soft pouch for Model 831 and SoundTrack LxT
PSA029	AC Power supply for Model 831 and SoundTrack LxT (100-240VAC to 5V USB w/mini-B cable, CBL138)
PSA031	12VDC to USB Converter for SoundTrack LxT and Model 831
CBL140	DC power cable for Model 831 sound level meter, 8 – 30VDC includes lead-acid battery clamps and 12V car plug
Microphones and Preamplifiers	
PRM831	Model 831 sound level meter preamplifier for 1/2" free-field or random incidence prepolarized microphones
377B02	1/2" free-field, prepolarized condenser microphone, typical sensitivity= 50 mV/Pa, 3.15 to 20k Hz (±2 dB)
377B20	1/2" random Incidence, prepolarized condenser microphone 50 mV/Pa, 3.15 to 12.5k Hz (±2 dB)
377C10	1/4" pressure, prepolarized condenser microphone typical sensitivity= 1.6 mV/Pa, 4 to 70k Hz (±2 dB)
ADP043	1/4 in microphone to 1/2 in preamplifier adaptor
426A12	Permanent Outdoor Preamplifier with Electrostatic Actuator, humidity reading, TEDS and supporting externally and pre-polarized microphones. (MIC not included)

Model Number	Description
Software	
SWW-SLM-UTILG3	Utility software for SoundTrack LxT and Model 831 sound level meter: download, upgrade, translate, print text reports or export to spreadsheet. CD with Quick Start Guide
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, setup, live display, data translation, and data download for Model 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, 831. Uses modem connection for communication and data download
Calibrators	
CAL200	Class 1 acoustic calibrator with user selectable output of 94 or 114 dB at 1 kHz. 1/2" opening. (no adaptor)
CAL250	Class 1 microphone calibrator, output 114 dB at 251.2 Hz. 1" opening with 1/2"(ADP019) adaptor. 3/8" (ADP020) and 1/4" (ADP021) adaptors available
Temporary Noise Monitoring System Components	
EPS029-831	Case for Model 831 including (2) 21Ah bat, charger (PSA032), internal preamp cable (CBL141), preamp cable (CBL142-006), power cable (CBL143), 3 ft mast
EPS030-831	Case for Model 831 sound level meter including (1) 21Ah battery, charger (PSA032), internal preamp cable (CBL141), and power distribution cable (CBL151)
EPS2106-2	Environmental protection for 1/2 in preamplifiers (PRMLXT or PRM831), with windscreen, bird spikes, desiccants, 3/4 in standard solid-wall PVC conduit thread
EPS2108-2	Environmental protection for 1/2 in preamplifiers (PRMLXT or PRM831), with windscreen, bird spikes, desiccants, 1/4-20 thread (FEM) for use with tripods
TRP001	Instrumentation tripod w/ADP032 preamp to tripod interface
TRP003	Support tripod, maximum height 8ft, used in portable NMS systems
ADP034	Adaptor connecting EPS2106 to TRP003 tripod
CBL174	Waterproof cable connecting EPS029-831/EPS030-831 to external PC, 2m USB A-to-B
Permanent Noise Monitoring Systems	
NMS016	Permanent NMS on tilt-down pole using mains power. Includes 831 (LOG, ELA), 831-INT, TRP019, 426A12-FF, EPS031 (w/ 9Ah battery) and cables
NMS019	Portable NMS on tripod using solar power. Incl. 831 (LOG, ELA), 831-INT, TRP020-20, 426A12-FF, EPS032 (w/ solar charger) and cables (must add PSA012 and battery)
NMS021	NoiseTutor complete system including 831-FF with 831-OB3, 831-ELA and 831-LOG firmware options and EPS2106-2. Also includes EPS041 that consists of weathertight case, 100 Wh battery, embedded PC, HDMI display, wireless keypad, SWW-DNA-NT software, and wireless gateway
Noise Monitoring System Components	
831-INT	831 Docking Station connecting weather sensors, batteries, charger and USB peripherals
ACC004	Surge suppressor for 110-240 VAC
CBL170	Cable connecting Model 831 to 9-pin D connector (wind speed, direction, logic I/O, 3 slow ADC) and coaxial DC connector (to PSA027), incl. breakout cable and I/F block
EPS037	Case on wheels (CCS035) with 100 Ah battery (BAT002) for permanent NMS, includes cable (CBL149) to enclosure (EPS031 or EPS032)
MDMUSB-A	Modem for Model 831 sound level meter with USB connection and Dial-up
MDMUSB-E	EDGE Modem for Model 831 sound level meter with USB connection
DVX008A	USB Adaptor to DB9 interface (used with Serial modem or SEN031)
SEN031	Combined weather sensor: wind speed and direction (no moving parts), temperature, humidity, pressure, rainfall (requires CBL167 cable + DVX008A)
Calibration	
CER-831	Calibration and Certification of 831(SLM, preamplifier w/o mic) and 831-RPT
CER-MIC	Calibration and certification for microphone
CER-831-E	Environmental Certification Model 831 for [-40,+70]°C range. Incl. calibration of 831 and PRM831, 831-RPT, Env. test of mic. Mic calibration not included
CER-426A12	Calibration and certification for 426A12 inc;. env. testing for temperature and humidity stability. Replaces windscreen, o-ring, and desiccant cartridges
831-RPT	Model 831 sound level meter certification test report. Certificate for SLM, preamplifier and microphone

Noise Sources & Accessories

EPS2106
Short Term Outdoor Protection, 3/4 inch Mount
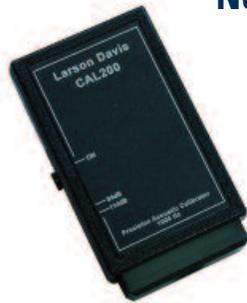
CAL200
1 kHz, 94 and 114 dB, Calibrator

BAS001
Omnidirectional Speaker

BAS002E/U
Lightweight Power Amplifier

BAS003
Directional Speaker on Tripod

Model 831 Sound Level Meter **Solutions**

Building Acoustics

Environmental Noise Monitoring

Spectrogram of Helicopter Passby

FFT Analysis
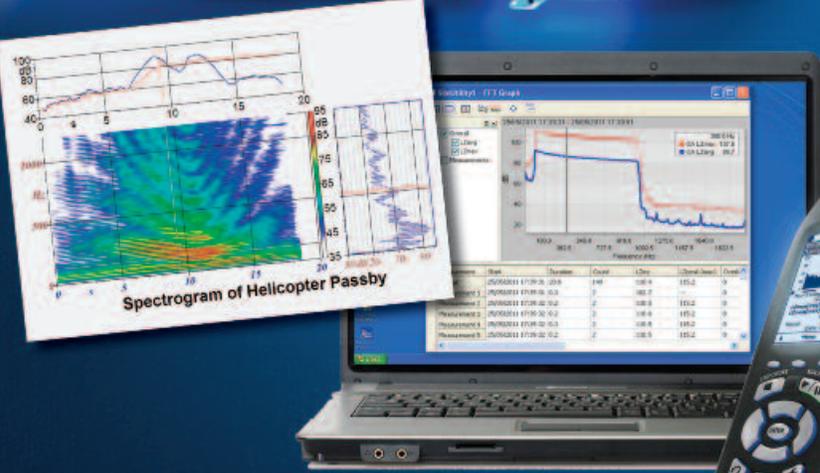
LARSON DAVIS
A PCB PIEZOTRONICS DIV.

Larson Davis provides complete solutions for noise and vibration measurement and analysis. From stand-alone, simple-to-use instruments to complete systems including sensors, data acquisition, and software, Larson Davis has what you need.

As a division of PCB Piezotronics, Inc., Larson Davis guarantees Total Customer Satisfaction through our outstanding limited warranty, our no-charge, 24 hours toll-free technical support and worldwide customer service.

3425 Walden Avenue, Depew, NY 14043-2495 USA
Phone 716-926-8243 | **Toll-Free in USA** 888-258-3222
Fax 716-926-8215 | **E-mail** sales@larsondavis.com
Web Site www.larsondavis.com
ISO 9001 CERTIFIED

Total Customer Satisfaction
LARSON DAVIS
A PCB PIEZOTRONICS DIV.

LD-831-0412

Printed in U.S.A.