EPS044 & NMS044
Noise Monitoring System
Reference Manual
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Record of Serial Number
SoundAdvisor Model 831C Serial Number: ____________

Preamplifier PRM 2103 Serial Number: ____________

Microphone 377B02 Serial Number: ____________

RV50 Cellular Gateway Serial Number: ____________

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Provo, UT, USA

Toll-free (in the US): 888-258-3222
Phone: 716-926-8243
USA fax: 716-926-8215

E-mail: sales@larsondavis.com
i.1 Install G4 LD Utility

G4 LD Utility (G4) software enhances the features, flexibility, and ease-of-use of Larson Davis instruments by providing setup utilities, instrument calibration, computer-based control of the instrument, data download and manipulation, printing, and export of data to third-party software for post processing and analysis.

You can download G4 at http://www.larsondavis.com/G4 or find the software on the supplied USB drive. Run LDsetup.exe to begin the download process. The install program prompts for any additional required information. A PCB Piezotronics menu item will be created under the Program menu item in the Start menu and a shortcut will be placed on the desktop.

i.2 Using A Digital Reference Manual

Larson Davis is committed to the green practices of limited paper waste. In this effort, we only offer reference manuals in a digital PDF format. Digital notes and comments can be made in certain readers, and you are encouraged to print any procedures or sections for quick references that fit your needs. Each page is drafted on A4 size, and can be easily scaled to fit most printers.
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The SoundAdvisor Model NMS044 noise monitoring system (NMS044, system) is the practical solution to long-term or short-term, unattended sound level monitoring. Power is supplied by a 12 V battery, and the system is charged by a solar panel, chosen specifically for the area sunlight availability. It is lightweight, as little as 50 lbs, so one person can carry to a site and setup within a few minutes.

FIGURE 1-1  NMS044 Overview

Environmentally protected microphone and preamplifier

Telescoping pole keeps the microphone away from any sound reflections in the area. Do not place near trees or other large elements.

The outdoor case protects and securely fits the battery, charge controller, antennas, modem, and sound level meter

Place the solar panel unobstructively facing the sun's main trajectory.
1.2 EPS/NMS044 Features

Acoustic Measurement
The area sound is measured with a prepolarized microphone and preamplifier that are environmentally protected in a shroud on a telescoping pole, which is mounted to the case.

Portable
The NMS044 can be deployed, before, during, or after you setup the 831C to make your measurements.

Low Power Consumption
A 12 V battery powers the system, which is charged by a solar panel through a charge controller. The system can run, without recharging, for about a week. Sunlight needed to reboot the system after a power loss is minimal and full charge is reached in only a few hours.

Continuous Sound Measurements
If the batteries are ever completely depleted, the system will shut off safely. When the battery is recharged sufficiently, it will power on and the measurement will continue. This feature runs without any prompting from the user.

Connectivity
Connect to a cellular network using the RV50 and access the 831C to view/download data from a PC at anytime. Control the system from a web browser from wherever you are.

1.3 Components

CCS051

- Environmentally protected case with foam inserts, attachment bracket, and cable gaskets
- Metal Case Plate
- Power distribution block
- Rubber Stoppers - Depending on which preamplifier is used, one is used for CBL222-08 or CBL222-20, and one is used for EXC cables.
- Silicon grease for cable glands
EPS044

- All that is included in the CCS051
- BAT019 45 Ah 12 V LiFePo Battery or BAT020 35 Ah 12 V SLA Battery
- Telescoping pole with guy wire ring
- PSA038 Genasun Solar Charge Controller
  - Controls the charge of the solar panel to the battery and indicates if the battery is charging or fully charged with the LED light. See A.5.3 "PSA038 Genasun Solar Charge Controller" on page A-5
  - Safe to use with BAT019 and BAT020
- CBL226-02 Charge controller to power block cable
- CBL225-01 Fused battery cable
- CBL228-03 Solar connectors to solar charger cable
- CBL224-02 831C to power block cable
- Canvas bag
EPS044-SLA includes the 35 Ah 12 V SLA Battery (BAT020)

EPS044-LFP includes the 45 Ah 12 V LiFePo Battery (BAT019)

FIGURE 1-3 EPS044 Hardware

Telescoping pole with guy wire ring

FIGURE 1-4 EPS044 Cables

PSA038 Solar Charge Controller

CBL224-02

CBL225-01

CBL226-02

CBL228-03
NMS044

- All items listed above for CCS051 and EPS044 (either the EPS044-SLA or EPS044-LFP, see Figure 1-3 EPS044 Hardware).
- SoundAdvisor Model 831C Sound Level Meter (831C, SLM, meter)
  - Firmware options 831C-LOG, 831C-ELA and 831C-SW
  - Default NMS044 measurement setup
  - Four NiMH AA batteries
- COM-RV50-DC Cellular Gateway with dual antennas
- SLP001 60 W or SLP002 100 W Solar Panel
- EPS2116 Environmental protection system for microphone and preamplifier
- PRM2103-FF Preamplifier
  - 377B02 Microphone
- PSA039 120 AC Battery Charger Adapter
- CBL222-08 Cable from PRM2103 to 831C
- CBL223-02 RV50 to power block cable
- CBL138 USB to a Mini B used for system setup
- DVX015 2 port USB adapter
- Phillips #2 screwdriver
- Phillips #0 screw driver

**TAKE NOTE** A SIM card for the RV50 cellular gateway is not included and will need to be purchased through a cellular provider. See “Configure the RV50 Gateway” on page 2-3.
FIGURE 1-5 NMS044 Hardware

- SoundAdvisor Model 831C Sound Level Meter
- EPS2116 Environmental Protection Shroud
- COM-RV50-DC Cellular Gateway
- PRM2103 preamplifier and 377B02 microphone
- NMS044-SLP60 & NMS044-LFP60 includes the SLP001 60 W Solar Panel
- NMS044-SLP100 & NMS044-LFP100 includes the SLP002 100 W Solar Panel

FIGURE 1-6 NMS044 Cables and Accessories

- PSA039
- CBL222-08
- Velcro Ties for the CBL222-08 and pole
1.4 Optional Accessories

- 831-MEM32G USB Flash Storage
- CAL200 Precision Acoustic Calibrator
- CAL250 Precision Acoustic Calibrator

1.5 Wiring Diagrams

FIGURE 1-7 System Wiring Diagram

- Cellular Antennas
- PRM2103-FF Preamplifier and Microphone
- Terminal Lug (ground to plate in case)
- COM-RV50-DC Cellular Gateway
- GPS Antenna
- PSA038 Solar Charge Controller
- CBL223
- CBL218
- CBL226-02
- CBL226-03
- Power Distribution Block
- Battery
- Solar Panel
- DVX015 2-port USB Hub
The following diagram shows the wiring details for the PRM2103 outdoor preamplifier, CBL222 cable, and the 831C.

FIGURE 1-8 Wiring Diagram for PRM2103

The following diagram shows the wiring details for the PRM831 preamplifier, EXCXXX cable, CBL2224 and the 831C. This is an optional wiring setup for the case that a PRM831 preamplifier is used instead of the PRM2103 outdoor preamplifier.

FIGURE 1-9 Wiring Diagram for PRM831
Module 2  Get Started

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2.1 Overview

**TAKE NOTE** This module assumes that you have the complete NMS044 and all its components. For EPS044 the setup is similar and the following modules can be adjusted to your equipment.

When you first receive the NMS044 system you will need to perform several “first use” procedures to get your system ready for deployment. While most steps can be done in the field or after deployment, these steps are recommended to do prior.

2.2 Ready Battery

2.2.1 Install Battery

**TAKE NOTE** Connect all wires and devices prior to turning on the system.

Open case and carefully lift out the plate as to not pull any wires loose. Set on an angle away from case, to expose the back.

**Step 1** If not already in place, insert the battery (BAT019 or BAT020) in the case inside the guide lines, with terminal toward power block. See Figure 2-1 Battery Installation.

**Step 2** Insert the connectors to the power distribution block - red to red and black to black, side by side in any available connector.
Step 3  Place the mounting plate back into the case, over the battery, until set all the way in.

Step 4  If installing a BAT020, insert foam block to fill empty space by the terminals.

FIGURE 2-1 Battery Installation

CAUTION The yellow connector does not connect in the power block. Do not attempt to connect the yellow connector to a red or black connector.

TAKE NOTE The 831C power button \( \Box \) controls the power in the whole system. It is used to turn off and on the NMS044. Additionally, connecting the battery will also turn the system on.

2.2.2 Charge Battery

It is recommended that you charge the battery prior to deployment. A PSA039 AC Battery Charger is included for this purpose. Connect the solar connectors together, and use the plug to connect to an external power source (wall outlet) until charged. You will know it is fully charged when the PSA038 Genasun Solar Charge Controller is green (blinking indicates it is charging, constantly on indicates charge is full), see A.5.3 "PSA038 Genasun Solar Charge Controller" on page A-5.

If there is no light, ensure the battery is properly installed and the system is turned on.
2.3 Configure the RV50 Gateway

The RV50 gateway requires a SIM card for access and service. When purchasing a SIM card, you will need:

- Adequate data plan. Significant charges may occur if the plan is exceeded.
  - Do not need messaging/voice on the plan
- Public IP address
  - A public IP address is needed in order to connect remotely with the 831C. If the plan does not have a public IP address you will not be able to access and control the system.
  - A static IP address or alternative dynamic IP with Dynamic Domain Name Service (DDNS) as an alternative can be used, however with this option you can not remotely access the system. You will still be able to upload files to SFTP or Dropbox.
  - APN
  - Request the APN from your cellular provider. You will need this to configure for remote use.

2.3.1 Install SIM Card

With system powered off, install the SIM card by following these steps:

LEARN MORE To learn more about the RV50 gateway, refer to the Sierra Wireless website.

Step 1  Using the provided #2 Phillips head screw driver, unscrew the two screws located on the RV50, disconnecting the gateway from the case plate.

FIGURE 2-2 Removing RV50 from case plate

Step 2  Using the #0 screwdriver, unscrew the two screws holding the front SIM card door closed. Insert your card into to
RV50, press in to slot until it clicks. Screw the door closed again.

**FIGURE 2-3 RV50 Sim Card Slot**

**Step 3** Remount the modem in the case with the two screws. Hand tight.

2.3.2 Configure for Remote Communication

**TAKE NOTE** If you’ve purchased the RV50 Gateway separately or it has been reset to factory settings, you will need to upload the LD settings first before you can configure for remote use. For procedures on loading the LD settings, see A.7 "Configuring LD Settings for the RV50" on page A-7.

You will need to configure your gateway for remote communication prior to deployment. Once the gateway is installed with a SIM card, and the charged battery is assembled, you are ready to begin.

To setup for remote communication, follow these steps:

**Step 1** The Ethernet port on the gateway has been disabled for power saving reasons and cannot be used to connect to. Disconnect the USB cable which is connected to the gateway, using a separate USB cable, connect the gateway directly into your computer. The USB cable now connects the RV50 gateway to your PC.

**FIGURE 2-4 Connecting to RV50**
Step 2  Turn system ON by pressing the power button on the 831C (if not already on).

Step 3  Open a web browser on the connected PC.


Step 5  Log in as “user” with configured password “LD_NMSystem16”.

**TAKE NOTE** If the login is not working, this may be a sign that the gateway does not have LD settings loaded. See A.7 "Configuring LD Settings for the RV50" on page A-7.

**FIGURE 2-5** User Login

![User Login](image)

**FIGURE 2-6** WAN/Cellular

![WAN/Cellular Configuration](image)

Step 6  Navigate **WAN/Cellular → SIM Slot 1** Configuration and open the + by the Network Credentials.
Step 7  Enter the APN provided by your cellular provider in the User Entered APN.

Step 8  Click Apply and Reboot.

Step 9  Login again. Navigate to Status → Home → Network State. This should say Network Ready if everything was correct. Verify the Active WAN IP Address matches the static address given to you by your cellular provider.

FIGURE 2-7 Status

Step 10  Disconnect the USB from the PC and RV50. Return the mini USB to the RV50.

FIGURE 2-8 Disconnecting USB/Reconnecting USB

Disconnect the USB from the PC and RV50  
Return the mini USB to the RV50.

Step 11  Perform a reboot on the 831C. ON/OFF ⚡ → Reboot.

By connecting via IP address to the 831C prior to deployment, you can determine if the service is working properly. To connect to the 831C with a mobile device, follow these steps:

Step 1  Open a web browser (Chrome is recommended) on your mobile device.
Step 2  In the URL, type the IP address provided to you from your cellular provider, then /SoundAdvisor. Press enter.
- Ex: 126.120.130.65/SoundAdvisor

Step 3  The browser will show the current state of the meter, the same screen as the meter. You can operate the 831C from this view.

FIGURE 2-9 Mobile View
2.4 Model 831C SLM Settings

While the user indicated properties are unique to each user and the intended use, the following settings are recommended for use in the NMS044 system:

- Auto-Off: Never
- Backlights On: 5 s - 10 s (power saving)
- Keypad Backlight: Off (power saving)
- Auto-Store: Store

FIGURE 2-10 System Properties

2.4.1 Shutoff Voltage

Set the shutoff voltage on the 831C to reflect the battery type that is installed in the NMS044 system. To indicate this setting, navigate **Tools → System Properties → Power**. Enter the correct voltage and click Close and Yes to save changes.

To determine the shutoff voltage, use the table below:

**Table 2.1 Shutoff Voltage**

<table>
<thead>
<tr>
<th>Battery</th>
<th>Shutoff Voltage</th>
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</thead>
<tbody>
<tr>
<td>The LiFePo Battery (12V 45Ahr)</td>
<td>12.0 V</td>
</tr>
<tr>
<td>The SLA Battery (12V 35Ahr)</td>
<td>10.8 V</td>
</tr>
</tbody>
</table>
Module 3 Deployment

3.1 Overview

The following module will demonstrate the setup of the NMS044 in the field.

FIGURE 3-1 Deployment Overview

A fully deployed NMS044 with cable tie downs
### 3.2 Travel Packs

Assemble all components in the recommended three travel packs. See Figure 3-2 NMS044 Deployment Travel Packs

**FIGURE 3-2 NMS044 Deployment Travel Packs**

- **Solar Panel in case**
- **EPS2116, telescoping pole, preamplifier, and microphone, guy wire ring, and stakes**
- **NMS044 case with battery, Model 831C SLM, RV50 gateway, charge controller antennas, and all connections**

### 3.3 Assemble EPS2116 and Preamplifier

**LEARN MORE** To learn more about the assembly of the EPS2116 refer to the EPS2116 Reference Manual (IEPS2116.01)

**Step 1** Remove rubber cap from top of preamplifier. Place microphone on preamplifier, then gently screw together until hand tight. Set aside (you can store these connected so you do not need to repeat this step with every deployment).

**FIGURE 3-3 Connecting Microphone and Preamplifier**
**Step 2**  Hold EPS2116 windscreen and birdspike together and unscrew from top. Screw together top and base. The EPS2116 should now appear in two components, see Figure 3-4 EPS2116 Separated.

**FIGURE 3-4  EPS2116 Separated**

**Step 3**  Thread the CBL222-08 cable up through the base and top. Align red dots on bottom of preamplifier to top of CBL222-08, gently push together until mounted. Gently ease the cable back down until the microphone is seated at the top of the EPS2116. As illustrated in Figure 3-5.

**FIGURE 3-5  EPS2116 Threading**
Step 4  Holding windscreen and birdspike over the top, screw the assemblies together (this can wait until after calibration, see “Calibrate” on page 3-8.

TAKE NOTE  Step 4 can be done after calibration, see “Calibrate” on page 3-8.

CAUTION  If you need to remove the windscreen, do not pull it off the birdspike with an upward motion. First, unscrew the birdspike by twisting its top and then pull the windscreen down over the bottom of the unscrewed birdspike.

3.4 Install Pole and EPS2116 to System

Step 1  Remove the protective cap from the top and the bottom of the telescoping pole. Place guy wire ring on the top of the pole. Place the EPS2116 on top and hold it still, twist the pole only, making sure to have the signal cable between two of the tie downs of the ring to not over strain the cable.

FIGURE 3-6  EPS2116 to Telescoping Pole
**Step 2**  Wrap the cable around the pole (2) two times in a counter clockwise orientation. Place into the bracket and twist clockwise to tighten.

**FIGURE 3-7 Telescoping Pole with EPS2116 to system**

**Step 3**  Extend the sections of the pole by loosening the telescoping pole clamp and then tighten.

**Step 4**  Use hook and loop cable straps (already on the cable) to fix the signal cable to the pole.

**Step 5**  Use the guy wires and stakes to steady the pole by attaching them to the guy wire ring and then to the ground.
3.5 Connect Solar Panel

**Step 1** Unlatch solar panel to open.

**Step 2** Loosen thumb screws to extend legs. Match angle on either side.

**Step 3** Connect the solar connectors together.

**Step 4** Place solar panel in a secure, unobstructed flat spot facing toward the sky with optimal sunlight.

---

**FIGURE 3-8 Solar Connection**

---

**Procedures for Disconnecting Solar Connectors**

To disconnect the solar connectors, a solar connector tool is provided. Insert the tool in the middle of the connection, to pinch the locking mechanism, then pull apart.

**FIGURE 3-9 Solar Connector Removal**

---
3.6 Turn System ON

Press the power button ◄ on the 831C to turn the whole system on.

The Model 831C SLM power button ◄ controls the power in the whole system. It is used to turn off and on the NMS044.

FIGURE 3-10 NMS044 Case Components
3.7 Calibrate

**TAKE NOTE** For best results, use Larson Davis Precision Acoustic Calibrators and Larson Davis Microphone-Preamplifiers.

**TAKE NOTE** It is recommended to perform a calibration after the system is deployed.

Refer to your calibrator and microphone-preamplifier product manuals for specific requirements in performing the acoustic calibration.

**Step 1** Holding windscreen and birdspike together, unscrew the assemblies until they come apart.

**Step 2** Place the calibrator over the microphone. Apply it carefully to avoid sudden large pressure changes to the diaphragm.

**Step 3** Navigate **Tools → Calibrate** on the meter.

**Step 4** Select the calibrator and click the **Edit Settings** button if the calibrator settings need to be modified. Ensure that the settings correspond to those described in the manual for the selected calibrator.

**Step 5** Turn calibrator on.

**Step 6** Click the **Do Calibration** button on the meter.

**FIGURE 3-11 Acoustic Calibration**
Step 7  After a few seconds, a message appears indicating the measured difference and a prompt to save the results. Click Yes to save the calibration or No to reject it.

Step 8  Carefully remove the calibrator from the microphone.

FIGURE 3-12  Calibration Results

Click the Calibration History tab to view either acoustic calibration or calibration check summaries.

Step 9  When calibration process is complete, assemble windscreen and birdspike back on to the microphone.

3.8 Due Diligence

Follow these steps prior to leaving the system:

FIGURE 3-13  Due Diligence

Check the charge controller and the RV50 for operation status
3.8.1 Verify Battery is Charged/Charging

You will know the battery is fully charged when the PSA038 Solar Charge Controller is green. A blinking LED indicates it is charging, constantly on indicates charge is full. See A.5.3 "PSA038 Genasun Solar Charge Controller" on page A-5.

3.8.2 Check Cellular Service

**TRY THIS** Check the service lights, see A.5.2 "COM-RV50-DC-U/E Cellular Gateway" on page A-3.

By connecting to the 831C while in the field, you can determine if the service is working properly. To connect to the 831C via a mobile device (with active cellular service), follow these steps:

**Step 1** Open a web browser (Chrome is recommended)

**Step 2** In the URL, type the IP address provided to you from your cellular provider, then /SoundAdvisor. Press enter.

- Ex: 126.120.130.65/SoundAdvisor

**Step 3** If you have cellular service, then the browser should show the current state of the meter, the same screen as the meter. You can operate the 831C from this view.

3.8.3 Secure case with lock

This step is optional but recommended. The NMS044 case latches tight, and a lock can be used to secure it. You can chain the system to a fixed object as well, to deter theft.
Module 4 Making Measurements

4.1 Overview

Setting up the Model 831C Sound Level Meter can be done prior, during, or after deployment. You have complete accessibility to make settings changes, check the measurement, or download the file at any step of the process.

4.2 Connect to G4 LD Utility

TAKE NOTE G4 LD Utility can also be connected to multiple instruments through all connection types.

You can connect directly to a PC from the meter with a mini USB cable; however, this section will describe connecting via TCP/IP.

Launch the software and click Connect.

FIGURE 4-1 Connect

In the Connect to Meter dialog box, select 831 as the device and TCP/IP as the connection type. Enter the IP address given by your cellular provider for the RV50 modem SIM card and the port number for the instrument (most likely port 80). Click Connect.
4.3 Default NMS044 Setup File

For convenience, there is a default setup file for the NMS044 on the meter that can be set to Active. If you make any changes to this setup, you can save it as a custom setup file for multiple use, even transferring it to a PC to be transferred to any number of meters. To do this, follow these steps:

**Step 1** Using G4, mobile device, or the meter itself navigate to the Setup Manager for the meter. ([Tools → Setup Manager])

**Step 2** Select the setup “NMS044”, press Enter.

**Step 3** Select Set to Active.
The NMS044 setup file contains metrics that are commonly measured when measuring outdoor noise. These default settings will log one hour intervals, daily results, and one second time histories to view noise levels as a function of time. Triggers SPL 2 (set to 65 dB) and/or PEAK 3 (set to 140 dB) will send email alerts any time there is an event detected. This default setup is described below.

**FIGURE 4-4 NMS044 Settings: Control**

**TAKE NOTE** Measurement history is only available with the 831C-ELA or 831C-MRS option purchased and installed on the Model 831C SLM. For more information, see “Contact Larson Davis” on page i-2.

It is recommended to set Continuous as the Run Mode for the NMS044. This mode will begin a run every time the meter is powered on and will continue to run until a manual Stop or the meter is powered off. If the system loses power and then is recharged sufficiently, the system will power on and a measurement will start on its own. The Daily Auto Store is set to store once a day, so you will have 24 hour measurement files.

The PRM2103 preamplifier can do a daily automatic calibration check to ensure that the measurements are accurate. A recommended time for the calibration check is 2:30:00.

**FIGURE 4-5 NMS044 Settings: Time History**
**TAKE NOTE** Time History is only available with the 831C-LOG or 831C-MRS option purchased and installed on the Model 831C SLM. For more information, see “Contact Larson Davis” on page i-2.

Time History at one second period will create one second records in each measurement. For each record, the selected metrics will be logged. The NMS044 setup enables the default metrics.

**FIGURE 4-6 NMS044 Settings: Triggers, Events, and Sound**

**TAKE NOTE** Options 831C-SR, 831C-MSR, 831C-ELA enable this feature and must be purchased and installed on the Model 831C SLM. For more information, see “Contact Larson Davis” on page i-2.

Make event-based sound recordings that can be sent via email or SMS and stored in the measurement data with these settings. When the area sound exceeds the SPL 2 or Peak 3 triggers, a sound recording will begin and record 7 seconds of sound, which will immediately be sent as an email or text message. To assign the recipients, see “Email/Text Alerts” on page 4-5.
4.4 Email/Text Alerts

TAKE NOTE Email alerts are enabled on an Event History setup. Once enabled, the email preferences from System Properties will be used for the alerts.

Send text/email alerts from the Model 831C SLM for noise exceedances and other features (ex. cloud storage notifications). Sound can be recorded and sent via email in the alert as well.

To set up email alerts, follow these steps:

**Step 1** Connect the 831C to a router with Internet access via WiFi or Ethernet.

**Step 2** On the meter, or using G4, navigate System Properties → Email.

**FIGURE 4-7 System Properties: Email**

TAKE NOTE The email server the 831C connects to needs to be SMTP server with TLS authentication (using port 587). When setting up an email account through a public server (i.e. Gmail or Yahoo), you may need to enable SMTP access for the account, typically through secure login settings. To avoid spam filters, add the host email addresses to your contact list.

**Step 3** Enter an email hostname, username, and password.

**Step 4** Enter the email addresses the recipients will reply-to.

**Step 5** Indicate the email address for the text alert. For this field, the phone number @ carrier email address will be accepted. For example, 80155555555@vtext.com will send a text message to a Verizon Wireless mobile device.

**Step 6** Send a test email.

**Step 7** Close and save.

Example: Run a measurement. When the SPL 2 or Peak 3 Triggers exceed their indicated thresholds, an email will be sent with a sound recording attached to the recipients you have indicated.
4.4.1 Listening to .OGG Files

The 831C supports interfacing with the meter using a browser. This function is in beta testing, and the functionality is not complete. Support for browsers and audio playback is summarized below:

Table 4.1 Audio Playback

<table>
<thead>
<tr>
<th>Platform</th>
<th>Browser</th>
<th>Audio File (.OGG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows</td>
<td>Internet Explorer - Not recommended</td>
<td>No Supported</td>
</tr>
<tr>
<td></td>
<td>Chrome - Recommended</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Firefox</td>
<td>Not Tested</td>
</tr>
<tr>
<td></td>
<td>Microsoft Edge</td>
<td>Not Tested</td>
</tr>
<tr>
<td>Mobile (Apple &amp; Android)</td>
<td>Chrome - Recommended</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Safari</td>
<td>Requires CODEC download and installation</td>
</tr>
<tr>
<td></td>
<td>Opera</td>
<td>Not Tested</td>
</tr>
<tr>
<td></td>
<td>Symbian</td>
<td>Not Tested</td>
</tr>
</tbody>
</table>
## Appendix A  Additional Features

### A.1 Physical Characteristics

<table>
<thead>
<tr>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>• NMS044 with SLP001 &amp; BAT019, cases: 23 kg (50 lbs)</td>
</tr>
<tr>
<td>NMS044 without battery or solar panel: 8.18 kg (18 lbs)</td>
</tr>
<tr>
<td>• SLP001 60 Watt solar panel: 9 kg (19.85 lbs)</td>
</tr>
<tr>
<td>• SLP002 100 Watt solar panel: 12.27 kg (27.05 lbs)</td>
</tr>
<tr>
<td>• Telescoping pole, EPS21116, and PRM026 in bag: 1.92 kg (4.2 lbs)</td>
</tr>
<tr>
<td>• BAT019: 5.8 kg (12.8 lbs)</td>
</tr>
<tr>
<td>• BAT020: 11.2 kg (24.7 lbs)</td>
</tr>
</tbody>
</table>

**Dimensions**

- NMS044 Case: 61 cm x 35.5 cm x 18 cm (24” x 14” x 7”)
- SLP001: 66 cm x 35.5 cm x 8 cm (26” x 14” x 3”)
- SLP002: 50 cm x 68.5 cm x 8 cm (20” x 27” x3”)
- Canvas Bag: 48 cm x 23 cm x 15 cm (19” x 9” x 6”)

**Deployment Dimension**

3 m (10’) diameter on the ground with a 2 m (6.5’) overhead clearance minimum. Though sound reflections are possible with objects that could be nearby, so more clearance is recommended.
A.2 NMS044 Power Draw

The NMS044 system draws power from the connected battery. It cannot be powered any other way (ex. wall outlet). The following table was generated from the recommended setup for the RV50, see “Configure the RV50 Gateway” on page 2-3. Other options are available that will change the power consumption of the system and any deviation from the recommended setup. Setting up scheduled run-time(s) on the 831C meter will cause the meter to turn off when not running which will extend the number of days of backup. All of these values are given with the assumption that no external power is attached (solar, outlet, etc.).

<table>
<thead>
<tr>
<th>Table A.1 Draw and days of battery backup</th>
</tr>
</thead>
<tbody>
<tr>
<td>System continuously running</td>
</tr>
<tr>
<td>The LiFePo Battery (12V 45 Ahr)</td>
</tr>
<tr>
<td>The SLA Battery (12V 35 Ahr)</td>
</tr>
<tr>
<td>System continuously running and streaming</td>
</tr>
<tr>
<td>The LiFePo Battery (12V 45 Ahr)</td>
</tr>
<tr>
<td>The SLA Battery (12V 35 Ahr)</td>
</tr>
</tbody>
</table>

A.2.1 Sunlight Hours


A.2.2 Alternative Solar Panel

The NMS044 system can support solar panels that are <140 W.

A.3 Long Term Storage

If your system is to be stored for more than one week, unplug and/or remove the battery from the case and store separately.

A.4 Shipping Information

Caution: Do not transport with lid open.

Prior to shipping the system, always disconnect the battery from the power block terminal, as to not drain the battery while in transit. The battery can be shipped in the case, with the correct shipping labels on the outside of the box.
A.4.1 Lithium Iron Phosphate Battery (LiFePo)

The BAT019 LiFePo is considered Class 9 Hazardous Material, and additional requirements will need to be met when shipping. A company and/or individual will need to be 49 CFR and IATA certified to be able to ship the BAT019 (which is a lithium battery over 100 W Hr). Additionally, recertification is required every two years. Licensing can be obtained through a training course, such as the Lion Technology online training course - code #HMT 254 “Shipping Lithium Batteries”.

A.5 LED Indicators

A.5.1 SoundAdvisor Model 831C Sound Level Meter

<table>
<thead>
<tr>
<th>Measurement State</th>
<th>Red LED</th>
<th>Green LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stopped with Reset</td>
<td>Winking</td>
<td>***..</td>
</tr>
<tr>
<td>Stopped</td>
<td>Blinking</td>
<td>**.<em>.</em></td>
</tr>
<tr>
<td>Paused</td>
<td>Flashing</td>
<td>.*.</td>
</tr>
<tr>
<td>Running</td>
<td>Off</td>
<td>Blinking</td>
</tr>
<tr>
<td>Waiting for valid data to</td>
<td>Delayed winking</td>
<td>.----*</td>
</tr>
<tr>
<td>begin running</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table A.2 Measurement Status LED Indicators

Charge Status LED

The charge status indicated by an LED on are as follows:

- LED continuously lit: Charging
- LED not lit: Not charging
- LED winking: Charging stopped (battery fault)
- LED fast blinking: meter is powering up or shutting down

A.5.2 COM-RV50-DC-U/E Cellular Gateway

When installed and running, the state of the RV50 is indicated in the four LED indicators on the side and bottom of the device. Refer to the following table for the LED behavior:
### Table A.3 RV50 LED Indicators

<table>
<thead>
<tr>
<th>LED</th>
<th>Color/Pattern</th>
<th>Description</th>
<th>LED Power Saving Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>Off</td>
<td>No power or input voltage &gt; 36 Vdc or &lt; 7 Vdc</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td>Solid Green</td>
<td>Power is present</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Green with Amber Flash</td>
<td>Power is present and the gateway has a GPS fix</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Solid Red</td>
<td>Standby mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flashing Green</td>
<td>When you press the reset button, flashing green indicates when to release</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>the reset button to reboot the gateway.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flashing Red</td>
<td>When you press the reset button, flashing red indicates when to release the</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>reset button to reset the gateway to the factory default settings.</td>
<td></td>
</tr>
<tr>
<td>Signal</td>
<td>Solid Green</td>
<td>Good signal (equivalent to 4-5 bars)</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td>Solid Amber</td>
<td>Fair signal (equivalent to 2-3 bars)</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td>Flashing Amber</td>
<td>Poor signal (equivalent to 1 bar)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>If possible, move the gateway to a location with a better signal.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flashing Red</td>
<td>Inadequate (equivalent to 0 bars)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>If possible, move the gateway to a location with a better signal</td>
<td></td>
</tr>
<tr>
<td>Network</td>
<td>Solid Green</td>
<td>Connected to an LTE network</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td>Solid Amber</td>
<td>Connected to a 3G or 2G network</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td>Flashing Green</td>
<td>Connecting to a network</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flashing Red</td>
<td>No network available</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flashing Red/Amber</td>
<td>Network Operator Switching is enabled, but the gateway is unable to locate</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>the required firmware. For more information, contact Sierra Wireless®.</td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Flashing Green</td>
<td>Traffic is being transmitted or received over the WAN interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flashing Red</td>
<td>Traffic is being transmitted or received over the serial port. This behavior</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>only appears if the RV50 is configured to display it. For more information,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>contact Sierra Wireless®.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flashing Amber</td>
<td>Traffic is being transmitted or received over both the WAN interface and the</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>serial port. This behavior only appears if the RV50 is configured to display</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>it. For more information, contact Sierra Wireless®.</td>
<td></td>
</tr>
<tr>
<td>ALL</td>
<td>Green LED chase</td>
<td>Radio module reconfiguration/firmware update or Network Operator Switching is</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>in progress.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Amber LED chase</td>
<td>ALEOS software update is in progress.</td>
<td></td>
</tr>
</tbody>
</table>

**FIGURE A-1 Gateway LED Indications**
The solar charger has one bicolor status LED. When you first connect your charger to the battery, the LED should blink red then green. The LED blinks green to indicate that your charger is powered and charging, and the LED may blink red to indicate errors. Refer to the following list for more specific indications:

**Green LED**
- Short blinks every 4-5 seconds
  Battery connected, no panel voltage
- Short blinks every 1 second
  Panel detected, but not providing power
- Fast short blinks
  Charging with low current
- Slower long blinks
  Charging with high current
- Long Blink, Short Blink
  Charging at internal current limit
- Constant on
  Battery is Fully Charged

**Red LED**
- Two Blinks
  Temperature Too High
- Three Blinks
  Power Too High
- Four Blinks
  Battery Too Low
- Five Blinks
  Battery Too High
- Six Blinks
  Panel Too High
- Two Long Blinks followed by short blinks
  Contact Technical Support

**FIGURE A-2 Genasun Solar Charge Controller LED**
A.6 Removing Cables from Case

In the event that the cables need to be removed from the case, follow these steps:

**Step 1** Remove the CBL228-03 from the charge controller by unscrewing the terminals and gently pulling the cable out. Remove the CBL222-08 from the top of the 831C by pressing the release button and pulling out.

**Step 2** Unscrew the gasket by turning counterclockwise.

**Step 3** Using your hands on either side of the case wall, gently push the rubber stopper out. The cable can be removed through the slit in the stopper.

**Step 4** Follow the steps in reverse order to reinstall the cables in the case.

![FIGURE A-3 Removing Cables from Case](image-url)
A.7 Configuring LD Settings for the RV50

The RV50 Gateway can only be a functioning communication device if it is configured with the correct settings. If you have purchased a new RV50 from another source besides Larson Davis or if it has been reset to factory defaults, you will need to perform these steps to configure your system to the settings that were installed when first shipped from Larson Davis.

Upload LD Settings Data File to RV50

**Step 1** Attach the mini USB cable from the PC to the gateway. See Figure 2-4 Connecting to RV50.

**Step 2** Open a web browser.

**Step 3** Enter http://192.168.14.31:9191 into the address bar.

**Step 4** Login as “user” with default password “12345”

**Step 5** Take note of the version of firmware currently on the device.

FIGURE A-4 Sierra Wireless Login

---

FIGURE A-5 Firmware version
Step 6  Check for the latest firmware version at http://source.sierrawireless.com/ select the proper device and follow the link Firmware Package.

Step 7  If needed, download and update the firmware according to the manufacturer’s instructions and log back in when it has rebooted.

Step 8  Navigate to Admin tab.

Step 9  Enter the default “12345” password in Old Password.

Step 10 Enter unique password in both New Password and Retype Password.

Step 11 Select Change Password. Select Apply.

**TAKE NOTE** Record this password. If you forget it you will need to reset the RV50 to factory settings and reconfigure.

**FIGURE A-6** Admin Tab
Step 12 Select Template on the top right.

Step 13 Select the template file found on the USB device included with the NMS044 system called “RV50TemplateFile.xml”. The file can also be found at http://www.LarsonDavis.com

Step 14 Select Apply.
If you are using the template file skip the remaining steps on the series and you have completed the setup process.

FIGURE A-7 Template File Loading Process
LD Settings without Template File

**Step 1** If you did not use the template file, navigate to Security tab.

**Step 2** Click on the Port Forwarding section on the left.

**Step 3** Change the screen to match what is shown in Figure A-8 Port Forwarding. Port 80 allows for G4 LD Utility to have access to the HLD on the 831C.

**FIGURE A-8 Port Forwarding**

Step 4 Apply when finished.

**Step 5** Navigate to Services tab.

**Step 6** Select ACEmanager section in the left pane.

**Step 7** Ensure the settings are as show in

**FIGURE A-9 Services - ACEmanager**

**Step 8** Apply when finished.
Step 9  Navigate to Power Management section in the left pane.

Step 10  Select Power Saving Mode.

Step 11  Change the Processor Power Saving Mode to Enable.

FIGURE A-10  Services - Power Management

Step 12  Apply when finished.
Step 13 Click on the Telnet/SSH section in the left pane.

Step 14 Set Telnet/SSH Echo on the left pane and set the value to disable.

Step 15 Apply

FIGURE A-11 Telnet/SSH

Step 16 Navigate to the Location tab.

Step 17 Select Global Settings on the left pane.

Step 18 In the Location Service box choose Enable.

Step 19 Set the TCP GPS Port to 9494.

FIGURE A-12 Location Settings

Step 20 Apply when finished.
Step 21 Navigate to the Serial tab.

Step 22 Change the Serial Port to Disable.

FIGURE A-13 Serial

Step 23 Apply when finished.

Step 24 Navigate to the LAN tab.

Step 25 Select the USB section in the left pane.

Step 26 Verify that the settings are as shown in

FIGURE A-14 USB Port

Step 27 Apply when finished.
**TAKE NOTE** After this change you will not be able to connect to the gateway with a wired Ethernet connection. In order to restore that connection without connecting to the gateway through the cellular connection a hard reset must be performed. This will reset all items to a factory default and you would have to start over on the configuration.

**FIGURE A-15** LAN Settings

![LAN Settings](image)

**Step 28** Navigate to the Ethernet section in the left pane.

**Step 29** Change the Ethernet Port 1 to Disable.

**Step 30** Apply when finished.

**Step 31** Select Reboot on the top right.

**Step 32** Allow the gateway to save the applied settings and reboot.
A.8 Declaration of Conformity

EU Declaration of Conformity PS144
in Accordance with ISO/IEC 17050

Manufacturer: Larson Davis, a Division of PCB Piezotronics
1681 West 820 North
Provo, Utah, USA 84601

Authorized European Representative:
PCB Piezotronics Europe GmbH
Porschestrasse 20-30
41836 Hückelhoven, Germany

Certifies that type of equipment: Sound Level Meter

Whose Product Models Include: 831C and derived kits, including NMS044 configurations

This declaration is applicable to all 831 Series models which have the CE mark on their data sheets and where those data sheets refer to this Declaration of Conformity. The data sheets for all model numbers referenced above which include the CE mark on such data sheets and refer to this Declaration of Conformity are hereby incorporated by reference into this Declaration.

<table>
<thead>
<tr>
<th>Conform to the following EU Directive(s) when installed per product documentation:</th>
<th>2014/30/EU</th>
<th>2014/35/EU</th>
<th>2011/65/EU</th>
</tr>
</thead>
</table>

Standards to which Conformity is Declared:

<table>
<thead>
<tr>
<th>Harmonized Standards</th>
<th>EN 61010-1:2001</th>
<th>EN 50581:2012</th>
<th>Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Immunity Test Standard</th>
<th>EN 61326-1:2013</th>
<th>Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Emissions Test Standard</th>
<th>EN 55011:2009</th>
<th>Industrial, scientific and medical equipment. Radio-frequency disturbance characteristics - Limits and methods of measurement</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Industry Standards</th>
<th>EN 61672-1:2002</th>
<th>Sound level meters – Part 1: Specifications</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Test Reports</th>
<th>EMC and Safety Report</th>
<th>D1247.0024(A) – Model 831C EMC and Safety Test Report</th>
</tr>
</thead>
</table>

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) Standard(s)

Place: Provo, UT Date: 08/01/2017

Signature: 
Name: Carrie Termin
Title: Regulatory Affairs and Product Certification Specialist

- ISO 9001 Certified PCB Piezotronics, Inc. Phone: 716-684-0001 FAX: 716-684-0987

PS144 Rev. A 08/01/2017