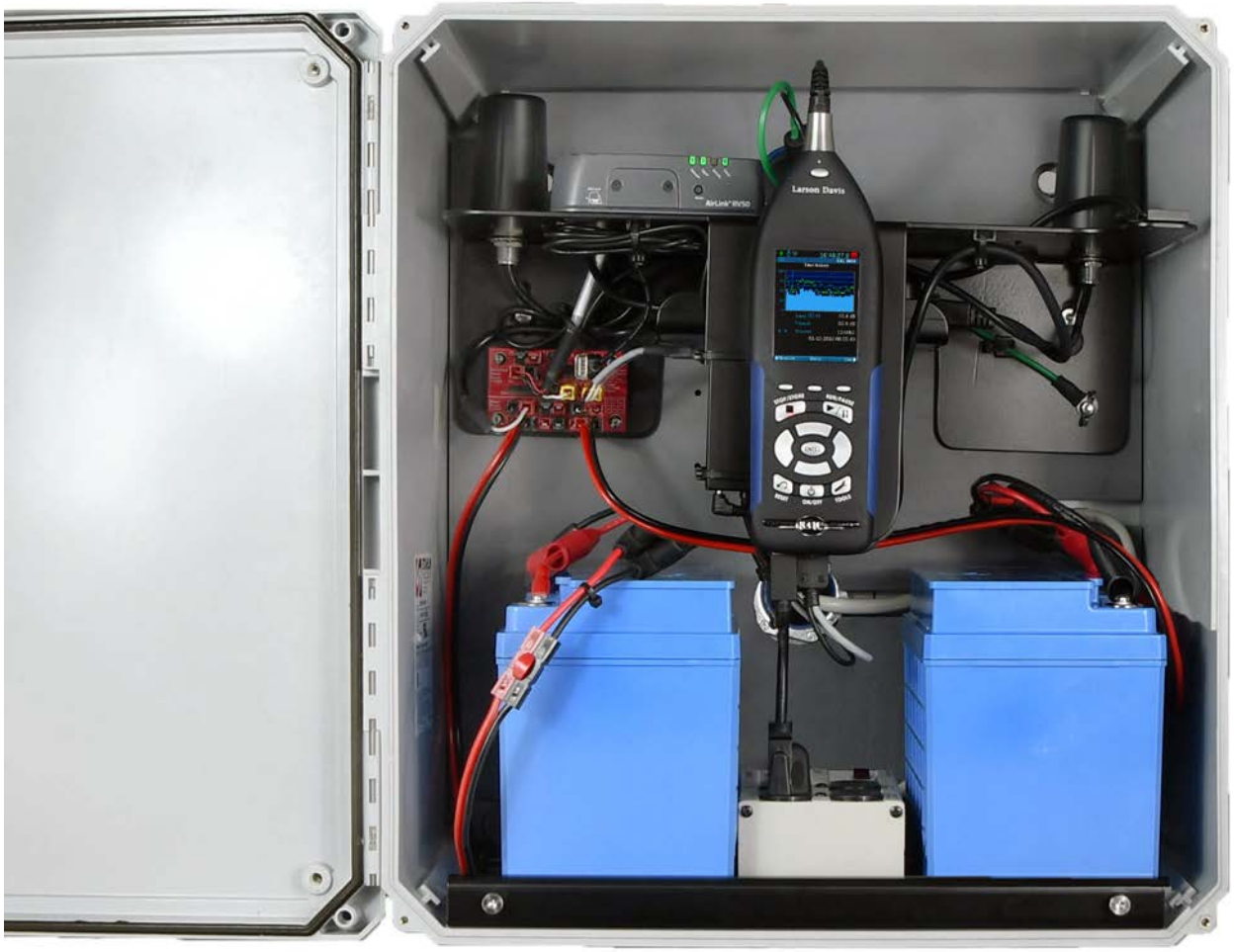
SoundAdvisor™
Model NMS045
Permanent Noise Monitoring System
Reference Manual



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Larson Davis

SoundAdvisor™ Model NMS045
Permanent Noise
Monitoring System

Reference Manual

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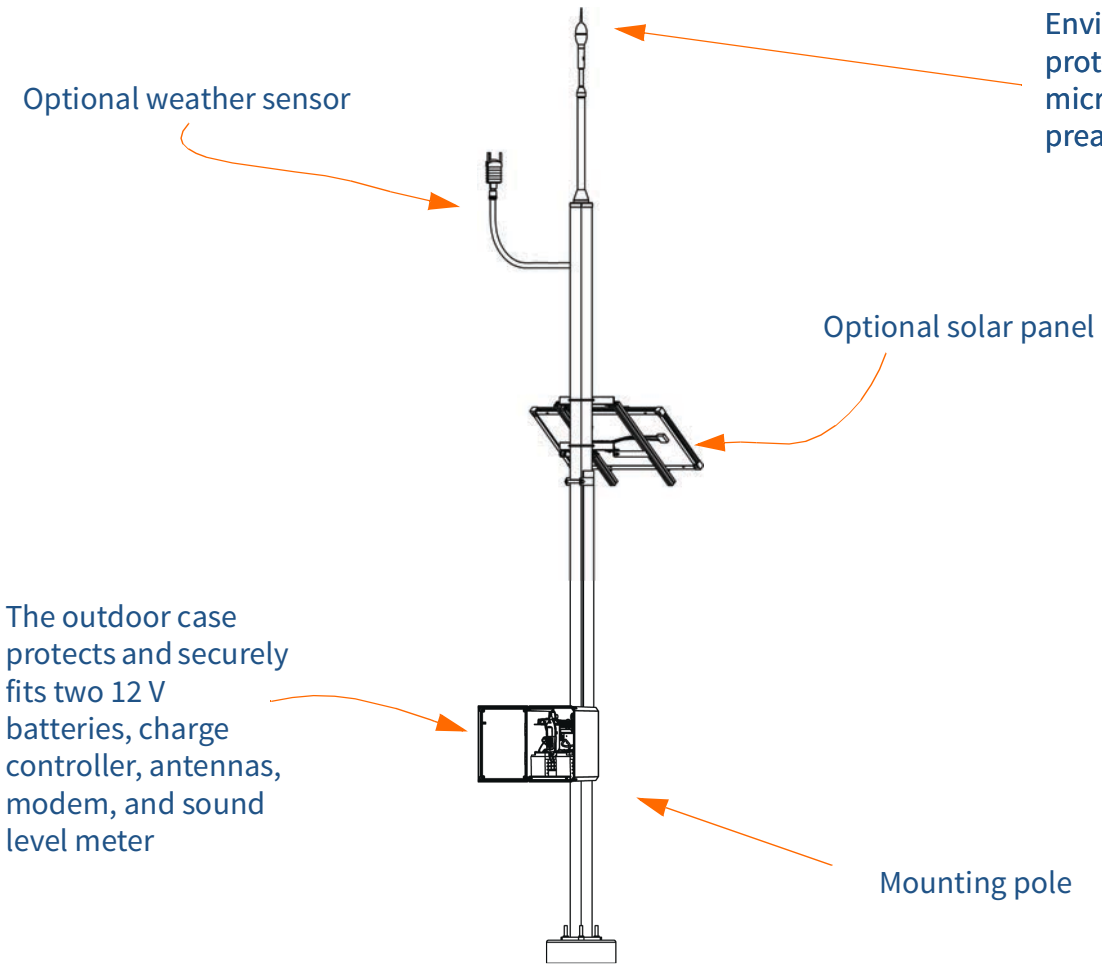
Module 1 System Overview

1.1 Overview

The SoundAdvisor™ Model NMS045 Permanent Noise Monitoring System is a mounted, permanent noise monitoring system used for long-term outdoor sound level monitoring. It is powered by one or two 12 V batteries which are charged by a solar panel or an AC connection. The secure fiberglass case is equipped with an intrusion detection device that will send a notification through the RV50X Gateway Modem if the door has been opened. The gateway is used to connect remotely to the SoundAdvisor™ Model 831C Sound Level Meter.

The NMS045 is not a product but rather the name for a set of products used with the 831C sound level meter to create a permanent noise monitoring system.

FIGURE 1-1 NMS045 Overview



1.2 NMS045 Features

Acoustic Measurement
The area sound is measured with the SoundAdvisor™ Model 831C sound level meter using a prepolarized microphone and preamplifier that are environmentally protected in a shroud.

Power Options
A solar panel can effectively charge the 12 V battery to power the system continuously without interruption. Alternatively, an AC power source will keep the battery charged.

Connectivity
Connect to a cellular network using the RV50X Cellular Gateway so that you can access the 831C to view/download data from a PC anytime. You can access the interface from a web browser, so an external device may control the system. Ethernet and WiFi are viable connection options as well.

Intrusion Detection
The anti-theft system will alert through email when the door has been opened. There is a magnet on the door and the main plate. When separated it sends a signal to the RV50X Gateway, and then an alert is sent to the email address specified in the gateway settings.

1.3 Components

TRP019 Pole

TRP019 is a 17 foot pole that when used with the 426A12-NPT and EPS2116 is designed to mount the PRM2106-FF at approximatively 20 feet above ground. It is installed by a local contractor using the Larson Davis mechanical drawing. The foundation is poured, pole mounted, and the EPS045 box installed by a local contractor.

EPS045

The EPS045 is an environmentally protected fiberglass case used to protect and house the NMS045 system. It includes:

- Fiberglass case
- Back panel, distribution plate, and battery plate
- Grounding cable

Depending on mounting option, you will receive items to meet your specific mounting requirements. A system with a solar or weather system will determine holes and accessories for the EPS045.

831C-045S/AC

The SoundAdvisor™ Model NMS045 includes the following components as a base for the NMS045 system:

- SoundAdvisor™ Model 831C Sound Level Meter with options:
  - 831C-ELA
  - 831C-LOG
  - 831C-SW
- Main plate
- PRM2103-FF Preamplifier and microphone
- EPS2116 Environmental Protection Shroud
- PSA040 Battery charger (831C-045-AC only)
- Control power block
- DVX013 USB hub
- 32G Memory drive for 831C
- Zip ties
- Velcro straps
- 5/8” 4 foot flexible tubing
- 6425.0024 Solar ring tool (831C-045-S only)

Cables

- CBL235 USB power cord for the DVX13, 3 port USB Hub
- CBL222-20 PRM2103 to 831C
- CBL233-12 charge controller to solar panel (831C-045-S only)
- CBL226-03 power block to charge controller (831C-045-S only)

Battery

- BAT019-045 12 V LiFePo battery
  - CBL225-01 with extension CBL232-02
- BAT020-045 12 V SLA battery
  - CBL225-01 with extension CBL232-02

Optional Kits

Solar Panel

- SLP003 Solar panel and mount

Wireless Gateway

- COM-RV50X-045NA/EU:APAC with antennas
- CBL218
- CBL231

Weather

- SEN031-045 NMS045 weather station kit with CBL 229-20, DVX-008A, and ADP101
- SEN032-045 NMS045 wind station kit with CBL 229-20, DVX008A, and ADP101
- CBL229-20 Weather sensor to power block
- DVX008A Weather sensor to USB hub

Security Band

- EPS043-BAND security band/lock for case

AC Power Adapter

- PSA041 AC Adapter and USB cable to power the COM-RV50X gateway modem

1.4 Wiring Diagram

The following diagram shows the system with all available options, including the two power options: solar and AC. At least one battery is needed to run the system.

FIGURE 1-2 System Wiring Diagram

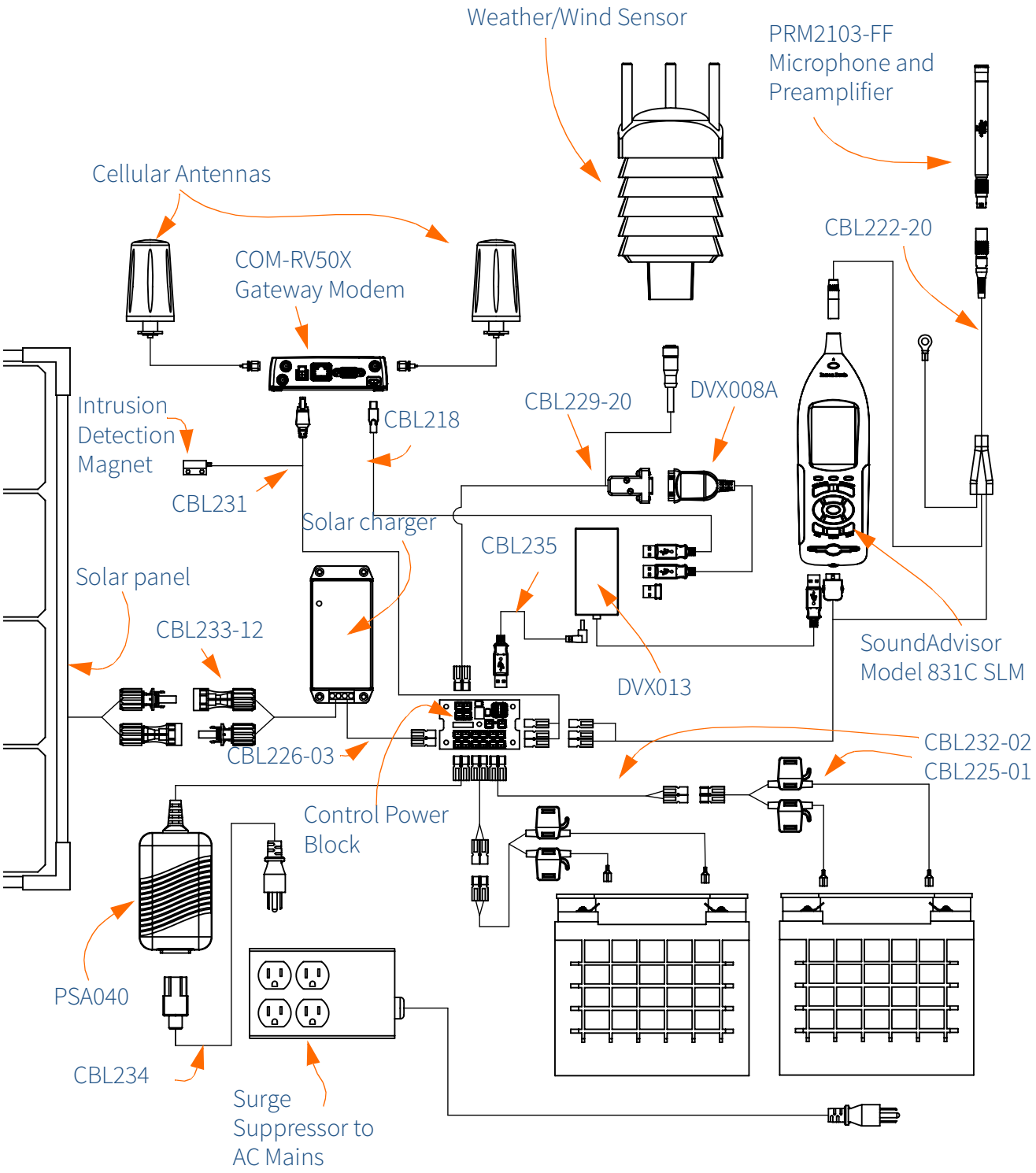
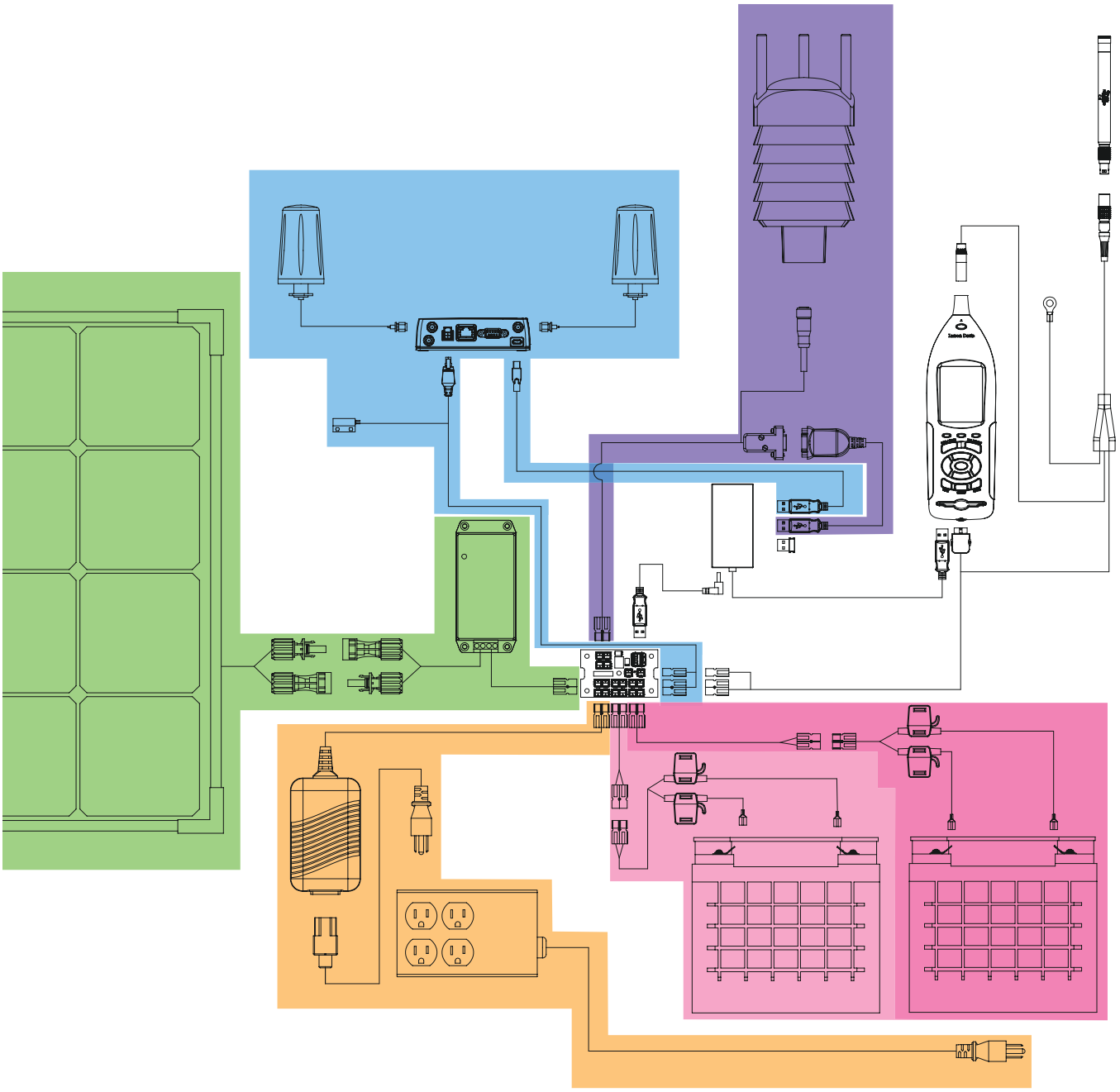


Figure 1-3 is color coded to show the options and their components:

- Blue - COM-RV50X-045NA/EU:APAC Cellular Gateway
- Purple - SEN031-045, SEN032-045 Weather/Wind System
- Green - Solar Powered System
- Orange - AC Powered System
- Pink - Batteries, one or two
- Not colored - 831C0-45 base system for the NMS045

FIGURE 1-3 System Wiring Diagram - Options



Module 2 Getting Started

2.1 Overview

Before installing the components of the NMS045 system, you will need to perform several “first use” procedures. While some steps can be done in the field after installation, these steps are recommended prior to installation.

2.2 Preparing the Battery

The battery cables ship separately from the battery. To connect to the cables, insert the spade connectors to the terminals, black to negative and red to positive. Cover terminals with caps.

FIGURE 2-1 Battery with Cables

CAUTION If you are using two 12 V batteries ensure both batteries are fully charged before installation. You risk blowing a fuse if one is depleted and one is charged. The batteries cannot have more than 1 V difference in charge when connected.

We recommended that you charge the battery prior to installation using the PSA040 battery charger.

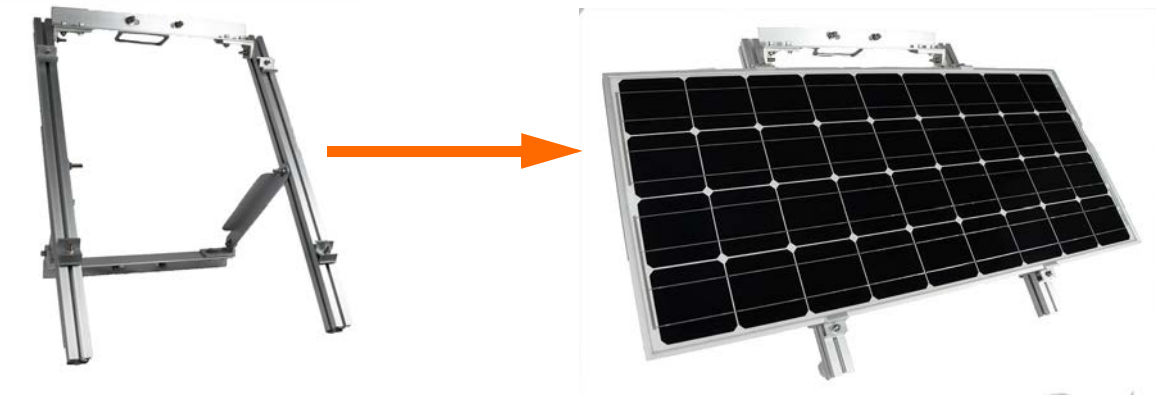
2.3 Assembling the Solar Bracket

Assemble the bracket and mount the solar panel following the manufacturer's instructions included with the SLP003 Solar Panel and Mount. (MTS-SP200)

The bracket is supplied with round U-bolts which do not mount to the TRP019. They mount to a pipe. Square U-bolts are included for use when mounting to a TRP019.

Ensure that the angle of the panel on the bracket will be close to the desired angle on the pole. Solar tilt will need to be calculated using your location and can be adjusted throughout the year for optimal sunlight exposure.

FIGURE 2-2 Solar panel with bracket



2.4 Assembling Main Plate & Components

The 831C-045 ships partially assembled. Mount the separate components of the 831C-045 as shown in *Figure 2-3* prior to field installation. The 831C SLM mounts with 2 front screws. The cables can be left bundled together.

FIGURE 2-3 831C-045 Assembly

2.5 Preparing Cellular Service for the RV50X

The RV50X gateway requires a data plan, SIM card, public IP address, and an APN for access and service.

Step 1 Purchase a SIM card with the following features:

- A data plan sufficient to the NMS044 data usage. The NMS044 does not regulate data use. Significant charges may occur if the plan is exceeded.
- No messaging/voice data is needed.

Step 2 The cellular plan must support a public IP address so that you can access and control the system remotely. (Often cellular providers block incoming connection requests to a

SIM with a dynamic IP address.) Check with the cellular provider to assure that incoming connection requests are allowed.

- If the plan does not have a public IP address you will not be able to access and control the system. However, you can still upload files to SFTP or Dropbox using a static IP address or alternative dynamic IP with Dynamic Domain Name Service (DDNS) as an alternative.

Step 3 Request the APN from your cellular provider. You will need this to configure your system for remote use.

LEARN MORE To learn more about the RV50X gateway, refer to www.SierraWireless.com.

2.5.1 Installing the SIM Card

If the SIM was provided by the factory it will ship already installed. In this case, move ahead to section 2.5.3 "Configuring the Intrusion Detection".

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

TRY THIS Send the SIM card to Larson Davis and have the system configured before shipment.

Step 1 Using the Phillips #0 screwdriver, unscrew the two screws holding the front SIM card door closed.

Step 2 Insert your card into to RV50X Sim Slot 1 (the top slot). Press in to slot until it clicks.

Step 3 Screw the door closed.

FIGURE 2-4 RV50X Sim Card Slot

2.5.2 Configuring for Remote Communication

You will need to configure your gateway for remote communication before it can be used in two-way communication. Configuring for remote use can only be done with the gateway attached to the antennas and a power source (either the battery or the PSA041), as shown in this section.

Step 1 Ensure the gateway is connected to the antennas. They are connected to the ports marked **Diversity** and **Cellular**.

FIGURE 2-5 RV50X Peripherals

Step 2 Connect the system to a power source. Choose one of the following options:

- Connect a 12 V battery to the power block on the connection line marked **Power Block** using the CBL231.
- Disconnect the **DC Power** cable on the RV50X and connect to a power outlet using the PSA041.

Step 3 Using CBL218 USB to mini cable, connect the gateway directly to a PC with Internet access.

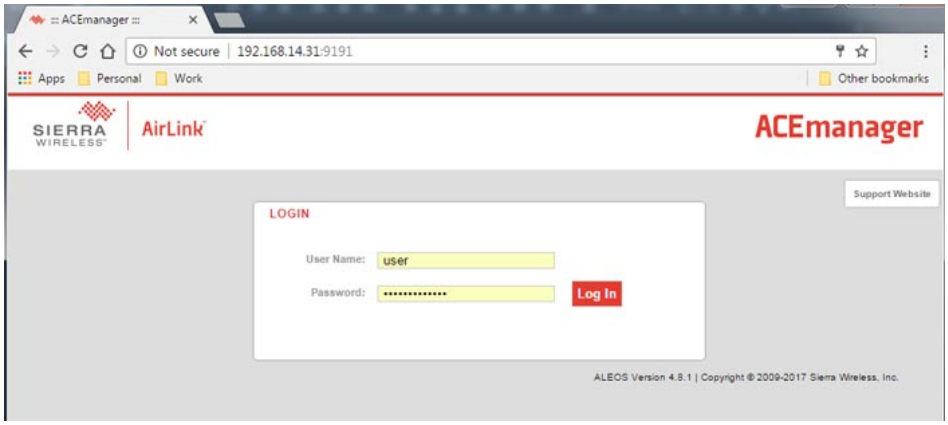
Step 4 Open a web browser on the connected PC.

Step 5 In the address bar, enter **http://192.168.14.31:9191**.

Step 6 Log in as "**user**" with the password "**LD_NMSystem16**".

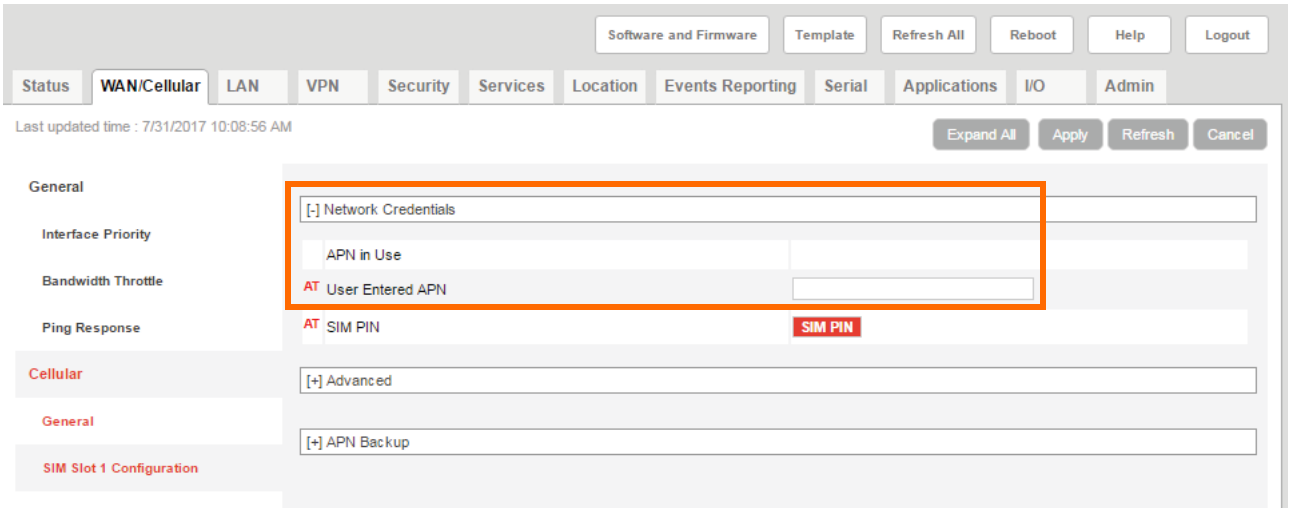
TAKE NOTE If the login doesn't work, verify that the LD settings are loaded as shown in "Configuring LD Settings for the RV50X" on page A-11.

FIGURE 2-6 User Login



Step 7 Navigate to **WAN/Cellular →SIM Slot 1 Configuration** and expand the **Network Credentials** menu by pressing the **+** icon.

FIGURE 2-7 WAN/Cellular



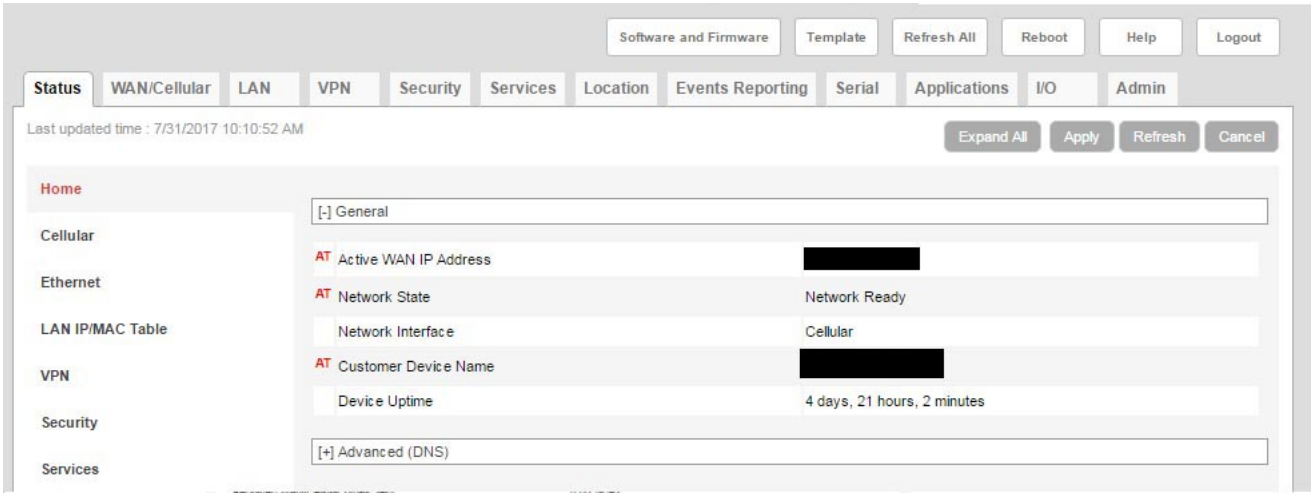
Step 8 Enter the APN provided by your cellular provider in the **User Entered APN**.

Step 9 Click **Apply**, then click the **Reboot** button.

Step 10 Login again, and navigate to the **Status** tab.

Step 11 From the left pane, select the **Home** section. The **Network State** should say **Network Ready** if everything is correct.

FIGURE 2-8 Status



Step 12 On the **WAN/Cellular** tab, verify that the **Active WAN IP Address** matches the static address given to you by your cellular provider.

Step 13 Change your password as shown in “Updating Your Password” on page A-12.

TAKE NOTE This feature is only available with the COM-RV50X-045NA/EU:APAC Wireless Gateway.

TAKE NOTE The gateway will need to have the LD settings loaded. If you purchased the gateway separately or performed a factory reset, you must reload the LD settings. See "Configuring LD Settings for the RV50X" on page A-11.

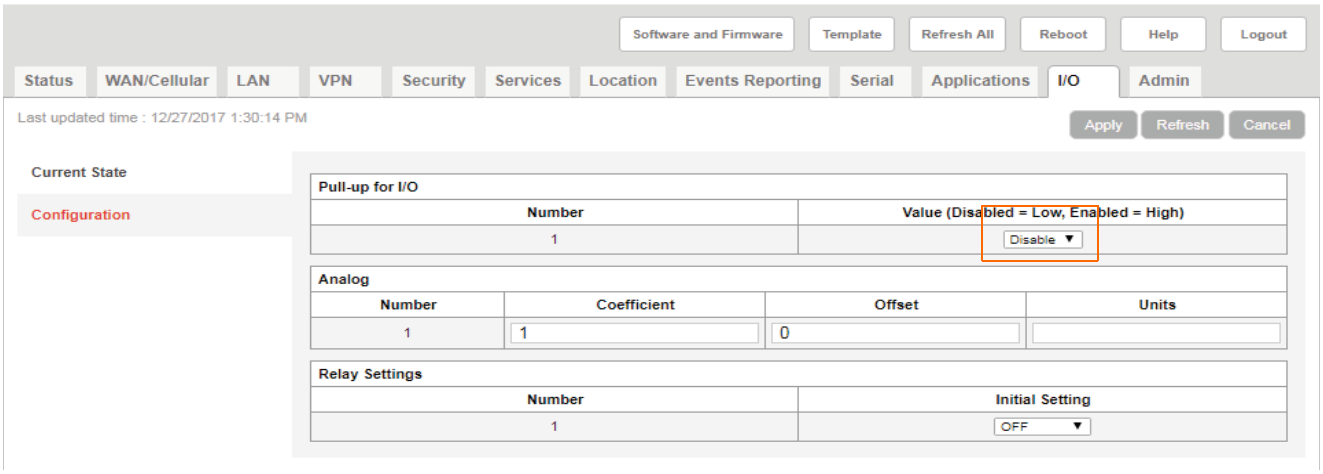
If the RV50X was purchased through Larson Davis and the SIM was provided to the factory, you can skip to section 2.5.3 "Configuring the Intrusion Detection".

To configure the gateway for intrusion alerts, follow these steps:

Step 1 Follow steps 1 through 6 of 2.5.2 "Configuring for Remote Communication".

Step 2 Navigate to **I/O →Configuration** and ensure the that **Pull-up for I/O** is disable. If you need to set it to **Disable**, click **Apply**.

FIGURE 2-9 I/O Disabled

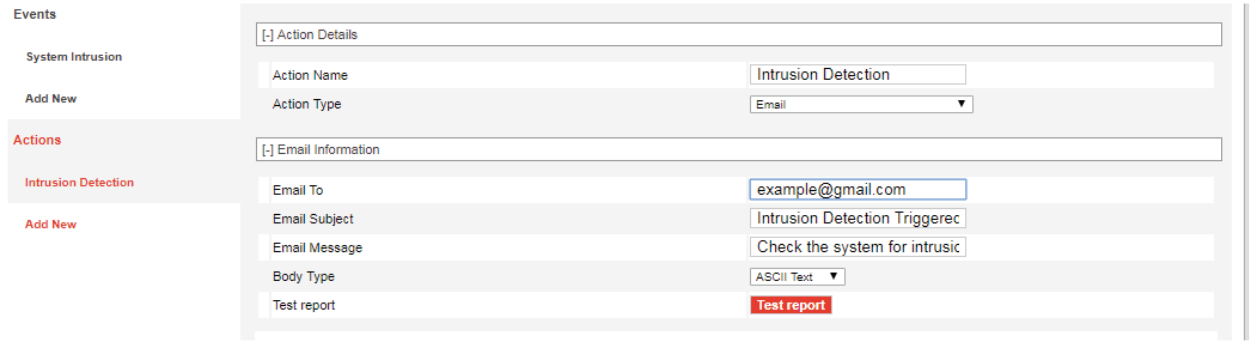


Step 3 Navigate **Events Reporting → Intrusion Detection**. If there is not item called **Intrusion Detection** this may indicate that the LD Settings have not been loaded. See A.8 "Configuring LD Settings for the RV50X" on page A-11.

Step 4 The **Action Type** should be set to **Email**. Add an email address to **Email To** then enter an email subject and

message that will be included in the alert. When finished click **Apply**.

FIGURE 2-10 Intrusion Detection Settings

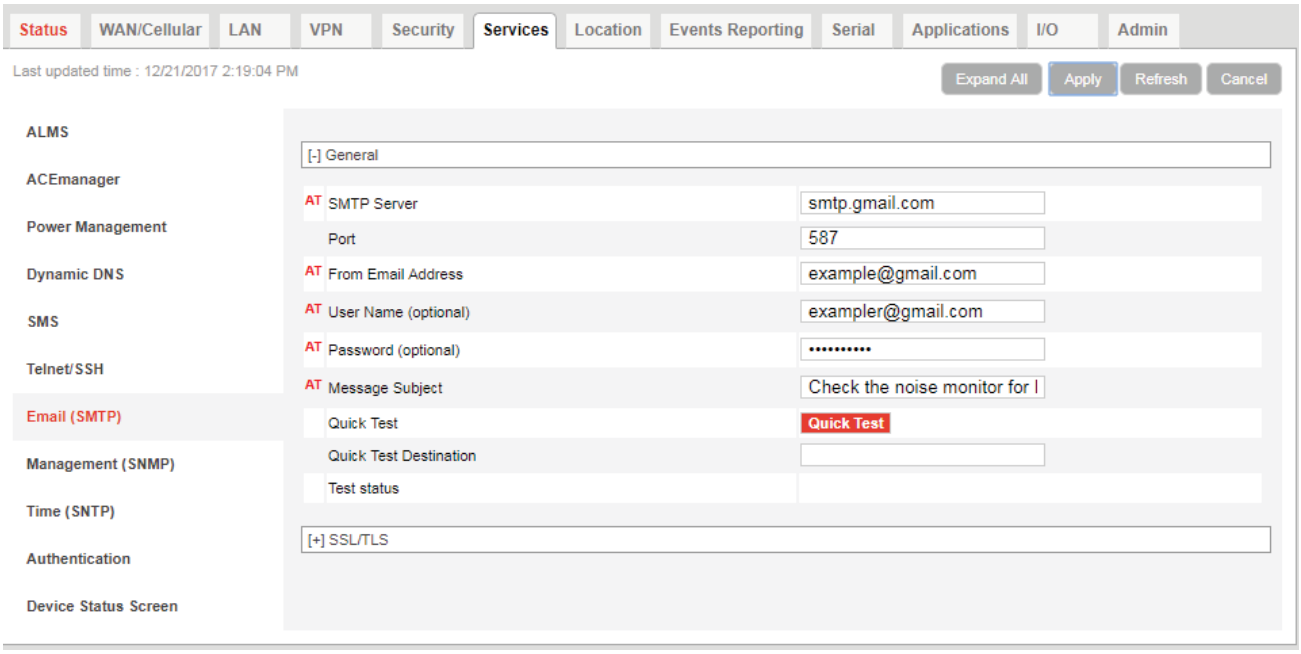


Step 5 Navigate **Services** ⇢**Email (SMTP)**. These settings are to determine where the emails are coming from.

The following shows an example unsecured Gmail account. Contact your IT professional for more information on your specific communication needs.

Step 6 Gmail uses the indicated server and port information for an unsecured account. You will need a valid email address and password entered. See *Figure 2-11*.

FIGURE 2-11 Email Settings



Step 7 To apply settings, click **Apply** then **Reboot**.

Step 8 The email feature may still need further security settings to enable it to function. For this unsecured Gmail account, open up Gmail and go to **My Account** ⇢**Sign-in & security**

and turn **Allow less secure apps** to **ON**. For other SMTP accounts, contact your IT professional.

Step 9 Send a test email. Navigate **Events Reporting** ⇢**Intrusion Detection** in the RV50X ACEmanager.

2.5.4 Enabling the Trusted IP (Friends) List

We strongly recommend that you complete the following process to disable remote access from unknown IP addresses.

Step 1 Log in to ACEmanager or ALMS.

Step 2 Go to **Security → Trusted IP - Inbound (Friends)**.

Step 3 Under **Inbound Trusted IP List** (**Inbound Trusted IP** Range) enter the IP addresses or address ranges that should have remote gateway access.

Step 4 Set **Inbound Trusted IP (Friends List) Mode** to **Enable**.

Step 5 Click **Apply**, and reboot the gateway.

2.6 Configuring SLM Settings On the 831C

Step 1 On the 831C, go to **Tools → System Properties**, or using G4 while connected to your 831C, select your meter in the **Meters Panel→ Live View → Menu → System Properties**.

Step 2 We recommend selecting the following basic settings when using the NMS044 system:

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

Step 3 Enter a value in the **Ext Shutoff Voltage** field. This value should reflect the battery type that is installed in your

NMS044 system. To determine the shutoff voltage, use *Table 2.1*:

Table 2.1 Shutoff Voltage

Battery	Shutoff Voltage
The LiFePo Battery (12V 45Ahr)	12.0 V
The SLA Battery (12V 35Ahr)	10.8 V

Step 4 Navigate to the Preferences tab, set **Auto-Store** to **Store**, and click **Close** and **Yes** to save your changes.

Module 3 Field Installation

3.1 Overview

The steps in this module describe installing the 831C-045 contents, which is done after the pole and box have been installed. For instructions on pole and box installations, contact Larson Davis.

Complete each section in this module to correctly install the 831C-045 contents.

3.2 Required Tools (not supplied)

The tools listed are a recommended to have available for installation. It is not a comprehensive list, and comparable substitutions can be made at your discretion.

- Ladder for each installer
- 3/4” Ratchet or box wrench to open TRP019 pole
- Electrical wire fish tape
- Tape to help feed cables with fish tape

3.3 Installing the NMS045 on the TRP019 Pole

Complete each section below to install the NMS045.

In this section:

- 3.3.1 "Positioning the Pole Tip-Down"
- 3.3.2 "Installing the Battery and Main Plate"
- 3.3.3 "Routing Cables in the Pole"
- 3.3.4 "Connecting the Preamplifier, Microphone, and Protection"
- 3.3.5 "Installing Components in the Box"
- 3.3.6 "Powering the System On"

3.3.1 Positioning the Pole Tip-Down

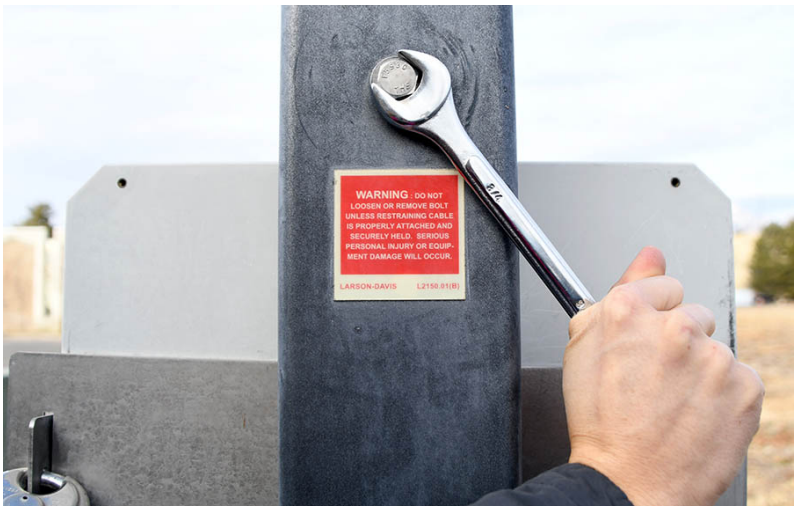
Step 1 Attach the 2 carabiners to either side of the rope. The length of the rope between the 2 carabiners should be 11 feet (3.3 meters). Cut or tie the rope to modify the length.

Step 2 Remove the lock, and attach the carabiners on the rope to the top and bottom loops on the pole.

FIGURE 3-1 Carabiners on Pole

Step 3 Remove the bolt on the pole using the 3/4” wrench or socket.

FIGURE 3-2 Remove Bolt from Pole



CAUTION Do not stand underneath the pole.

Step 4 Using the rope attached to the top ring, pull gently until the top half of the pole tip down. The rope prevents the pole from hitting the ground. Ensure you create adequate clearance for the pole to tip down so the pole does not contact electrical wires or surfaces. For more information on clearance distance, refer to Figure A-3 TRP019 Dimensions.

FIGURE 3-3 Tip-down position

3.3.2 Installing the Battery and Main Plate

Before you begin:

- If the system includes options, such as a solar panel or weather station, do not install the battery until you've mounted all options. See Module Module 4 "Options Installation" for installation procedures.
- If the battery cables are not yet installed, see section 2.2 "Preparing the Battery".

Step 1 Open the box using the supplied driver. Place the battery on the bottom battery plate. If you have one battery, place it on the left side with the connectors on the outside. For two batteries, place on either side with connectors on the outside.

FIGURE 3-4 Battery placement

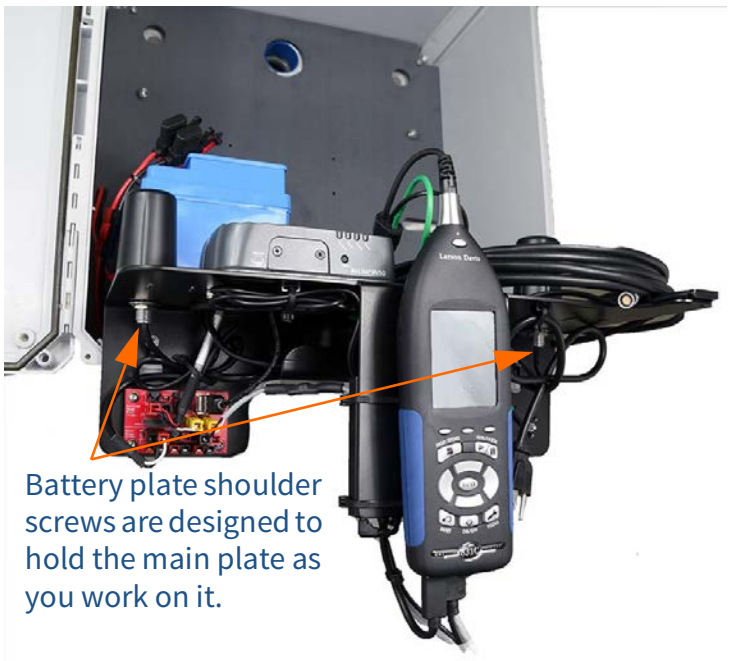
One battery placement

Two battery placement

Step 2 Place the main plate on the outside of the box, on the battery plate shoulder screws.

TAKE NOTE The main plate should have all the components installed, and the gateway network ready. For these steps, see 2.4 "Assembling Main Plate & Components" on page 2-3.

FIGURE 3-5 831C-045 on Shoulder Screws



Battery plate shoulder screws are designed to hold the main plate as you work on it.

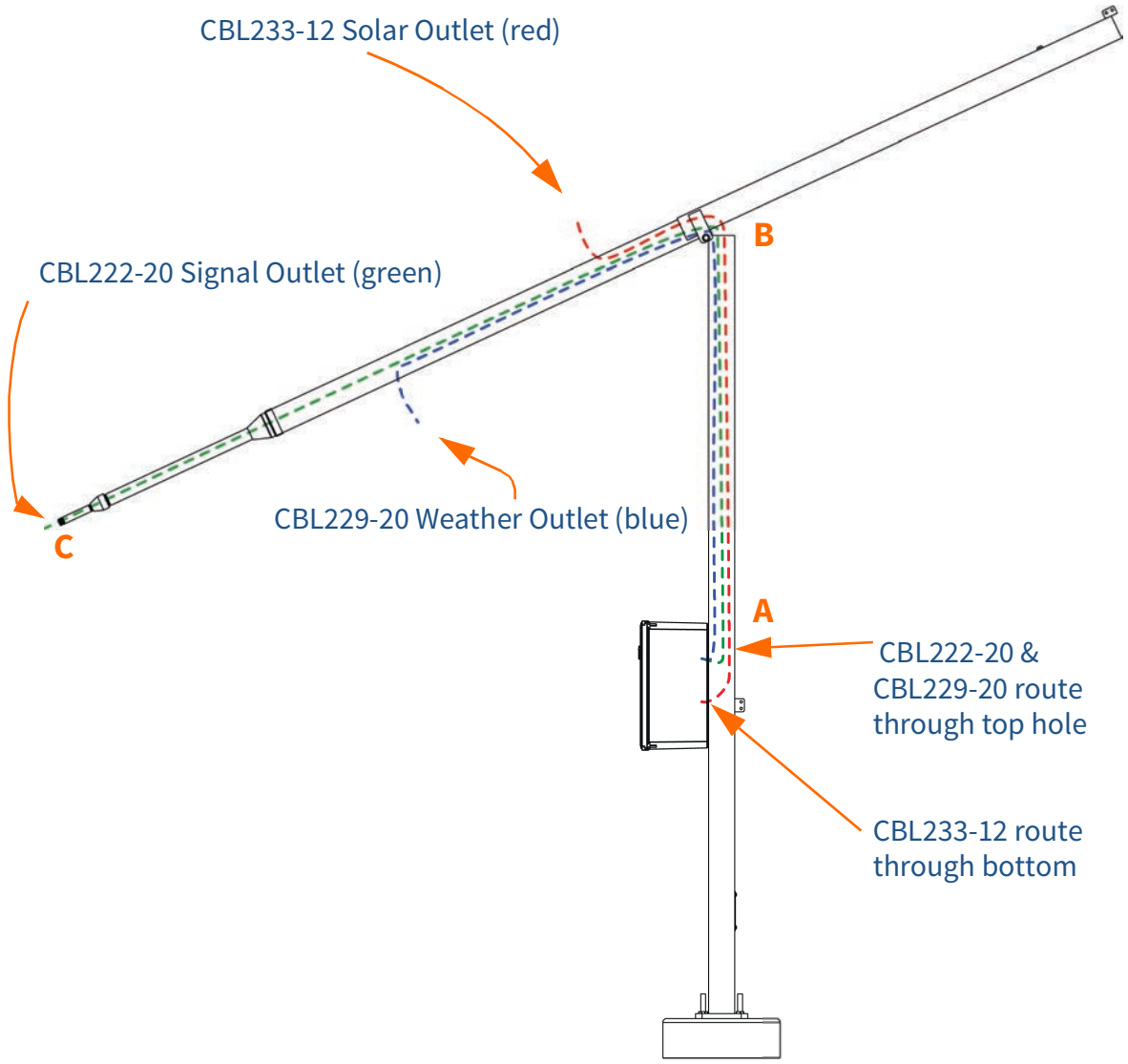
3.3.3 Routing Cables in the Pole

Before you begin:

- If desired, feed the cables through the included flexible tubing for protection. Figure 3-6 Cable Protection shows the protected cables during installation.

FIGURE 3-6 Cable Protection

FIGURE 3-7 Cables in TRP019



Step 1 Open the back of the pole as shown in Figure 3-8 "Back of Pole".

FIGURE 3-8 Back of Pole

Step 2 Feed the CBL222-20 through the top hole in the back of the box until it is on the outside of the pole on the opposite side. See point A in Figure 3-7 "Cables in TRP019".

Step 3 Feed the cable up the pole and out at the bend at point B.

Step 4 Feed the cable down the second half of the pole. We recommend using fish tape for this process. See Figure 3-9 "CBL222-20 Routing with Fish Tape".

TAKE NOTE If the end of the cable gets stuck at the weather cable outlet, recoil and try again until it clears the opening.

FIGURE 3-9 CBL222-20 Routing with Fish Tape

1

Attach fish tape to CBL222-20

2

Insert fish tape into signal outlet, and route to the back of the pole.

3

Recoil fish tape until the CBL222-20 is out.

Step 1 Remove the rubber cap from the top of the preamplifier.

Step 2 Place microphone on preamplifier, and gently screw together until hand tight.

Step 3 Hold the EPS2116 windscreen and bird spike together, and unscrew from the top. Screw the top and base together. The EPS2116 should now appear in two components, see Figure 3-10 EPS2116 Separated.

FIGURE 3-10 EPS2116 Separated

Step 4 Follow the steps in Figure 3-11 to complete the EPS2116 threading.

FIGURE 3-11 EPS2116 Threading

1

Thread the CBL222-20 cable up through the base and top of the EPS2116.

2

Align red dots on bottom of preamplifier to top of CBL222-20, gently push together until mounted. (This step can be done after the EPS2116 is mounted to the pole, but attaching it now prevents the CBL222-20 from slipping into the pole).

3

With the preamp on the outside of the assembly, carefully screw the base of the EPS2116 on the pole. Do not twist the CBL222-20 or the PRM2103-FF. Hold steady as you mount the EPS2116 on the pole.

4

Gently ease the cable into the EPS2116 until the microphone is seated at the top.

Step 5 Holding the windscreen and birdspike over the top, screw the assemblies together.

TAKE NOTE "Step 5" can also be done after you calibrate. see 3.6 "Calibrating the 831C" on page 3-13.

CAUTION If you need to remove the windscreen, do not pull it off the birdspike with an upward motion. This will damage the weather protection. First, unscrew the birdspike by twisting its top. Then pull the windscreen down over the bottom of the unscrewed birdspike.

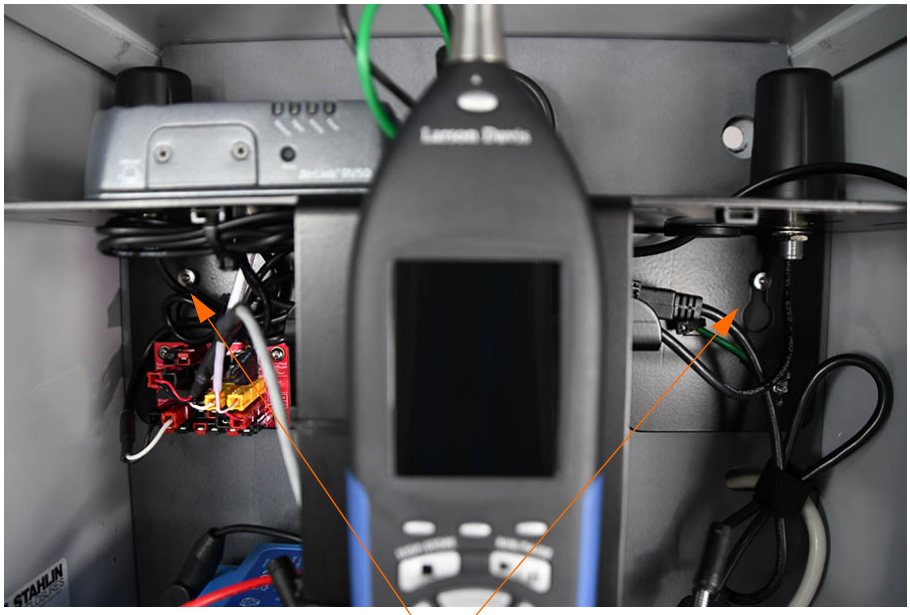
3.3.5 Installing Components in the Box

Step 1 Connect the CBL222-20 to the top of the 831C.

FIGURE 3-12 CBL222-20 Connection

Step 2 Lift plate off of shoulder screws, then mount onto the shoulder screws on the back plate.

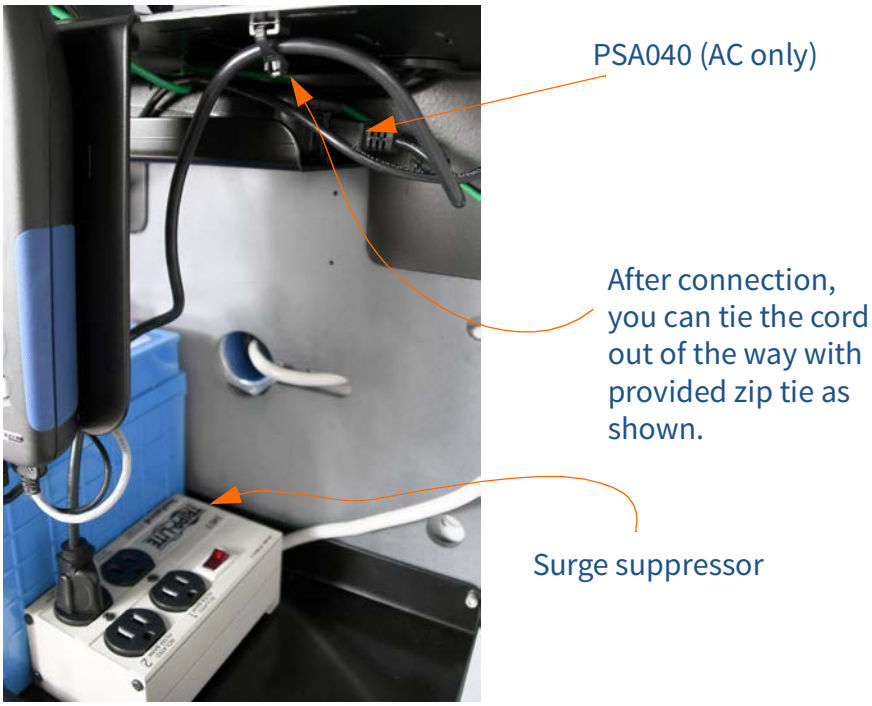
FIGURE 3-13 Plate On Back Shoulder Screws



Shoulder screws
location on back plate

Step 3 **For AC**: connect PSA040 to the surge suppressor (as shown in Figure 3-14)
For solar: connect the solar charger to the control power block on the line called **Power Block**.

FIGURE 3-14 PSA040 to Surge Suppressor



Step 4 Connect the battery to the power block on the line called **Power Block**.

FIGURE 3-15 Control Power Block Suggested Setup

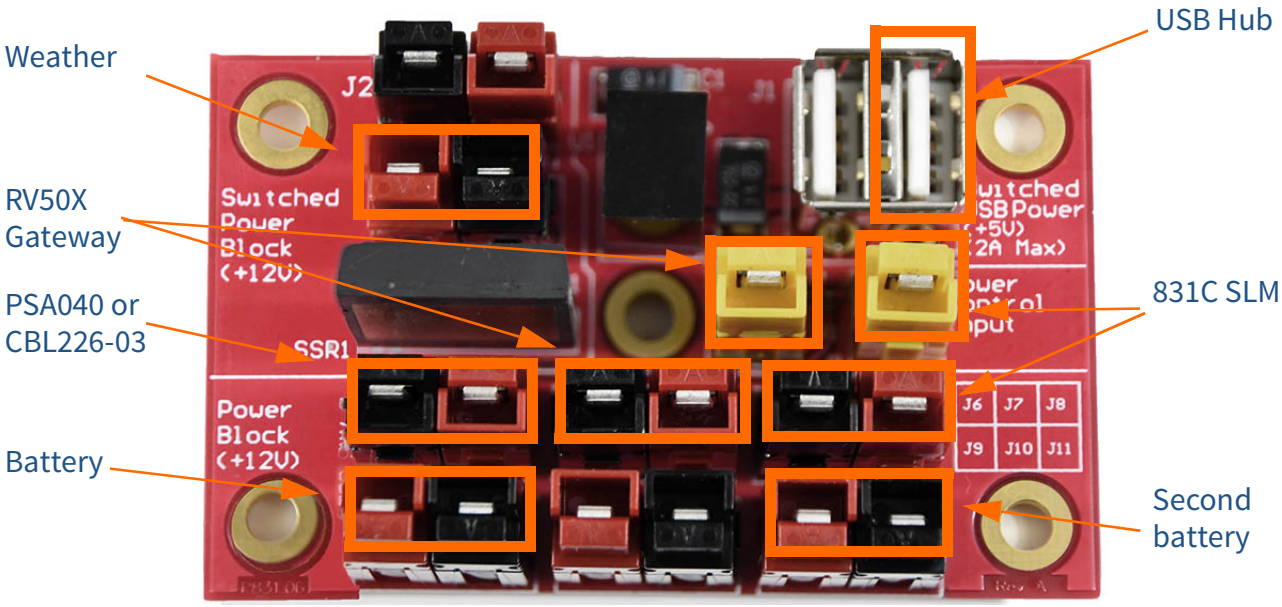


FIGURE 3-16 Components Installed

3.3.6 Powering the System On

Once the battery is connected, the system powers on.

The 831C power button ⏻ controls the power in the whole system. It is used to turn off and on the NMS045.

3.4 Performing a Field Operational Check

Follow these steps prior to leaving the installed system:

3.4.1 Verifying Battery is Charged/Charging

AC Power Charging

You will know the battery is fully charged when the LED on the PSA040 power charger is green. An orange LED indicates the battery is charging.

Solar Charging

You will know the battery is fully charged when the PSA038 Solar Charger is green. A blinking LED indicates charging. See A.4.3 "PSA038 Genasun Solar Charger" on page A-8.

3.4.2 Checking Cellular Service

Connect to the 831C while in the field to determine if the service is working properly.

Connecting to the 831C Remotely

To connect to the 831C via a mobile device (with cellular service), follow these steps:

TRY THIS Check the service lights, see A.4.2 "COM-RV50X-045NA/EU:APAC Cellular Gateway" on page A-6.

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 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 3-17 Mobile Phone Connection

3.5 Securing the Pole

After installation and calibration, put the pole back to its upright position.

Step 1 Gently pull the rope until the pole tips back into place.

Step 2 Secure the bolt using a 3/4” wrench.

Step 3 Remove carabiners and secure with padlock.

Step 4 If a security band is purchased, wrap around case and secure with lock.

3.6 Calibrating the 831C

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

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

Tools Needed

- Keys for removing locks, and tools for opening box and putting the pole in the tip down position.
- Calibrator like the Larson Davis CAL200 or CAL250.
- Access to the 831C in the box, or a mobile device with Internet access.

Step 1 The pole should be in the tip down position. See 3.3.1 "Positioning the Pole Tip-Down" on page 3-2.

Step 2 If windscreen is over microphone, then remove. Holding windscreen and birdspike together, unscrew the assemblies until they come apart.

Step 3 Place calibrator over microphone. Apply it carefully to avoid sudden large pressure changes to the microphone diaphragm.

FIGURE 3-18 CAL200 Calibrator

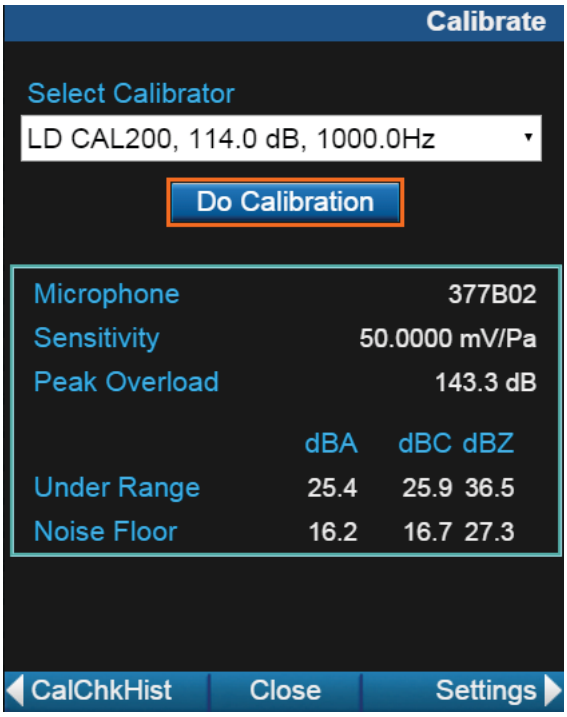
Step 4 Navigate **Tools** →**Calibrate** on the 831C sound level meter. Alternatively, you can access this page using remote communication on a mobile device. See "Connecting to the 831C Remotely" on page 3-12.

Step 5 Select calibrator from the drop-down list. Click **Edit Settings** if calibrator settings need to be modified. Ensure that the settings correspond to those described in the manual for the selected calibrator.

Step 6 Turn calibrator on by pressing the button.

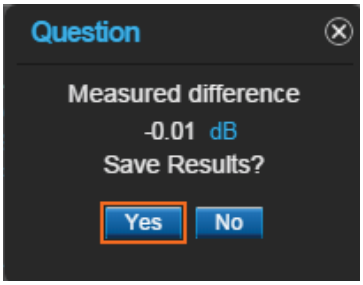
Step 7 Select **Do Calibration**.

FIGURE 3-19 Acoustic Calibration



Step 8 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.

FIGURE 3-20 Calibration Results



Step 9 Carefully remove calibrator from microphone.

Step 10 When calibration process is complete, assemble the windscreen and bird spike back on to microphone.

TRY THIS Click **Calibration History** to view either acoustic calibration or calibration check summaries.

Module 4 Options Installation

4.1 Overview

The following options can be installed in conjunction with the steps in "Field Installation".

4.2 Required Tools (not supplied)

The tools listed are a recommended to have available for installation. It is not a comprehensive list, and comparable substitutions can be made at your discretion.

TAKE NOTE It is recommended to have two installers for the solar panel install.

- Ladder for each installer
- Ratchet or box wrench
  - Open pole (TRP019): 3/4”
  - Solar panel install: 9/16”
  - Weather arm install: 9/16”
- Electrical wire fish tape
- Tape to help with feeding cables with fish tape
- #2 or #3 flat head screwdriver

4.3 Solar Installation

Step 1 The pole should be in the tip down position. See 3.3.1 "Positioning the Pole Tip-Down" on page 3-2.

Step 2 Locate solar outlet hole in TRP019. See Figure 3-7 Cables in TRP019.

Step 3 Install the bracket and mount it to the solar panel following the manufacturer’s instructions included with

the SLP003 solar panel and mount. See 2.3 "Assembling the Solar Bracket" on page 2-2.

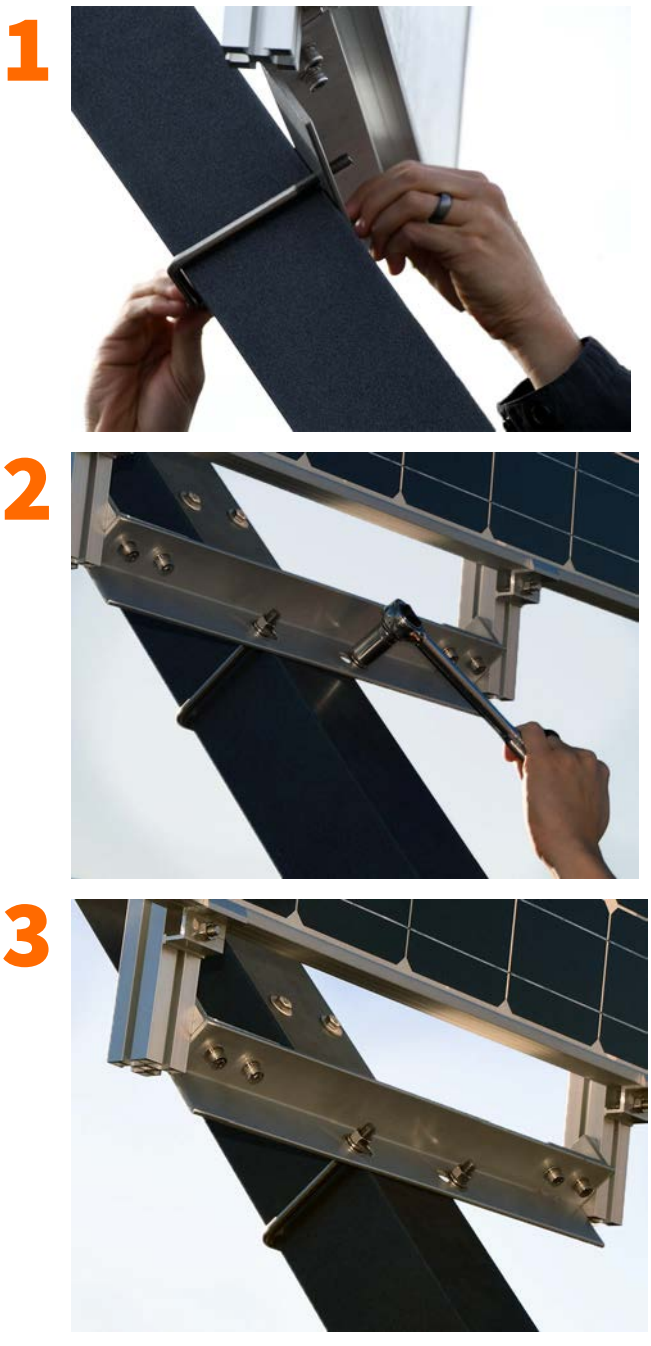
Step 4 Establish which side of the pole is best for the solar panel to face. It should face an unobstructed view of the sun's main trajectory in the sky.

- Southern hemisphere: facing the north.
- Northern hemisphere: facing the south.

Step 5 Using the included u-bolts install the top and bottom of the solar panel to the pole. Tighten with 9/16" wrench. Do not over-tighten u-bolts.

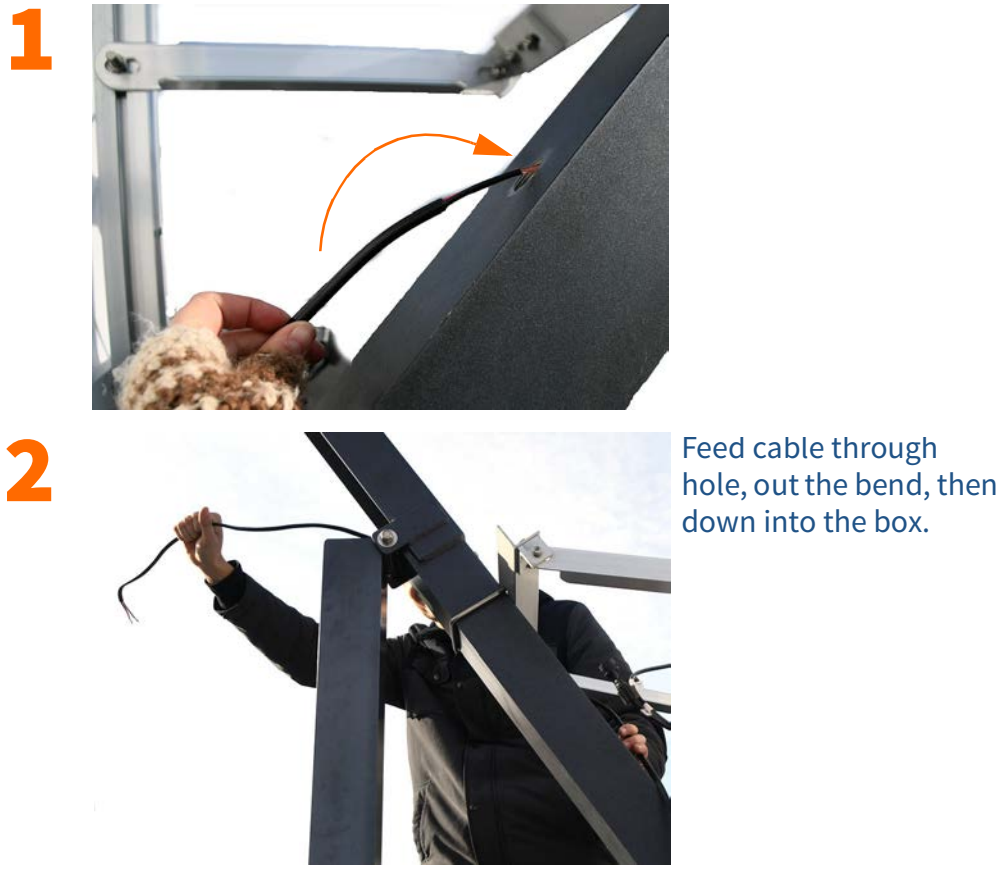
TAKE NOTE Mount panel so the solar outlet is close the to the solar cables on the panel. Do not strain the cables.

FIGURE 4-1 Solar Panel Install



Step 6 The solar cable CBL233-12 will connect the panel with the charge controller. Feed the cable down the pole to the bottom hole in the box.

FIGURE 4-2 Feed Cable Down Pole



Step 7 To get the solar cable through the gland bend the connectors so they are in-line, one pointing up and one pointing down. Then feed through the cable gland pieces to be fitted into the hole on the pole. Grease the plug. Secure down into place, leaving enough slack to connect the cable to solar panel.

FIGURE 4-3 Gland Install

TAKE NOTE To disconnect the solar connectors, use the included ring tool.

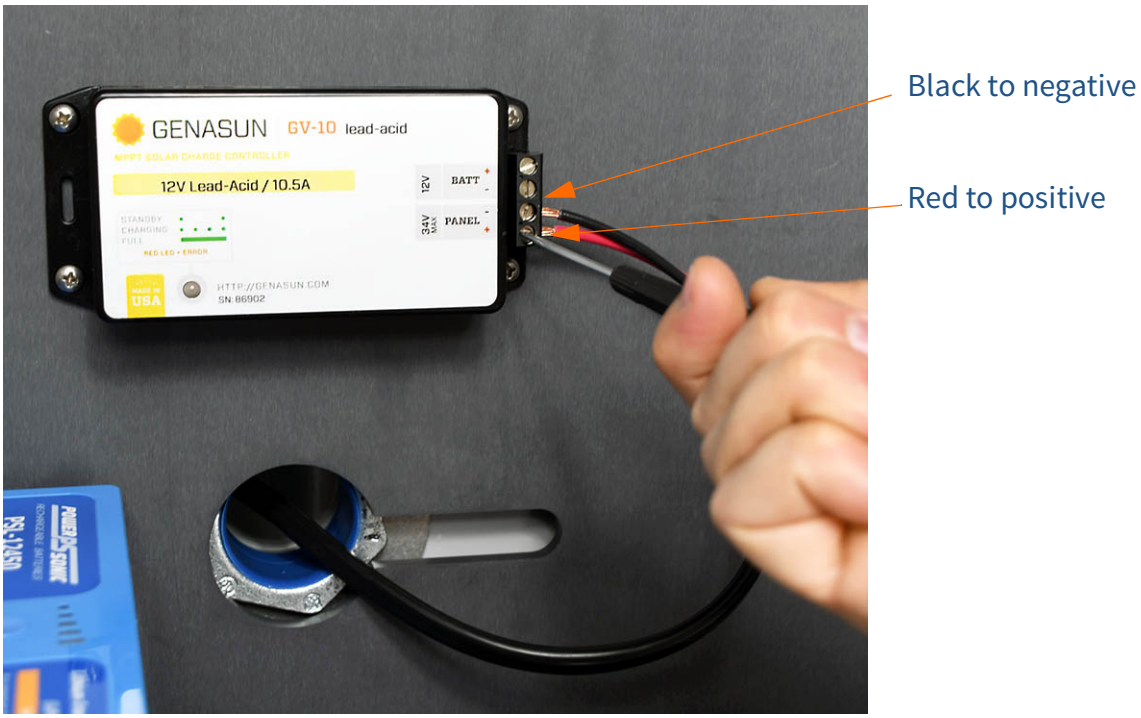
Step 8 Connect cables, ensuring they are completely seated. You will hear a small snap when they are connected.

FIGURE 4-4 Connect Solar Cable to Panel

Step 9 Feed CBL233-12 into the box through the bottom hole. Connect to solar charger on the area marked **Panel**. Loosen the screws with a flat head screwdriver, insert the

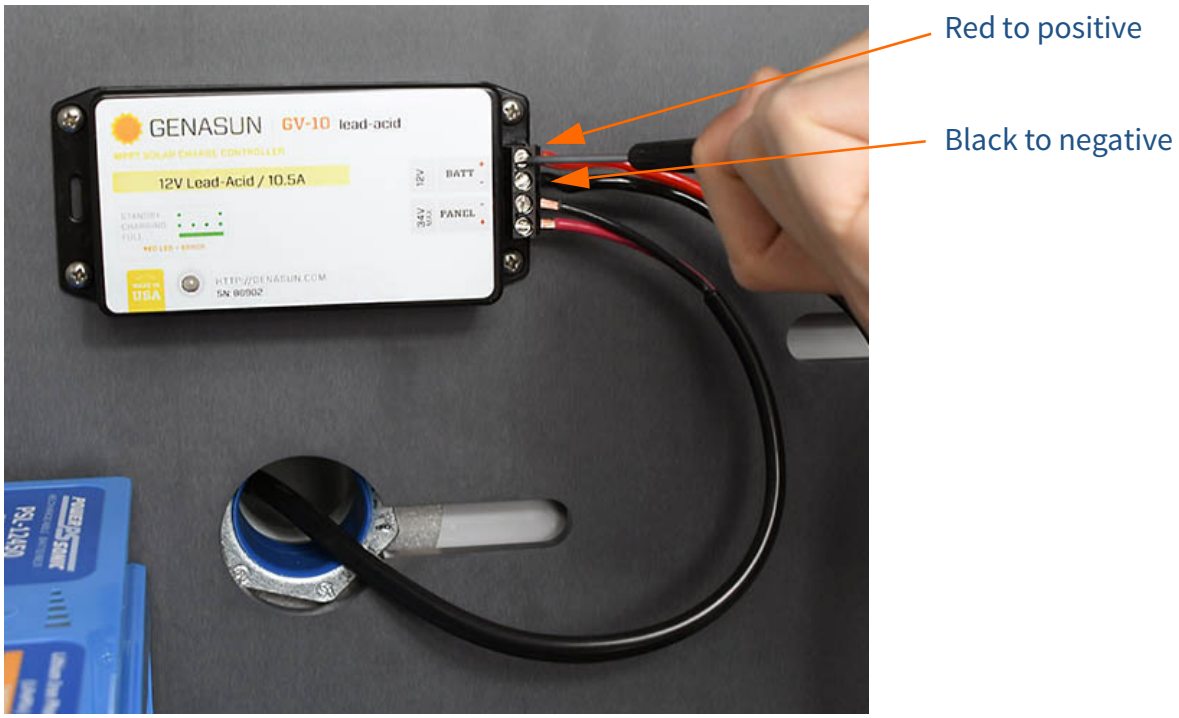
correct cable ends, then tighten down. Black to negative, red to positive.

FIGURE 4-5 CBL233-12 to Solar Charger



Step 10 Connect CBL226-03 to the solar charger in the space marked **Battery**. Loosen the screws, insert the correct cable ends, then tighten down. Black to negative, red to positive.

FIGURE 4-6 CBL226-03 to Solar Charger



Step 11 After the plate has been placed into the box (see "Step 2" on page 3-4), connect CBL226-03 to the control power

block on the line marked **Power Block**. After everything else is connected to the control power block, connect the battery to the line marked **Power Block**.

Step 12 Check that the panel is charging the battery, see Step 10 "When calibration process is complete, assemble the windscreen and bird spike back on to microphone." on page 3-15.

FIGURE 4-7 Solar Panel on Tip-Down Pole

4.4 Weather Installation

Step 1 The pole should be in the tip down position. See 3.3.1 "Positioning the Pole Tip-Down" on page 3-2.

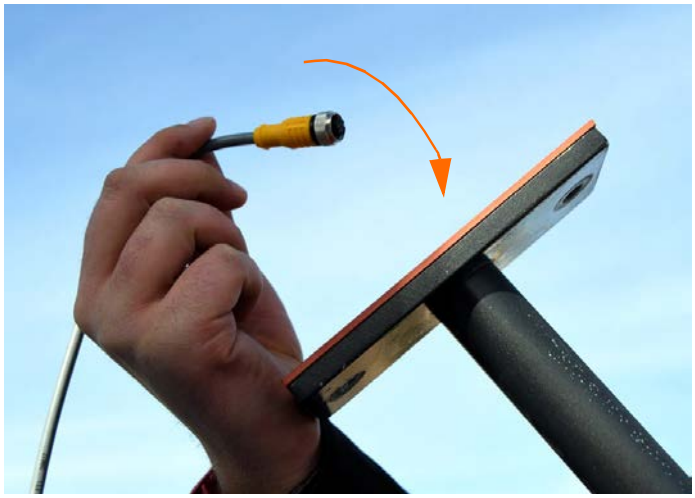
Step 2 Feed CBL229-20 out the top hole in the box, up the pole and out at the bend. Then feed the cable down the second half of the pole and out the weather outlet hole. It is recommended to use fish tape for this process. Careful not to twist up the cables inside of the pole. The following figure shows feeding the fish tape through the weather hole to retrieve CBL229-20.

FIGURE 4-8 Feed CBL229-20 with fish tape

Step 3 Install the ADP101 on the weather arm top.

Step 4 Place the gasket on the bottom of the weather arm. Feed CBL229-20 through the weather arm and adapter.

FIGURE 4-9 Feed CBL229-20 Through Weather Arm



Step 5 Bolt the weather arm to the pole with the gasket in place using a 9/16” wrench.

FIGURE 4-10 Weather Arm Bolted to the Pole

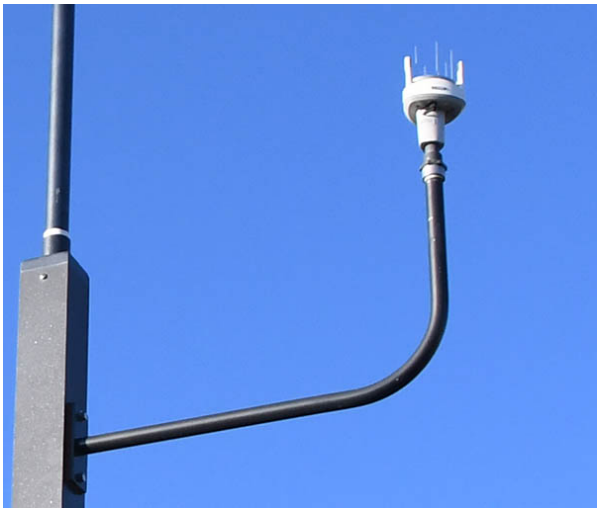
Step 6 Connect the weather or wind sensor to the cable, push the slack back through the arm, and connect the sensor to the arm.

FIGURE 4-11 Feed CBL229-20 Through Weather Arm

Step 7 Ensure that north will point north once the pole is brought back into place. Once the direction is adjusted, tighten down the set screw with hex driver included with sensor. Do not over-tighten.

FIGURE 4-12 Weather/wind station

FIGURE 4-13 Wind Station Example



Step 8 Inside the box, route CBL229-20 through the top hole. Connect to the DVX008A, which should be routed through the top of the plate and into the USB hub. Route the Anderson connectors of the CBL220-20 through the top plate and into the control power block on the line marked **Switched Power Block**.

Appendix A Additional Information

A.1 Physical Characteristics

Operating Temperature

- -40 °C to 50 °C ambient temperature

TAKE NOTE Weights are approximate and for reference only.

Weight

- EPS045: 24 lbs (11 kg)
- 831C-045: 7 lbs (3 kg)
- COM-RV50X-045NA/EU:APAC 1 lbs (22 oz)
- BAT019-05: 13 lbs (6 kg)
- BAT020-045: 23 lbs (11 kg)
- SLP003: 26 lbs (12 kg)
- SEN031-045: 10 lbs (4.5 kg)

FIGURE A-1 Main Plate Dimensions

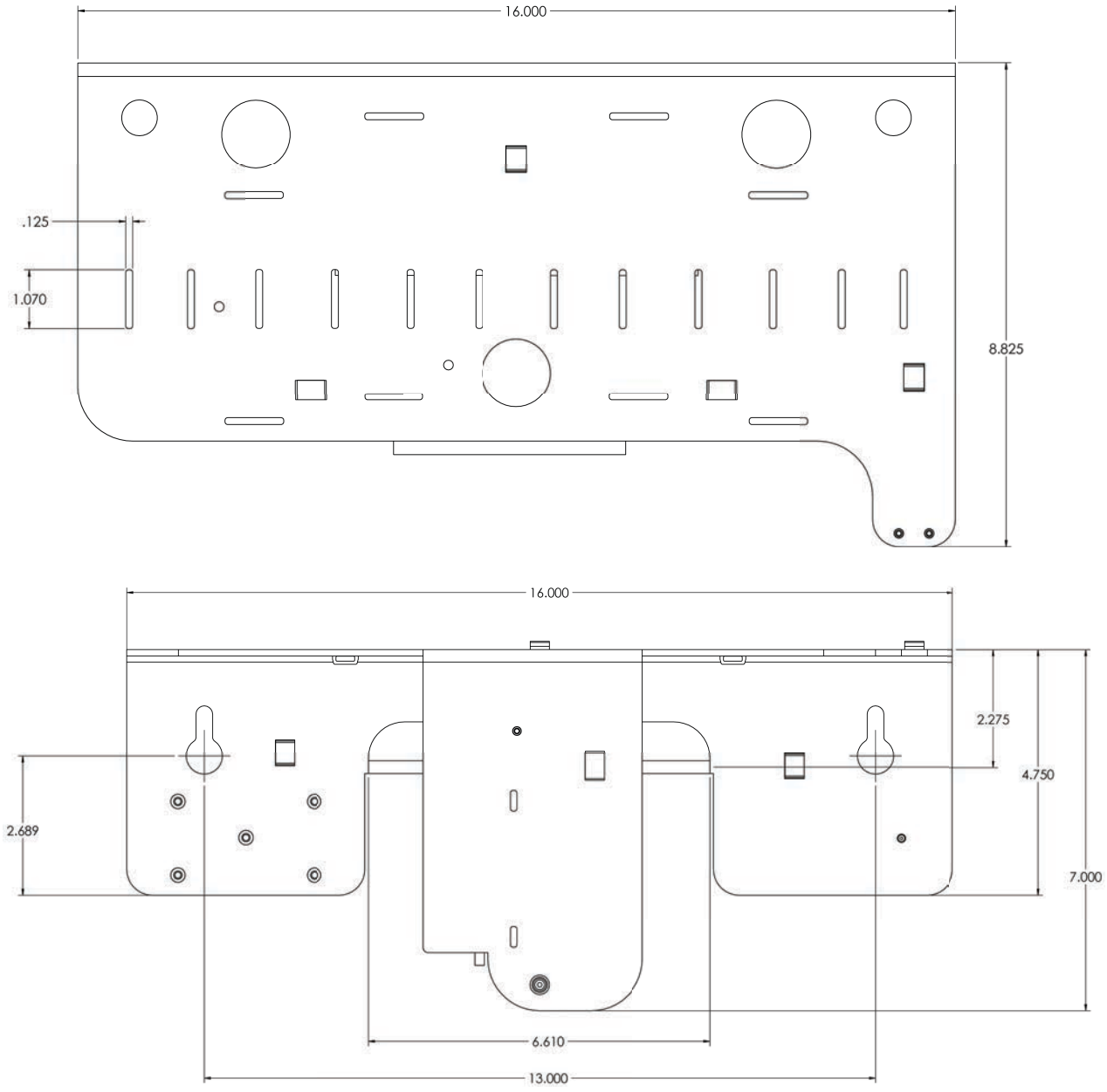


FIGURE A-2 EPS045 Dimensions

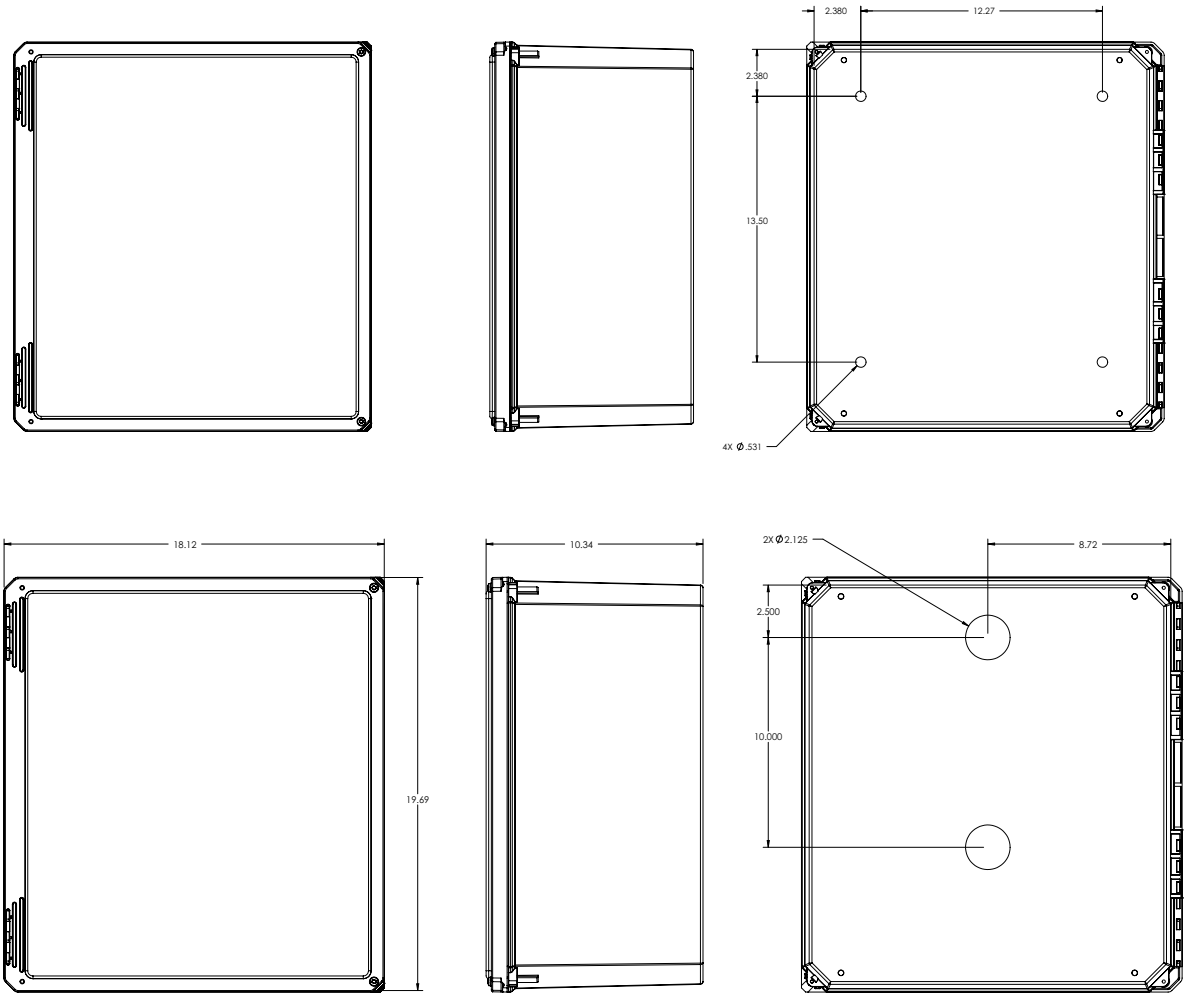
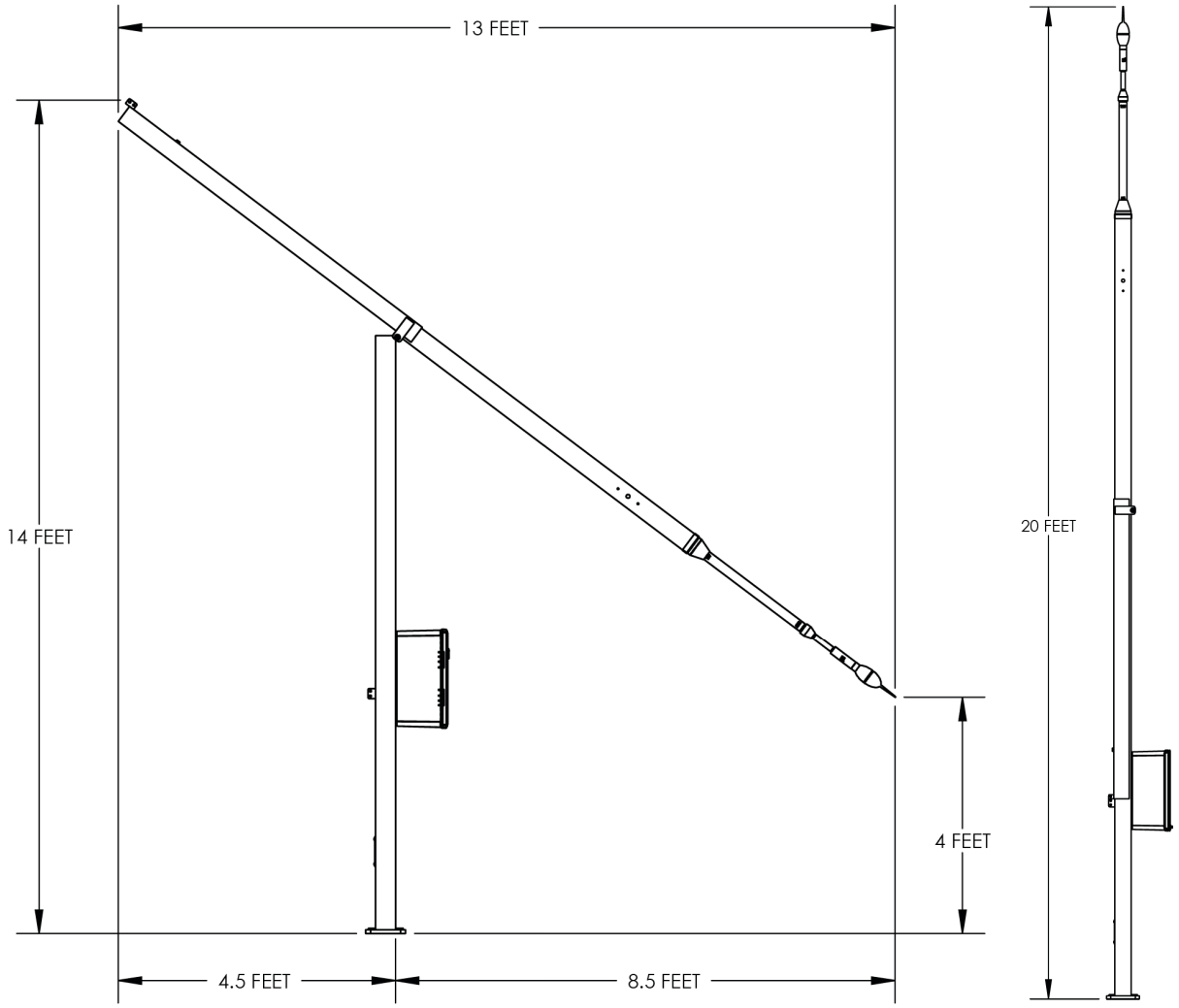


FIGURE A-3 TRP019 Dimensions



A.2 NMS045 Power Information

The NMS045 System draws power from the connected battery that is charged by a solar panel or AC connection.

A.2.1 Power Draw

The power draw for the system depends on your settings, mode, and component options installed. These numbers are for your reference and assume the components for the system are the 831C-045 with the COM-RV50X-045NA/EU:APAC:

- Minimum Current (Standby Mode): ~5mA
- Average Current (Setting Dependent): ~280mA
- Maximum Current (Setting Dependent): ~500mA

Typical Runtime

The NMS045 system is powered by a 12 V battery that is charged by either AC or solar panel. The typical runtime for the system solely on battery life is given below. These are average numbers and should be

used only as reference, for example as batteries age or operate at low temperature the runtime will be less:

Table A.1 Typical Runtime

Configuration	One 45 Ah LiFePo Battery (BAT019-045)	One 35 Ah SLA Battery (BAT020-045)
NMS045 with Ethernet	8 days	6 days
NMS045 with cellular gateway	6 days	4 days

A.2.2 Sunlight Hours

You are encouraged to take advantage of the most daylight, direct sun for your area. To better understand your sunlight, refer to http://rredc.nrel.gov/solar/old_data/nsrdb/1961-1990/redbook/atlas/ http://re.jrc.ec.europa.eu/pvgis/countries/countries-europe.htm

A.2.3 Alternative Solar Panel

The NMS045 system can support a solar panel that is <140 W.

A.2.4 Two Battery System

The NMS045 can support two 12 V batteries of the same chemistry. Before installation ensure both batteries are charged equally. You risk blowing a fuse if the one is depleted and one is charged, once connected to the system.

A.3 Shipping Information

A.3.1 Lithium Iron Phosphate Battery (LiFePo)

CAUTION Do not ship BAT019 without proper certification.

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.4 LED Indicators

A.4.1 The 831C Sound Level Meter

Table A.2 Measurement Status LED Indicators

Measurement State	Red LED		Green LED	
Stopped with Reset	Winking	***-	Off	
Stopped	Blinking	**-*-*	Off	
Paused	Flashing	*-*-	Flashing	-*-*
Running	Off		Blinking	**-*-*
Waiting for valid data to begin running	Delayed wink	----*	Off	

Charge Status LED

The charge status indicated by an LED on 0 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.4.2 COM-RV50X-045NA/EU:APAC Cellular Gateway

When installed and running, the state of the RV50X 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 RV50X LED Indicators (Sheet 1 of 2)

LED	Color/Pattern	Description	LED Power Saving Mode
Power	Off	No power or input voltage > 36 Vdc or < 7 Vdc	
	Solid Green	Power is present	
	Green with Amber Flash	Power is present and the gateway has a GPS fix	
	Solid Red	Standby mode	
	Flashing Green	When you press the reset button, flashing green indicates when to release the reset button to reboot the gateway.	
	Flashing Red	When you press the reset button, flashing red indicates when to release the reset button to reset the gateway to the factory default settings.	

Table A.3 RV50X LED Indicators (Sheet 2 of 2)

LED	Color/Pattern	Description	LED Power Saving Mode
Signal	Solid Green	Good signal (equivalent to 4-5 bars)	Off
	Solid Amber	Fair signal (equivalent to 2-3 bars)	Off
	Flashing Amber	Poor signal (equivalent to 1 bar) If possible, move the gateway to a location with a better signal.	
	Flashing Red	Inadequate (equivalent to 0 bars) If possible, move the gateway to a location with a better signal	
Network	Solid Green	Connected to an LTE network	Off
	Solid Amber	Connected to a 3G or 2G network	Off
	Flashing Green	Connecting to a network	
	Flashing Red	No network available	
	Flashing Red/Amber	Network Operator Switching is enabled, but the gateway is unable to locate the required firmware. For more information, contact Sierra Wireless®.	
Activity	Flashing Green	Traffic is being transmitted or received over the WAN interface.	
	Flashing Red	Traffic is being transmitted or received over the serial port. This behavior only appears if the RV50X is configured to display it. For more information, contact Sierra Wireless®.	
	Flashing Amber	Traffic is being transmitted or received over both the WAN interface and the serial port. This behavior only appears if the RV50X is configured to display it. For more information, contact Sierra Wireless®.	
ALL	Green LED chase	Radio module reconfiguration/firmware update or Network Operator Switching is in progress.	
	Amber LED chase	ALEOS software update is in progress.	

FIGURE A-4 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:

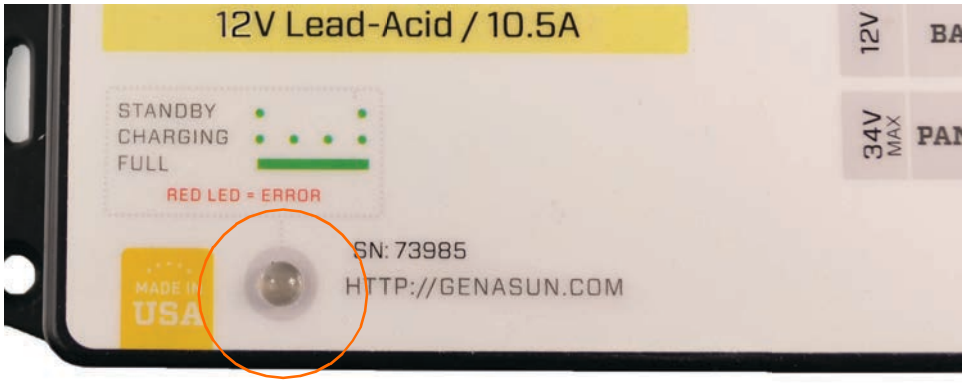
Green LED

- 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-5 Genasun Solar Charger LED



A.5 Connecting to G4 LD Utility Over TCP

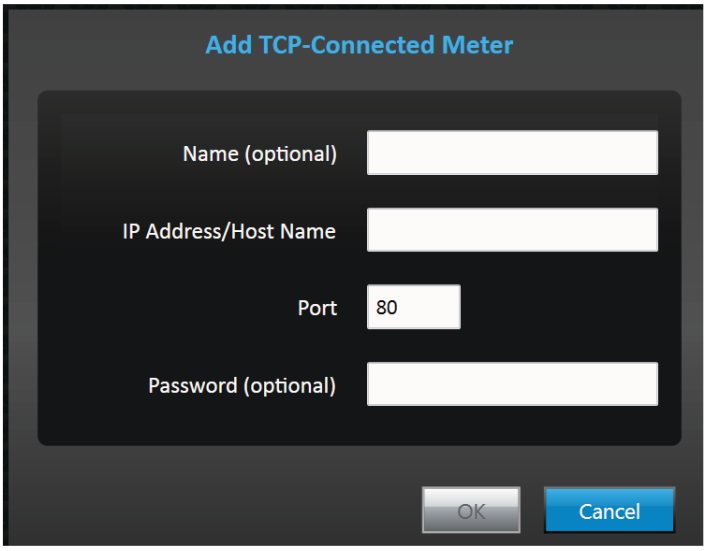
While you can always connect directly to a PC from the 831C using the included USB cable, this section describes connecting via TCP/IP.

Step 1 In G4 in the Meters Panel, click the blue plus icon in-line with **Meters**. This opens the Add TCP Connected Meter window

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

- **Name**
- **IP Address/Host Name:** Enter the IP Address given by your cellular provider for the RV50X modem SIM card.
- **Port**: Unless you receive specific instructions, this will usually be **Port 80**.
- **Password**

FIGURE A-6 Adding a TCP/IP Connected Meter



A.6 Exceedance Alert Notifications

TAKE NOTE Email alerts are enabled in the Event History dialog. Once enabled, your 831C uses your **System Properties** ▸ **Email Preferences** to address the alerts.

If you have the Event History firmware option (831C-ELA) installed, you can set up email or text alert notifications for noise exceedances and other features (ex. cloud storage notifications).

Additionally, if you have the Sound Recording firmware option (831C-SR) installed, your 831C records the triggered sound events and attaches them to the alert notification. For more information about

defining trigger and exceedance levels, see **section 6.2.6** in the *SLM Model 831C Reference Manual*.

Other alerts, such as an Intrusion Detection alert are available through the RV50X. For more information about setting up this alert, see 2.5.3 "Configuring the Intrusion Detection" on page 2-7.

To set up an exceedance alert notification, follow these steps:

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

Step 2 Create an Event History Setup File with an alert as described in **section 17.3.1** of the *SLM Model 831C Reference Manual*. Follow the directions in that section to enable email alert notifications.

TRY THIS Use the process described here to set up an email or text alert when the SPL 2 or Peak 3 Trigger exceeds the set threshold. Then Run a measurement, and cause a trigger event. Observe the resulting email or text with an attached sound recording.

A.6.1 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 A.4 Audio Playback

Platform	Browser	Audio File (.OGG)
Windows	Internet Explorer - Not recommended	No Supported
	Chrome - Recommended	Supported
	Firefox	Not Tested
	Microsoft Edge	Not Tested
Mobile (Apple & Android)	Chrome - Recommended	Supported
	Safari	Requires CODEC download and installation
	Opera	Not Tested
	Symbian	Not Tested

A.7 Measurement Setup

To learn more about setting up a measurement, refer to **Module 6: Measurement Setup** in the *SLM Model 831C Reference Manual*.

A.8 Configuring LD Settings for the RV50X

The RV50X Gateway can only be a functioning communication device if it is configured with the correct settings. If you purchased a new RV50X from someone other than Larson Davis—or if it has been reset to factory defaults—complete the following sections to configure your system for use with Larson Davis instruments.

In this section:

A.8.1 Logging In to ACEmanager

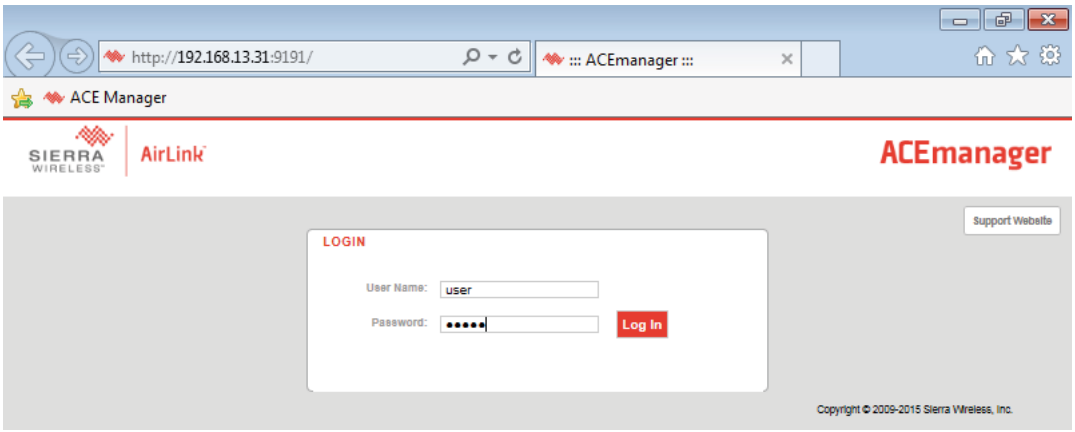
Step 1 Attach the USB to mini cable from the PC to the gateway. See *Figure 2-4 Connecting to RV50X*.

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**".

FIGURE A-7 Sierra Wireless Login



Step 5 Take note of the device's firmware version. Update to the latest version if needed.

Updating Firmware to the Latest Version (Optional)

a. Go to **http://source.sierrawireless.com/**.

b. Select the name of your device, then select **Firmware Package**.

c. If needed, download and update the firmware according to the manufacturer's instructions.

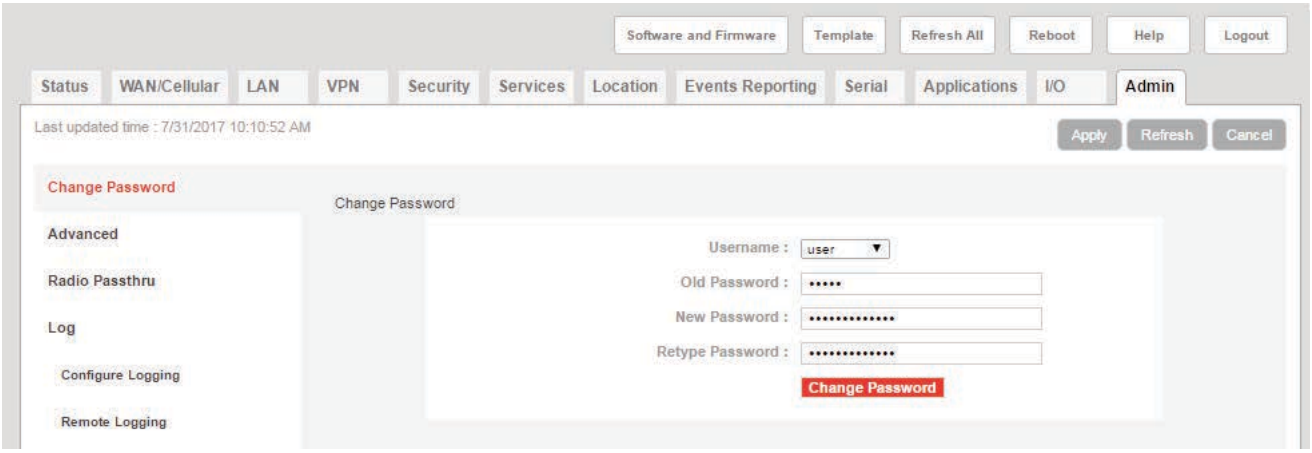
d. Log back in when the system is rebooted.

Step 6 Change your password.

Updating Your Password

a. Navigate to the **Admin** tab, and enter the default password (“12345”) in **Old Password**.

FIGURE A-8 Admin Tab



b. Enter a unique password in **New Password**, and again in **Retype Password**.

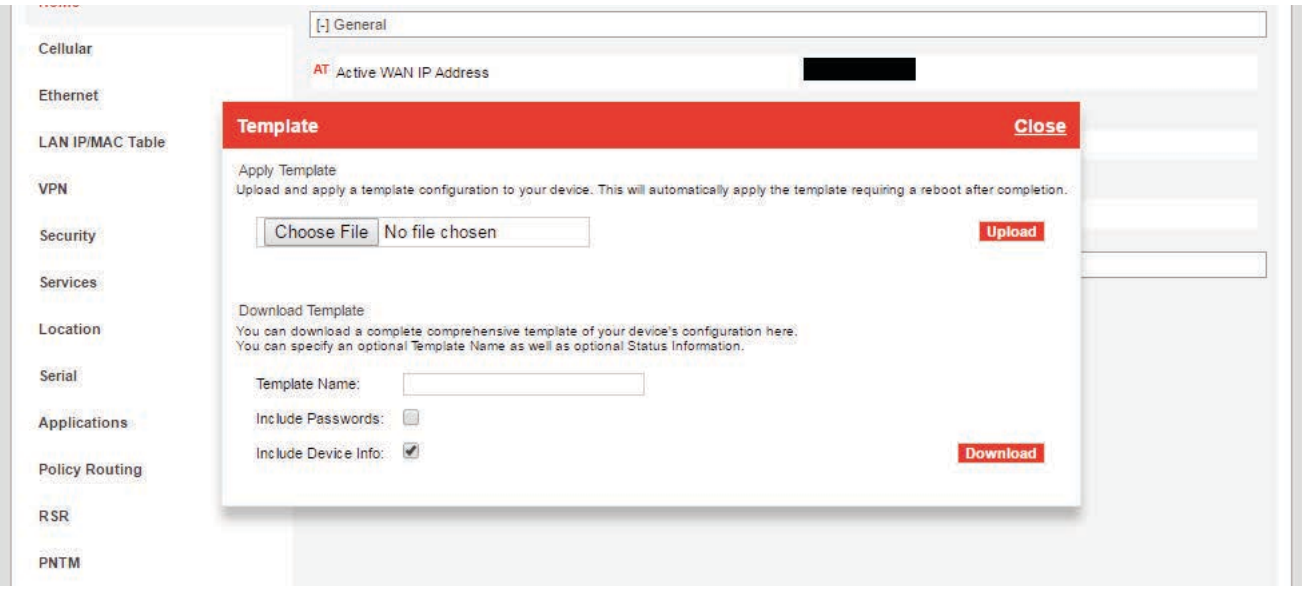
c. Record your password. If you forget it you will need to reset the RV50X to factory settings and reconfigure.

d. Click **Change Password**, then click **Apply**.

A.8.2 Configuring LD Settings Using the Template File

Using the LD Settings Template File is the quickest and easiest way to configure the gateway. However, if you would prefer to manually configure it, see **A.8.3 Configuring LD Settings Without the Template File**.

Step 7 Select **Template** in the top right. This opens the Template upload window.



Step 8 Click **Choose File**, select the template file "**RV50XTemplateFile.xml**" from the LD USB drive included with your system, then click **Upload**. If needed, you can also access the file from http://www.LarsonDavis.com

Step 9 Select **Apply**. The gateway configuration is complete.

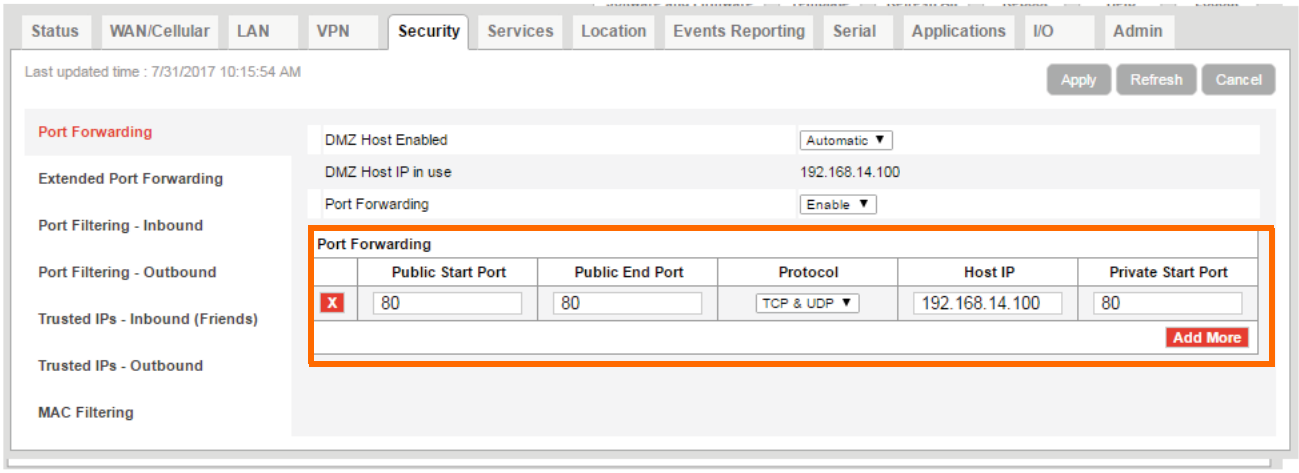
A.8.3 Configuring LD Settings Without the Template File

If you would prefer to manually configure the RV50X instead of uploading the Template file, complete this section.

Step 1 Go to the **Security** tab, and in the left pane, select the **Port Forwarding** section.

Step 2 Edit the values in the Port Forwarding section to match what is shown in *Figure A-9 Port Forwarding*, and click **Apply**.

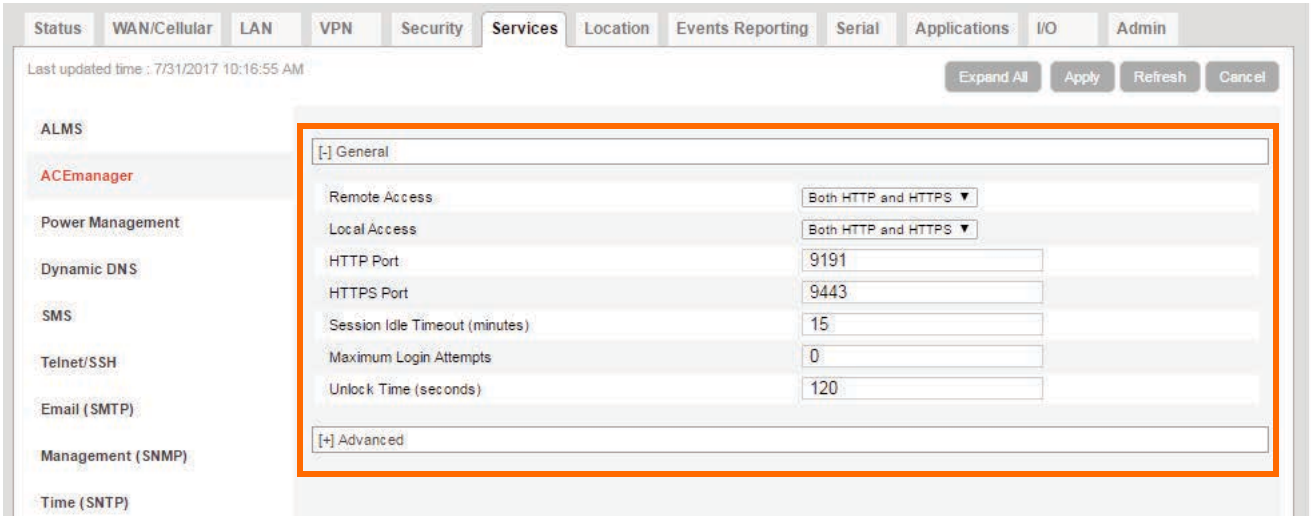
FIGURE A-9 Port Forwarding



Step 3 Navigate to the **Services** tab, and in the left pane, select the **ACEmanager** section.

Step 4 Edit the values to match what is shown in *Figure A-10* and click **Apply**.

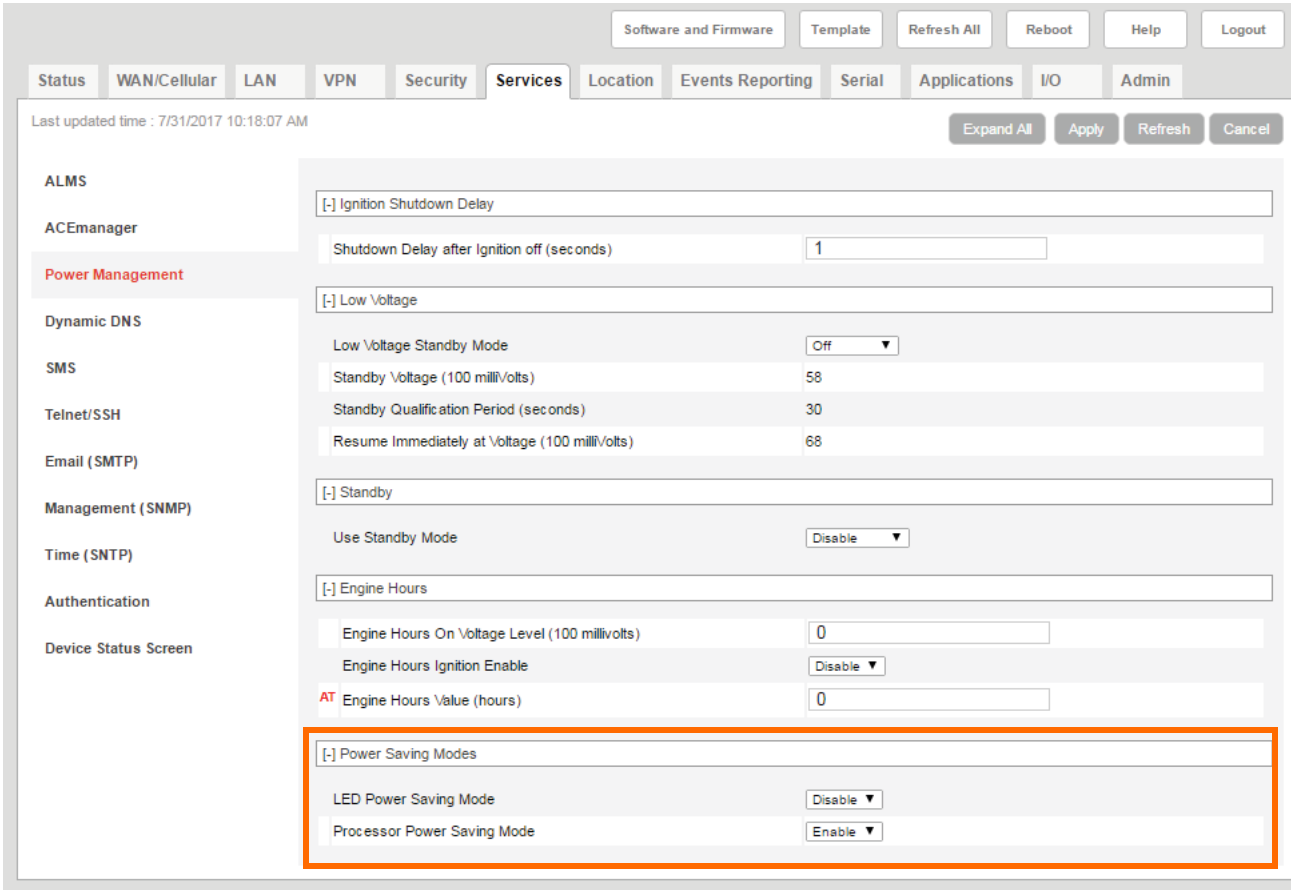
FIGURE A-10 Services - ACEmanager



Step 5 In the left pane, click the **Power Management** section, and select **Power Saving Mode**.

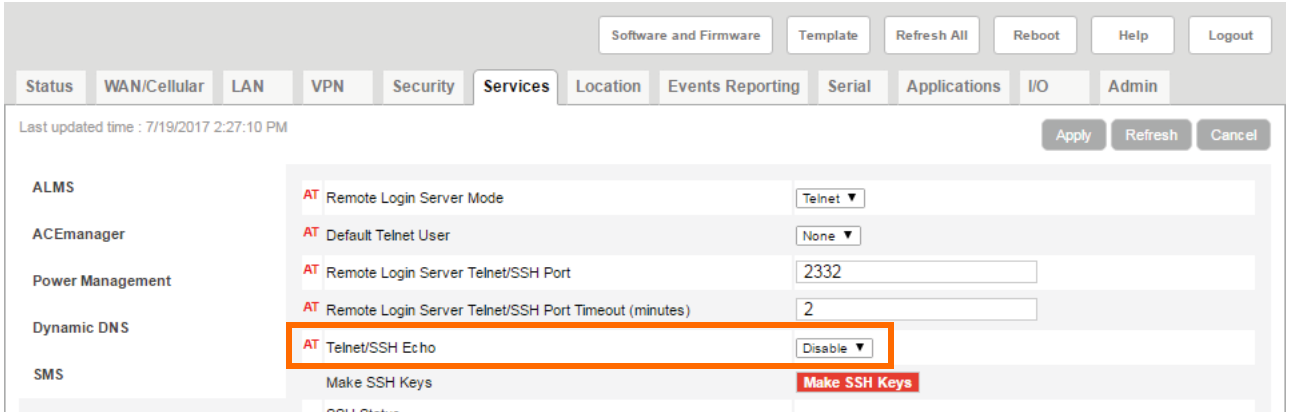
Step 6 From the **Processor Power Saving Mode** drop-down, select **Enable** and click **Apply**.

FIGURE A-11 Services - Power Management



Step 7 In the left pane, select **Telnet/SSH Echo**, set the value to **Disable** and click **Apply**.

FIGURE A-12 Telnet/SSH

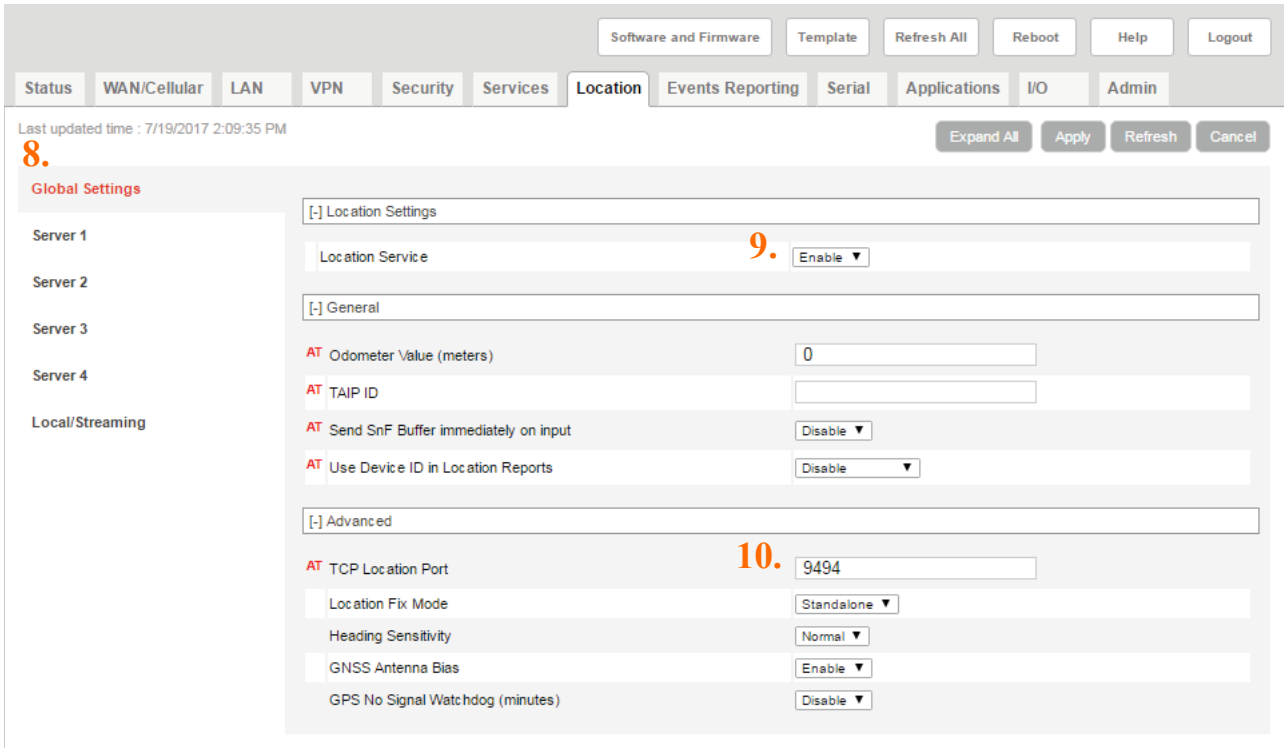


Step 8 Select the **Location** tab, then in the left pane, select **Global Settings**.

Step 9 From the **Location Service** drop-down, choose **Enable**.

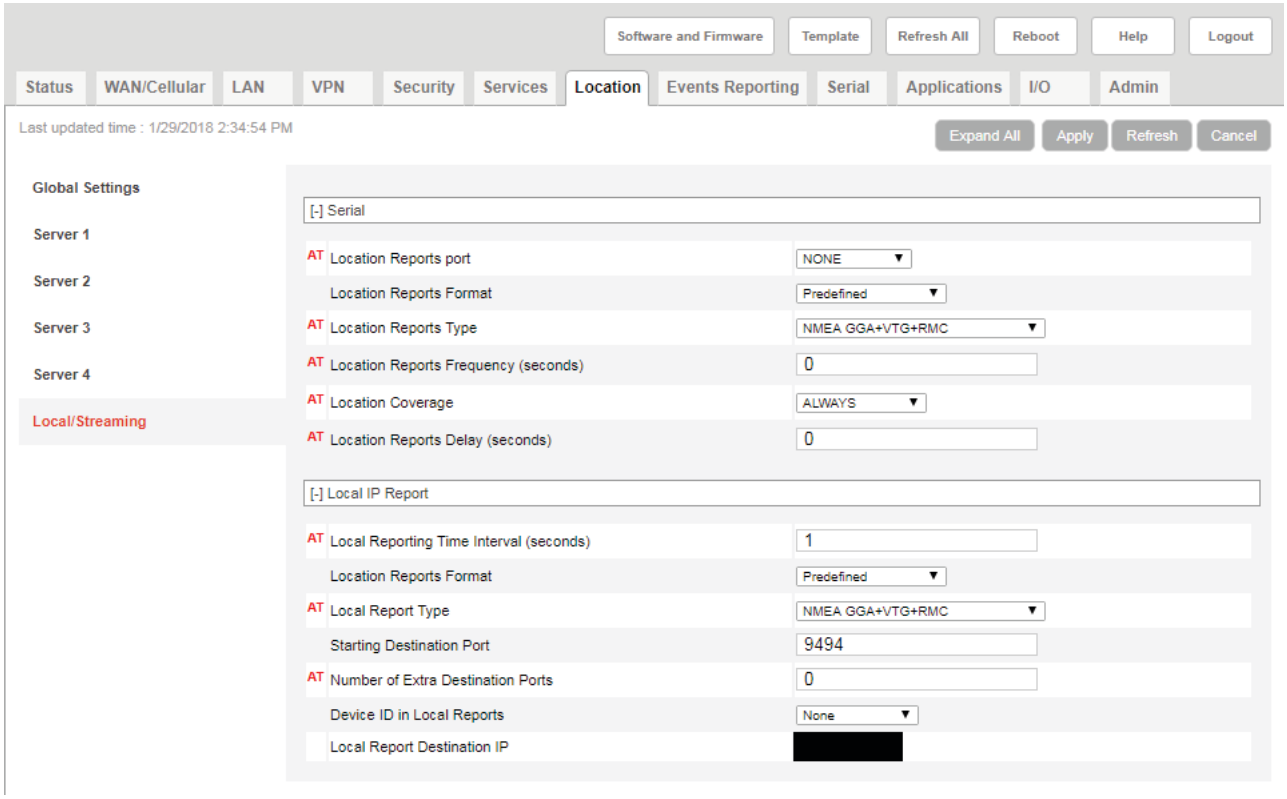
Step 10 Set the **TCP Location Port** to **9494**, and click **Apply**.

FIGURE A-13 Location Settings



Step 11 In the left pane, select **Local/Streaming**, modify the values to match *Figure A-14*, and click **Apply**.

FIGURE A-14 Local/Streaming Configuration Values

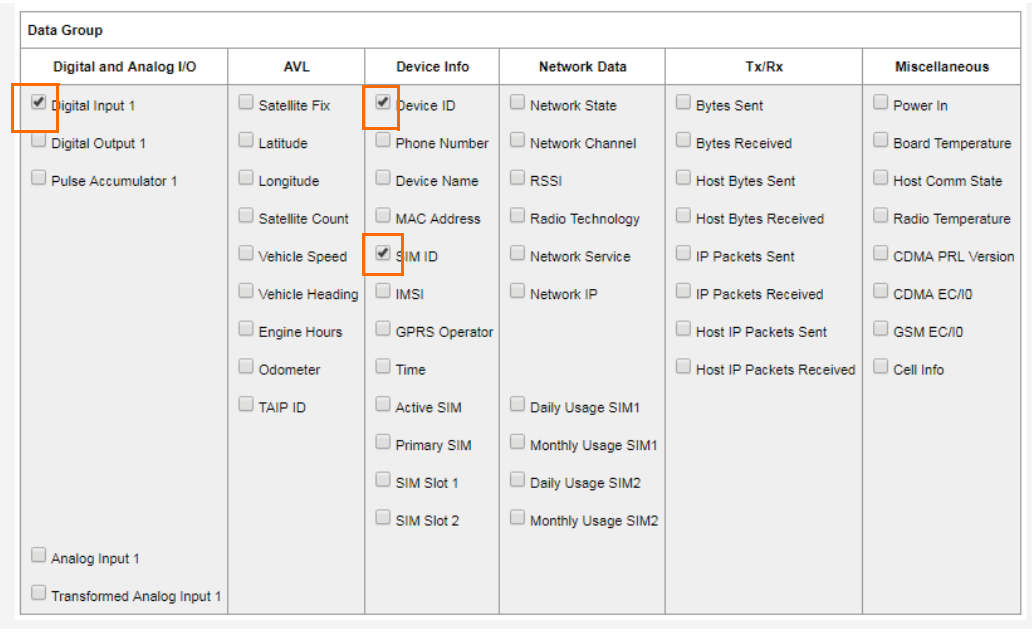


Step 12 Navigate to the **Events Reporting** tab.

Step 13 Change the **Action Name** to be **Intrusion Detection**, and the **Action Type** to be **Email**.

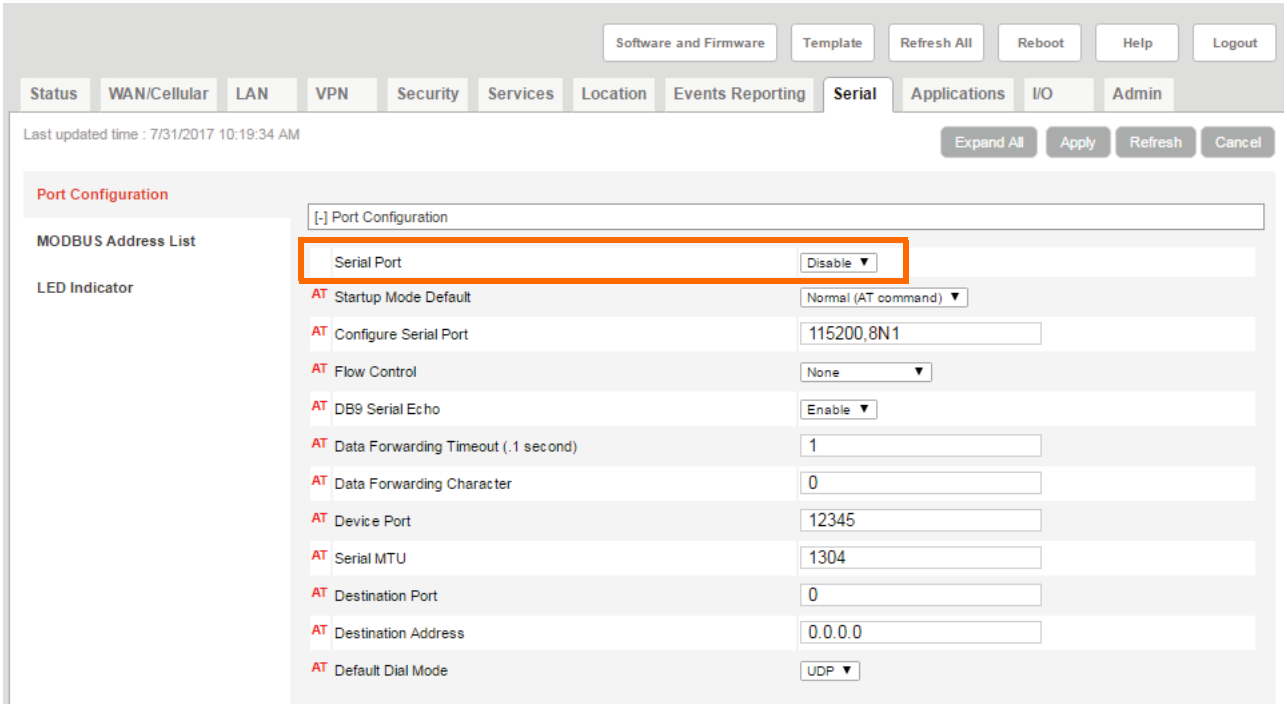
Step 14 In the Data Group section on the same page, set the values to match *Figure A-15*.

FIGURE A-15 Data Group Settings



Step 15 Navigate to the **Serial** tab, select **Disable** from the **Serial Port** drop-down menu, and click **Apply**.

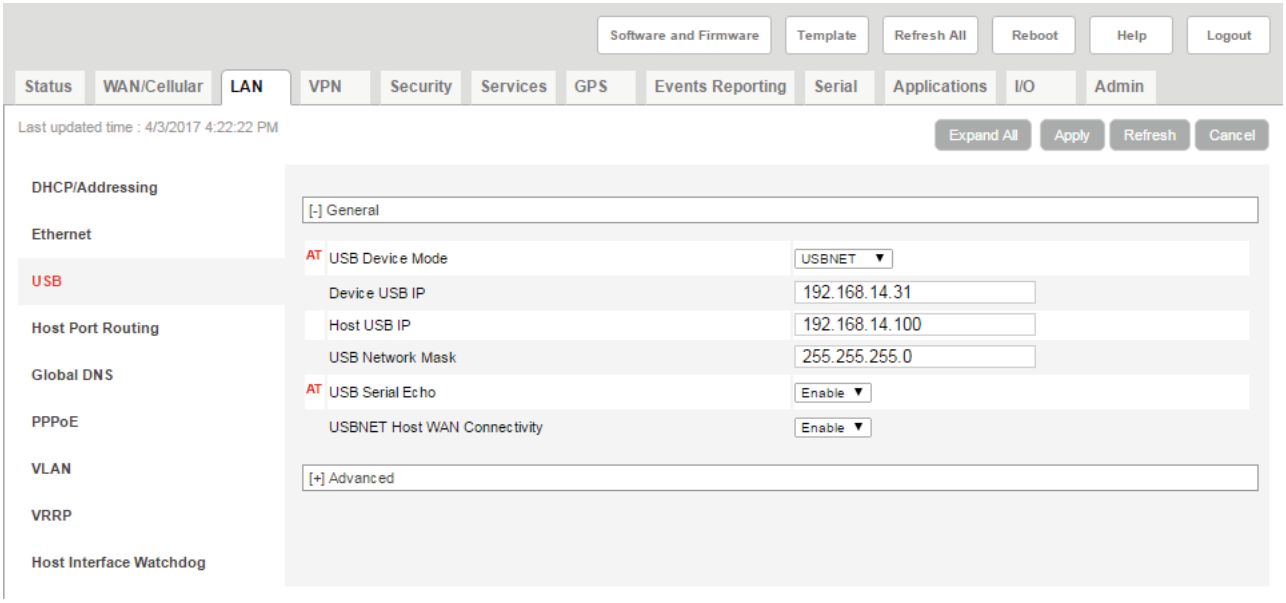
FIGURE A-16 Serial Port Settings



Step 16 Navigate to the LAN tab, and in the left pane, select the **USB** section.

Step 17 Verify that the settings are as shown in *Figure A-17*, and click **Apply**.

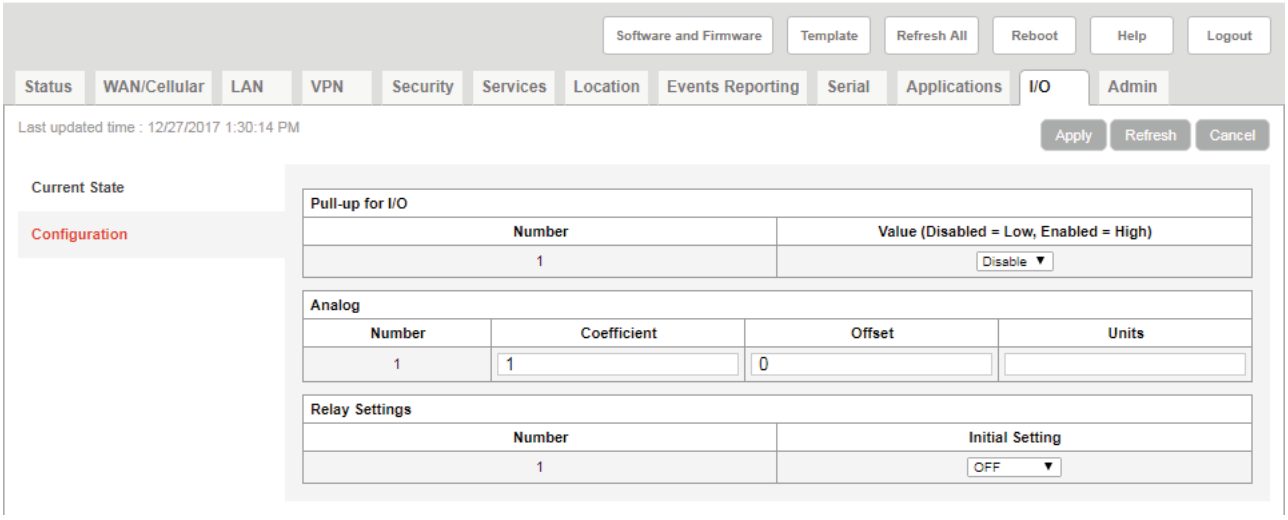
FIGURE A-17 USB Port Settings



Step 18 Navigate to the **I/O** tab, and select the **Configuration** section in the left pane.

Step 19 Verify that the settings are as shown in *Figure A-18*, and click **Apply**.

FIGURE A-18 I/O

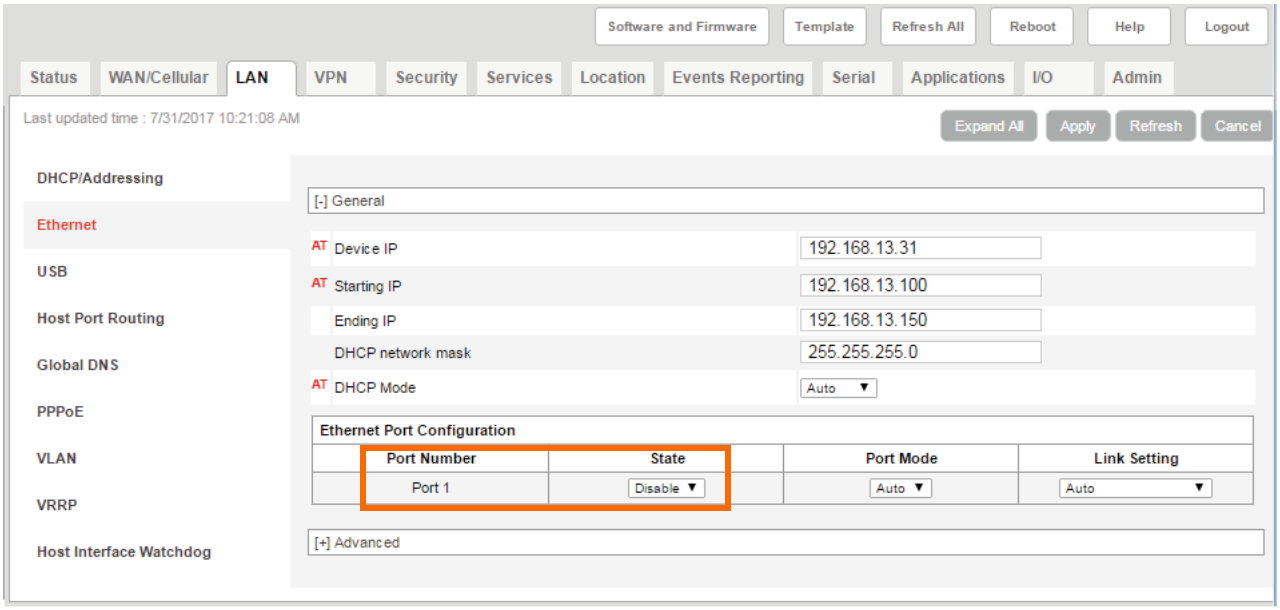


TAKE NOTE After this change you will not be able to connect to the gateway with a wired Ethernet connection. If you need to restore the wired connection without connecting to the gateway through the cellular connection, do a hard reset on the gateway. This resets all items to the factory defaults. As a result, you will need to configure the gateway again from step 1.

Step 20 Navigate to the **LAN** tab, and select the **Ethernet** section in the left pane.

Step 21 In the **Ethernet Port Configuration** section, change the **Ethernet Port 1 State** to **Disable**, and click **Apply**.

FIGURE A-19 LAN Settings



Step 22 In the top right of the screen, click the **Reboot** button. The gateway saves your settings and reboots.

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