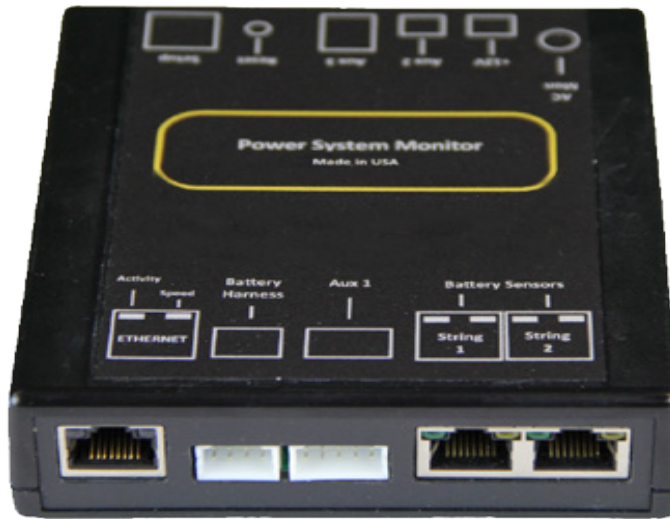


Battery Health Management

Installation and Operation Manual



Power System Monitor

This battery monitoring system is the first in a series of low-cost controller options designed to dramatically lower cost and provide battery health and cabinet/hut facility monitoring capabilities.

The battery monitoring system can be equipped with either an eight battery wiring harness or a battery sensor option. The eight battery harness allows for the lowest cost solution monitoring, battery string, and individual battery voltages. Using the battery sensor option provides additional battery measurements including ohmic measurements and individual battery temperatures. Both solutions offer facilities and cabinet monitoring capabilities.

The control unit connects to a network switch, router, or Cable\DSL\cellular modem via an Ethernet connection. Among the facilities parameters monitored are AC line voltage, equipment AC load current (optional), moisture (optional), controller internal temperature, two monitorable digital inputs, and one controllable digital output.

The battery monitoring system controller typically obtains its operating power from the battery string being monitored and supplies a 12 VDC output to power a companion cable\DSL\cellular modem, thus eliminating the need for a separate modem power unit.



The battery monitoring system has a built-in SNMP proxy, a built-in web server, and a built-in SMTP mail client. The SNMP proxy supports IEEE/SCTE HMS MIBs making the battery monitoring system compatible with virtually any management system. HMS traps are generated based on alarm conditions defined using the HMS property MIB. The built-in web server allows the status of the monitored batteries to be analyzed from anywhere in the network using a common web browser. This eliminates the need for expensive client application software licenses. Near real-time monitoring and alarm provisioning are available via a standard web browser or software. The built-in SMTP mail client can be set up to send alarm messages to another computer (via email addresses) or mobile phone when an alarm occurs.

Section 1: Critical Safety Issues **4**

Safety Admonishments	4
Emergency Shutdown Procedure	5
General Safety Issues	5
Battery Safety Issues	5
Safety Notes	7
Important Symbols	7
Definition of Terms	7

Section 2: System Overview **9**

Overall Operation	8
Battery Health Module Description	9
Accessories	11
Utility AC Transformer (Optional) Battery Health Module	11
Moisture Sensor (Optional)	11
Current Sensor (Optional)	11
Using the General-Purpose Interface	12

Section 3: Initial Bench Evaluation **14**

Initial Bench Evaluation	12
--------------------------------	----

Section 4: Installation and Setup **16**

Network Connections	14
Powering	15
Connecting Battery Sensors (Optional)	15
Setting the IP Address	15
Running the Battery Health Module Setup Using PuTTY	16
Battery Health Module Setup Menu	17
Server Setup	18
Password Setup	22
SNMP Setup	23
HMS Defaults	26
E-mail Setup	26
Restore Factory Defaults and Reset	30



Exit Without Reseting	30
Save Changes and Reset	30
Navigating the Web Pages	30
Overview Web Pages	31
Login – Unlocking the Overview Web Page	31
Site Data	34
Site Details View	35
Updating Site Details	36
Analog Alarm Details	36
Battery Voltage Alarms	38
Battery Admittance Change Alarms	38
Battery Temperature Alarms	39
Battery Voltage Delta Alarms	39
Harness: Battery Voltages Alarms	40
Sensor String Voltage Alarms	40
String Discharge Alarm Threshold Alarms	41
AC Line Voltage Alarms	41
AC Current Alarms	42
Controller Temperature Alarms	42
System Controls	43
String Sensor Data	44
String Details View	45
Battery Sensor Details View	46
String Harness Data	47
I/O Functions Indicators	48
Default Values	48
Resolving Common Problems	48

Critical Safety Issues

Section 1: Critical Safety Issues

Safety admonishments

IMPORTANT SAFETY INSTRUCTIONS. SAVE THESE INSTRUCTIONS.

Three different levels of safety admonishments are used within this instruction manual; specifically **DANGER**, **WARNING**, and **CAUTION**.

*Trois niveaux différents d'avertissements de sécurité sont utilisés dans ce mode d'emploi; spécifiquement **DANGER**, **AVERTISSEMENT** et **ATTENTION**.*



DANGER

The statement following the **DANGER** heading alerts the equipment user of a potentially life or health-threatening situation unless precautions are taken against it. Admonishments of this nature usually entail the hazards of electrical shock or those encountered that may result in physical injury.

*La déclaration sous la rubrique **DANGER** avertit l'utilisateur de l'équipement d'une situation potentiellement mortelle ou mortelle, sauf si des précautions sont prises contre lui. Les admonistances de cette nature entraînent habituellement les dangers d'un choc électrique ou ceux rencontrés qui peuvent entraîner des blessures physiques.*



WARNING / AVERTISSEMENT

The statement following the **WARNING** heading alerts the equipment user of a condition or procedure that could result in interruption of service to the users or subscribers of the service receiving power from this product.

*La déclaration sous le chapitre **AVERTISSEMENT** avertit l'utilisateur de l'équipement d'une condition ou d'une procédure qui pourrait entraîner une interruption de service pour les utilisateurs ou les abonnés du service qui reçoit l'alimentation de ce produit.*



CAUTION / ATTENTION

The statement following the **CAUTION** heading alerts the equipment user of a condition that could result in damage to the subject equipment or ancillary equipment if care is not exercised during certain maintenance or operating procedures.

*La déclaration suivant la rubrique **ATTENTION** avertit l'utilisateur de l'équipement d'une condition qui pourrait endommager l'équipement concerné ou l'équipement auxiliaire si les soins ne sont pas exercés pendant certaines procédures de maintenance ou d'exploitation.*

Emergency Shutdown Procedure



Exercise extreme caution when performing the following procedure. Carry out the steps precisely in the order given to avoid the possibility of personal injury or equipment damage.

Faites preuve d'une extrême prudence lors de l'exécution de la procédure suivante. Effectuez les étapes précisément dans l'ordre indiqué pour éviter la possibilité de blessures ou de dommages matériels.

Perform the following procedure if the battery health module must be shut down and disconnected on an emergency basis:

1. Open the DC circuit breaker protecting the main battery system.
2. Disconnect the Battery harness from its receptacle.
3. Remove the power harness from the battery health module.

General Safety Issues:

The Battery Health Module documented in these instructions has been designed, tested and produced to ensure safe, trouble-free operation. Personnel using or installing this power supply should completely read and fully understand the following safety instructions. They are provided here as informational guidelines for your continued safety in usage of the product.

Battery Safety Issues

When choosing a battery type (gelled electrolyte or AGM) for installation, it is not recommended mixing different types of batteries in the same string. **DO NOT** use flooded type batteries containing liquid electrolyte under any circumstances. Such batteries are hazardous to use within DOT/ITS enclosures and can degrade or destroy equipment installed in the enclosure with them. Flooded batteries also pose environmental hazards when acid containment methods cannot be employed. Use only gelled electrolyte or AGM batteries of suitable size, voltage and capacity for use in a DOT/ITS system.



Batteries can supply extremely large currents (>4000 amps) for a short period of time, sufficient to vaporize or melt metal objects. For this reason, installers must remove watches, rings and other jewelry before placing or connecting batteries in the cabinet. Insulating gloves and protective clothing should be worn during battery installation, consistent with local practices. Use only fully insulated tools designed for battery maintenance.

Les batteries peuvent fournir des courants extrêmement importants (> 4000 ampères) pendant une courte période, suffisant pour vaporiser ou faire fondre des objets métalliques. Pour cette raison, les installateurs doivent enlever les montres, bagues et autres bijoux avant de placer ou de connecter les piles dans le cabinet. Des gants isolants et des vêtements de protection devraient être portés pendant

l'installation de la batterie, conformément aux pratiques locales. Utilisez uniquement des outils entièrement isolés conçus pour l'entretien de la batterie.



CAUTION / ATTENTION



a. CAUTION: Risk of energy hazard, 12 V, 100 Ampere-hour (watt or kilowatt) batteries. Before replacing batteries, remove conductive jewelry such as chains, wrist watches, and rings. High energy through conductive materials could cause severe burns.

b. CAUTION: Do not dispose of batteries in a fire. The batteries may explode.

c. CAUTION: Do not open or mutilate batteries. Released material is harmful to the skin and eyes. It may be toxic.

a. ATTENTION: Risque d'énergie, batteries 12 V, 100 Ampères-heures (watts ou kilowatts). Avant de remplacer les piles, retirez les bijoux conducteurs tels que les chaînes, les montres-bracelets et les bagues. Une énergie élevée à travers les matériaux conducteurs pourrait causer de graves brûlures.

b. ATTENTION: Ne jetez pas les piles dans un feu. Les piles peuvent exploser.

c. ATTENTION: N'ouvrez pas et ne mutilez pas les piles. Le matériau libéré est nocif pour la peau et les yeux. Cela peut être toxique.

Batteries contain Sulfuric acid in gelled or semi-liquid form. Direct contact with any spilled electrolyte from a damaged battery may result in skin irritation or chemical burns. For this reason, handle batteries carefully to avoid puncturing the case and releasing any of the electrolytes. Replace any battery that is found to have a swollen or cracked case. Always recycle used batteries to reclaim lead and other materials that can pose environmental hazards if disposed of improperly.

In case of contact with the electrolyte, thoroughly wash any contaminated areas of the skin with soap and water. In case of contact with the eyes, immediately flush with copious amounts of water and seek medical attention. Minor surface spills can be neutralized with an appropriate neutralizing agent such as bicarbonate of soda (baking soda).

Always use proper lifting techniques when handling batteries. Each 12-volt battery weighs approximately 30 Kg or 66 lbs.

Personnel installing or servicing batteries must wear eye protection (goggles or full-face shield) and protective clothing (apron and gloves) if necessary, according to local practices. Additionally, only fully insulated tools specifically designed for battery installation and service should be used for that purpose. Tools wrapped with vinyl or fabric-based electrical tapes are NOT acceptable substitutes. (Insulated wrenches complying with IEC 60900 and ASTM F-1505 Standards¹

¹ IEC 60900: Live Working – Hand Tools for Use Up to 1000VAC and 1500VDC
ASTM F-1505: Standard Specification for Insulated & Insulating Hand Tools

are distributed by various industrial supply organizations.)

The Battery harness **MUST** be removed from the receptacle on the front of the power supply before installing, changing, and/or connecting batteries.

Verify correct battery polarity and voltage at the end of the battery harness connector before connecting the battery harness. Applying DC input of improper polarity or voltage can seriously damage or destroy the power supply or the battery string.

SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during installation and maintenance.

1.2. Safety Notes

- High currents and voltages may be present on the equipment terminals and on the interior of the equipment. Make sure you understand and observe all appropriate safety codes and regulations. Follow prudent electrical safety practices when installing or servicing the equipment. Installation, maintenance and servicing of the equipment should only be performed by qualified, trained and authorized personnel.
- Before installation, take measurements with a volt meter to ensure that no battery post in the system has lethal AC or DC voltages relative to earth ground.
- Except as explained in this manual, there are no user-serviceable parts inside the Battery Monitoring System components. Opening the equipment could expose you to dangerous voltages and void the product warranty. All product servicing should be referred to factory-authorized personnel.
- Use only interconnection cables supplied by or authorized by Multilink. Use of user-made interconnection cable assemblies could result in damage to equipment and potential safety hazards, as well as voiding of equipment warranties.
- Do not exceed the voltage specifications of the product.
- Make sure the equipment is grounded properly.
- The equipment should be protected from liquids, moisture, explosives and corrosive vapors.

1.3. Important Symbols



CAUTION! The use of a CAUTION indicates safety information intended to prevent damage and/or injury.

1.4. Definition of Terms

The inverse of impedance in units of Siemens. Admittance is a measure of how easily a circuit or device will allow a current to flow. Resistance is a measure of the opposition of a circuit to the flow of a DC current, while impedance takes into account not only the resistance, but AC effects (known as reactance) as well. Likewise, admittance is not only a measure of the ease with which a DC current can flow (conductance, the inverse of resistance), but also takes in to account the AC effects of susceptance (the inverse of reactance).

System Overview

Section 2: System Overview

Overall Operation

The Battery Health Module is the first in a series of controller options designed to dramatically lower cost while providing battery health and cabinet/hut facility monitoring capabilities.

The Battery Health Module provides facility or cabinet monitoring capabilities via the included battery string harness as well as optional battery sensors. The battery string harness allows for the lowest-cost solution for monitoring the battery string. Using the optional battery sensors provides additional battery measurements, including ohmic measurements as well as individual battery voltages and temperatures.

The Battery Health Module also allows for monitoring AC line voltage (optional), equipment AC load current (optional), moisture (optional), controller internal temperature, and two monitorable digital inputs. The Battery Health Module also includes one controllable digital output.

The Battery Health Module typically obtains its operating power from the battery string being monitored and supplies a 12 Vdc output to power a companion cable\DSL\cellular modem, thus eliminating the need for a separate modem power supply unit.

The Battery Health Module connects to a network switch, router or cable\DSL\cellular modem via an Ethernet connection.

The Battery Health Module has a built-in SNMP agent, a built-in web server and a built-in SMTP mail client. The SNMP agent supports IEEE/SCTE HMS MIBs making the battery Health Module compatible with virtually any management system. HMS traps are generated based on alarm conditions defined using the HMS Property MIB. The built-in web server allows the status of the monitored batteries to be analyzed from anywhere in the network using a common web browser. This eliminates the need for expensive client application software licenses. Near real-time monitoring and alarm provisioning are available via standard web browser or software. The built-in SMTP mail client can be set up to send alarm messages to another computer (via e-mail addresses) or to a mobile phone when an alarm occurs.

The Battery Health Module can be upgraded over the network, facilitating firmware upgrades and feature enhancements as they become available. The unit also contains a special “watchdog timer” that monitors the modem and automatically resets it in case of a modem “hang” situation.

Contact Multilink to learn about other options for monitoring cabinets, huts or small building battery backup.

BS3B-12-4-EQ Sensor



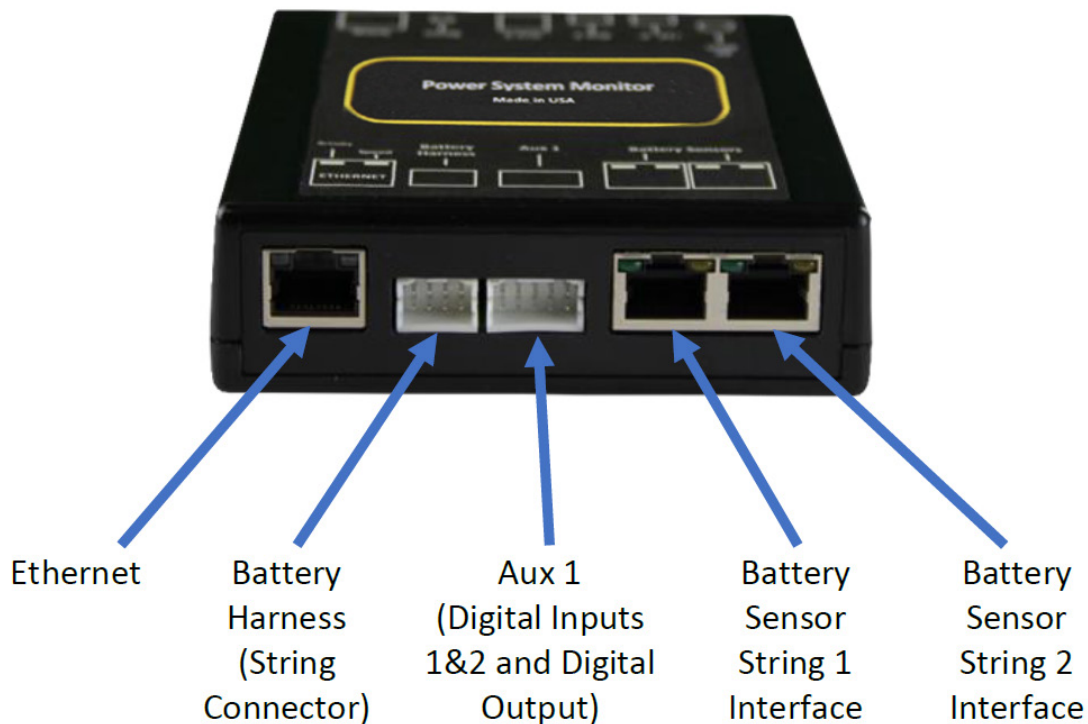
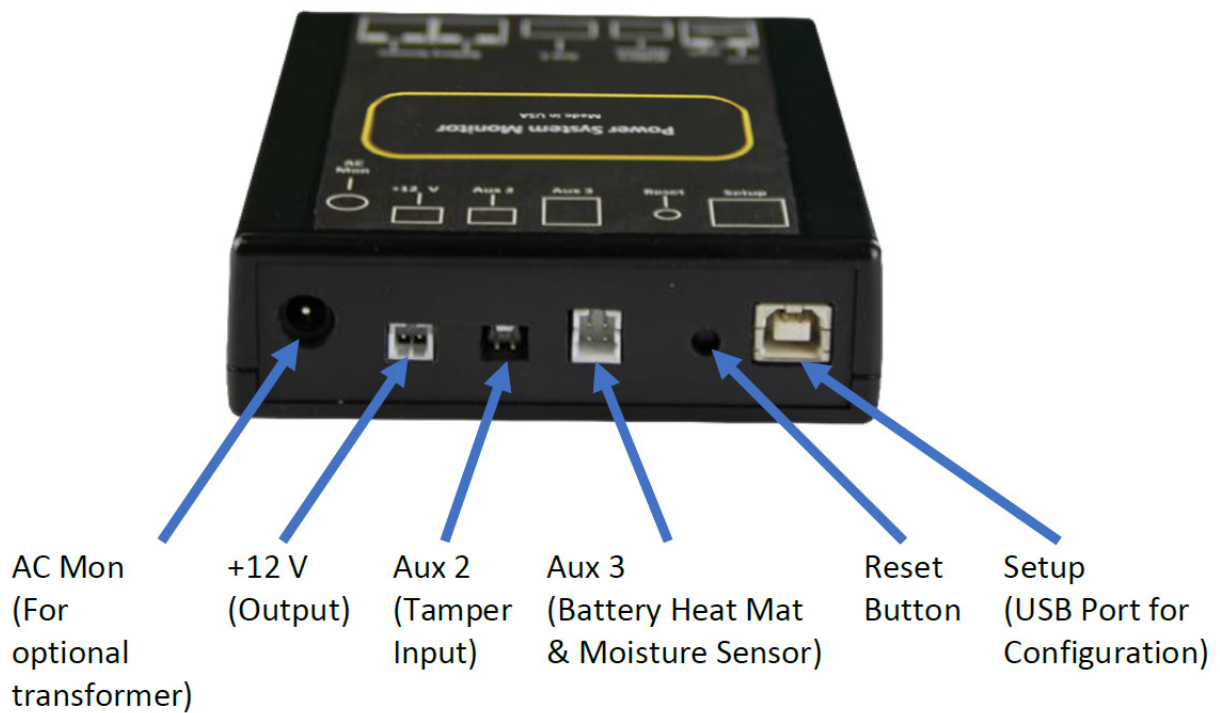
This is a universal battery sensor with two wire connections that will work with most Batteries. The maximum bolt size for the terminals is 5/16 inch. When the sensor is mounted to the top of the Batteries, and not in the direct cooling air flow, the sensor will read the approximate Battery case temperature. The sensor is equipped with a self-adhesive industrial Velcro strip for fastening the sensor to the Batteries.

2.2. Battery Health Module Description

The Battery Health Module is a small, low-cost unit that monitors batteries directly using a battery wiring harness and/or optional battery sensors, and makes the data collected by them available via a local area network or the Internet. The Battery Health Module has two RJ-45 ports for connection of up to two chains of optional battery sensors, with each chain connected to three or four jars. Connections are available for optional features, including a current sensor, moisture sensor and line voltage monitoring transformer. Included are additional input and output capability through two general purpose digital inputs and one general purpose digital output. A USB setup port allows direct connection to a PC for configuration.

The Battery Health Module is powered directly from a battery string voltage of 36-48 Vdc via the included PBT-PAC-BATT battery harness. Acceptable voltage range for providing power to the Battery Health Module is 24 to 59 Vdc. Power consumption is approximately 7 W, with current draw dependent on the input voltage and whether or not an external device is being powered from the rear panel power output connector (0.5 A typical).

A rear panel USB connection provides access to configure the Battery Health Module IP address and other parameters during installation. Setup can also be performed over the network connection via a PuTTY connection.





The Battery Health Module has two RJ45 connectors on the right front panel for connecting the optional battery sensors, integrating one or two strings of monitored jars.

A front panel Ethernet connection provides a TCP/IP (Internet protocol) interface to a local area network or to the Internet. A built-in web server is accessible via this interface, with no need for any software other than a common PC web browser. More sophisticated monitoring and control of the Battery Health Module can be performed remotely using any SNMP-capable network management software system. See SNMP for more details.

Upon power-up, the Battery Health Module automatically begins a search sequence to determine which of its Battery Sensor ports are attached to a string of battery sensors and discovers each connected battery sensor automatically, including its correct position in the string. (No factory programmed address is necessary.)

Once the "auto-discovery" process is finished, the Battery Health Module can individually address each sensor, collect its readings and display those readings in the hierarchical web page display. This process is 'plug & play'. All sensor assignments and configuration information are saved in non-volatile memory, so the system automatically reconfigures itself if power is lost or if the system is turned off for maintenance.

The Battery Health Module can be mounted in any small, inconspicuous location that is available in the cabinet/enclosure.

2.3. Accessories

Various optional accessories are available to enhance the system functionality. Output Overcurrent Monitoring

2.3.1. Utility AC Transformer (Optional) Battery Health Module

The Battery Health Module can monitor the utility power voltage via an optional 12 Vac wall mount transformer. This transformer can be ordered from Multilink as model number WT-5. The transformer plugs into a jack on the Battery Health Module rear panel.

2.3.2. Moisture Sensor (Optional)

The PBT-PAC-MS-1 kit adds capability for the transponder to detect that snow and/or standing water have infiltrated the standby power supply cabinet. The kit consists of a sensor board with double-faced foam tape adhesive and a companion wire harness.

The sensor cable plugs into the Aux 3 connector on the Battery Health Module rear panel.

2.3.3. Current Sensor (Optional)

The model PBT-PA-CS-1 kit adds capability to measure the AC output current from the power supply. The kit consists of a current transformer module and a wiring harness.

The sensor cable plugs into the Aux 1 connector on the front panel

2.3.4. Using the General-Purpose Interface

The Aux 1 general purpose interface can be used to monitor and control auxiliary equipment if the connection between the Battery Health Module and the monitored/controlled equipment is properly implemented. Interface information for available general purpose input and output points (via the Aux 1 connector), as well as electrical specifications for interfacing those points to the target equipment, is provided below. The picture below that shows the locations of the interface connection points on the Battery Health Module.



Initial Bench Evaluation

Section 3: Initial Bench Evaluation

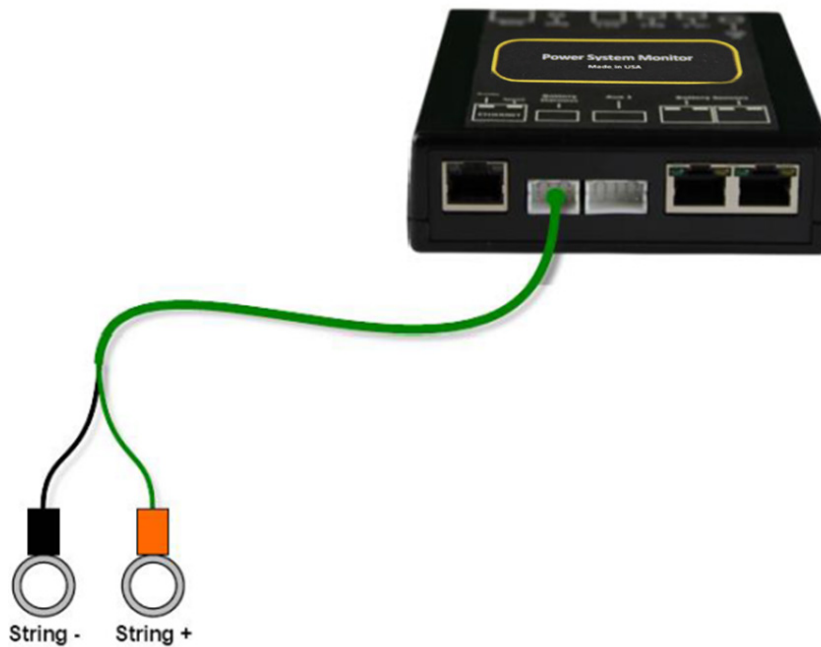
If the user has no previous experience with the Battery Management System, it is recommended that a small local test and evaluation of the system components be set up prior to field deployment of the equipment. This approach will allow you to verify proper operation of the Battery Health Module web server and Telnet configuration without having to troubleshoot larger network issues (firewalls, router and connectivity, and so on).

1. Power up the laptop and connect the laptop to the controller.
2. Set the laptop IP to the same IP plus one of the .Battery Health Module The Battery Health Module ships with a default, static IP address of 192.168.0.91. (So, for example, set the laptop IP address to 192.168.0.92.)



Lethal voltages may be present on the battery strings. If you are not fully trained to work safely around batteries and our monitoring system, leave the installation to a certified technician.

3. Battery harness – Connect the two-wire PBT-PAC-BATT harness to the battery String+ (Red) and String – (Black) terminals. Connect the other end of the harness to the Battery Harness connector on the Battery Health Module front panel. This will power up the Battery Health Module. After a short period, the Battery Health Module 'ready' light should illuminate indicating that the modem has registered itself.



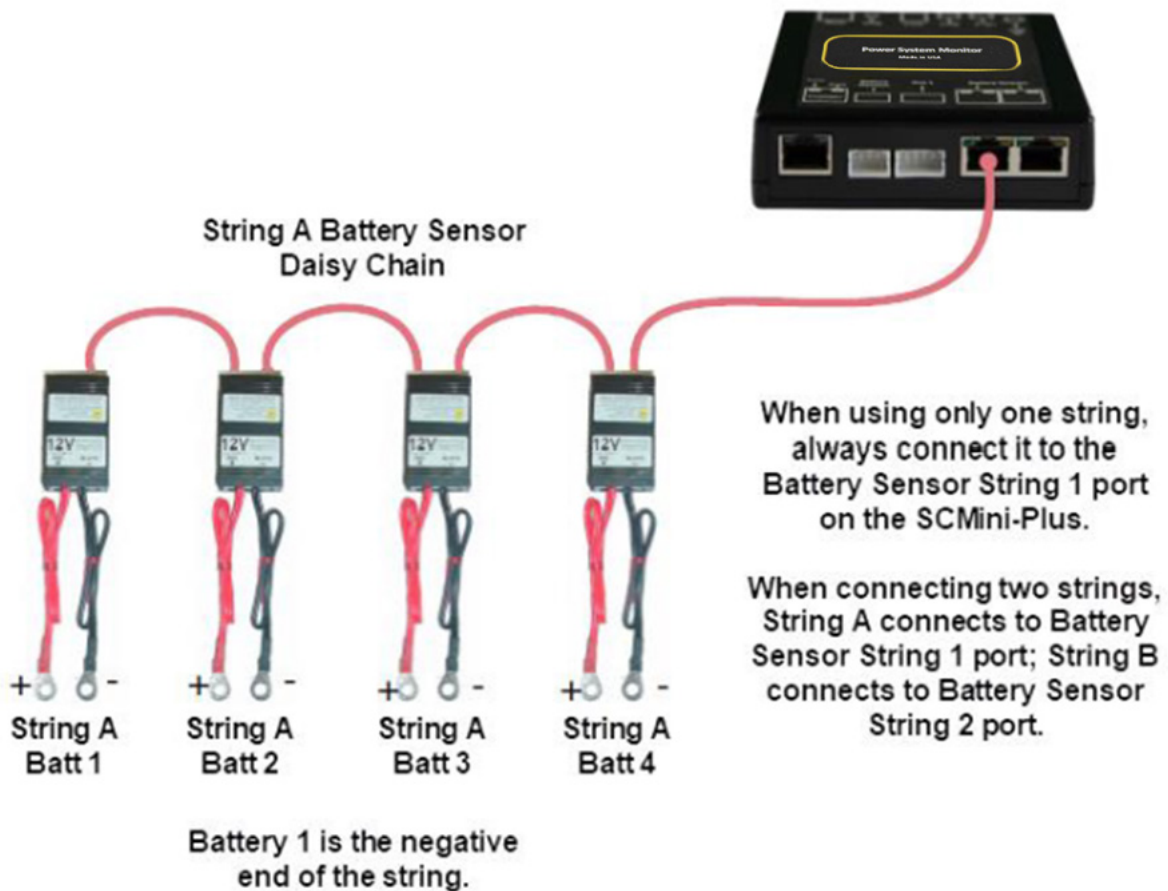
Lethal voltages may be present on the battery strings. If you are not fully trained to work safely around batteries and our monitoring system, leave the installation to a certified technician. Read the sensor installation instructions carefully.



Be sure to disconnect the rectifier or charger before installing the battery sensors. Failure to do so could result in sensor damage.

Refer to the Battery Sensor Installation and Operation Manual (700-000015-00) for detailed information before installing the optional battery sensors.

4. Battery Sensors (optional) – Connect the battery sensors to each battery in the string. Connect the sensors to each other (via CAT5 cables daisy-chained from sensor to sensor). Connect the last sensor in the daisy chain to the String 1 input on the front panel of the Battery Health Module.



5. Type the IP address of the controller into your laptop's web browser and verify that the web page displays properly. Verify that all battery voltages and number of strings or optional battery sensors have been auto-discovered. Verify that the parameter information displayed in the web page appears reasonable.
6. Verify Telnet connectivity by connecting to the controller via PuTTY (remember Multilink uses port 9999 for our Telnet connection). (See Running the Battery Health Module Setup Using PuTTY.)

Installation and Setup

Section 4: Installation and Setup

Select a location for the Battery Health Module. The location should be central to the strings being monitored and the modem (if used) or router. It should be dry and free of corrosive or explosive vapors.

4.1. Network Connections

Connect the front panel Ethernet connector to the router (or modem) using a Cat5 cable.

Set the IP address of the Battery Health Module as described in Setting the IP Address.

Verify network communications by accessing the web page and Telnet setup menu over the network.

4.2. Powering

The Battery Health Module is powered by the battery string via the PBT-PAC-0BATT harness. Connect the harness to the batteries, verify correct wiring and then connect the connector end of the harness to the Battery Health Module battery string connector. The connectors are keyed and will only fit into one of the Battery Health Module female connectors. See Initial Bench Evaluation for details.

4.3. Connecting Battery Sensors (Optional)

Refer to the Battery Sensor Installation and Operation Manual (700-000015-00) for detailed information before installing the optional battery sensors.



Lethal voltages may be present on the battery strings. If you are not fully trained to work safely around batteries and our monitoring system, leave the installation to a certified technician. Read the sensor installation instructions carefully.



Be sure to disconnect the rectifier or charger before installing the sensors. Failure to do so could result in sensor damage.

NOTE: We strongly recommend that you only use the cables included with the Battery Health Module for each string and not make your own sensor cables. A single improperly made cable can destroy an entire string of sensors.

Connect the cable from the string one sensor daisy-chain to the Battery Sensor / String 1 RJ-45 connector on the . If two battery strings are being used, connect the cable from the string two daisy-chain to the Battery Sensor / String 2 RJ-45 connector on the Battery Health Module. See Initial Bench Evaluation for details.

4.4. Setting the IP Address

In order to communicate over the network, the Battery Health Module must be assigned an IP address.

There are several ways the IP address can be assigned.

- You can pre-configure your DHCP server to assign a reserved IP address to the Battery Health Module based on the Battery Health Module MAC Address. The MAC address is printed on the Battery Health Module label. This method is commonly used for field installations.
- You can let your DHCP server assign an address and then interrogate the DHCP server to determine what address was used. This technique works well in the lab environment where the DHCP server may be in a router. This method is not very practical for field installations since the IP address can

change if the resets or the DHCP server decides there is a reason to change the address on the Battery Health Module.

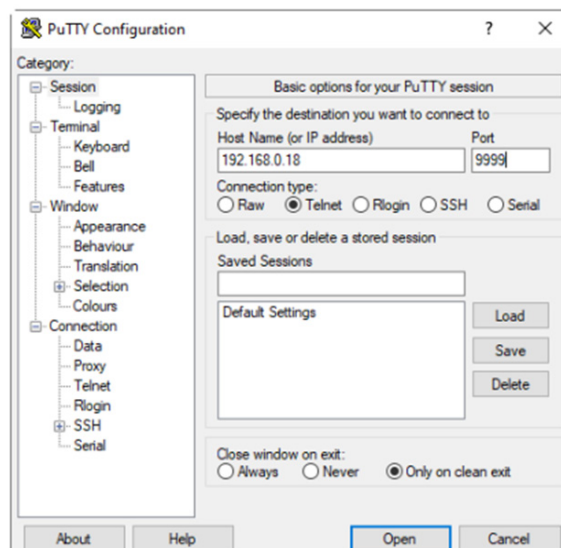
- You can program a static IP address in the Battery Health Module using a temporary connection to a router with a built-in DHCP server and the Battery Health Module Telnet configuration port.
- You can program a static IP address in the Battery Health Module directly using the USB interface and a PC as described in the next section.
- You can program a static IP address in the Battery Health Module using an Ethernet standard or crossover cable and a PC as described in the next section.

Generally, static IP addresses are used so that the network manager can associate the IP address with a physical location. Contact your network administrator or IT department to obtain a static IP address, gateway address and subnet mask that will work on your network.

The Battery Health Module is shipped from the factory configured with a static IP address. If this has been changed, you can set it to the default static IP address by pressing and holding the Battery Health Module reset button for a minimum of 5 seconds. When all of the string port LEDs light and the Battery Health Module resets it will have a static IP address of 192.168.0.91. This IP address can be changed using the techniques described in the following sections.

4.5. Running the Battery Health Module Setup Using PuTTY

1. If necessary, download and install PuTTY.
2. Launch PuTTY from the Windows Start menu.
3. Enter the Battery Health Module IP address in the Host Name (or IP Address) field.
4. Enter 9999 in the Port field.
5. Set the Connection type to Telnet.
6. Click Open.



The Battery Health Module ships without a password. If the Battery Health Module is online and a password has been specified, the following screen will be displayed. If no password has been specified, skip to the next step.

NOTE: The screens in this document may be slightly different than your Battery Health Module screens.

The Battery Health Module will not ask for the password when using the direct USB connection or if the password is not set.

4.6. Battery Health Module Setup Menu

No matter what method of access was used, the setup menu will then be displayed as shown below. These screen shots were captured using PuTTY, but they will look the same in any serial program.



```
COM3 - PuTTY

PIC ver 0.0 SnmpTimer 0, PicTimer 0, ModemTimer 0

*** basic parameters
Hardware: Ethernet TPI
IP addr 192.168.0.91, no gateway set

SNMP Community String, Set: public, Get: public, Trap:
Trap Receivers: 1: --- not set --- 2: --- not set --- 3: --- not set ---
Reset after 2 hours with no SNMP Messages: Disabled

SMTP Server:
Resolved Server IP: 0.0.0.0
Name:
Password:
To Addr 1:
To Addr 2:
To Addr 3:
From Addr:
DNS, Primary: --- not set ---, Secondary: --- not set ---

NTP Servers, Pri: 132.163.4.103, Sec: 129.6.15.29
Time Offset -300 Minutes

07 Feb 2036 06:28:16

0 Server Setup
1 Web Password Setup
2 Power Supply Setup
3 SNMP Setup
4 HMS defaults
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? █
```

The top two thirds of the screen display the present configuration. The menu at the bottom of the screen displays the setup menu.

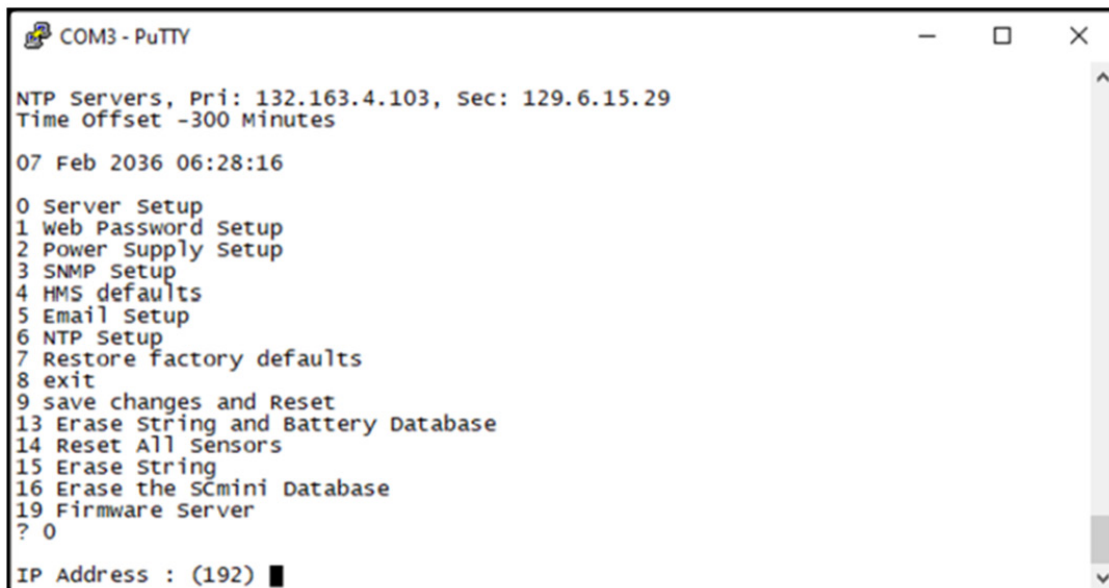
NOTE: Closing the Telnet window will terminate the Telnet session and reset the. To avoid resetting the Battery Health Module, exit by pressing "8" followed by "Enter".

4.7. Server Setup (0)

Various options can be controlled by setting the IP address. For static IP address operation, the IP address should be set to the address assigned by the IT department or other authority. Other IP address options are as follows:

- If the IP address is set to 0.0.0.0 – DHCP is enabled.
- If the IP address is set to 0.0.1.0 – DHCP is enabled and AutoIP is disabled.
- If the IP address is set to 0.0.9.0 – DHCP is enabled, DHCP option 81 is disabled, and AutoIP is disabled.

To change the IP address, select option 0 from the setup menu by typing a 0 followed by “Enter”. The following screen will appear.



```
COM3 - PuTTY

NTP Servers, Pri: 132.163.4.103, Sec: 129.6.15.29
Time Offset -300 Minutes

07 Feb 2036 06:28:16

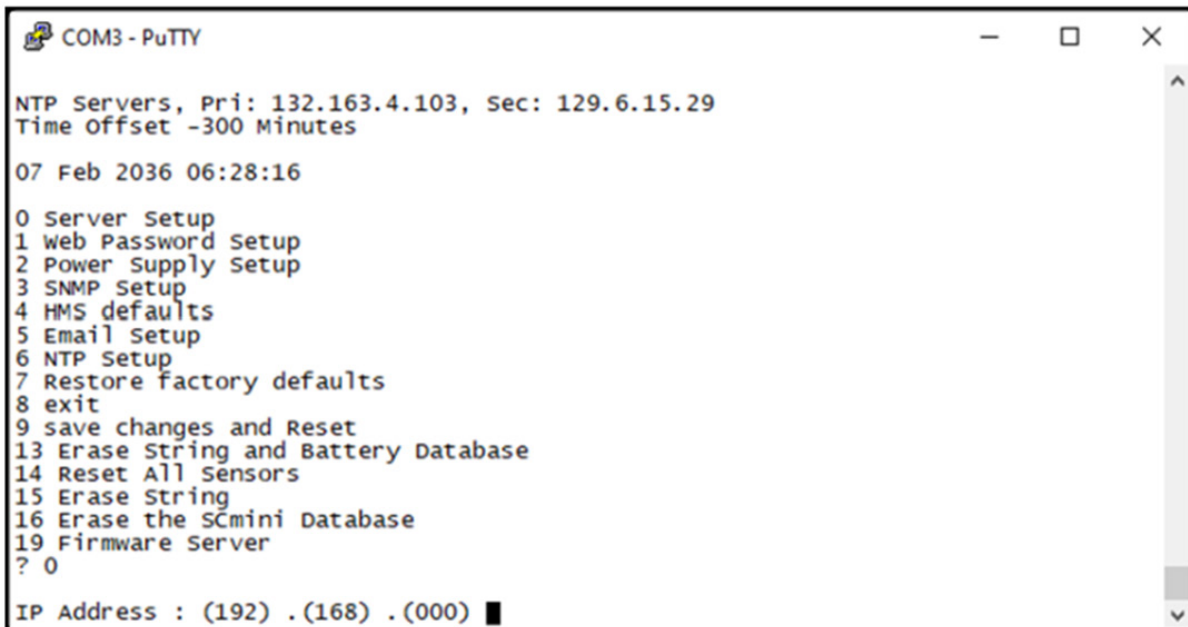
0 Server Setup
1 Web Password Setup
2 Power Supply Setup
3 SNMP Setup
4 HMS defaults
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SMini Database
19 Firmware Server
? 0

IP Address : (192) █
```

The current value of the first octet of the IP address will be shown in parenthesis. This indicates that the first octet of the IP address is 192. To change the octet, type the new number followed by "Enter". To move on without making any changes, press "Enter".

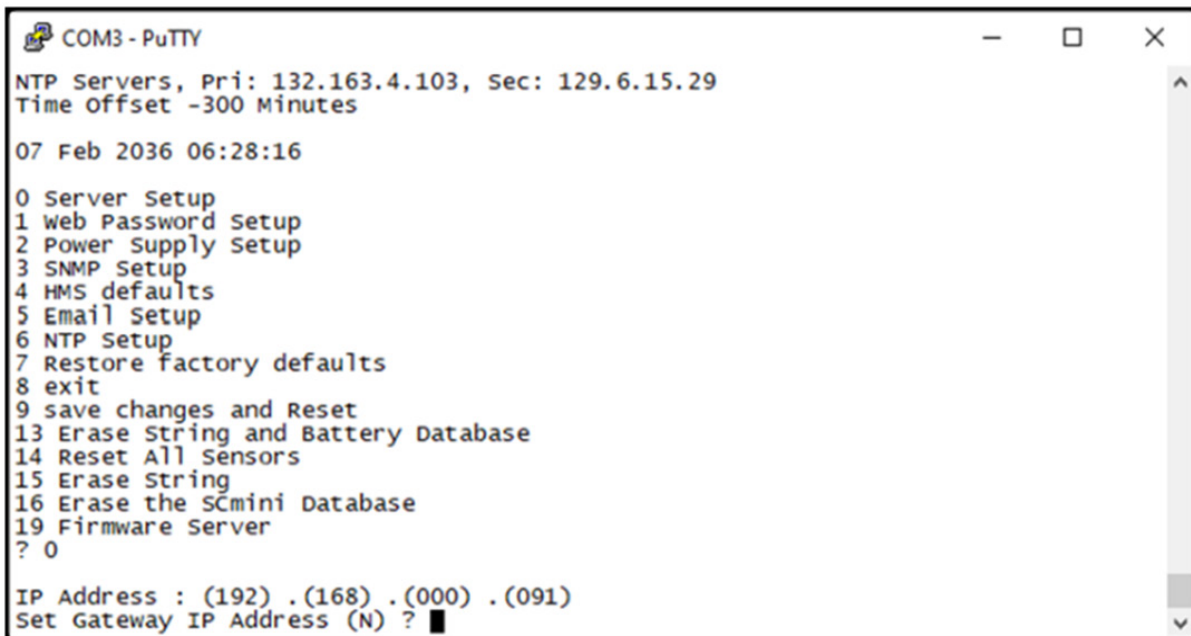
In this example the first octet of the IP address was kept at 192.

Continue entering each octet of the IP address until all four octets have been entered. To skip any entry without making any changes, type "Enter" without typing any numbers.



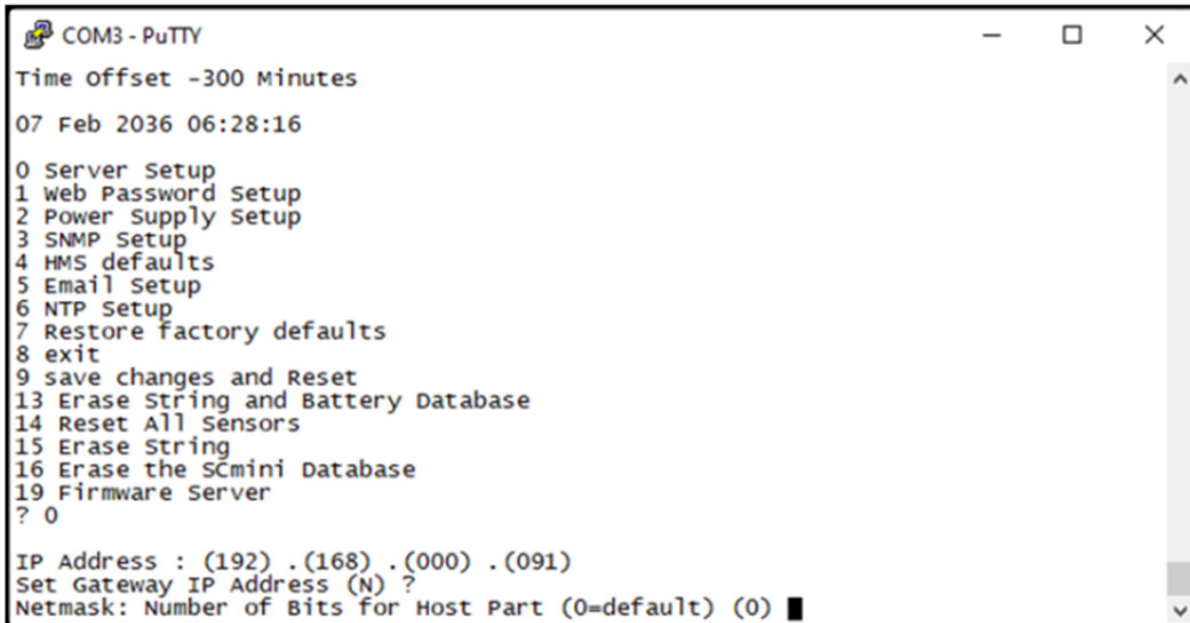
```
COM3 - PuTTY
NTP Servers, Pri: 132.163.4.103, Sec: 129.6.15.29
Time Offset -300 Minutes
07 Feb 2036 06:28:16
0 Server Setup
1 Web Password Setup
2 Power Supply Setup
3 SNMP Setup
4 HMS defaults
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 0
IP Address : (192) . (168) . (000) █
```

Next the Battery Health Module will ask if you would like to set the Gateway IP Address. The gateway address is required for the Battery Health Module to initiate communications with other devices on the network, such as the time or e-mail servers. This address is obtained automatically when running with DHCP, however when a static IP address is assigned to the Battery Health Module the gateway address must be set manually. The gateway address is normally set to the IP address of the first router encountered by outbound network traffic. To change the address, type a "Y" and enter the IP address as described above. To skip the address, press "Enter".



```
COM3 - PuTTY
NTP Servers, Pri: 132.163.4.103, Sec: 129.6.15.29
Time Offset -300 Minutes
07 Feb 2036 06:28:16
0 Server Setup
1 Web Password Setup
2 Power Supply Setup
3 SNMP Setup
4 HMS defaults
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 0
IP Address : (192) . (168) . (000) . (091)
Set Gateway IP Address (N) ? █
```

The Battery Health Module will now ask for the network mask. To change the mask, enter the number of bits required for the local host. Example: for 255.255.255.0 enter 8, for 255.255.252.0 enter 10. Verify the Netmask was set correctly by observing the displayed value when the menu returns to the screen. The table below shows the value to be entered for common Netmasks.

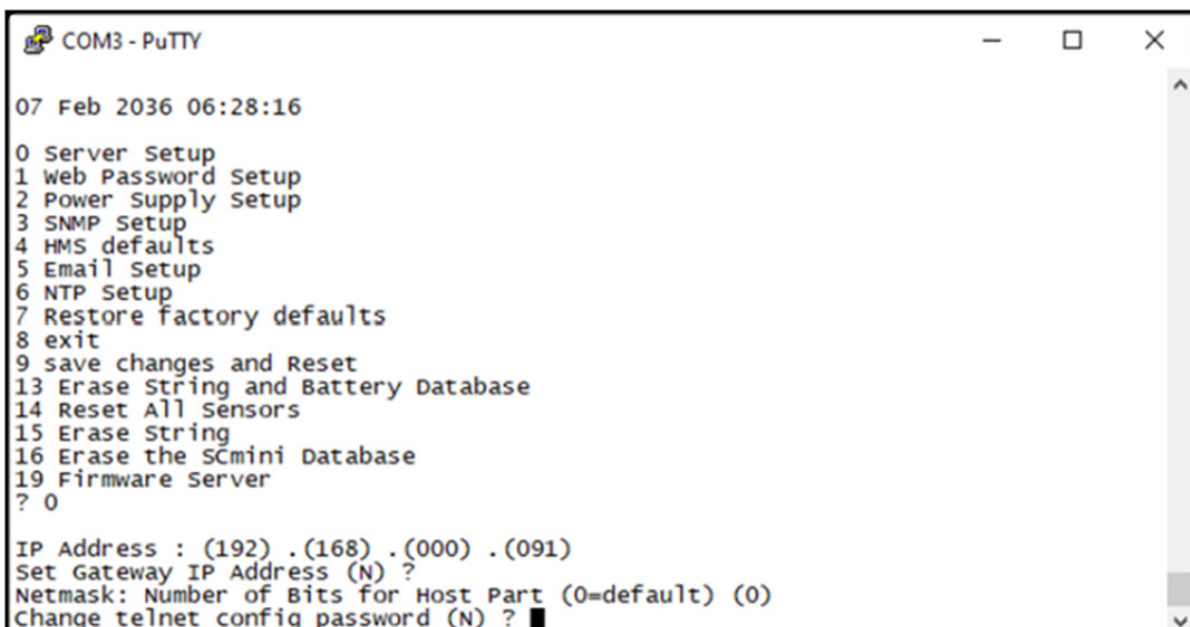


```

COM3 - PuTTY
Time Offset -300 Minutes
07 Feb 2036 06:28:16
0 Server Setup
1 Web Password Setup
2 Power Supply Setup
3 SNMP Setup
4 HMS defaults
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 0

IP Address : (192) .(168) .(000) .(091)
Set Gateway IP Address (N) ?
Netmask: Number of Bits for Host Part (0=default) (0) █
  
```

Next the Battery Health Module will ask if a Telnet password is desired. A four-character password can be selected to secure Telnet access to the agent. Use caution when selecting a password. If you forget the password or enter it incorrectly the Battery Health Module must be accessed using the USB programming adapter locally to reset the password. To set the password, enter a "Y" and then the password, following the prompt. To remove a password, enter a "Y" and then hit enter at the prompt.

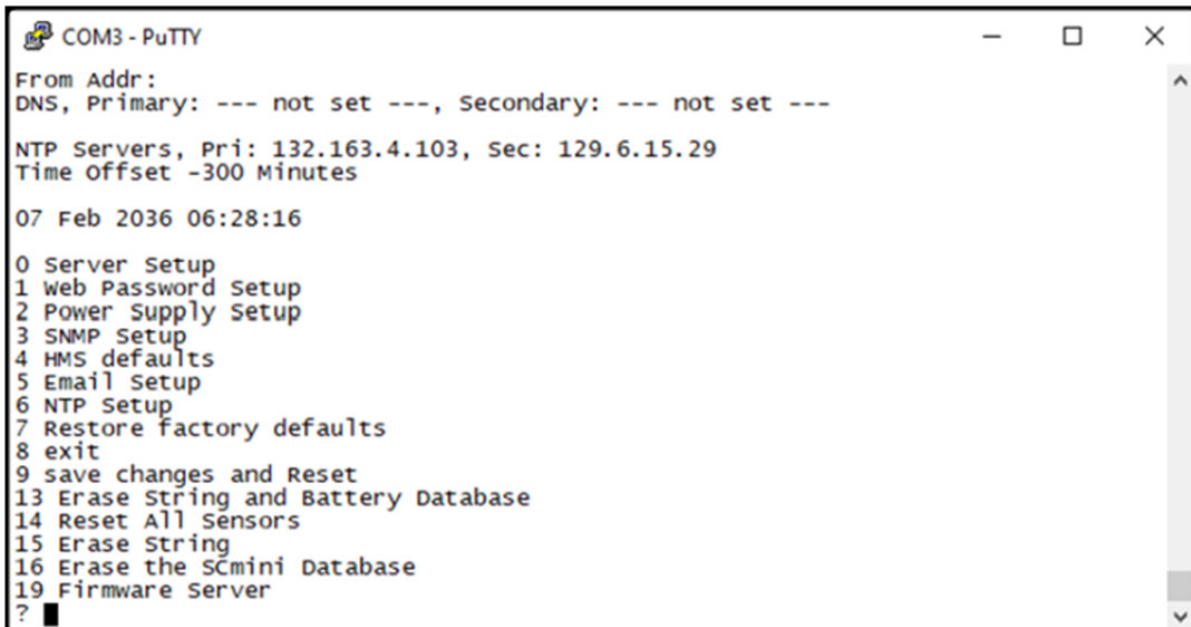


```

COM3 - PuTTY
07 Feb 2036 06:28:16
0 Server Setup
1 Web Password Setup
2 Power Supply Setup
3 SNMP Setup
4 HMS defaults
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 0

IP Address : (192) .(168) .(000) .(091)
Set Gateway IP Address (N) ?
Netmask: Number of Bits for Host Part (0=default) (0)
Change telnet config password (N) ? █
  
```

Telnet will return to the main menu. Once at the main menu, type “9” to save your changes. The changes will be saved in nonvolatile memory, the Telnet session will be terminated and the Battery Health Module will reset.



```
COM3 - PuTTY
From Addr:
DNS, Primary: --- not set ---, Secondary: --- not set ---

NTP Servers, Pri: 132.163.4.103, Sec: 129.6.15.29
Time Offset -300 Minutes

07 Feb 2036 06:28:16

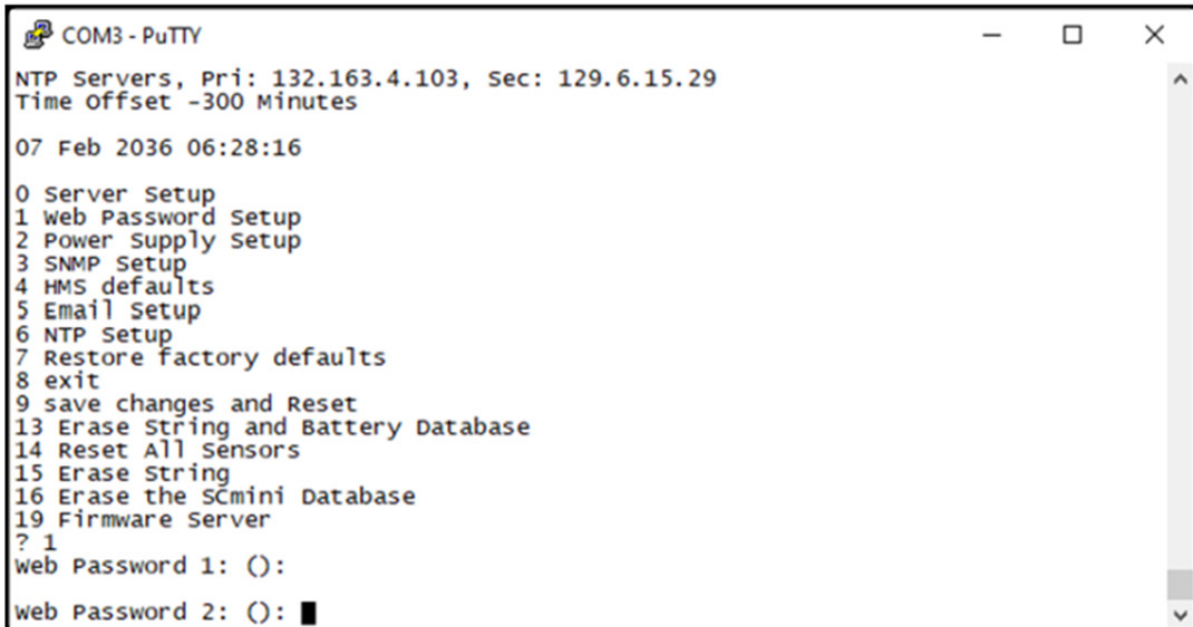
0 Server Setup
1 Web Password Setup
2 Power Supply Setup
3 SNMP Setup
4 HMS defaults
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? █
```

4.8. Password Setup (1)

To change the Passwords used for the web page access, type “1” followed by “Enter”.

NOTE: As of this writing, password 1 (also referred to as the user password) is not used. Web page settings are accessed using password 2.

There are two web passwords. Web password 1 is for user access that will allow the operator only to view alarm thresholds and not make changes. Web password 2 is for admin access and will allow changes to alarm thresholds and site setup configurations. To change either password, type the new password followed by “Enter”. To keep the present password, type “Enter”. Passwords can be up to 18 characters long and are case sensitive. The default for Web password 1 is “user” and the default for Web password 2 is “admin”. The password changes will immediately be saved to nonvolatile memory and become effective.



```
COM3 - PuTTY
NTP Servers, Pri: 132.163.4.103, Sec: 129.6.15.29
Time Offset -300 Minutes

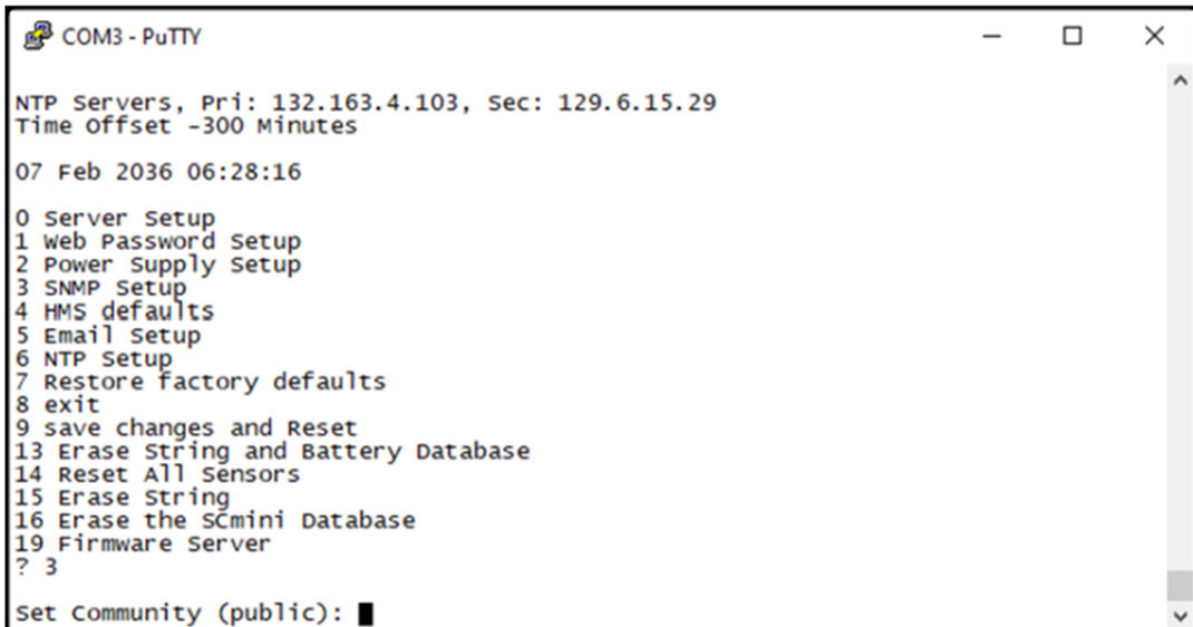
07 Feb 2036 06:28:16

0 Server Setup
1 Web Password Setup
2 Power Supply Setup
3 SNMP Setup
4 HMS defaults
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 1
Web Password 1: ():
Web Password 2: ():
```

Type “8” followed by “Enter” to close the Telnet session without resetting the Battery Health Module.

4.9. SNMP Setup (3)

The SNMP community strings and trap destinations are configured from the SNMP Setup. To configure SNMP on the SCMini-Plus, type “3” followed by “Enter”.



```
COM3 - PuTTY
NTP Servers, Pri: 132.163.4.103, Sec: 129.6.15.29
Time Offset -300 Minutes

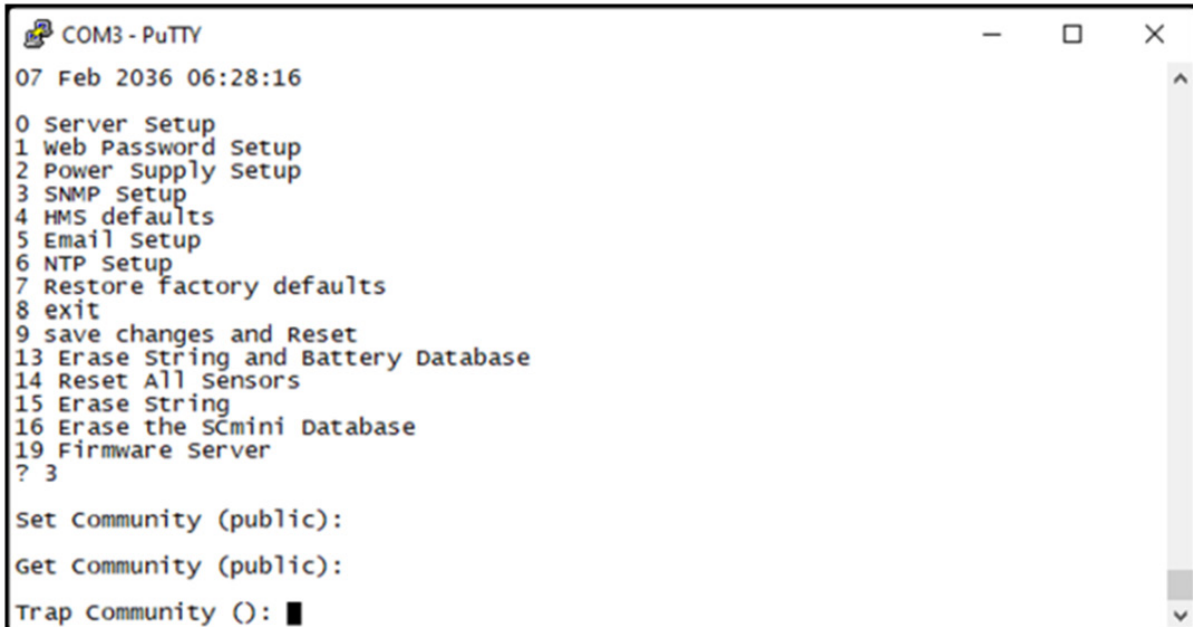
07 Feb 2036 06:28:16

0 Server Setup
1 Web Password Setup
2 Power Supply Setup
3 SNMP Setup
4 HMS defaults
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 3
Set Community (public):
```

The default community strings are set to “public”. You now have the option of changing the community strings. The present community string will be displayed in parenthesis as shown.

To change any community string, type the new string and then press “Enter”. To move to the next item without changing the community string, press “Enter”.

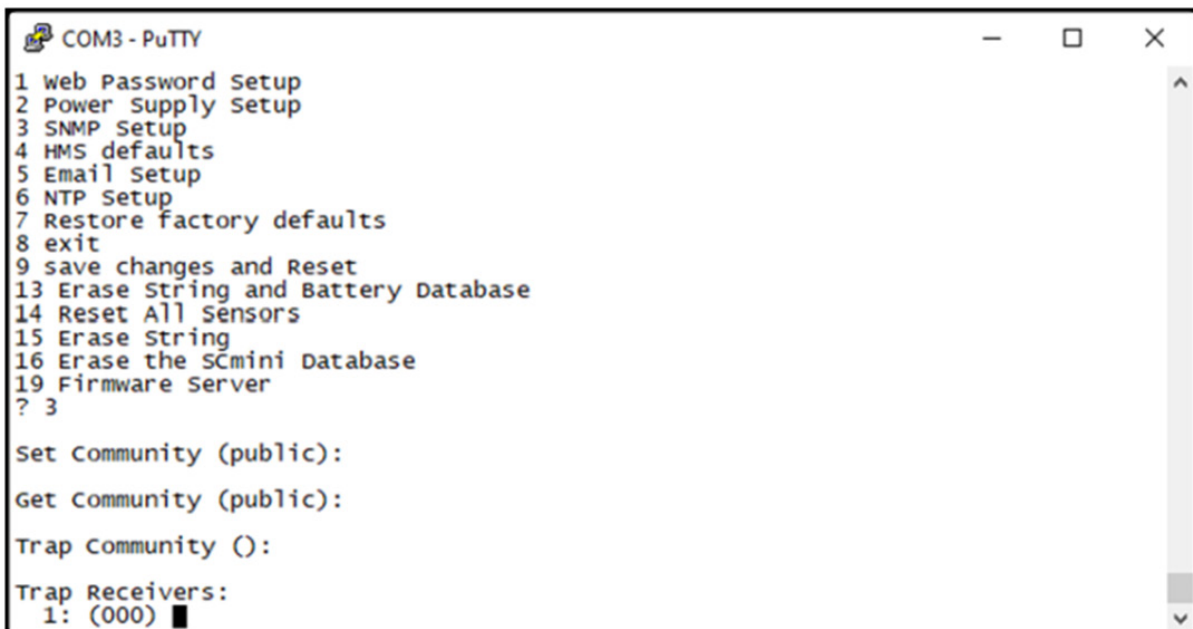
NOTE: Community strings are case sensitive and are limited to 12 characters.



```
COM3 - PuTTY
07 Feb 2036 06:28:16
0 Server Setup
1 Web Password Setup
2 Power Supply Setup
3 SNMP Setup
4 HMS defaults
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 3

Set Community (public):
Get Community (public):
Trap Community ():
```

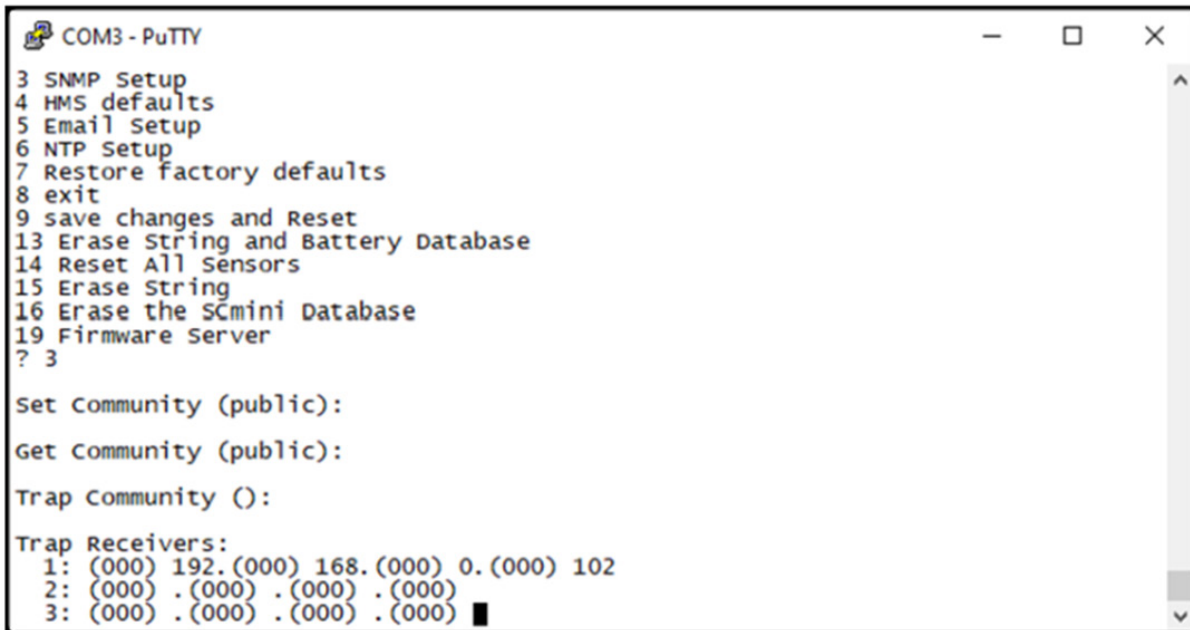
After setting the community strings, you have the option of setting up to three trap receivers. The IP addresses of the trap destinations are set similar to the IP address described above. To disable sending traps to any of the three IP addresses, enter zeros for the IP address. By default, the trap destinations are set to all zeros (disabled).



```
COM3 - PuTTY
1 Web Password Setup
2 Power Supply Setup
3 SNMP Setup
4 HMS defaults
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 3

Set Community (public):
Get Community (public):
Trap Community ():
Trap Receivers:
1: (000)
```

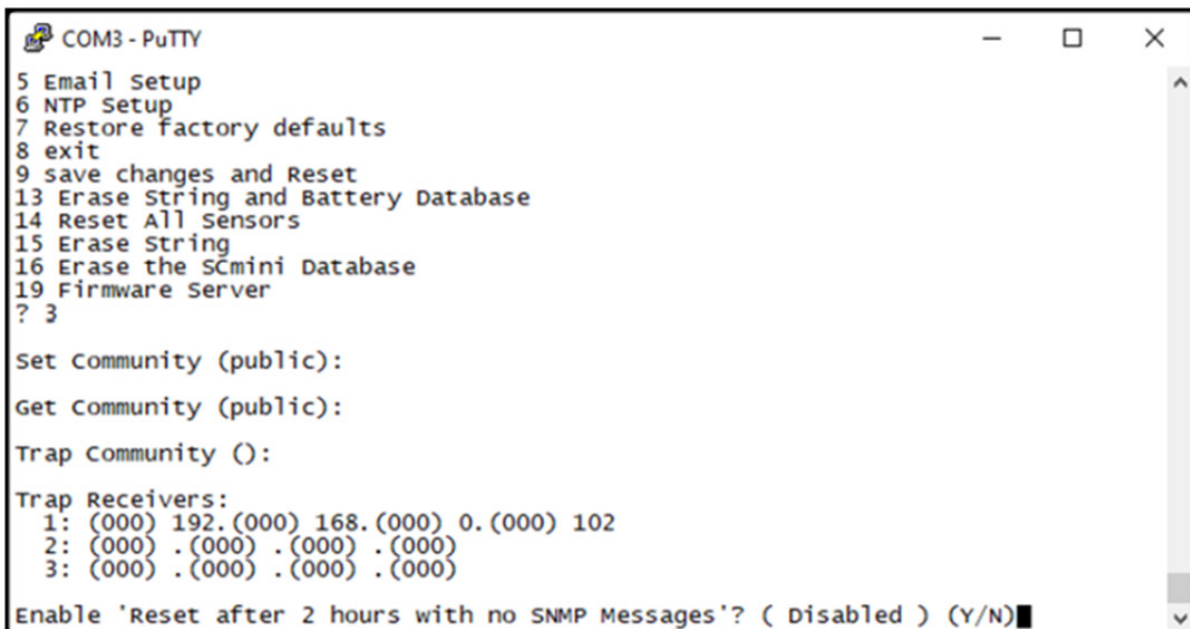
After entering the last trap receiver address, press “Enter”.



```
COM3 - PuTTY
3 SNMP Setup
4 HMS defaults
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 3

Set Community (public):
Get Community (public):
Trap Community ():
Trap Receivers:
1: (000) 192.(000) 168.(000) 0.(000) 102
2: (000) .(000) .(000) .(000)
3: (000) .(000) .(000) .(000) █
```

The Battery Health Module includes a feature that will reset the device if SNMP message is not received for approximately two hours. This safety feature is primarily used when the device is located in a remote unmanned location. If the SNMP firmware or cable modem hangs, this may recover the device without a visit to the remote location. The default setting is disabled. To enable the reset, type a “Y”; to disable the feature, type an “N” or “Enter”.



```
COM3 - PuTTY
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 3

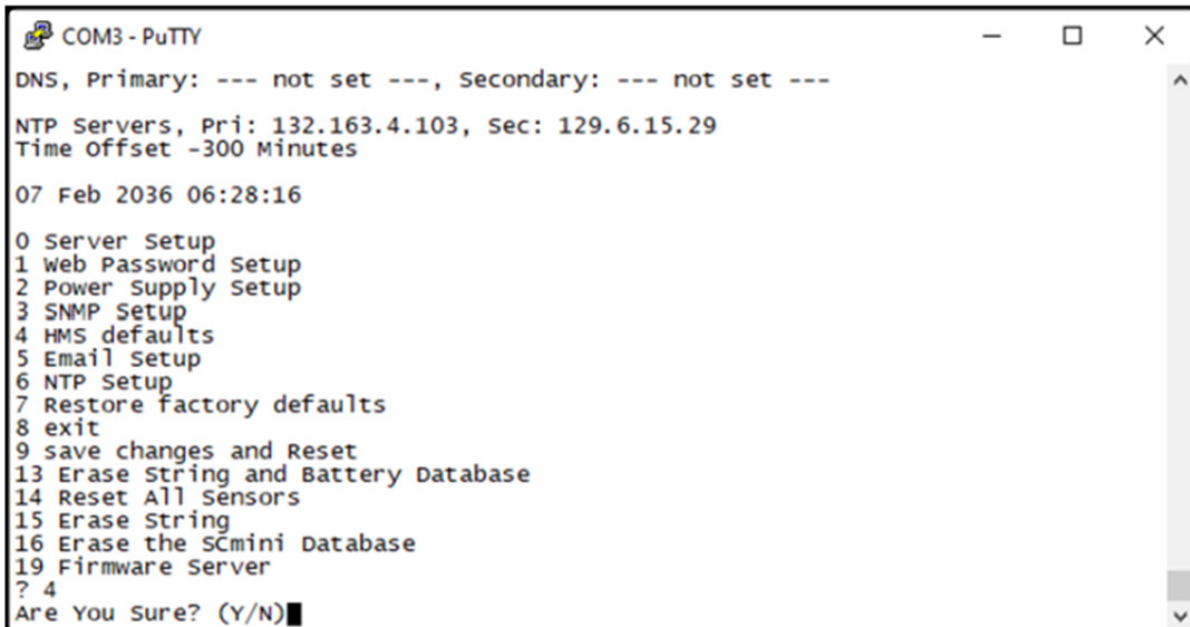
Set Community (public):
Get Community (public):
Trap Community ():
Trap Receivers:
1: (000) 192.(000) 168.(000) 0.(000) 102
2: (000) .(000) .(000) .(000)
3: (000) .(000) .(000) .(000)

Enable 'Reset after 2 hours with no SNMP Messages'? ( Disabled ) (Y/N) █
```

The menu will be redisplayed at the end of the SNMP configuration. Select “9” to save the changes and close the Telnet session.

4.10. HMS Defaults (4)

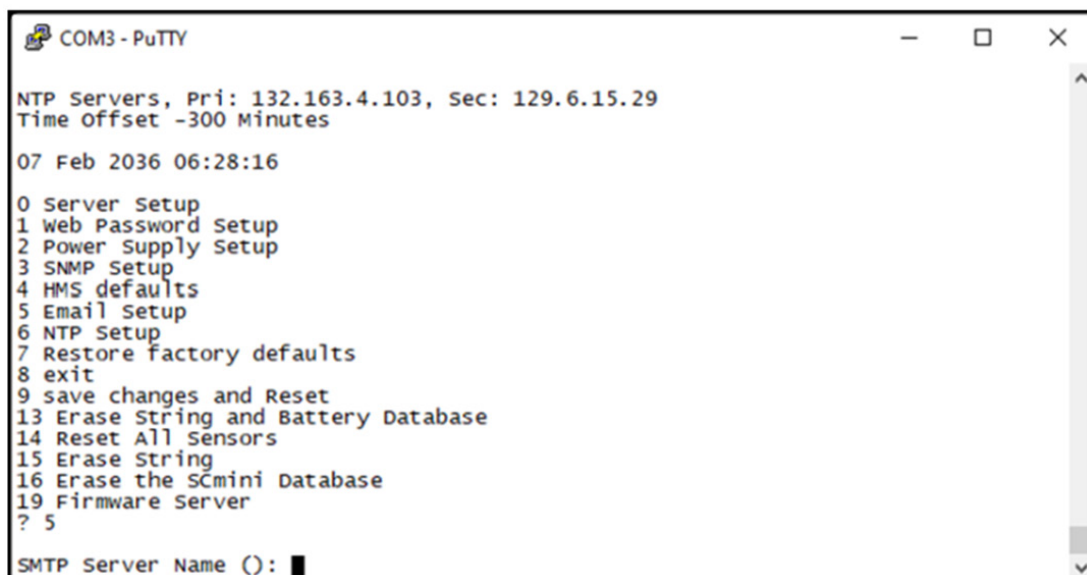
To restore the factory default settings for all SNMP objects, type a “4” followed by “Enter”. The e-mail, NTP, Gateway, Netmask, and IP address will not be changed. The Telnet session will be closed and the Battery Health Module will be reset.



```
COM3 - PuTTY
DNS, Primary: --- not set ---, Secondary: --- not set ---
NTP Servers, Pri: 132.163.4.103, Sec: 129.6.15.29
Time Offset -300 Minutes
07 Feb 2036 06:28:16
0 Server Setup
1 Web Password Setup
2 Power Supply Setup
3 SNMP Setup
4 HMS defaults
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 4
Are You Sure? (Y/N)
```

4.11. E-mail Setup (5)

The e-mail system will send alarm messages to a maximum of three e-mail addresses.



```
COM3 - PuTTY
NTP Servers, Pri: 132.163.4.103, Sec: 129.6.15.29
Time Offset -300 Minutes
07 Feb 2036 06:28:16
0 Server Setup
1 Web Password Setup
2 Power Supply Setup
3 SNMP Setup
4 HMS defaults
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 5
SMTP Server Name ():
```

If your server requires a username and password enter the username followed by “Enter”. If the username is left blank, the Battery Health Module will not send the username and password to the mail server. To keep the present name type “Enter”.

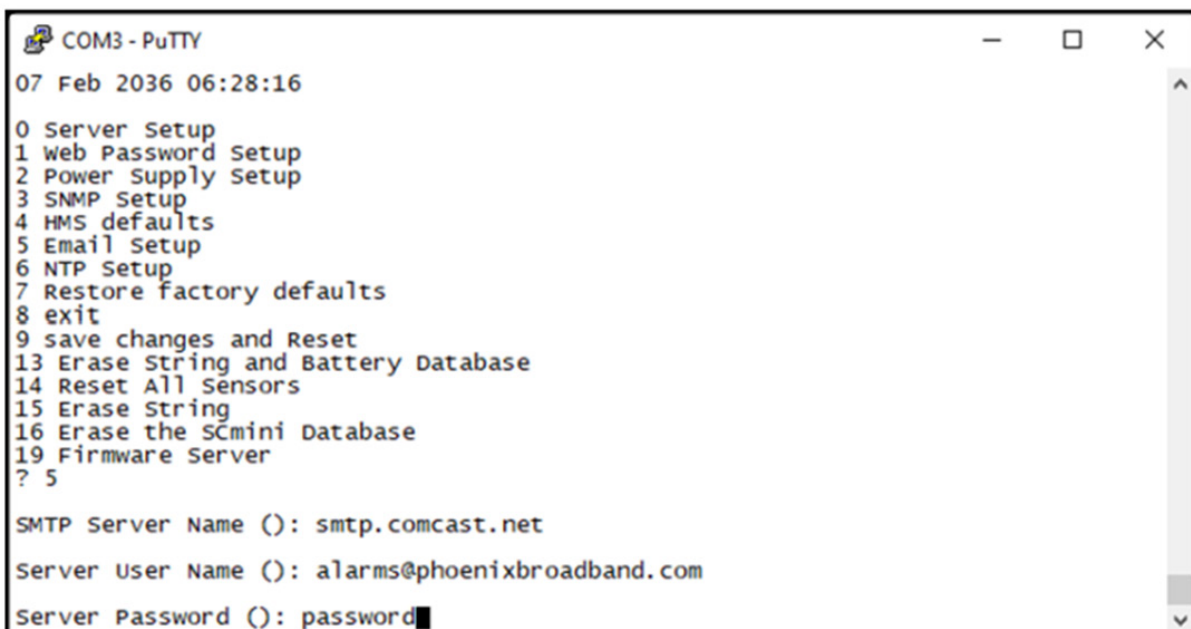
To setup the e-mail system, type a "5" followed by "Enter" from the setup main menu. Enter the outgoing e-mail server name. If there is no server name the e-mail system is disabled. If a server name was previously entered, it will be shown. To change the server name, type the new name followed by "Enter". To keep the server name shown, type "Enter". To remove the server name (or the contents of any other text field) type any character, then "Backspace" followed by "Enter". The IP address of the mail server can be entered in place of the server name if the server is unnamed.



```
COM3 - PuTTY
Time Offset -300 Minutes
07 Feb 2036 06:28:16
0 Server Setup
1 Web Password Setup
2 Power Supply Setup
3 SNMP Setup
4 HMS defaults
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 5

SMTP Server Name (): smtp.comcast.net
Server User Name (): alarms@phoenixbroadband.com
```

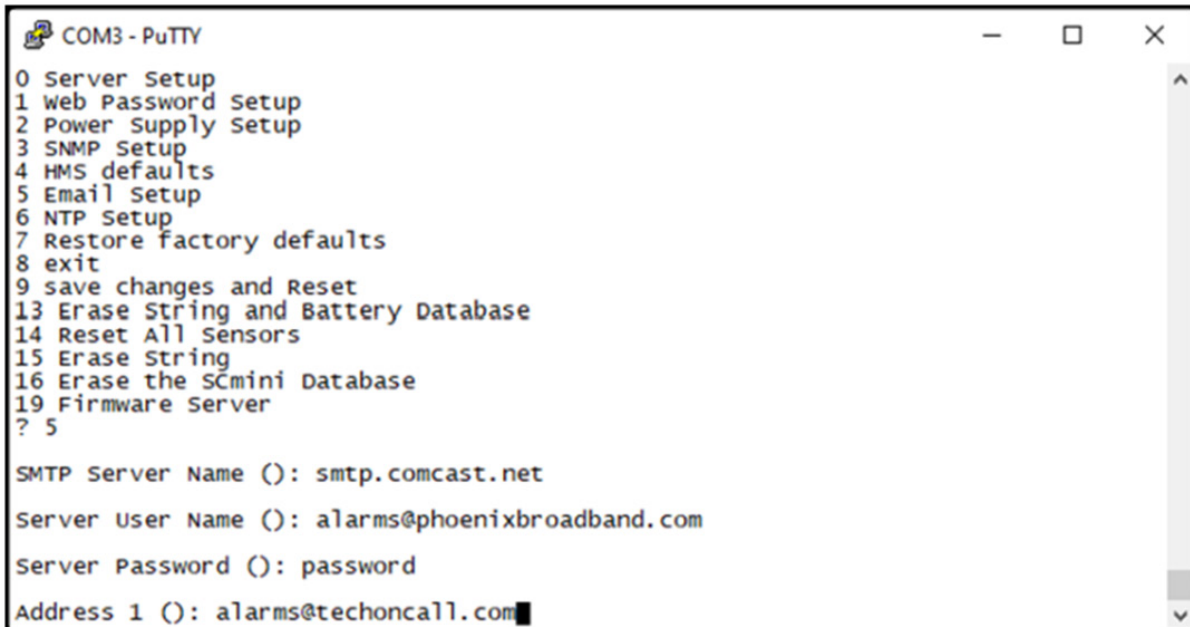
Now enter the server password followed by "Enter".



```
COM3 - PuTTY
07 Feb 2036 06:28:16
0 Server Setup
1 Web Password Setup
2 Power Supply Setup
3 SNMP Setup
4 HMS defaults
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 5

SMTP Server Name (): smtp.comcast.net
Server User Name (): alarms@phoenixbroadband.com
Server Password (): password
```

Up to three e-mail address may now be entered. The addresses are changed the same as the server name.

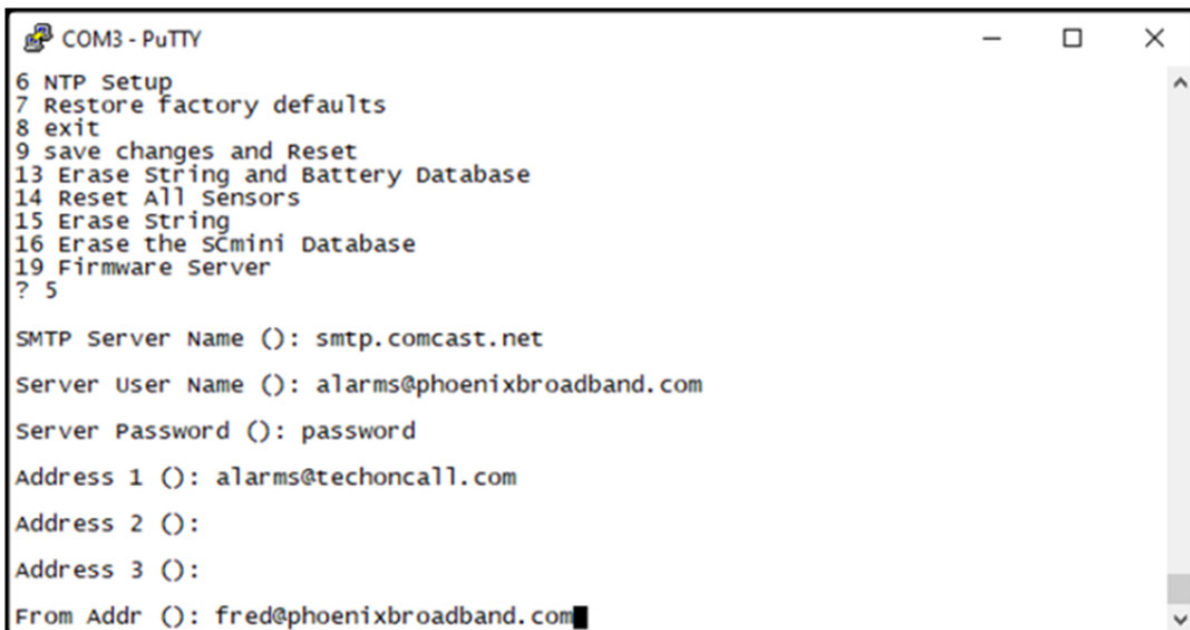


```
COM3 - PuTTY
0 Server Setup
1 Web Password Setup
2 Power Supply Setup
3 SNMP Setup
4 HMS defaults
5 Email Setup
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 5

SMTP Server Name (): smtp.comcast.net
Server User Name (): alarms@phoenixbroadband.com
Server Password (): password
Address 1 (): alarms@techoncall.com
```

Next enter the From address. This is the address that will be indicated in the e-mail when it is received.

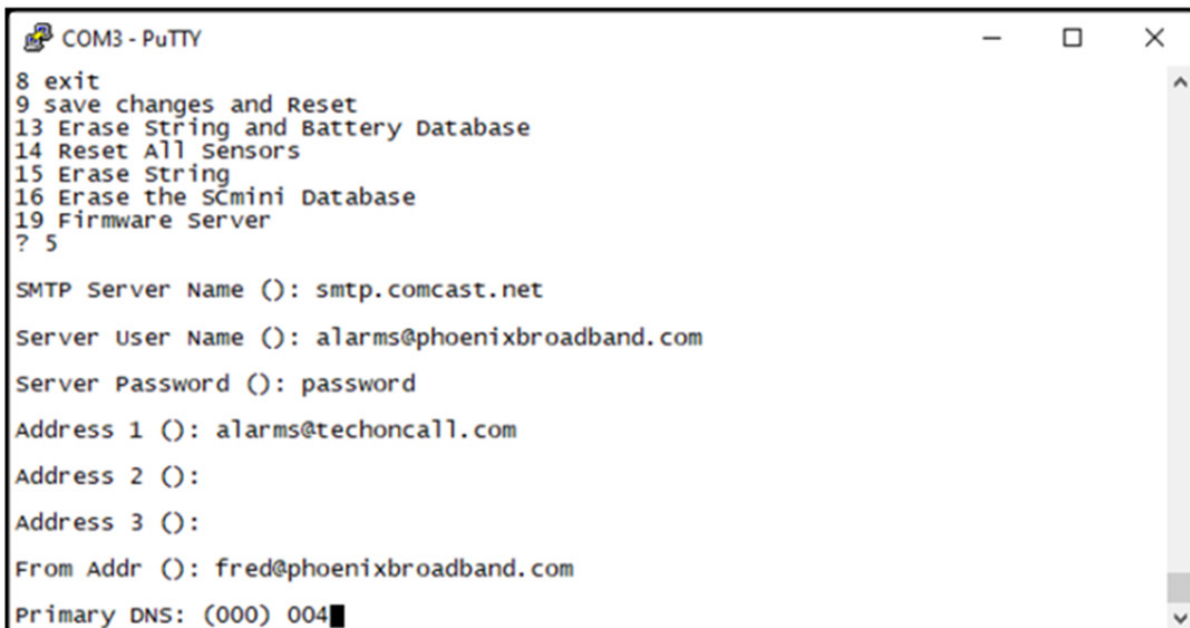
NOTE: The From address should generally be set to an address that is registered on the SMTP server. Many servers use this to authenticate the outgoing e-mail.



```
COM3 - PuTTY
6 NTP Setup
7 Restore factory defaults
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 5

SMTP Server Name (): smtp.comcast.net
Server User Name (): alarms@phoenixbroadband.com
Server Password (): password
Address 1 (): alarms@techoncall.com
Address 2 ():
Address 3 ():
From Addr (): fred@phoenixbroadband.com
```

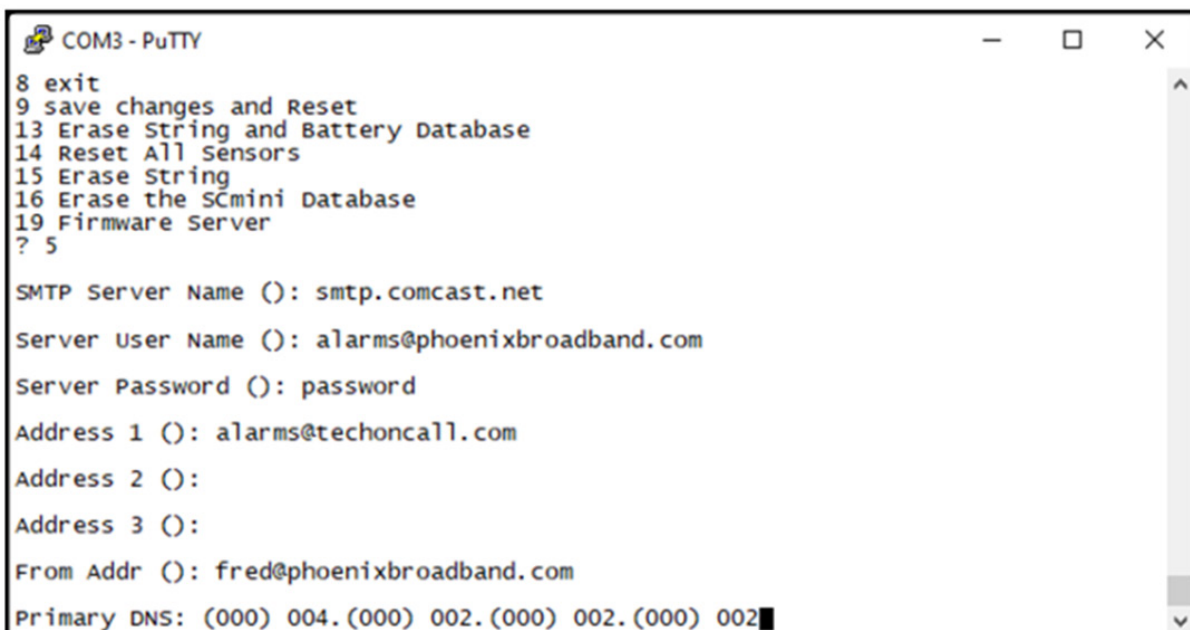
Finally, set the domain name server (DNS) IP address. The DNS allows the e-mail application to obtain the IP address of the specified server from the server name so that it can send the mail. There are fields for a primary and secondary DNS.



```
COM3 - PuTTY
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 5

SMTP Server Name (): smtp.comcast.net
Server User Name (): alarms@phoenixbroadband.com
Server Password (): password
Address 1 (): alarms@techoncall.com
Address 2 ():
Address 3 ():
From Addr (): fred@phoenixbroadband.com
Primary DNS: (000) 004█
```

The IP addresses are set as described in the IP address section of this document. By default, the Primary DNS is set to 0.0.0.0. Change this to your local DNS if you prefer. As long as the Battery Health Module can see the Internet, the default DNS will work.



```
COM3 - PuTTY
8 exit
9 save changes and Reset
13 Erase String and Battery Database
14 Reset All Sensors
15 Erase String
16 Erase the SCmini Database
19 Firmware Server
? 5

SMTP Server Name (): smtp.comcast.net
Server User Name (): alarms@phoenixbroadband.com
Server Password (): password
Address 1 (): alarms@techoncall.com
Address 2 ():
Address 3 ():
From Addr (): fred@phoenixbroadband.com
Primary DNS: (000) 004.(000) 002.(000) 002.(000) 002█
```

To save your changes, type “9” from the main menu and hit “Enter”. The changes will be saved in nonvolatile memory, the Telnet session will be terminated and the Battery health Module will reset.

4.12. Restore Factory Defaults and Reset (6)

To restore the factory default settings, type “7” followed by “Enter”. All SNMP, e-mail, NTP and HMS values will be set to the factory defaults. The IP address will not be changed. However, the gateway and netmask settings will be set to the factory default values.

NOTE: Be careful. Changing the gateway and netmask settings could prevent communications with the Battery Health Module, requiring a site visit.

4.13. Exit Without Resetting (7)

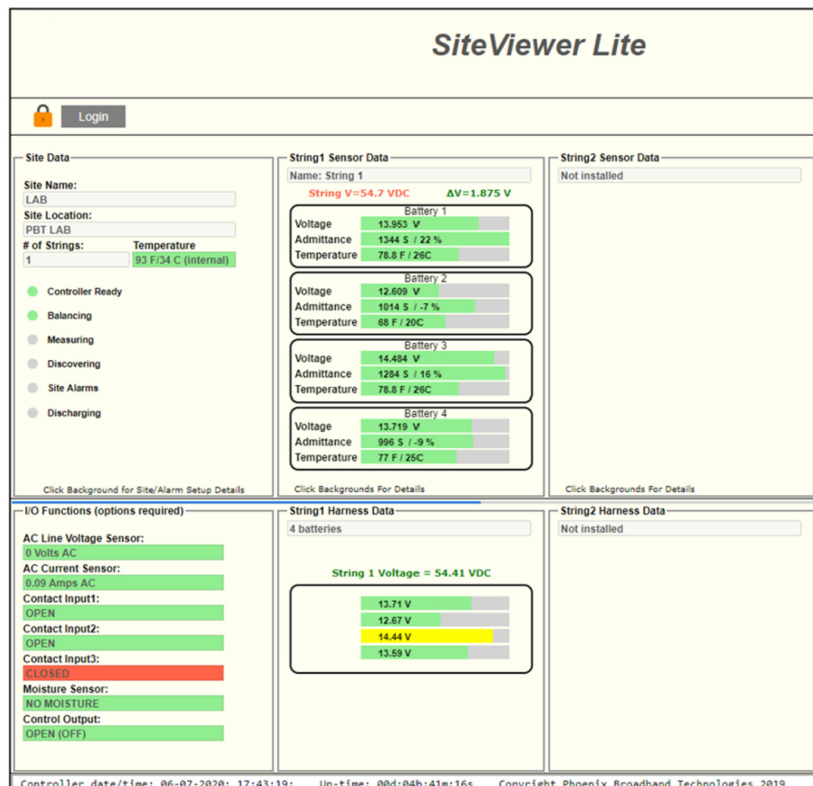
Type “8” followed by an “Enter”, to exit the setup program and close the Telnet window without saving the changes to nonvolatile memory and without resetting the Battery Health Module. Some changes will take effect (SNMP) others will not (e-mail).

4.14. Save Changes and Reset (8)

Type “9” followed by an “Enter”, to save all changes to nonvolatile memory, close the Telnet window, exit the setup program and reset the Battery Health Module so all changes take effect.

4.15. Navigating the Web Pages

The status of the batteries that are being monitored by an Battery Health Module can be viewed using any network-connected PC using a web browser. Type the IP address of the Battery Health Module in the browser’s URL address space, for example “50.199.84.xxx,” and the press “Enter”. The controller will serve the overview web page as shown in the example below.



The content of the web pages will vary depending on which options are installed (current sensor, moisture sensor, line voltage sensor, and so on).

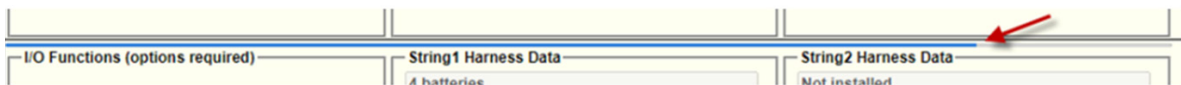
NOTE: Alarm checking and SNMP communications are disabled during initialization.

4.16. Overview Web Pages

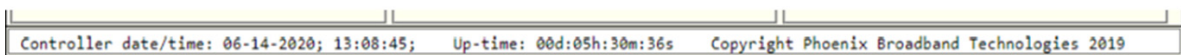
The overview web page displays the following details:

- Site Data – provides Site Name, Site Location, the number of Strings attached to the controller, the internal temperature of the controller, and controller status indications. See Site Data for details.
- String Sensor Data – provides string Name, string voltage (String V), String voltage change (ΔV), and Voltage, Admittance and Temperature readings for each battery on the string. A String Sensor Data area is provided for each of the two supported strings. See String Sensor Data for details.
- I/O Functions – provides readings for contact inputs (Contact Input1, Contact Input2, and Contact Input3), Control Output, and optional connected components: AC Line Voltage Sensor, AC Current Sensor, and Moisture Sensor. See I/O Functions Indicators for details.
- String Harness Data – provides voltage readings for each battery on the Battery String harness. A String Harness Data area is provided for each of the two supported harnesses. See String Harness Data for details.

An indicator between the two rows of displayed data areas shows polling activity.



At the bottom of the overview web page, the controller date and time are displayed, as well as the amount of time since the controller was last reset.



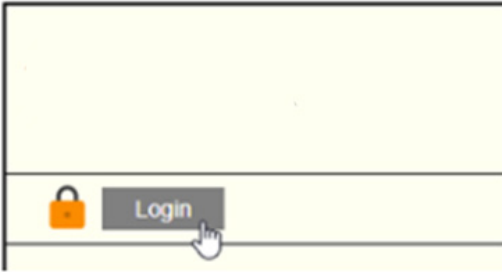
4.17. Login – Unlocking the Overview Web Page

When you first access the overview web page, it is in a locked state. In this state, you can view all current readings as well as view all site details and alarm settings. However, you cannot change any controller settings until you unlock the overview webpage.

NOTE: The password will time out if there is no activity for ten minutes or if the web browser is closed or refreshed.

To unlock the webpage:

1. Click the Login button.



The Login Password field appears.



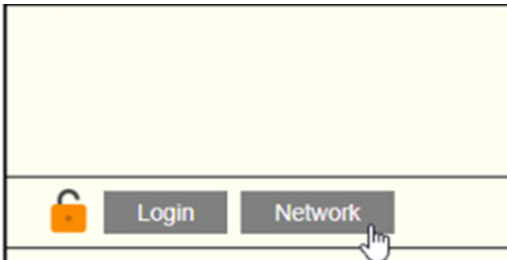
2. Enter the password for the controller. The default password is "admin". (Passwords are configured as part of the Telnet configuration of the controller. See Password Setup for details.)
3. Click the Unlock button. Controller settings can now be changed. The unlocked status is shown by the open lock symbol next to the Login button.

Changing the IP Address of the Controller from the Web Page



NOTE: You must be logged in to the controller to change the IP address. See Login - Unlocking the Overview Web Page for details.

To change the IP address:



1. Click the Network button.

A screenshot of a dialog box titled '192.168.0.91 says'. The text inside reads 'Enter the desired new IP address'. Below the text is a text input field. At the bottom right of the dialog box are two buttons: 'OK' and 'Cancel'.

A dialog box appears.

2. Enter the desired IP address in the field on the dialog box.

A screenshot of a dialog box titled '192.168.0.91 says'. The text inside reads 'One more chance: Are you sure you want to change the IP address to 192.168.0.92 ?'. At the bottom right of the dialog box are two buttons: 'OK' and 'Cancel'.

3. Click OK. The following dialog box appears.

A screenshot of a dialog box titled '192.168.0.91 says'. The text inside reads 'Don't forget to reset the site controller'. At the bottom right of the dialog box is a single button: 'OK'.

4. Click OK. The dialog box closes. The following dialog box appears.
5. Click OK. The Battery Health Module will reset. When it initializes, it will use the specified IP address.

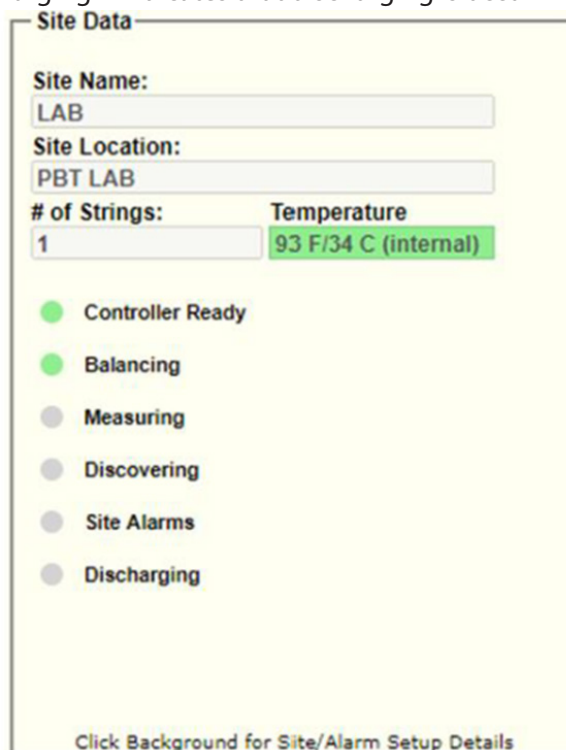
4.18. Site Data

The Site Data area of the overview web page shows:

- Site Name
- Site Location
- # of Strings (number of connected Strings)
- Temperature (internal controller Temperature)

Additionally, indicators are provided to display controller status and monitored device events as they occur:

- Controller Ready – turns green to indicate normal operation.
- Balancing – turns green to indicate that battery balancing is currently enabled. Balancing can be enabled/disabled via the System Controls.
- Measuring – turns green when measuring is currently occurring. Measuring can be forced via the System Controls.
- Discovering – turns green to indicate that string/battery discovery is occurring.
- Site Alarms – turns red to indicate that one or more site alarms are occurring. See Analog Alarm Details for more information on setting alarms.
- Discharging – indicates that discharging is occurring.



Site Data

Site Name:
LAB

Site Location:
PBT LAB

of Strings: 1 Temperature: 93 F/34 C (internal)

● Controller Ready

● Balancing

● Measuring

● Discovering

● Site Alarms

● Discharging

Click Background for Site/Alarm Setup Details

Clicking on the Site Data area brings up the Site Details View

4.19. Site Details View

The Site Details view allows you to view and modify controller details, change analog alarm settings, and control specific system functions.

NOTE: All users can view site details, but you must be logged in to the controller to make any changes. See

X

Site Details	
Site Name	LAB
Site Location	PBT LAB
Admittance Interval (Hours)	24
Sensor String Voltage	54.7 VDC
Controller Temperature	95 F/35 C (internal)
AC Voltage Sensor	0 Volts AC
AC Current Sensor	0.04 Amps AC
MAC Address	00-80-A3-CF-50-BE
Firmware Version	V0161
Web Version	1.0P
PIC Version	0.1
Uptime	00d:06h:17m:48s
Controller Time	06-14-2020; 13:56:00

Update Details

Analog Alarm Specs

Alarm Group: All Sensors: Battery Voltage ▼

All Sensors: Battery Voltage HIHI	16	VDC	<input type="checkbox"/>
All Sensors: Battery Voltage HI	13.5	VDC	<input type="checkbox"/>
All Sensors: Battery Voltage LO	15	VDC	<input type="checkbox"/>
All Sensors: Battery Voltage LOLO	9	VDC	<input type="checkbox"/>

Disable All

Enable All

Update Analog Alarms

System Controls

Measure Now

Stop Balancing

Reset Controller

Turn Output ON

Login - Unlocking the Overview Web Page for details.

4.20. Updating Site Details

NOTE: All users can view site details, but you must be logged in to the controller to make any changes. See Login - Unlocking the Overview Web Page for details.

With the Site Details view displayed, you can change the Site Name, Site Location, and Admittance Interval (Hours) (the duration between admittance measurements being made by the controller).

NOTE: Entering a value of zero (0) in the Admittance Interval (Hours) field will disable admittance measurements.

Controller specific details are also displayed:

- MAC Address
- Firmware Version
- Web Version
- PIC Version (Peripheral Interface Controller)

The Uptime is the amount of time since the controller was last reset.

Site Details ×

Site Name	<input type="text" value="LAB"/>
Site Location	<input type="text" value="PBT LAB"/>
Admittance Interval (Hours)	<input type="text" value="24"/>
Sensor String Voltage	54.8 VDC
Controller Temperature	95 F/35 C (internal)
AC Voltage Sensor	0 Volts AC
AC Current Sensor	0.09 Amps AC
MAC Address	00-80-A3-CF-50-BE
Firmware Version	V0161
Web Version	1.0P
PIC Version	0.1
Uptime	00d:06h:40m:23s
Controller Time	06-14-2020; 14:18:35

The Controller Time shows the date and time as determined by the controller. See NTP Setup (6) for details on setting the controller time.

4.21. Analog Alarm Details

NOTE: All users can view site details, but you must be logged in to the controller to make any changes. See Login - Unlocking the Overview Web Page for details.

With the Site Details view displayed, you can view or modify the analog alarm settings.

Many alarm settings include both major and minor alarms:

- HIHI (major high value alarm)
- HI (minor high value alarm)
- LO (minor low value alarm)
- LOLO (major low value alarm)

Analog Alarm Specs

Alarm Group: All Sensors: Battery Voltage

All Sensors: Battery Voltage HIHI	All Sensors: Battery Voltage
All Sensors: Battery Voltage HI	All Sensors: Battery Admittance Change (%)
All Sensors: Battery Voltage LO	All Sensors: Battery Temperature
All Sensors: Battery Voltage LOLO	Sensor: Battery Voltage Delta
	Harness: Battery Voltages
	Sensor String Voltage
	String Discharge Alarm Threshold
	AC Line Voltage (option)
	AC Current (option)
	Controller Temperature

To set alarms:

Analog Alarm Specs

Alarm Group: All Sensors: Battery Voltage

All Sensors: Battery Voltage HIHI	16	VDC	<input type="checkbox"/>
All Sensors: Battery Voltage HI	13.5	VDC	<input type="checkbox"/>
All Sensors: Battery Voltage LO	15	VDC	<input type="checkbox"/>
All Sensors: Battery Voltage LOLO	9	VDC	<input type="checkbox"/>

Disable All Enable All

Update Analog Alarms

1. Choose which alarms you want to view or modify using the Alarm Group drop-down list box.

The corresponding alarm details are displayed.

2. Modify alarm settings as desired. You can set numeric values by entering them in the desired field(s). You can selectively enable/disable individual alarms using the corresponding check boxes. You can also use the Disable All or Enable All buttons to disable or enable all alarms.
3. Click the Update Analog Alarms button. Any modified settings are saved to the controller memory.

For high alarms, the alarm will occur when the Present Value is greater than the Alarm Limit. The alarm will

clear when the present value is less than the high alarm limit.

4.22. Battery Voltage Alarms

The All Sensors: Battery Voltage alarm settings allow you to set up to four alarm levels for individual battery voltage. These alarms are applicable across all sensors.

Each alarm limit can be set independently and enabled/disabled via the corresponding check box. When

Analog Alarm Specs

Alarm Group: All Sensors: Battery Voltage ▼

All Sensors: Battery Voltage HIHI	16	VDC	<input checked="" type="checkbox"/>
All Sensors: Battery Voltage HI	13.5	VDC	<input checked="" type="checkbox"/>
All Sensors: Battery Voltage LO	11.5	VDC	<input checked="" type="checkbox"/>
All Sensors: Battery Voltage LOLO	9	VDC	<input checked="" type="checkbox"/>

enabled, the alarm will occur when the present value crosses the specified alarm value. In the example shown here there is a minor alarm because the present value for one or more batteries is above the All Sensors: Battery Voltage HI limit.

4.23. Battery Admittance Change Alarms

The All Sensors: Battery Admittance Change (%) alarm settings allow you to set up to four alarm levels for individual battery admittance change percentages. The percentage change is based on the configurable Baseline Admittance value. These alarms are applicable across all sensors.

NOTE: Alarm limits are invalid if Baseline Admittance is set to 0.

Each alarm limit can be set independently and enabled/disabled via the corresponding check box. When

Analog Alarm Specs

Alarm Group: All Sensors: Battery Admittance Change (%) ▼

All Sensors: Adm Change HIHI	40	%	<input checked="" type="checkbox"/>
All Sensors: Adm Change HI	10	%	<input checked="" type="checkbox"/>
Baseline Admittance	1100	S	
All Sensors: Adm Change LO	-10	%	<input checked="" type="checkbox"/>
All Sensors: Adm Change LOLO	-40	%	<input checked="" type="checkbox"/>

enabled, the alarm will occur when the present value crosses the specified alarm value. In the example shown here there is a minor alarm because the present value for one or more batteries is above the All Sensors: Adm Change HI limit.

4.24. Battery Temperature Alarms

The All Sensors: Battery Temperature settings allow you to set up to four alarm levels for individual battery temperature. These alarms are applicable across all sensors.

Analog Alarm Specs

Alarm Group: All Sensors: Battery Temperature ▼

All Sensors: Battery Temp HIHI	104	deg F	<input checked="" type="checkbox"/>
All Sensors: Battery Temp HI	95	deg F	<input checked="" type="checkbox"/>
All Sensors: Battery Temp LO	69	deg F	<input checked="" type="checkbox"/>
All Sensors: Battery Temp LOLO	50	deg F	<input checked="" type="checkbox"/>

Each alarm limit can be set independently and enabled/disabled via the corresponding check box. When enabled, the alarm will occur when the present value crosses the specified alarm value. In the example shown here there is a minor alarm because the present value for one or more batteries is below the All Sensors: Battery Temp LO limit.

4.25. Battery Voltage Delta Alarms

The Sensor: Battery Voltage Delta settings allow you to set up to four alarm levels for the difference between the highest and lowest battery voltage on a string. Too much variation in battery voltages could be an indication that there are problems with some batteries.

Analog Alarm Specs

Alarm Group: Sensor: Battery Voltage Delta ▼

Sensor: Voltage Delta HIHI	0.2	VDC	<input checked="" type="checkbox"/>
Sensor: Voltage Delta HI	0.1	VDC	<input checked="" type="checkbox"/>
Present Voltage Delta	1.875 VDC		
Sensor: Voltage Delta LO	0	VDC	<input checked="" type="checkbox"/>
Sensor: Voltage Delta LOLO	0	VDC	<input checked="" type="checkbox"/>

Each alarm limit can be set independently and enabled/disabled via the corresponding check box. When

enabled, the alarm will occur when the present value crosses the specified alarm value. In the example shown here there is a major alarm because the difference between the highest and lowest battery voltage for one or both strings is above the Sensor: Voltage Delta HIHI limit.

4.26. Harness: Battery Voltages Alarms

The Harness: Battery Voltages Delta settings allow you to set up to four alarm levels for individual battery

Analog Alarm Specs

Alarm Group: Harness: Battery Voltages ▼

Harness: Battery Voltage HIHI	15	VDC	<input checked="" type="checkbox"/>
Harness: Battery Voltage HI	14	VDC	<input checked="" type="checkbox"/>
Harness: Battersy Voltage LO	11	VDC	<input checked="" type="checkbox"/>
Harness: Battery Voltage LOLO	10	VDC	<input checked="" type="checkbox"/>

Disable All
Enable All
Update Analog Alarms

voltages.

Each alarm limit can be set independently and enabled/disabled via the corresponding check box. When enabled, the alarm will occur when the present value crosses the specified alarm value. In the example shown here there is a minor alarm because the present value for one or more batteries is above the Harness: Battery Voltage HI limit.

4.27. Sensor String Voltage Alarms

The Sensor String Voltage settings allow you to set up to four alarm levels for combined battery voltages

Analog Alarm Specs

Alarm Group: Sensor String Voltage ▼

String Voltage HIHI	54	VDC	<input checked="" type="checkbox"/>
String Voltage HI	51	VDC	<input checked="" type="checkbox"/>
Present Voltage	54.7 VDC		
String Voltage LO	44	VDC	<input checked="" type="checkbox"/>
String Voltage LOLO	38	VDC	<input checked="" type="checkbox"/>

Disable All
Enable All
Update Analog Alarms

across a sensor string.

Each alarm limit can be set independently and enabled/disabled via the corresponding check box. When

enabled, the alarm will occur when the present value crosses the specified alarm value. In the example shown here there is a major alarm because the Present Voltage value for the battery strings is above the String Voltage HHI limit.

Analog Alarm Specs

Alarm Group: String Discharge Alarm Threshold

Present Discharge State	NORMAL	
Discharge Voltage Threshold	<input type="text" value="0"/>	VDC
Discharge Alarm Severity	<input type="radio"/> Minor <input type="radio"/> Major <input checked="" type="radio"/> Disabled	

4.28. String Discharge Alarm Threshold Alarms

The String Discharge Alarm Threshold alarm allows you to set the Discharge Voltage Threshold value as well as specify whether the alarm is Major, Minor or Disabled.

Analog Alarm Specs

Alarm Group: AC Line Voltage (option)

AC Line Voltage HHI	<input type="text" value="16"/>	VAC	<input type="checkbox"/>
AC Line Voltage HI	<input type="text" value="3448"/>	VAC	<input type="checkbox"/>
Present LineVoltage	0 Volts AC		
AC Line Voltage LO	<input type="text" value="15"/>	VAC	<input type="checkbox"/>
AC Line Voltage LOLO	<input type="text" value="9"/>	VAC	<input checked="" type="checkbox"/>

4.29. AC Line Voltage Alarms

The AC Line Voltage (option) alarm settings allow you to set up to four alarm levels for AC Line Voltage as determined by the optional WT-5 transformer.

Each alarm limit can be set independently and enabled/disabled via the corresponding check box. When enabled, the alarm will occur when the present value crosses the specified alarm value. In the example shown here there is a major alarm because the Present Line Voltage value is below the AC Line Voltage LOLO limit.

Analog Alarm Specs

Alarm Group: AC Current (option) ▼

AC Current HIHI	16	Amps	<input type="checkbox"/>
AC Current HI	13.5	Amps	<input type="checkbox"/>
Present AC Current	0.04 Amps AC		
AC Current LO	12	Amps	<input type="checkbox"/>
AC Current LOLO	9	Amps	<input checked="" type="checkbox"/>

Disable All Enable All
Update Analog Alarms

4.30. AC Current Alarms

The AC Current (option) alarm settings allow you to set up to four alarm levels for AC Current as determined by the optional PBT-PA-CS-1 current probe.

Each alarm limit can be set independently and enabled/disabled via the corresponding check box. When enabled, the alarm will occur when the present value crosses the specified alarm value. In the example

Analog Alarm Specs

Alarm Group: Controller Temperature ▼

SiteTemperature HIHI	115	deg F	<input checked="" type="checkbox"/>
SiteTemperature HI	90	deg F	<input checked="" type="checkbox"/>
Present Site Temperature	91 F/33 C (internal)		
SiteTemperature LO	32	deg F	<input checked="" type="checkbox"/>
SiteTemperature LOLO	0	deg F	<input checked="" type="checkbox"/>

Disable All Enable All
Update Analog Alarms

shown here there is a major alarm because the Present AC Current value is below the AC Current LOLO limit.

4.31. Controller Temperature Alarms

The Controller Temperature alarm settings allow you to set up to four alarm levels for internal controller temperature.

Each alarm limit can be set independently and enabled/disabled via the corresponding check box. When enabled, the alarm will occur when the present value crosses the specified alarm value. In the example shown here there is a minor alarm because the present value for controller temperature is above the Controller Temperature HI limit.

Site Details ✕

Site Name	LAB
Site Location	PBT LAB
Admittance Interval (Hours)	24
Sensor String Voltage	54.7 VDC
Controller Temperature	95 F/35 C (internal)
AC Voltage Sensor	0 Volts AC
AC Current Sensor	0.04 Amps AC
MAC Address	00-80-A3-CF-50-BE
Firmware Version	V0161
Web Version	1.0P
PIC Version	0.1
Uptime	00d:06h:17m:48s
Controller Time	06-14-2020; 13:56:00

Analog Alarm Specs

Alarm Group: All Sensors: Battery Voltage ▼

All Sensors: Battery Voltage HIHI	16	VDC	<input type="checkbox"/>
All Sensors: Battery Voltage HI	13.5	VDC	<input type="checkbox"/>
All Sensors: Battery Voltage LO	15	VDC	<input type="checkbox"/>
All Sensors: Battery Voltage LOLO	9	VDC	<input type="checkbox"/>

System Controls

4.32. System Controls

With the Site Details view displayed, you can change the Site Name, Site Location, and Admittance Interval (Hours). (See Updating Site Details.) The Admittance measurements are normally made at a rate set by the Admittance Interval (Hours).

Clicking the Measure Now button will initiate an admittance measurement on this sensor the next time it is polled. The measurement may take a minute to start depending on what the Battery Health Module is doing at the time. Admittance measurements may be delayed up to five minutes to prevent over heating the sensor.

Clicking the Stop Balancing button stops balancing on the battery sensor string(s). Battery balancing is used to improve the available capacity of a battery pack with multiple cells (usually in series) and increase each cell's longevity. When balancing has stopped, the battery changes to Start Balancing to allow you to start balancing again.

Clicking Reset Controller causes the Battery Health Module to reinitialize and run through its start up procedures again.

Clicking the Turn Output ON button grounds the control output. With the control output on, the button changes to Turn Output OFF to allow you to open the control output. See Using the General-Purpose Interface for more details.

4.33. String Sensor Data

The String Sensor Data areas of the overview web page show:

- String Name (Name)
- String Voltage (String V)
- String Voltage Delta (ΔV)

Battery Readings for each of up to four connected batteries:

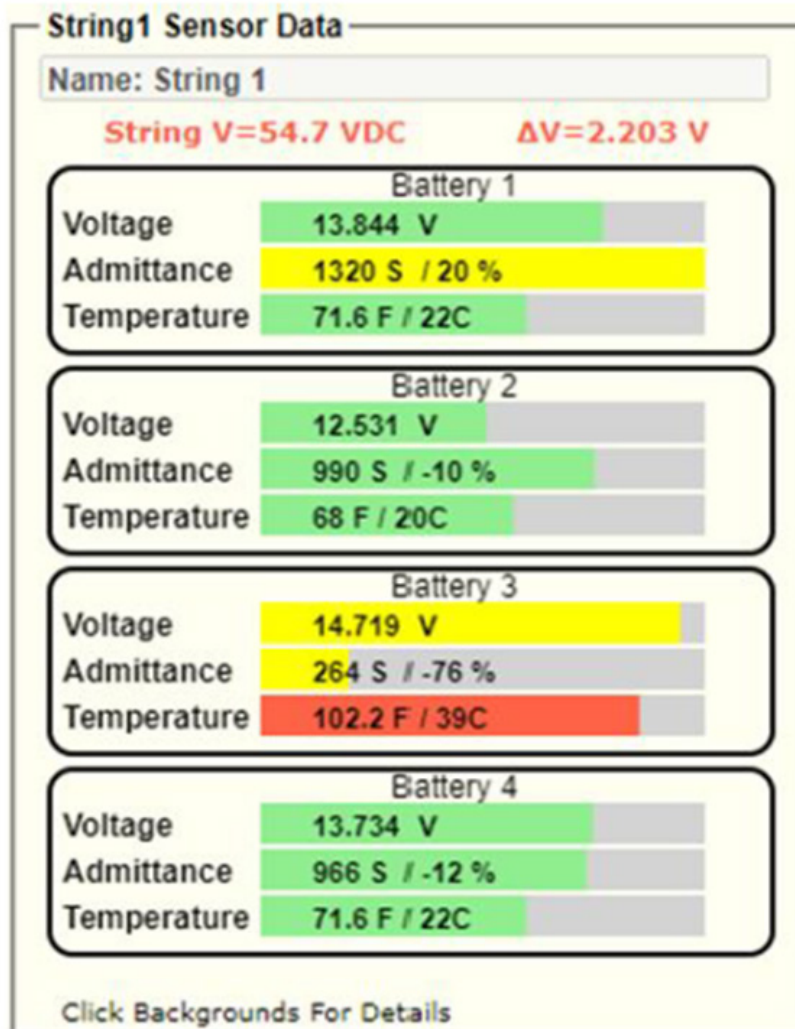
- Voltage
- Admittance / Admittance Change Percentage
- Temperature (Battery Temperature)

The Name field will also include a Sensor Communication Status indication as well as the number of connected batteries on the string if the Sensor Communication Status is anything other than Normal. (See String Details View for details.)

The String V reading displays the total string voltage measured by the highest reading on either battery sensor string. Alarms may be provisioned for this voltage using the Sensor String Voltage Alarms.

Clicking on the String Name brings up the String Details View.

The Battery listings include the current readings for each battery on the string:



- Voltage
- Admittance
- Temperature

The backgrounds of the reading are color coded to indicate status. Normal status is indicated by a green background, a red background indicates a major alarm, and a yellow background indicates a minor alarm. (See Battery Sensor Details View for details on setting these alarms.) The fill amount of the color is based on normal operating ranges for the corresponding value.

Clicking on any of the Battery areas brings up the Battery Sensor Details View for the corresponding battery.

4.34. String Details View

NOTE: All users can view string details, but you must be logged in to the controller to make any

String 1 Details ✕

String Name	String 1
Sensor String Voltage	54.7
String Delta Voltage	2.266
Number of Batteries	4
String Discharge Status	1
Sensor Communication Status	Normal

changes. See Login - Unlocking the Overview Web Page for details.

The String Details allows you to:

- Modify the String Name.
- Reset all sensors on the string.
- Re-discover the string.

The String Discharge Status is displayed. 1 indicates normal status. 0 indicates discharging status. The alarm status for this parameter is set using the String Discharge Alarm Threshold Alarms.

Battery Sensor Details: String 1, Battery 1 ✕

Name	String 1, Jan 1
Voltage	13.797 V
Temperature	72 F / 22 C
Admittance (Battery/Cell)	220 S / 1320 S
Admittance Change (%)	20
Baseline Admittance	1100
Baseline Admittance Date	06-22-2020; 14:58:47
Last Admittance Date	06-22-2020; 14:03:10
Balancing Status	Balancing
SensorStatus	Normal
Flash Sensor LED	<input type="checkbox"/>

All Conductance measurements and balancing are automatically disabled on all strings when a discharge event is detected on any string.

4.35. Battery Sensor Details View

NOTE: All users can view battery sensor details, but you must be logged in to the controller to make any changes. See Login - Unlocking the Overview Web Page for details.

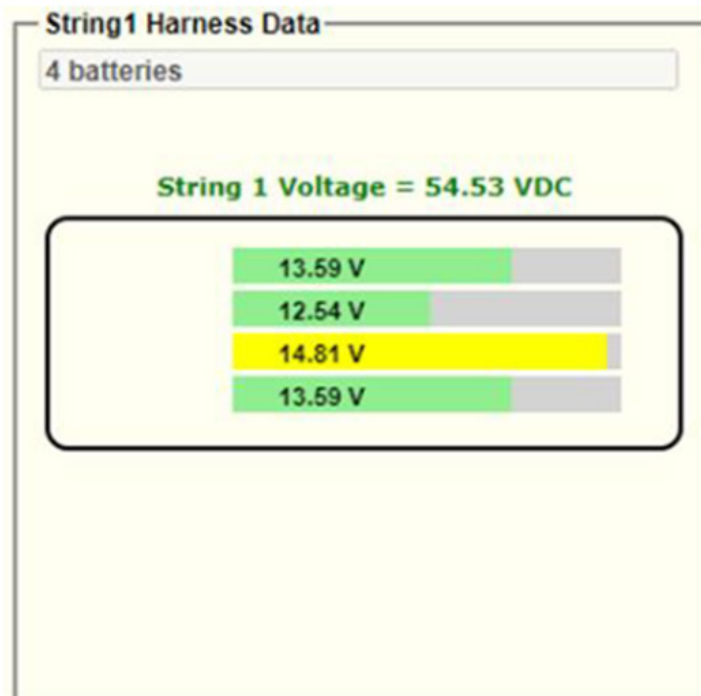
NOTE: Some parameter values displayed will only be present when the system has the optional sensors installed. These include admittance and temperature values.

The Battery Sensor Details view displays the measurements and available settings for a single jar. The backgrounds of the measured parameters are color coded to indicate status. Normal status is indicated by a green background, a red background indicates a major alarm, and a yellow background indicates a minor alarm.

Admittance Date add a time perspective to the change. Alarms may be provisioned for the change, and the Baseline Admittance can be set, using the Battery Admittance Change Alarms.

While measurements are normally made at intervals specified in the Site Details view using the Admittance Interval (Hours) setting (see Updating Site Details), clicking the Measure Now button in the Site Details view will initiate an admittance measurement on this sensor the next time it is polled. (See System Controls.) The measurement may take a minute to start depending on what the Battery Health Module is doing at the time. When the measurement starts, the Sensor Status will indicate "Measuring".

The status will return to normal when the measurement is complete. Admittance measurements may be delayed up to five minutes to prevent overheating the sensor.



Balancing Status shows whether battery balancing is currently enabled ("Balancing") by the Battery Health Module . When balancing is not enabled, this field shows "Disabled."

The Sensor Status provides an indication of what is happening at the sensor. The table below lists the possible values of the Sensor Status.

4.36. String Harness Data

The String Harness Data areas of the overview web page show:

- The number of batteries installed on the corresponding string.
- The String Voltage reading.
- Individual voltage readings for each battery on the string.

Individual battery voltage readings are color coded to indicate current alarm conditions.

4.37. I/O Functions Indicators

I/O Functions (options required)	
AC Line Voltage Sensor:	0 Volts AC
AC Current Sensor:	0.04 Amps AC
Contact Input1:	OPEN
Contact Input2:	OPEN
Contact Input3:	CLOSED
Moisture Sensor:	NO MOISTURE
Control Output:	OPEN (OFF)

The contact inputs are general purpose inputs which display the current state of the inputs, with alarms indicated when the default value is not detected.

4.38. Default values are:

- Contact Input1 – open
- Contact Input2 – open

- Contact Input3 – open

See Using the General-Purpose Interface for more details.

The Moisture Sensor displays the presence of moisture detected by the optional PBT-PA-MS-1 sensor. If no sensor is connected, the reading will display DISABLED.

The Control Output displays the state of the general-purpose digital output on the Battery Health Module. See Using the General-Purpose Interface for more details.

4.39. Resolving Common Problems

- Problem – The Battery Health Module resets approximately once an hour. Background – The Battery Health Module updates its real-time clock from a network time server approximately once per hour. If the Battery Health Module is unable to communicate with the time server, it will reset in an attempt to restore communications. Solution – First check if the Battery Health Module is obtaining the time by looking at the time display above the Telnet setup menu. If the time is correct, the Battery Health Module is communicating with the time server and the time server is not the cause of the resetting. If the time is incorrect, verify that the time server IP addresses are correct and that port 123 is not being blocked by a firewall or router. Verify that the reset is being caused by no time server communications by setting the IP address of the first time server to zeros on the setup menu. This will disable the time server reset. Verify that the time server IP addresses are correct.
- Problem – Sensor module not communicating to Battery Health Module. Solution – Verify that the serial cables are properly connected to each sensor module. Verify that the Green LED is illuminated or periodically flashes after startup. If LED does not illuminate, verify the wiring and power cable connections to each battery. If connected improperly, an internal fuse may have opened to protect the sensor module and a replacement must be ordered.
- Problem – No IP address assigned or Battery Health Module is unavailable through Telnet or local interface. Solution – The Battery Health Module is setup for DHCP by default. A default static IP address may be configured by pressing and holding the reset button for 5 seconds if a static IP address is required for the network in use. Otherwise, the use of an IP scanner may help determine the assigned DHCP address. If using Telnet, verify that the correct IP address is in use and the port is set to 9999.

INSTALL AND OPERATION



Scan
QR for
website.

Multilink, Inc
580 Ternes Ln
Elyria, OH 44035
Tel: (440) 366-6966
Fax: (440) 366-6802



facebook.com/GoMultilink1



twitter.com/GoMultilink



youtube.com/GoMultilink

Contact Us

North America	Europe, Middle East & Africa	Latin & South America
Tel: +1 440 366 6966 Fax: +1 440 366 6802 Email: engsupport@gomultilink.com	Tel: +1 440 366 6966 Fax: +1 440 366 6802 Email: engsupport@gomultilink.com	Tel: +1 440 366 6966 Mobile: +1 440 366 6802 Email: lasupport@gomultilink.com