OPTILINK BMS

Serial-to-Ethernet BMS Monitoring Module

Installation and Operations Manual

Documented Models

The following Optilink BMS models are documented by this instruction and operations manual.

MODEL	PART NUMBERS	OPTIONS
OPTILINK BMS	740-095-20	See Specifications

INSTALL AND OPERATION

Multilink Inc. 580 Ternes Ln. | Elyria, OH 44035 | 440.366.6966 | www.gomultilink.com

Table of Contents

Introduction and Operation:

The Optilink BMS is a Serial-to-Ethernet status monitoring module used for the remote status monitoring of Multilink's PantheonCell series of Lithium Iron Phosphate (LiFePO4) batteries. The device has been designed for use in outside deployments wherever the LiFePO4 batteries may be used.

The device collects information from the embedded Battery Management System (BMS) contained within each battery and provides this information via SNMP. A proprietary Management Information Base (MIB) is used to provide battery specific information such as cell voltage, remaining capacity, alarm information, etc. An embedded webpage also allows for remote access and configuration of the device and its respective power supply.

The Optilink BMS is a standalone unit and uses a proprietary data protocol. Data transmission to the device is through a proprietary RS-485 serial cable that is provided with each unit, along with a power harness to power the unit from the respective battery.

Features:

- 10/100 BASE-T RJ-45 Ethernet Port
- RS-485 Serial Port for data capture
- SNMPv1, v2, and v3 monitoring compatible
- Multilink proprietary MIB for BMS (MULTILINK-OPTILINK-BMS-MIB.mib)
- Static and dynamic IP addresses are support for both IPv4 and IPv6
- Configurable NTP and timezones
- Embedded webpage with remote configuration capability

Operation:

The Optilink BMS ships with a serial cable and power harness. The device is powered from the respective battery that is to be monitored. When connected to the battery's BMS, the device will gather data and provide it through the Ethernet connection, either through SNMP or the embedded webpage.

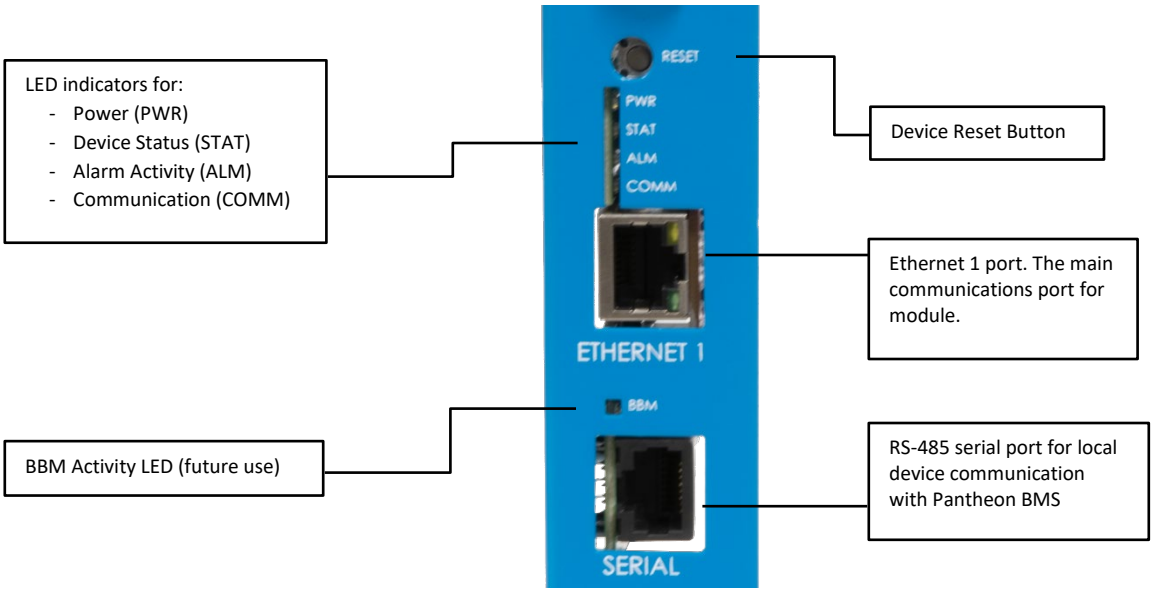
From the factory, the Optilink BMS is configured with a static IP address. This allows users to directly connect to the unit to configure the device for a different static IP address or configure the device for DHCP to automatically receive an IP address. When connected to the device, the user may use any browser to view the embedded webpage. Enter the default IP address and use the default credentials listed above to view the information. Users must enter https:// before the IP address and accept the certificate warning, if prompted.

Default Static IP Address and Default Credentials	
IP Address	192.168.100.1
Subnet Mask Address	255.255.255.0
Gateway Address	192.168.100.1
Default Credentials	Username: user Password: multilink

Battery information is described in the MULTILINK-OPTILINK-BMS-MIB.mib document. This information allows the SNMP objects to be more human readable and defines the use of each item. This MIB document is available by contacting Multilink or visiting www.gomultilink.com to download the MIB file.

Connections, Controls, and Indicators:

The following section describes the connections, controls, and indicators on the Optilink ST. While two models of the Optilink ST exist, both share similar layout, connections, and indicators. The Optilink ST 1G SFP model is used in this example. Refer to the image and information table below for connection and operating information.



Optilink BMS LED Operation	
PWR	ON: device is powered OFF: no power available
STAT	ON: updating device status OFF: operating as normal
ALM	ON: device alarm, serial comm. error OFF: no alarm
COMM	ON: serial comm. is active OFF: serial comm. is not active

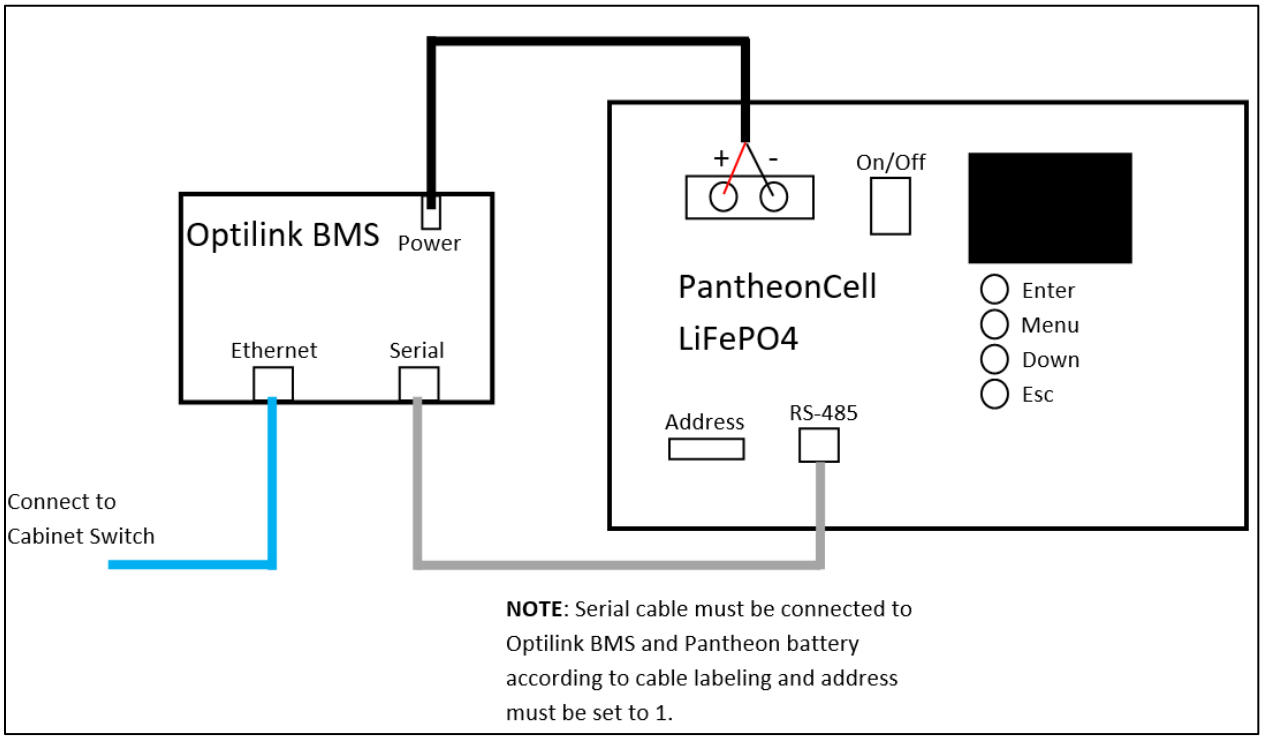
Installation:

Prior to beginning installation, please verify the Optilink BMS and its harnesses are not damaged.

NOTE: The serial cable provided uses RJ45 connectors, similar to a standard Ethernet cable. **DO NOT** attempt to connect the serial cable to the Ethernet port or an Ethernet cable to the serial port.

To install the Optilink BMS module:

1. If the power supply is currently operating, turn OFF the battery breaker.
2. Disconnect the battery harness.
3. Turn off the PantheonCell.
4. Using a Phillips screwdriver, unfasten the two screws on the terminal block and connect the power harness.
5. Attach the power harness to the Optilink BMS module.
6. Attach the serial cable with the label “Optilink BMS” to the module
7. Attach the serial cable with the label “PantheonCell” to the RS485 port on the battery.
8. Set the address on the PantheonCell to “1”.
9. Attach an Ethernet cable from the cabinet’s switch to the Ethernet port on the module.
10. Turn ON the battery breaker on the UPS.
11. Turn ON the PantheonCell.
12. After 60 seconds, verify that the Power LED on the module becomes active and the Comm LED begins to flash periodically.



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SNMP Operation and Configuration:

The SNMP agent embedded in each Optilink BMS can be manually configured for operation with SNMP-based network management software and trap receivers. All three versions of SNMP are supported, with SNMPv2 set as the default. The standard set of SNMP's SMI MIBs are supported. The following MIB documents are also supported. Multilink proprietary MIB documents may be supplied upon requested.

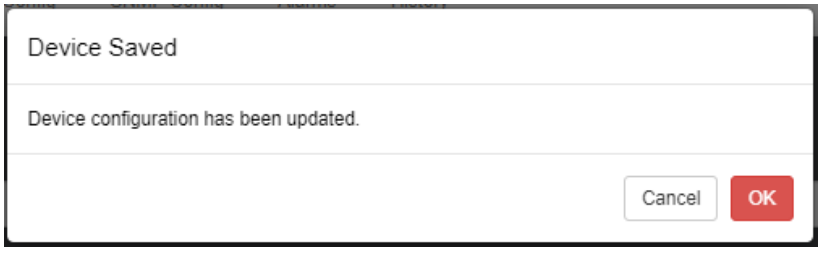
- MULTILINK-ROOT
- MULTILINK-OPTILINK-BMS-MIB

Webpage Use and Navigation:

Embedded in each Optilink BMS is a standalone web server that contains a webpage to allow for both local and remote observation and configuration. The embedded webpage is addressable by entering the assigned IP address into a web browser. All webpages are mobile device friendly. Several sub-sections exist within the webpage for viewing current PantheonCell BMS operating information, SNMP configuration, alarm status, and device configuration.

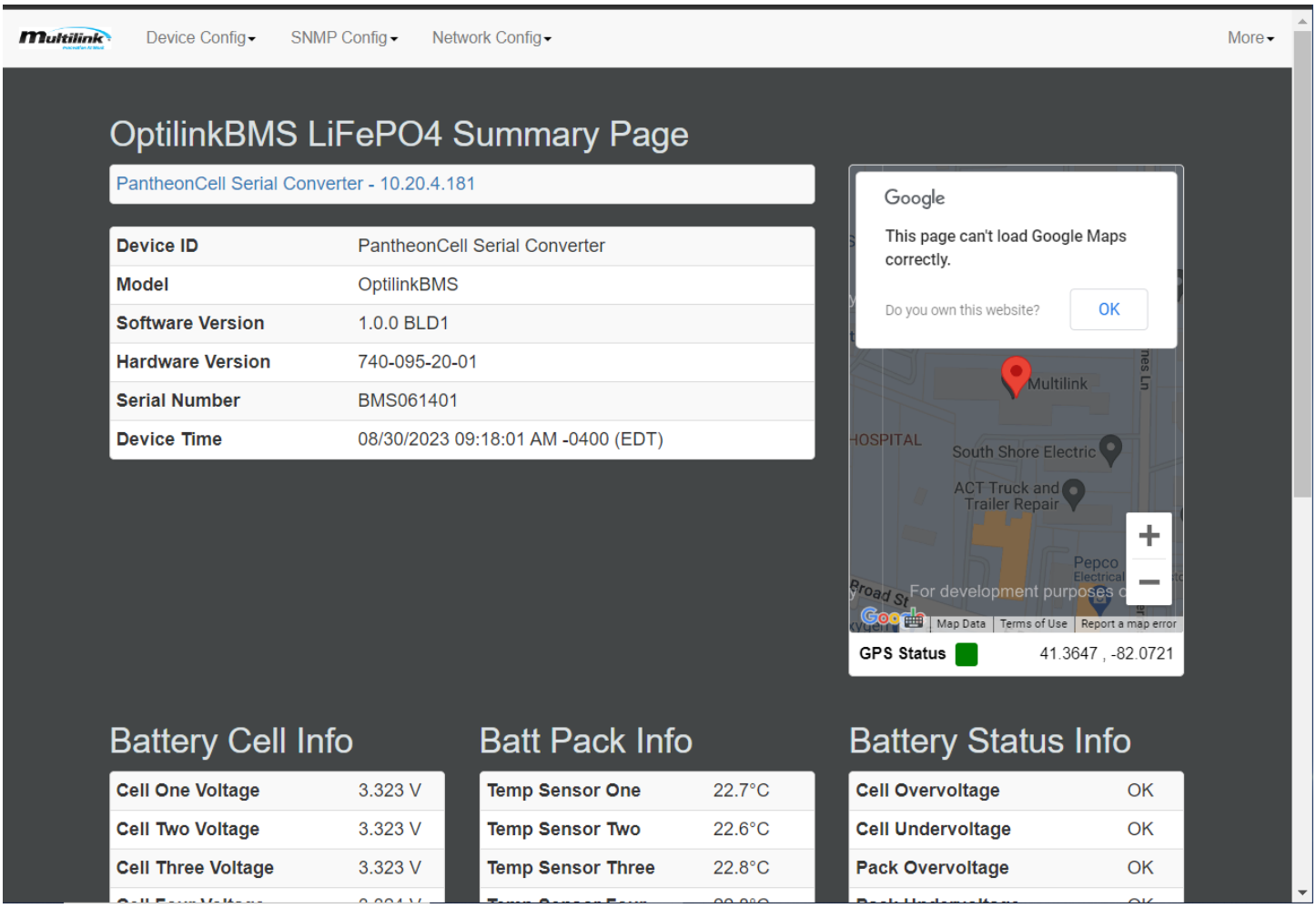
Several pages allow for the configuration of items. For these items, either a textbox or a dropdown list is provided for the user to view the current setting or to set a new value for each respective item. For items that are pre-configured or are not allowed to be configured, the textbox or dropdown list will be "greyed-out", and a red caution symbol will appear over each item when navigating around the webpage. These items are intended for informational purposes only.

On pages where the user may select a different value for one or more items, Submit/Cancel buttons are provided and should be used if any parameters are modified. After submitting changes, the user will be prompted to verify that is action has taken place. Saved changes will display on the webpage. Items that are modified but are not saved will be discarded automatically when using the Cancel button or when navigating away from the page. Below is an example of a prompt that may appear after successfully submitting changes to any of the webpages:



Summary Page:

The Optilink BMS Summary Page provides the user with all pertinent information for the respective battery. On the page, a menu list with several selectable options heads the top of the page. Selecting any one of these tabs displays a submenu the user may then select to view. Several tables containing battery information are shown alongside a functional Google Maps API that may be user-configured for device location. Each of the tables on the Summary page are updated automatically every 5 seconds to provide the latest information. The user may also choose to Log Out or reboot the device from the More tab.



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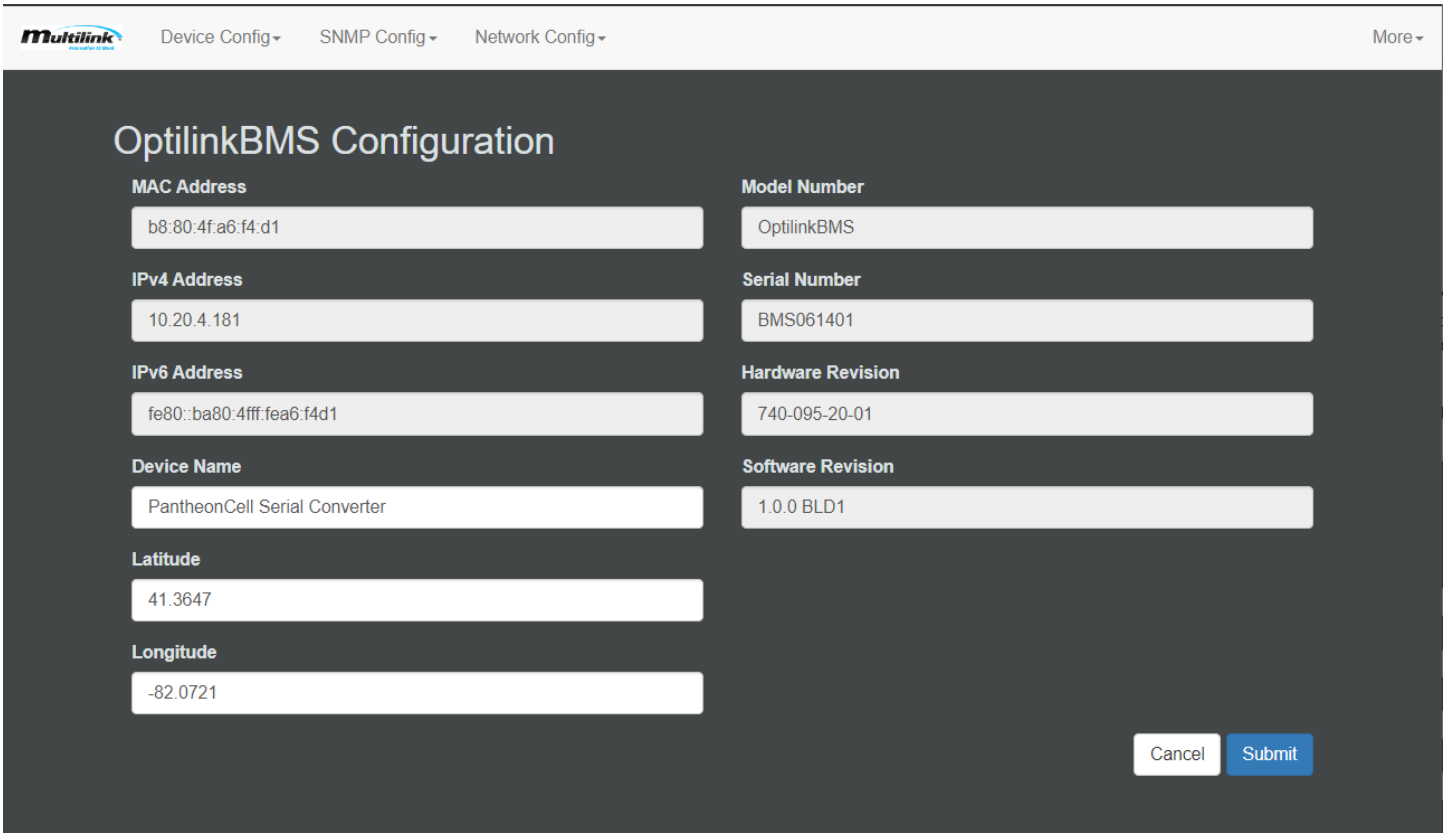
Device Config - Optilink BMS Page:

This page provides network parameters, device information, and current configuration for the Optilink BMS device. By default, several of the items are pre-configured at the factory. Those items are not user configurable, and a red caution symbol will display when navigating over these items. The user may configure the name of the device as well as enter the GPS coordinates for the device. Should the user modify any available option, be sure to click the Submit button to save changes. Click Cancel to reject any modifications.

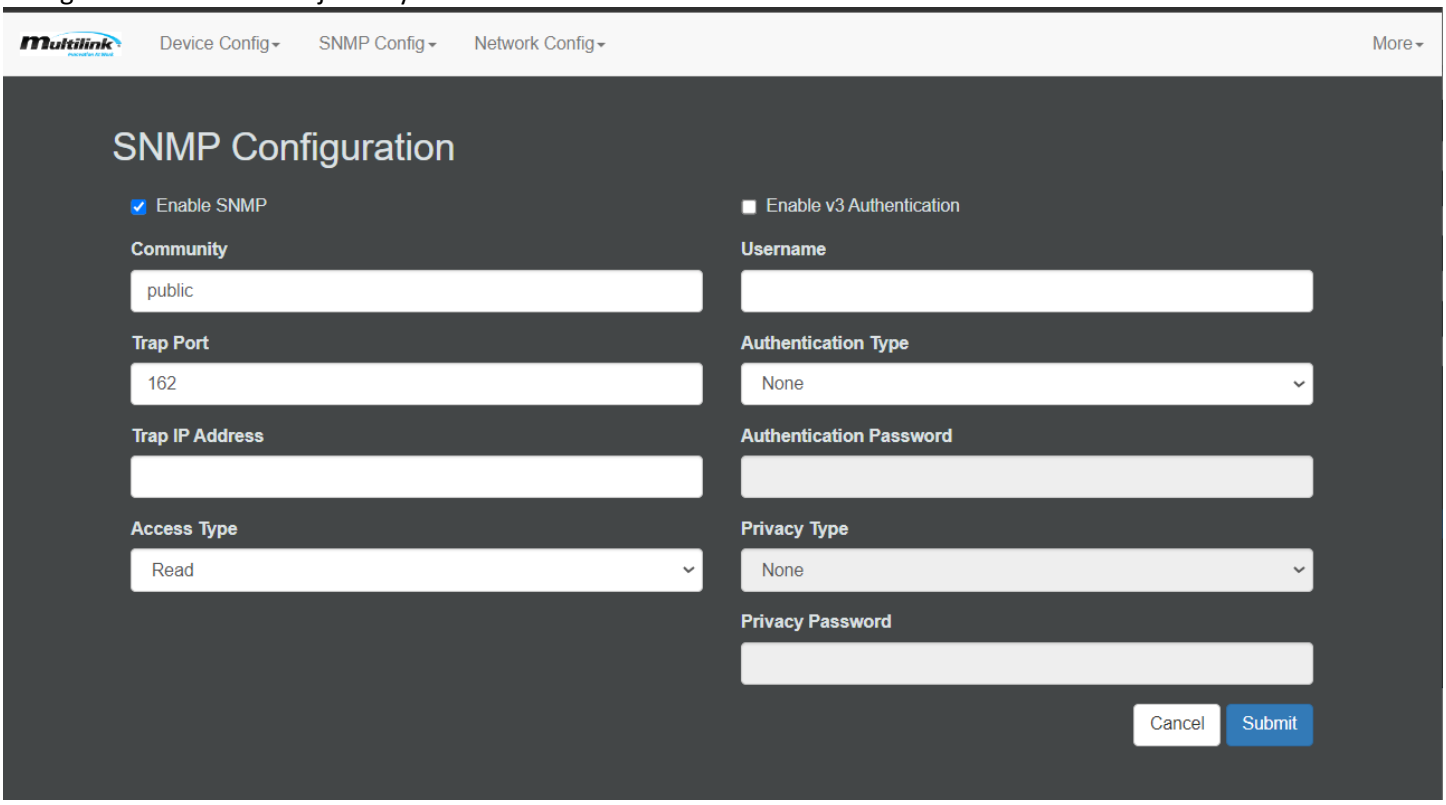


User Login:

To view any of the pages that may be configured, the user must login using the default credentials. The default credentials are **user** and **multilink**.

SNMP Configuration:

This page allows for the manual configuration of the embedded SNMP agent. By default, SNMPv2 is the default protocol. Users may modify these items for additional security and trap destination information. Modification of these items are automatically applied to the SNMP agent and may affect adversely SNMP communication with the device if not properly configured. Should the user modify any available option, be sure to click the Submit button to save changes. Click Cancel to reject any modifications.



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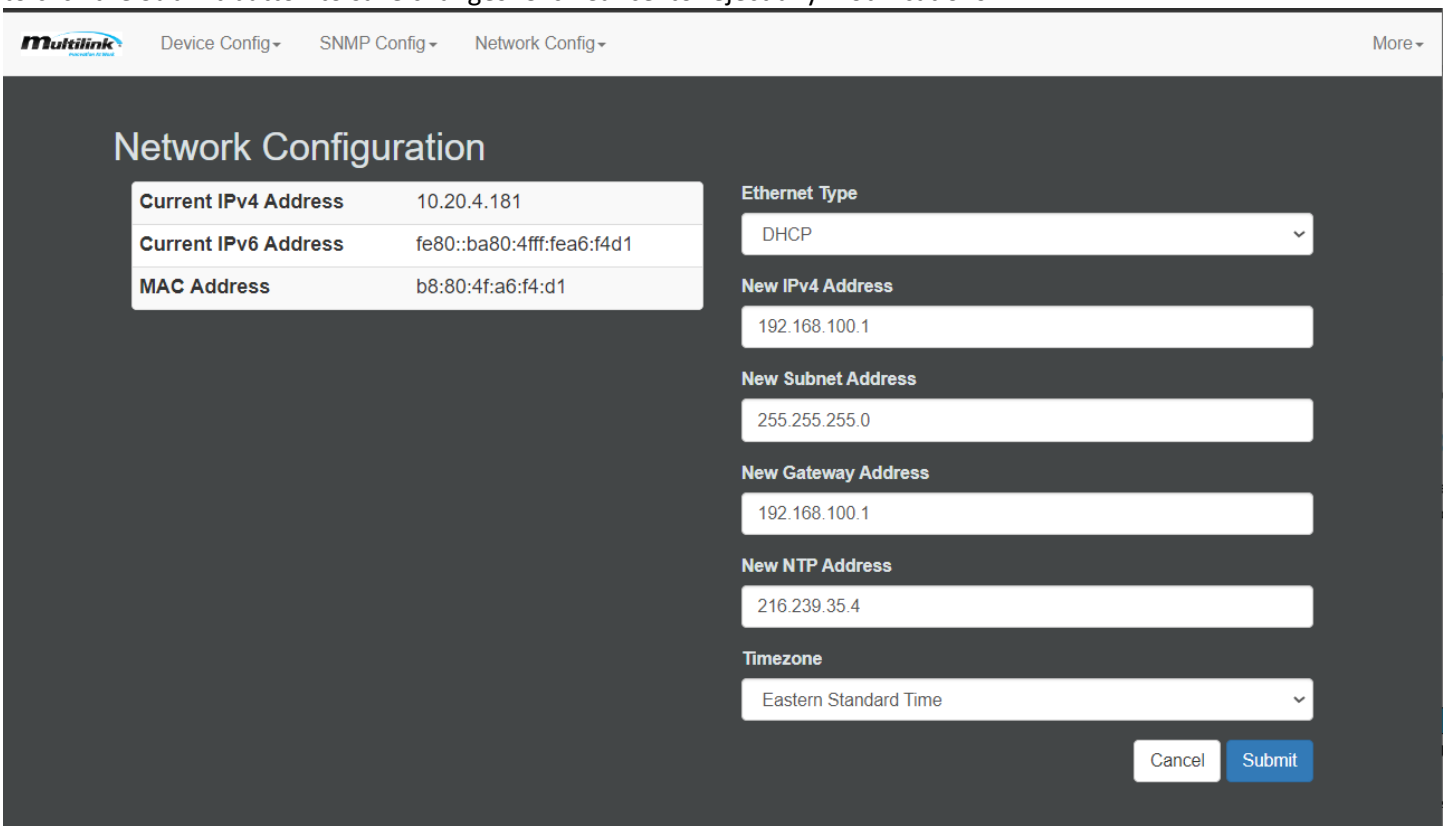
Network Configuration:

This page allows for the manual configuration of the network agent. Current network configuration is shown in the table on the left. The user may select to set a different static IP address or configure the device to use DHCP. The "Ethernet Type" shown is the current setting in use by the device. Select "Static" to configure a new IP address to use. The user may also enter an NTP address and select the time zone. Should the user modify any available option, be sure to click the Submit button to save changes. Click Cancel to reject any modifications.



Troubleshooting:

Refer to the table below for common troubleshooting items and recommended solutions.

Issue	Description	Solution
Power LED not illuminated on the Opitlink BMS	Power LED is not illuminated	• Verify power harness is correctly attached to battery. • Verify PantheonCell battery is turned on. • Verify that the fuse contained within the power harness has not opened.
Cannot view embedded webpage	Webpage does not load	• Verify the address is correct. • Verify the network card of the laptop, if directly connected, is within the same range and does not use the same IP address • Verify that https:// is used before the IP address and the certificate warning has been accepted.
IP address not assigned or addressable. IP address is within the range of 169.254.X.X.	An active DHCP server was not found through either	• Verify that all connections are correct. If using Ethernet ONLY, Ethernet 1 should be connected to an active network. If using Fiber, ensure the correct SFP or SFP+ module is in use for the respective Optilink ST model and verify the Ethernet Jumper is connected between Ethernet 1 and Ethernet 2. • Verify that both the TP/Link and FX/Link LEDs are ON and periodically flickering. • Verify the Activity LEDs on Ethernet 1 are active. • Verify device is connected to an Active DHCP network. • Verify that the upstream fiber transmitter is compatible with the currently installed SFP module.
SNMP communication is not functioning or returns no response.	SNMP settings are likely not configured correctly.	• Verify that the correct SNMP settings are configured for both the Agent and the NMS/MIB Browser. • Verify the correct SNMP protocol is in use. By default, the Optilink ST uses SNMPv2.

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Optilink BMS Specifications:

Operational Specifications		
Parameter	Description	Notes
Processor	Sitara AM335X Arm processor	
Memory	4GB onboard flash	SD card expansion for additional storage and redundancy
Ethernet Connection	10/100 Base-T	RJ45 w/LEDs, auto-negotiation, auto-MDI/MDI-X
Serial Port	RS-485	Used for PantheonCell Battery Only.
Power	5-60V, 3W	Powered by PantheonCell Battery.
Temperature	-40°C to +65°C	
Humidity	5-90%	Non-condensing
Elevation	Up to 3000m	
Agency Approval	FCC Part B Sub 15	
Standards and Protocols	HTTPS, TCP/IP, UDP, SNMP, SNTP	

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