

PowerAgent [™]SC3 Site Controller Installation and Operation

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		Phoenix Broadband Technologies
Battery Monitoring System	Manual () Web Site	
Site Name: PBT-PA-BMS-SC3		
Site Location: Default Site Location	Overview Display	
	overview biopidy	
String Name	String Voltage String Status	
String 1 String 1	S 51.8 VDC Normal	
String 2	S 0.0 VDC Not Connected	
String 4	S 0.0 VDC Not Connected	
String 5	S 0.0 VDC Not Connected	
String 6	S 0.0 VDC Not Connected	
		3
		li II
Admittance Measurement Interval: 24 Hours		
Site Setup RIMs and ROMs		Update Firmware
System Up Time: 0:07:03:03 D:H:M:S	Site Controller Time:	14:48:20 1-14-2014
Firmware Version: XP 06.2b5, PIC 1.6, LPIC 1.9	Site Controller MAC Address:	d4-0-d-0-4-2e
Updated.		14:48:21 1-14-2014
Copyrig	WebAgent PBT-PA-BMS-SC3-XL Ver 3.25 ht Phoenix Broadband Technologies, LLC 201	.2
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Contents

Importan	t Inform	ation	5
1.1.	Revisio	n History	5
1.2.	Safety I	Notes	5
1.3.	Importa	ant Symbols	5
1.4.	Definiti	on of Terms	5
System O	verview		7
2.1.	Sensor	Description	8
	2.1.1.	"High Voltage" and "Low Voltage" Sensors	8
	2.1.2.	Sensor Selector Guide	Э
2.2.	Site Co	ntroller Description1	1
2.3.	Accesso	pries1	3
	2.3.1.	Cable Kits1	3
	2.3.2.	Power Transformer1	3
	2.3.3.	Rack Mount Bracket1	3
Initial Ber	nch Eval	uation1	4
Sensor In	stallatio	n1	6
Site Cont	roller Ins	stallation1	7
5.1.	Poweri	ng1	7
5.2.	Networ	k Connections1	7
5.3.	Connec	ting Battery Sensors1	7
5.4.	Connec	ting RIMs and ROMs1	8
5.5.	Connec	ting Current Sensors1	8
5.6.	Setting	the IP Address	8
5.7.	Configu	ring the Site Controller1	8
	5.7.1.	Direct USB Connection	9
	5.7.2.	USB Port Selection1	9
5.8.	Accessi	ng the Setup Menu2	C
	5.8.1.	Ethernet Crossover Cable Method2	C
	5.8.2.	Router Method2	С
	5.8.3.	Running the Site Controller Telnet Setup	С
5.9.	Site Co	ntroller Setup Menu2	1

		5.9.1.	Server Setup (0)	22
		5.9.2.	Password Setup (1)	24
		5.9.3.	SNMP Setup (3)	24
		5.9.4.	HMS Defaults (4)	25
		5.9.5.	Email Setup (5)	25
		5.9.6.	NTP Setup (6)	26
		5.9.7.	Restore Factory Defaults and Reset (7)	28
		5.9.8.	Exit Without Resetting (8)	28
		5.9.9.	Save Changes and Reset (9)	28
		5.9.10.	Erase String and Battery Database (13)	28
		5.9.11.	Reset All Sensors (14)	28
		5.9.12.	Erase String (15)	28
		5.9.13.	Erase RIM/ROM Flash (16)	28
		5.9.14.	Reset Logging PIC (18)	28
		5.9.15.	Setup Firmware Server (19)	29
		5.9.16.	Erase Virtual Strings (21)	29
		5.9.17.	Load Setup File (40)	29
		5.9.18.	Site Controller Setup (50) –XL controller only	29
		5.9.19.	DNP3 Setup (93)	29
		5.9.20.	Remote Log File Access Setup (94) –XL controller only	29
		5.9.21.	WEB Setup (95) –XL controller only	29
		5.9.22.	DEBUG Setup (96) –XL controller only	29
		5.9.23.	TELNET Setup (97) –XL controller only	29
		5.9.24.	TFTP Setup (98)–XL controller only	30
		5.9.25.	System Information (99)	30
	5.10.	Web Se	rver	30
		5.10.1.	Accessing the Web Server	30
		5.10.2.	Ports	30
6.	Navig	ating the	e Web Pages	32
	6.1.	Overvie	w Display	33
	6.2.	Single S	tring Display	33
	6.3.	Single J	ar Display	36
	6.4.	Virtual	Strings	37

	6.4.1.	Combine S	Strings	37
	6.4.2.	Split String	gs	
6.5.	RIM an	d ROM Ma	in Display	40
6.6.	UGM D	isplay SC3-	XL only	41
6.7.	Provisio	oning		42
	6.7.1.	Provisioni	ng Site Settings	43
	6.7.2.	Provisioni	ng String Settings	44
	6.7.3.	Provisioni	ng Jar Settings	45
	6.7.4.	Provisioni	ng the Sensor Calibration	46
		6.7.4.1.	Calibrating using an Instrument	46
		6.7.4.2.	Setting the Calibration	47
		6.7.4.3.	Provisioning the Baseline	48
		6.7.4.4.	Baselining using the Present Measurement	48
		6.7.4.5.	Baselining using Manufacturer's Specifications	48
		6.7.4.6.	Setting a Baseline	48
	6.7.5.	Provisioni	ng Analog Alarms	
	6.7.6.	Provisioni	ng Discrete Alarms	50
	6.7.7.	Using con	troller to provision alarm ROM outputs	50
SNMP				52
7.1.	MIBs			52
7.2.	Comm	unity String	S	53
7.3.	Traps			54
7.4.	MIB Br	owsers		54
Updating	Firmwa	re		55
Summary	/ of Port	Usage		57
Resolving	g Commo	on Problem	ıs	58

Important Information

1.1. Revision History

Release	Date	Revision Description
Rev 1.0	04/27/2010	Draft for review, Firmware version 4.04, Web version 1.1
Rev 2.0	05/12/2010	Ongoing revisions, Firmware version 4.10, Web version 1.3
Rev 3.0	03/15/2014	Ongoing revisions, Firmware version 6.25 (XL), Web version 3.25
Rev 3.1	11/14/2017	Added Safety Note for power wire temperature rating
Rev 3.2	11/29/2017	Changed maximum input voltage to 59 VDC, removed reference to AC powering, added safety note on power source voltage

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 jar 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 PowerAgent 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 or authorized by Phoenix Broadband Technologies. Use of user-made interconnection cable assemblies could result in damage to equipment and potential safety hazards and 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, explosive, and corrosive vapors.
- Connect power with wire suitable for 80 degrees C minimum.
- If the controller is powered by a source outside the specified voltage range, the UL listing is void.

1.3. Important Symbols

The following symbols are used in this document.

 CAUTION!

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

V	NOTE:
	A NOTE provides additional information to help complete a specific task or procedure.

1.4. **Definition of Terms**

Admittance – 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 in to 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).

Battery	A collection of jars connected in series. A battery is sometimes referred to as a Battery String or String in this document.
Cell	A collection of plates connected to a single positive and single negative terminal immersed in electrolyte in a single container. The cell may have multiple positive and negative connections but they connect to a single set of plates. A lead acid cell produces approximately 2.1 volts.
Jar	A collection of one or more cells connected in series in a single housing. A 12 volt jar contains 6 cells. A Jar is commonly and incorrectly referred to as a battery.
P-Bus	A Phoenix proprietary communications interface and protocol used to connect devices to the Site Controller for the purpose of providing additional input, output, and measurement capability.

If you have any questions about the installation or use of the equipment described in this manual, contact Phoenix Broadband Technologies (PBT) at (215) 997-6007 or <u>customerservice@phoenixbroadband.com</u>.

When contacting Phoenix Broadband please have the following information available:

- 1. Site Controller Model Number and firmware version (from the Site Controller Web Page).
- 2. Battery Sensor Model Number, hardware version and firmware version. The version numbers are shown on the Site Controller single Jar Web Page.
- 3. The Battery and String Voltage.
- 4. The battery model number.
- 5. UPS or DC power plant.
- 6. If a UPS the manufacturer and model number.

System Overview



The Phoenix Broadband Technologies (PBT) PowerAgent[™] Battery Management System is a comprehensive solution for remotely monitoring the state of health for individual cells or jars within the battery bank of a UPS or DC power plant system.

The system consists of sensor modules which are electrically and mechanically affixed to the terminal posts of the jars being monitored, and a PowerAgent TM Site Controller unit which collects readings from the individual sensors and makes the information available for management purposes via an Ethernet local area network. The Sensor modules are designed for use with 2 or 12 volt jars in DC power plants and UPS power systems

up to 600 volts DC and with several choices of mounting brackets for different post configurations.

Each sensor in a PowerAgent TM Battery Management System measures its associated cell or jar's terminal voltage, post or case temperature, and internal cell impedance (admittance). Multiple sensors within a string of monitored jars are interconnected in a "daisy-chain" utilizing CAT-5 cabling and RJ-45 connectors. Each daisy-chain of sensors is connected via another CAT-5 cable to one of the six string ports on the Site Controller. Each site controller can manage up to six strings of batteries with a maximum of 40 batteries in any string and a site total of 240 batteries. The site controller has extensive



user-definable set-up capabilities, including labels for every monitored jar and alarm thresholds for voltage, temperature and admittance on each individual jar.

The site controller has several user interface mechanisms built-in, including a configurable web server that displays site, string, and individual jar information, as well as an SNMP (Simple Network Management

Protocol) interface that allows any SNMP compliant management software to collect data and perform jar tests. Other features of the site controller include a password protected Telnet port for remotely configuring the unit, A DHCP (Dynamic Host Configuration Protocol) client that automatically obtains an IP (internet protocol) address from a DHCP server, and TFTP (Trivial File Transfer Protocol) server for uploading firmware changes remotely.



2.1. Sensor Description

Sensor modules are small, inexpensive units designed to mount in close mechanical, electrical, and thermal proximity to the monitored jar's terminal posts. The sensor takes a very small amount of "idling" power from the monitored jar (typically less than 10ma). Internally, a programmable microcontroller chip provides an optically isolated communications interface for the site control unit. Sensors are connected to the Site Controller using a CAT5 cable daisy chain.

The sensor continuously monitors the voltage and temperature of the jar. At user-defined intervals, the microcontroller generates a digitally synthesized AC test signal of approximately 0.5 to 6.0 amps (depending on



sensor type) which drives the jar's terminals for testing purposes. This test current causes a small AC voltage, proportional to jar impedance, to be superimposed on the jar's DC terminal voltage. This AC voltage is separated from the DC terminal voltage and amplified inside the sensor module. It is then fed to an analog-to-digital converter inside the microcontroller chip. The microcontroller digitally samples the AC waveform and performs a DSP (digital signal processing) algorithm that filters out noise and measures the amplitude of the AC signal. These measurements and subsequent calculations determine the jar's internal AC impedance, which is the basis for Admittance measurements.

Mechanically, the sensor consists of a nickel-plated copper mounting bracket which fits on the jar's negative terminal post, a short wire terminated in terminal lug that connects to the jar's positive terminal post, and an electronics assembly that contains the test signal generation and measurement circuitry. Sensors with two wires are also available.

The sensors with brackets have the advantage of being able to more accurately measure the temperature of the electrolyte in the cell. The two wire sensors have the advantage of working with a wide variety cell and jar mechanical configurations that could requires several different bracket types. Refer to the Sensor Selector Guide later in this section for more details.

Each sensor is shipped with a 1 foot CAT5 cable to connect the sensor to the daisy chain. This cable is the proper length for most applications. Longer cables are available from PBT.

2.1.1. "High Voltage" and "Low Voltage" Sensors

Sensors are typically used in DC power plant and UPS applications. DC power plant applications commonly utilize two volt cells and twelve volt jars wired in series with total nominal string voltages typically ranging from 24 to 48 VDC nominal. In many UPS systems, voltages can be significantly higher (480 volts or more). Because of the specific requirements of high voltage systems, Phoenix Broadband has developed two types of sensors to accommodate each environment.

When working in environments where string voltages are greater than 59 VDC, always use the High Voltage sensors. The communications path in "high voltage" (HV) sensors are completely optically isolated from the controller and each other, with no string-level voltages present in the interconnecting CAT5 cables. This architecture was designed to ensure safety and prevent damage. For environments where string voltages

are 59 VDC and lower, Low Voltage sensors are appropriate, however either sensor (High or Low voltage) can be used low voltage strings.

CAUTION: Installing Low Voltage sensors on a high voltage string will damage the sensors and may present a shock hazard.

Both sensor types will be auto-discovered by the controller. The Low Voltage sensor has the advantage that its position in the string is automatically discovered. This means the sensors can be connected in any order and the controller will automatically discover upon which cell or jar the sensor was installed. High Voltage sensors have an address. The address and cell or jar number must be recorded when the sensor is installed. These addresses are then entered into the Site Controller Web page so that the ordering of the cells or jars will be correct.

High Voltage and Low Voltage sensor should not be mixed in the same string.

Each sensor has a bi-color red/green LED that indicates the operational state of the sensor and its communications status with the site controller. Each sensor is also is internally fused so that improper connection to the jar will not damage the jar, the jar cabling, or the sensor. Again, the sensors are fully optically isolated from the site controller.

2.1.2. Sensor Selector Guide

Selecting a sensor requires first determining if a Low or High voltage sensor is required. Then a jar voltage is selected, either 2 or 12 volts. Finally the bracket style is selected. The sensor model number is constructed as shown below.

Series B sensors should be used for all new installations, they offer improved noise immunity and an enhanced feature set including battery balancing. These sensors require a B series Site Controller.

When selecting a bracket be sure to consider the clearance above the jar. This is particularly important when the jars are installed in a cabinet as is typical with most UPSs. Be sure there is enough space for the CAT-5 cables to exit the sensor without kinking.



size for the

Type 2 Bracket

as the "Z" bracket,

that are connected

This bracket.

It is also used are secured by

the jar. The

Type 1 Bracket

This bracket commonly referred to as the "L" bracket, is typically used on Jar terminals where the sensor must stand up from the jar. An example is the vertical blade type terminal where the bolt is parallel to the top of the Jar. The maximum bolt



terminal and bracket is 5/16 inch.

commonly referred to

is typically used jars

together with straps. when the jar cables

bolts that extend into

maximum bolt size for





Type 3 Bracket

the terminal and bracket is 5/16 inch.

This bracket, commonly referred to as the "Front Mount" bracket, is used front terminal Jars. While specifically designed for the Marathon, the bracket will fit most front terminal Jars. This bracket was designed for a M6 (6 mm) bolt.





Type 4 Bracket

This bracket is not a with two wire universal sensor that The maximum bolt 5/16 inch. The one is that it does not post (electrolyte) bracketed sensors. mounted to the top of direct cooling air flow, approximate jar case equipped with a selfthe jar.



bracket at all but a sensor connections. This is the will work with most jars. size for the terminals is disadvantage of this sensor directly measure the jar temperature like the When the sensor is the jar, and not in the the sensor will read the temperature. The sensor is



adhesive industrial velcro strip for fastening the sensor to



<u>Type 5 Bracket</u>

This bracket is similar to the Type 2 bracket but is designed for a larger bolt. The maximum bolt size for the terminal and bracket is ½ inch or M12 (12mm). Because of the higher torque required for the larger bolt this bracket has a round hole rather than a slot. This prevents distorting the bracket when tightening the bolt.



Type 6 Bracket

This bracket is not a bracket at all but a sensor with two wire connections; however each wire is equipped with a quick disconnect female receptacle crimped on the end of the wire. This receptacle is designed to be mated with a male tab terminal. Washers equipped with dual male tabs terminals are available from Phoenix Broadband and are specially designed to



accommodate most applications. The one disadvantage of this sensor is that it does not directly measure the jar post (electrolyte) temperature like the bracketed sensors. When the sensor is mounted to the top of the jar, and not in the direct cooling air flow, the sensor will read the approximate jar case temperature. The sensor is equipped with a self-adhesive industrial velcro strip for fastening the sensor to the jar.

2.2. Site Controller Description

The Site Controller is a small, rack-mountable unit that monitors the sensor modules and makes the data collected by them available via a local area network or the internet. The SC3 Site Controller has 6 string ports for connection to strings of up to 40 jars each for a total capacity of 240 jars. Two P-Bus ports provide expansion capability for connection to current sensors, RIMs and ROMs for additional input and output capability. A USB setup port allows direct connection to a PC for configuration. A USB thumb drive provides storage of logged data and additional USB ports provide expansion capability.

The SC3 Site Controller has most of the connections on the rear panel and indicators on the front panel.

The SC3 Site Controller can be powered directly from a battery string voltage of 24-48VDC, or it can be powered from an optional small wall-mount 24VDC wall transformer. The voltage range is 18 to 59 VDC and power consumption is about 5 watts, with current draw dependent on the input voltage. Power is supplied to the unit via a rear-panel screw-type terminal block. The power supply input is floating. The terminal block also provides a chassis ground connection.



A Front panel USB connection provides access to configure the Site Controller IP address and other parameters during installation. Setup can also be performed over the network connection.

To the right of the USB flash drive on the controller front panel is an RJ-45 "aux" port. This port provides three digital outputs. See document 705-000009-00 Rev3 Aux port wiring diagram for details on this feature.

The site controller has six RJ-45 connectors on the rear panel for interfacing to up to six strings of monitored jars. Each string has a front panel indicator. The LED lights when the string is being polled. A green LED indicates everything is normal, a red LED indicates abnormal conditions within that string.



A Rear 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 site controller can be performed remotely using any SNMP-capable network management software system. These systems are described in additional detail in the SNMP section of this Manual.

Upon power-up, the site controller automatically begins a search sequence to determine which of its string ports are attached to battery sensors and discovers each sensor module.

When a string of High Voltage sensors is discovered, the controller discovers the factory-programmed address of the sensor module as part of this discovery process. The HV sensor is randomly assigned to one of the jars in the string, so the user needs should configure these assignments after installation is complete.

When a string of Low Voltage sensors is discovered the controller automatically discovers each sensor and its correct position in the string (no factory programmed address is necessary with low voltage sensors).

Once the "auto-discovery" process is finished, the site controller can individually address each sensor, collect its readings, and display those reading in the hierarchical web page display. Except for the final user assignment of High Voltage sensors to jars, 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 site controller can be rack-mounted in a standard 19" (or 23" with adapter ears) equipment rack using the optional rack-mount bracket or can be mounted on a wall using our wall bracket. One rack bracket can hold one or two site control units. Rubber feet, screws for mounting the site controller to the rack bracket, and extra sensor fuses are included with the Site Controller. Contact PBT for brackets to mount the Site Controller directly to a wall.



2.3. Accessories

Various optional accessories are available to aid in the system installation.

2.3.1. Cable Kits

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Cable Kit Model Number	Jars per string
PBT-PAC-BMS-04	4
PBT-PAC-BMS-12	12
PBT-PAC-BMS-20	20
PBT-PAC-BMS-24	24
PBT-PAC-BMS-30	30
PBT-PAC-BMS-40	40

A Cable kits provides the cables necessary to connect a string of jars to the site controller. Each string requires a Cable Kit. The Cable Kit contains the cables most commonly required to connect the string of jars. Cable Kits are available for common string sizes. Contact PBT for any special requirements such as individual cable lengths. The Cable Kit contains the cables most commonly required to connect the string of jars.

NOTE: We strongly recommend that you order the appropriate Cable Kit for each string and not make your own sensor cables. A single improperly made cable can destroy an entire string of sensors.

2.3.2. Power Transformer

The Site Controller is normally powered from the Rectifier or UPS battery charger (24 to 60 VDC). In cases where this power is not available a 24 VDC wall mount transformer is required to power the Site Controller. This transformer can be ordered from PBT as model number WT-3.



A bracket that mounts up to 2 Site Controllers in a 1U space in a 19 or 23 (ears)" rack is available by ordering model PBT-RK-1.



Initial Bench Evaluation

If the user has no previous experience with the PowerAgent TM 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 can save a significant amount of time before connecting to a much larger network. It will allow you to verify proper operation of the site controller's web server; telnet configuration, and DHCP client without having to troubleshoot larger network issues (firewalls, router, and connectivity etc.).



The above diagram shows a low cost networking router (D-Link[™], NetGear[™], or other) connected to a laptop/Desktop and the Site Controller. In this scenario the installation steps are as follows:

- 1. Power up router
- 2. Power up laptop and connect laptop to router
- 3. Verify that the laptop has acquired an IP address from the router (view the router's configuration web page and write the address down)
- 4. Connect controller to router (via Ethernet connection)
- 5. Power up controller (upon power up, the controller will seek an IP address from the router)
- 6. Connect sensors to the each other (via CAT 5 cables daisy chained from sensor to sensor)

- 7. Connect last sensor in the daisy chain to one of the six controller's sensor input ports
- 8. View the router's web page to determine which IP address has been given to the controller (write it down)
- 9. Type the IP address of the controller into your laptop's web browser and verify that the web page displays properly. Verify that all sensors have been auto-discovered. Verify that the parameter information displayed in the web page appears reasonable.
- 10. Verify telnet connectivity by connecting to the controller via telnet (remember Phoenix Broadband uses port 9999 for our telnet connection)
- 11. If you are using an SNMP manager, verify proper SNMP operation (gets, sets & traps)

This bench evaluation can also be performed using the free Lookout software described in the SNMP section of this manual.

Sensor Installation

Refer to the Battery Management System Manual (700-000006-02) for detailed information before installing the battery sensors.



CAUTION! 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.



CAUTION! Be sure to disconnect the Rectifier or Charger before installing the Sensors. Failure to do so could result in sensor damage.

Site Controller Installation

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NOTE: Before any sensor strings are connected to the Site Controller, it should be mounted (either in a rack or shelf), connections should be made to the network (Ethernet connection) and it should be powered up and checked out for network connectivity.

Select a location for the Site Controller. The location should be central to the strings being monitored. It should be dry and free of corrosive or explosive vapors.

The maximum cable length between the SC3 Site Controller and the battery string varies with the number of battery sensors on the string. With 40 sensors a maximum total cable length of 200 feet is recommended. This includes the sensor to sensor cables. With 24 sensors this increases to 300 feet.

Mount the Site Controller in an equipment rack using the optional rack mount bracket, or place the Site Controller on a shelf.

5.1. Powering

Connect a source of 18 to 59 volts DC to the rear panel power connector. This can be DC power from a DC power plant or it can be 24 VDC from the optional WT-3 plug-in transformer. For UPS installations the Site Controller should be powered from the WT-3 or other DC source. The WT-3 should be plugged into an outlet that is backed up by the UPS. Never power the Site Controller from UPS batteries. There is a power input fuse inside the Site Controller. It is extremely rare for this fuse to blow.

The power supply input is floating on the SC3 Site Controller. To ground the Site Controller connect the center ground pin on the power connector to an earth ground.

5.2. Network Connections

Connect the rear panel Ethernet connector to the network through a hub or switch. On a managed switch, make sure that the switch port has been enabled.

Set the IP Address of the Site Controller as described in the following section.

Verify network communications by accessing the Web page and telnet setup menu over the network.

5.3. Connecting Battery Sensors

Connect the cable from the battery sensor daisy-chain to an available "BATTERY STRINGS" connector on the Site Controller rear panel.



NOTE: We strongly recommend that you order the appropriate Cable Kit for each string and not make your own sensor cables. A single improperly made cable can destroy an entire string of sensors.

The site controller will begin to auto-discover the sensors connected in each of the daisy-chains. You will notice the String LEDs on the front panel flashing in sequence left to right. This indicates that the controller is polling each string and looking for sensors on that string. Once a string has been discovered it will be visible in the Web page.

5.4. Connecting RIMs and ROMs

RIMs and ROMS are connected to one of the P-BUS connectors on the rear of the Site Controller using CAT-5 cables. Up to 200 feet of cable can be connected each of the two P-BUS ports. Up to 4 RIMs and 4 ROMs can be connected to each P-Bus port, for a total of 8 RIMs and 8 ROMs. Refer to the RIM and ROM installation manual for information on mounting and configuring the RIM and ROM.

5.5. Connecting Current Sensors



Up to 6 Current Measurement Interfaces (CMI) can be daisy-chained and connected to P-BUS port A via a standard CAT5 cable (straight through). These 6 units correspond to the 6 strings. Each CMI must be set to a unique address, from 1 to 6. The Addresses correspond to the 6 strings. For example; current measurements made on CMI address 2 are displayed with

string 2.

5.6. Setting the IP Address

In order to communicate over the network, the Site Controller 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 Site Controller based on the Site Controller MAC Address. The MAC address is printed on the Site Controller 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 Site Controller resets or the DHCP server decides there is a reason to change the address.
- You can program a static IP address in the Site Controller using a temporary connection to a router with a built-in DHCP server and the Site Controller Telnet configuration port.
- You can program a static IP address in the Site Controller directly using the USB interface and a PC as described in the next section.
- You can program a static IP address in the Site Controller using an Ethernet 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 sub net mask that will work on your network.

The Site Controller is shipped from the factory configured to obtain an IP address automatically from a DHCP server.

5.7. Configuring the Site Controller

The Site Controller can be configured over the network through a telnet connection or through a USB connection directly from a PC. Support of telnet is a standard part of Windows so virtually any PC can configure the Site Controller.



NOTE: For Windows Vista, Windows 7, and Windows 8 telnet is disabled by default. To enable, go to Add/Remove Programs, Turn Windows Features On or Off, and check the box next to Telnet Client.

There are several ways of connecting your PC to the Site Controller to access the configuration program.

5.7.1. Direct USB Connection

This method can always be used to connect a laptop or computer directly to the Site Controller, and is required when provisioning the Site Controller from a laptop or if the controller has been programmed with an unknown static IP Address.

The Site Controller is equipped with a USB interface that allows a PC to be connected to the Site Controller through a USB cable to access the configuration program. A PC with a USB Port, a serial communications program such as HyperTerminal, Tera Term, or Putty is required. The USB cable is provided with the Site Controller.

NOTE: HyperTerminal which has been part of Microsoft Windows since the beginning is no longer included with Microsoft Vista or Windows 7. HyperTerminal can be downloaded from the internet and added to these systems. There are many other terminal programs available on the internet that will work. We recommend Tera Term which can be downloaded for free at http://www.ayera.com/teraterm/. Be sure to comply with all licensing requirements.

A USB driver may be required for your PC to connect to the Site Controller. The USB driver is located on the USB flash drive that is plugged into the Site Controller.

Before connecting the Site Controller to your PC, download this driver to you desktop. Apply power to the Site Controller and connect the USB3 port on the Site Controller front panel to your PC using the cable provided. A flashing red LED next to USB3 indicated the USB connection has not been established. The USB installation should begin shortly. When the wizard asks for the location of the driver, point to your desktop. The LED next to USB3 will light green when the USB interface has initialized.

5.7.2. USB Port Selection

To connect to the Site Controller with your serial communications program you will need to identify which COM port is being used for the USB serial communications.

- 1. Open the PC's "Control Panel" and click on the "System" icon.
- 2. Select the "Hardware" tab and click the "Device Manager" button.
- Navigate down the tree of Devices and expand the "Ports (COM & LPT)" item.
- Find the item labeled "Site Controller Com Port (COM#)". The Com Port that was installed on is shown in the parenthesis (COM7 in the example).
- 5. To change the Port, right-click the Device and select
 "Properties". Select the "Port Settings" tab and click on the
 "Advanced" button. A new Port # may now be selected and applied from the "Advanced Settings" Window.



When configuring your Serial Communications program use the COM port number identified above. If you program only supports low number COM ports, change the port number as described in step 5.

5.8. Accessing the Setup Menu

To access the Site Controller setup menu connect the Serial Communications program to the Site Controller using the USB interface as described above. Confirm that the USB connection has been established by looking for the green LED next to USB3. Open the Serial Communications program, select the COM Port identified above, and set the date rate to 9600, 8 data bits, one stop bit, no parity, and no flow control. When the program is configured properly the USB3 LED should flash off when you type on the keyboard.

Hold down the x (lower case) for about 15 seconds. The USB3 LED on the Site Controller will rapidly flash while you are holding down the x key. A message "-- Device Reset, hold 'x' key down until prompted. --", will appear. Continue to hold the x key until the setup menu appears and then follow the setup instructions below.

5.8.1. Ethernet Crossover Cable Method

This method can be used when the Site Controller IP address is set to a known static IP address. Connect an Ethernet Straight through or Crossover cable between the PC and the Site Controller. Set your PC IP address to the Site Controller Address + or -1. Set the gateway of the controller to the laptop's IP address and the laptop's gateway to the controller's IP address. Follow the telnet setup instructions below.

5.8.2. Router Method

This method can be used when the Site Controller is set for DHCP operation (Factory Default). Connect the Site Controller to a router that supports DHCP. This is generally done with a router designed for home use but this process can also be used with most commercial routers and DHCP servers if the proper access is available. The DHCP server will automatically assign an IP address to the Site Controller which will enable network access to the Site Controller for configuration. Your router should have a built in Web Server or some other method of determining what IP address was assigned to the Site Controller (refer to the router manual). Once the IP Address is known the Site Controller can be configured through a telnet connection as described below.

5.8.3. Running the Site Controller Telnet Setup



To open a telnet connection to the Site Controller select "Run" from the Windows Start menu. Enter "telnet" followed by a space, then the IP address of the Site Controller followed by a space, and then the port number "9999" followed by "Enter". If the Site Controller is online and the telnet password is enabled the following screen will be displayed. If the telnet password is not enabled, skip to the next step. Note that the screens in this document may be slightly different than your Site Controller screens. The Site Controller will not ask for the password when using the direct USB connection.



5.9. Site Controller Setup Menu

Putty 192.168.0.18 - Putty - 0 - X mtuSize 1000 SnmpTimer 7200 Sec. SnmpMessageCount 164 Seconds since the time Received from DNP3 Master 4,817 *** basic parameters Hardware: Ethernet IP addr - 0.0.0.0/DHCP/BOOTP/AutoIP, no gateway set DHCP device name : not set SNMP Enabled SNMP Community String, Set: public, Get: public, Trap: public Trap Receivers: 1: --- not set --- 2: --- not set --- 3: -Reset after 2 hours with no SNMP Messages: Disabled 3: --- not set ---TFTP Enabled TELNET Enabled TELNET DEBUG Enabled WEB Server Enabled Remote Log File Access Enabled DNP3 Enabled DNP3 Master IP Address 192.168.000.005 DNP3 TCP Port 20000, Master UDP Port 20000, Outstation UDP port 20000 Master DNP3 Address 0, Outstation DNP3 Address 1 UDP IP Addresses must match master IP Address above UDP responses will be sent to the port specified in the UDP message. Use DNP3 Time. Unsolicited Responses Disabled. Unsolicited Response Retries: 5 Unsolicited Response Timeout (mS): 1000 Mail Enabled SMTP Server: Resolved Server IP: 0.0.0.0 Name: Password: To Addr 1: To Addr 2: To Addr 3: From Addr: DNS, Primary: 004.002.002.002, Secondary: --- not set ---09 Jan 2014 09:52:47 0 Server Setup 1 Password Setup 3 SNMP Setup 4 HMS defaults 5 Email Setup 6 NTP Setup 7 Restore factory defaults and reset 8 Exit without resetting 9 Save changes and reset 13 Erase String and Battery Database 14 Reset All Sensors 15 Erase String 16 Erase RIM/ROM Flash 18 Reset Logging PIC 19 Setup Firmware Server 21 Erase Virtual Strings 40 Load Setup File 50 Site Controller Setup 93 DNP3 Setup 94 Remote Log File Access Setup 95 WEB Setup 96 DEBUG Setup 97 TELNET Setup 98 TFTP Setup System Information ?

Enter the password. You only have a few seconds before the session times out. If the password is accepted the following screen will be displayed, if the password is not accepted the telnet session will be terminated.

Type "Enter", to display the setup menu shown in the next section. For security purposes, if "Enter" is not typed in a few seconds the telnet session will be terminated by the Site Controller.

No matter what method of access was used the Setup Menu will then be displayed as shown below. These screen shots were made with a telnet client but they will look the same in a serial program.

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 Site Controller. To avoid resetting the Site Controller, exit by pressing "8" followed by "Enter".



5.9.1. 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. (Factory Default)

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.

P 192.168.0.18 - PuTTY	
93 DNP3 Setup	
94 Remote Log File Access Setup	
95 WEB Setup	
96 DEBUG Setup	
97 TELNET Setup	
98 TFTP Setup	
99 System Information	
2 0	
IP Address : (000)	*

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 0. To change the octet, type the new number followed by "Enter". To move on without making any changes, just type "Enter".

_		
P	192.168.0.18 - PuTTY	
93	DNP3 Setup	*
94	Remote Log File Access Setup	
95	WEB Setup	
96	DEBUG Setup	
97	TELNET Setup	
98	TFTP Setup	
99	System Information	
? 0		
IP	Address : (000) 192.(000)	-
-		

🛃 192.168.0.18 - PuTTY	
93 DNP3 Setup	
94 Remote Log File Access Setup	
95 WEB Setup	
96 DEBUG Setup	
97 TELNET Setup	
98 TFTP Setup	
99 System Information	
? O	
_	
IP Address : (000) 192.(000) 168.(000) 0.(000) 18	*

₽ 192.168.0.18 - PuTTY	
95 WEB Setup	*
96 DEBUG Setup	
97 TELNET Setup	
98 TFTP Setup	
99 System Information	
2 0	
IP Address : (000) 192.(000) 168.(000) 0.(000) 18	
Set Gateway IP Address (N) ? Y	
Gateway IP Address : (000)	-

In this example the first octet of the IP address was changed to 192.

Continue entering each octet of the IP address until all 4 octets have been entered. To skip any entry without making any changes type "Enter" without typing any numbers.

Next the Site Controller will ask if you would like to set the Gateway IP Address. The Gateway address is required for the Site Controller to initiate communications with other devices on the network; such as the time or email servers. This address is obtained automatically when running with DHCP, however when a static IP address is assigned to the Site Controller 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, type an "N".

The Site Controller will now ask for the Network Mask. To change the mask, enter the number of bits

🚰 192.168.0.18 - PuTTY	- 0 X
96 DEBUG Setup	*
97 TELNET Setup	
98 TFTP Setup	
99 System Information	
? O	
IP Address : (000) 192.(000) 168.(000) 0.(000) 18	
Set Gateway IP Address (N) ? Y	
Gateway IP Address : (000) 192.(000) 168.(000) 0.(000) 1	
Netmask: Number of Bits for Host Part (0=default) (0) 8	-

required for the local host. Example; for 255.255.255.0 enter 8, for 255.255.252.0 enter 10. Verify the Net Mask 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 Net Masks.

Next the Site Controller 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 Site Controller must accessed using the USB cable 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 just hit enter at the prompt.

Value	Net Mask
2	255.255.255.252
3	255.255.255.248
4	255.255.255.240
5	255.255.255.224
6	255.255.255.192
7	255.255.255.128
8	255.255.255.0
9	255.255.254.0
10	255.255.252.0

🛃 192.168.0.18 - PuTTY	
97 TELNET Setup	*
98 TFTP Setup	
99 System Information	
? 0	
IP Address : (000) 192.(000) 168.(000) 0.(000) 18	
Set Gateway IP Address (N) ? Y	
Gateway IP Address : (000) 192.(000) 168.(000) 0.(000) 1	
Netmask: Number of Bits for Host Part (O=default) (0) 8	
Change telnet config password (N) ?	-

Finally the Site Controller will ask if you would like to change the DHCP device name. We recommend that you do not change this setting. Type "Enter" to return to the menu. This prompt may or may not display depending upon configuration.

8	192.168.0.18 - PuTTY	
50	Site Controller Setup	*
93	DNP3 Setup	
94	Remote Log File Access Setup	
95	WEB Setup	
96	DEBUG Setup	
97	TELNET Setup	
98	TFTP Setup	
99	System Information	
2 1	9	-
_	-	

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 Site Controller will reset.

5.9.2. Password Setup (1)

P 192.168.0.18 - PuTTY	
94 Remote Log File Access Setup	*
95 WEB Setup	
96 DEBUG Setup	
97 TELNET Setup	
98 TFTP Setup	
99 System Information	
? 1	
CAUTION - If a password is entered incorrectly,	
you may have to visit the site to correct it!	
Change Telnet Password? (Y/N)	-

To change the Passwords used for Telnet and the Web Page access type "1" followed by "Enter". The first option will be to change the Telnet password. A nine character password can be selected to secure telnet access to the Agent. This Telnet password will override any Telnet

password that was programmed during the server setup (option "0"). Use caution when selecting a password. If you forget the password or enter it incorrectly the Site Controller must accessed using the USB cable 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 just hit enter at the prompt.

P 192.168.0.18 - PuTTY	
98 TFTP Setup	
99 System Information	
? 1	
CAUTION - If a password is entered incorrectly,	
you may have to visit the site to correct it!	
Change Telnet Password? (Y/N)N	
Change Web Passwords? (Y/N)Y	
Web Password 1: user	
Web Password 2: admin	*

Next you have the option of changing the Web Passwords. To change the Web passwords type "Y". There are two Web passwords, Web password 1 is for user access that will allow the operator to only 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 20 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. Type "8" followed by "Enter" to close the telnet session without resetting the Site Controller.

5.9.3. SNMP Setup (3)

The SNMP Community Strings and Trap destinations are configured from the SNMP Setup.

Putty 192.168.0.18 - Putty	
0.2 DVID2 C-DVD	*
as DNPS Setup	
94 Remote Log File Access Setup	
9! Setup	
9 G Setup	
97 TELET Setup	
98 TFTP Setup	
99 System Information	
2.3	
Disable SNMP? (Y or N) (N) ?	*
🚱 192.168.0.18 - PuTTY	- 0 - X
P 192.168.0.18 - PuTTY	
99 System Information 2 3	
P 192.168.0.18 - PuTTY 99 System Information 2 3 Disable SNMP2 (Y or N) (N) 2 N	
P 192.168.0.18 - PuTTY 99 System Information ? 3 Disable SNMP? (Y or N) (N) ? N	
<pre> # 192.168.0.18 - PuTTY 99 System Information ? 3 Disable SNMP? (Y or N) (N) ? N SNMP Enabled </pre>	
<pre>9 System Information 7 3 Disable SNMP? (Y or N) (N) ? N SNMP Enabled Sst Comunity (nublic): NewSetString</pre>	
<pre>P 192.168.0.18 - PuTTY 99 System Information ? 3 Disable SNMP? (Y or N) (N) ? N SNMP Enabled Set Community (public): NewSetString</pre>	
<pre> # 192.168.0.18 - PuTTY 99 System Information ? 3 Disable SNMP? (Y or N) (N) ? N SNMP Enabled Set Community (public): NewSetString Get Community (public): NewSetString</pre>	
<pre> # 192.168.0.18 - PuTTY 99 System Information ? 3 Disable SNMP? (Y or N) (N) ? N SNMP Enabled Set Community (public): NewSetString Get Community (public): NewGetString</pre>	

To configure SNMP on the site controller type "3" followed by "Enter". If SNMP is enabled you will have the option to disable SNMP which will close UDP ports 161 and 162 on the site controller. If SNMP is disabled on the controller you will be prompted to enable SNMP which will open ports 161 and 162 on the site controller. The default community strings are set to "public". If SNMP is enabled then you will 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 followed by "Enter". To move to the next item without changing the community string just type "Enter".

NOTE: Community strings are case sensitive.

After setting the community strings you have the option of setting up to 3 trap receivers. The IP addresses

_ 0 <mark>_ X</mark> Putty 192.168.0.18 - Putty Set Community (public): NewSetString Get Community (public): NewGetString Trap Community (public): NewTrapString Trap Receivers: 1: (000) 192.(000) 168.(000) 0.(000) 25 2: (000) . (000) . (000) . (000) 3: (000) . (000) . (000) . (000)

of the Trap destinations are set similar to the IP address described above. To disable sending Traps to any of the three IP address enter zeros for the IP address.

The Site Controller includes a feature that will reset the device if a SNMP message is

not received for approximately 2 hours. This safety feature is primarily used when the device is located in a remote unmanned location. If the SNMP firmware 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".

🛃 192.168.0.18 - PuTTY	
Get Community (public): NewGetString	*
Trap Community (public): NewTrapString	
Trap Receivers:	
1: (000) 192.(000) 168.(000) 0.(000) 25	
2: (000) .(000) .(000) .(000)	
3: (000) .(000) .(000) .(000)	
Enable 'Reset after 2 hours with no SNMP Messages'? (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.

5.9.4. HMS Defaults (4)

To restore the factory default settings for all SNMP objects, type a "4" followed by "Enter". The Email, NTP, Gateway, Net Mask, and IP Address will not be changed. The telnet session will be closed and the Site Controller will be reset.

5.9.5. Email Setup (5)

The Email system will mail alarm messages to a maximum of 3 email addresses.

🛃 192.168.0.18 - PuTTY	
	*
93 DNP3 Setup	
94 Remote Log File Access Setup	
95 WEB Setup	
96 DEBUG Setup	
97 TELNET Setup	
98 TFTP Setup	
99 System Information	
? 5	
Disable Email? (Y or N) (N) ?	-
Putty 192.168.0.18 - Putty	
97 TELNET Setup	
98 TFTP Setup	
98 TFTP Setup 99 System Information	
98 TFTP Setup 99 System Information ? 5	
98 TFTP Setup 99 System Information ? 5 Disable Email? (Y or N) (N) ? N	
98 TFTP Setup 99 System Information ? 5 Disable Email? (Y or N) (N) ? N Email Enabled	
98 TFTP Setup 99 System Information ? 5 Disable Email? (Y or N) (N) ? N Email Enabled SMTP Server Name (): smtp.phoenixbroadband.com	

To setup the Email system, type a "5" followed by "Enter" from the setup main menu. If the mail server is enabled you will have the option of disabling it (SC3B-XL only) which will close TCP port 25 on the site controller. If the mail server is disabled you will have the option of enabling it which will open TCP port 25 on the site controller. Enter the outgoing Email server name. If there is no server name the email system is disabled. If a server name was previously entered it will be shown. To change the server name

just 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.

If your server requires a user name and password enter the user name followed by "Enter". If the user name is left blank the Site Controller will not send the user name and password to the mail server. To keep the present name type "Enter".

P 192.168.0.18 - PuTTY	
Server Password (): password	
Address 1 (): alarms@alarmtest.com	
Address 2 ():	
Address 3 ():	
From Addr (): phoenix@phoenixbroadband.com	-

Now enter the server password followed by "Enter".

Up to 3 Email address may now be entered. The address are changed the same as the server name. Next enter the From Address. This is the address that will show up in the Email 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 Email.

🛃 192.168.0.18 - PuTTY	
Address 1 (): alarms@alarmtest.com	•
Address 2 ():	
Address 3 ():	
From Addr (): phoenix@phoenixbroadband.com	
Primary DN5: (004) .(002) .(002) .(002) Secondary DNS: (000) .(000) .(000) .(000)	

Finally set the Domain Name Server (DNS) IP address. The DNS allows the Email application to obtain the IP address of the specified server so it can send the mail. There are fields for a primary and secondary DNS. The IP Addresses are set as described in the IP Address section of

this document. The default is a commonly used DNS (4.2.2.2). Change this to your local DNS if you prefer. As long as the Site Controller can see the internet the default DNS will work. If the DNS IP addresses are set to zeros, the Email will be disabled.

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 Site Controller will reset.

5.9.6. NTP Setup (6)

The Site Controller can set its internal clock from any internet time server that supports Network Time Protocol (NTP). There are many such servers around the world. Many of these servers are operated by government standards organizations. Most private networks also have time servers.

The Site Controller is shipped with the NTP configuration set to get the time from two different US National Institute of Standards (NIST) time servers. The IP addresses of these servers can be changed in the NTP Configuration. If the time server addresses are not configured or the Site Controller is unable to contact either time server the Site Controller will initialize the time to 00:00:00 1/1/2008. If communications is not established with a time server the internal clock will run from this point.

The time provided by most time servers is Greenwich Mean Time (GMT). The Site Controller will convert this to Local Time using a time offset that can be entered in the NTP Configuration.



To configure the NTP select option 6 from the Configuration Main Menu. Enter the IP addresses as described in the IP Address section of this manual. There are two Time Server addresses. The Site Controller will use the primary server unless it fails to respond and then it will

switch to the secondary. It will not switch back unless the secondary server fails to respond or the Site Controller is reset. To change a default Time Server IP Address to undefined, enter zeros for the IP address.

The Site Controller will reset itself if there is no communications with either time server for approximately 2 hours. To disable the reset function enter zero for all 4 octets of the primary time server IP address, or when prompted "NTP Reset Enabled? [Y/N], enter "N". The Site Controller will use the secondary Time Server to set the time if the second IP address is valid.

Time Offset	Time	Time
from GMT	Zone	Offset
12	NZST	720
11		660
10	GST	600
9	JST	540
8	CCT	480
7		420
6		360
5.5	IST	330
5		300
4		240
3	BT	180
2	EET	120
1	CET	60
0	GMT	0
-1	WAT	65476
-2	AT	65416

-3		65356
-4	AST	65296
-5	EST	65236
-6	CST	65176
-7	MST	65116
-8	PST	65056
-9	YST	64996
-10	AHST	64936
-11	NT	64876
-12	IDLW	64816

The time read from the time server is GMT. There is an option in the NTP Setup to enter a time offset to correct the time to read local time. If the time offset is positive, east of the UK, simply enter the offset in minutes. If the time offset is negative, west of the UK, the offset must be entered in 2's compliment form. To compute the value subtract the time offset in minutes from 65536 and enter the result. For example the offset to Eastern Daylight time is 4 hours. 65536 - 240 = 65296. Enter 65296 as the time offset for Eastern Daylight time. The table to the left contains the offset value for each

major time zone.

To save your changes, type "9" from the menu and hit "Enter". The changes will be saved in nonvolatile memory, the telnet session will be terminated, and the Site Controller will reset.

5.9.7. Restore Factory Defaults and Reset (7)

To restore the factory default settings type a 7. All SNMP, Email, NTP, and HMS values will be set to the factory defaults. The IP Address will not be changed, however the Gateway and Net Mask settings will be set to the factory default values.



NOTE: Be careful. Changing the Gateway and Net Mask settings could prevent communications with the Site Controller, requiring a site visit.

5.9.8. Exit Without Resetting (8)

Type "8" followed by an "Enter", to exit the setup program, close the telnet window without saving the changes to nonvolatile memory, and without resetting the Site Controller. Some changes will take effect (SNMP) others will not (Email).

5.9.9. Save Changes and Reset (9)

Type "9" followed by an "Enter", to save all changes to nonvolatile memory, close the telnet window, exit the setup program, and reset the Site Controller so all changes take effect.

5.9.10. Erase String and Battery Database (13)

Typing "13" followed by "Enter" will erase all of the String and Jar data from the Site Controller nonvolatile memory and then reset the Site Controller. All user entered data for the strings and jars including names and alarm setups will be lost. The other settings will not be changed.

5.9.11. Reset All Sensors (14)

Typing "14" followed by "Enter" will reset all the Sensors. The telnet session will remain open and no settings will be changed. The reset will force all of the sensors to be rediscovered.

5.9.12. Erase String (15)

Typing "15" followed by "Enter" will erase a specified string. You will be prompted for the string number. The telnet session will remain open and no settings will be changed.

5.9.13. Erase RIM/ROM Flash (16)

Typing "16" followed by "Enter" will erase the RIM and ROM database. All settings will be lost and the devices will no longer appear in the Web page or SNMP MIBs unless they are rediscovered. The telnet session will close and the Site Controller will reset.

5.9.14. Reset Logging PIC (18)

Typing "18" followed by "Enter" will reset the Logging PIC (processor). If the Site Controller is set up to log data and it is not writing to the flash drive then resetting the Logging PIC will return the Logging PIC to a known good state.

5.9.15. Setup Firmware Server (19)

Typing "19" followed by "Enter" will allow you to enter an IP address and port number of a Firmware Server. The IP Address should be set as described in the IP Address section of this document. If an IP address is entered for the Firmware Server then the Site Controller at random times will send the Firmware Server its IP address, Date/Time stamp, MAC Address, Unit Type and Firmware Version. This feature is used in conjunction with a dedicated Firmware Server to enable automatic updates of firmware and web pages to Phoenix Broadband units.

5.9.16. Erase Virtual Strings (21)

Typing "21" followed by "Enter" will erase all virtual strings on the controller.

5.9.17. Load Setup File (40)

Typing "40" followed by "Enter" will load the setup file.

5.9.18. Site Controller Setup (50) –XL controller only

Typing "50" followed by "Enter" will allow the user to configure special calibrations in the site controller. Only use this option at the request of a Phoenix Broadband employee and they will guide you through the process.

5.9.19. DNP3 Setup (93)

Typing "93" followed by "Enter" will allow the user to configure DNP3.

5.9.20. Remote Log File Access Setup (94) –XL controller only

Typing "94" followed by "Enter" will allow the user to enable or disable remote access to the log files located on the USB drive. If enabled TCP port 9995 will be open to the controller, if disabled then TCP port 9995 will be closed to the controller.

5.9.21. WEB Setup (95) -XL controller only

Typing "95" followed by "Enter" will allow the user to enable or disable both TCP Port 80 and UDP Port 30704.

5.9.22. DEBUG Setup (96) –XL controller only

Typing "96" followed by "Enter" will allow the user to enable or disable TCP Port 9998.

5.9.23. TELNET Setup (97) –XL controller only

Typing "97" followed by "Enter" will allow the user to enable or disable TCP Port 9999.

5.9.24. TFTP Setup (98)–XL controller only

Typing "98" followed by "Enter" will allow the user to enable or disable UDP Port 69. TFTP will be automatically enabled for one minute after reset.

5.9.25. System Information (99)

Typing "99" followed by "Enter" will list version, port and setup information.

5.10. Web Server

The Site Controller contains a Web Server that provides a complete set of Web Pages to observe and configure the Monitoring System from a Web Browser.

The Web Browser will load a Java applet from the Site Controller when the Web Page is opened. The applet is used to support the communications between the Web Browser on your PC and the Site Controller. For this to operate, the Java Runtime Environment (JRE) must be installed on your PC. This is a common function of many Web Sites so it is likely that the Java Runtime Environment is already loaded on your PC.

If you need to load the Java Runtime Environment go to the Sun Java Web Site at: <u>http://java.com/en/download/windows_automatic.jsp</u> and follow the directions to download and install the latest version of the JRE. This is a free download.

NOTE: The Site Controller web server has been tested to work with many versions of the Sun Java Runtime Environment. Versions of the Java Runtime Environment older than 1.4.2 may not function properly. Most newer versions appear to work properly but occasionally a version may have a bug that inhibits some feature. Contact PBT if you suspect an incompatibility.

To check which version you are using on your PC open Microsoft Internet Explorer and select Tools -> Internet Options -> Advanced. Scroll down to the line that displays Java (Sun). The version number of the Java Runtime environment installed on your PC will be shown. If this line is not present the Sun Java Runtime Environment is not installed on your PC.

5.10.1. Accessing the Web Server

To access the Site Controller Web page type: the IP address of the controller into the browser URL.

5.10.2. Ports

The Site Controller Web server uses Ports 80 and 30704 to receive requests from the PC. The ports on the PC are selected automatically. Port 80 is the normal HTTP port. Port 30704 is used by the Java applet to get data from the Site Controller for the real time screen updates.

The transaction goes something like this; When the Web browser is opened the PC assigns an outgoing port X and sends a request to port 80 on the Site Controller. The Site Controller replies with a response to the PC sent to port X. The java applet opens a connection on PC port Y to request the real time data and sends this request to Site Controller port 30704. The Site Controller responds to PC port Y with the requested data.

Both ports X and Y are selected by the PC. These ports may be mapped to other ports by routers in the communication path. This does not cause any problems since the Site Controller always responds to the port specified in the request.

If the Web page draws but the applet is unable to connect to the Site Controller chances are good that port 30704 is being blocked by a firewall or router. This could be on your PC or somewhere in the network. Consult with your IT people to find the problem. Also, for Windows 7 and 8 make sure the java security setting is set to medium in newer versions of java.

6. Navigating the Web Pages

NOTE: The site controller web page uses a java applet communicating on UDP port 30704 to deliver real time information. If you have trouble viewing the web page this port may be blocked, contact your IT department.

Phoenix Battery Managerr ×		
← → C 🖍 🗋 192.168.0.18		☆ =
Battery Monitoring System	Manual () Web Site	
Site Name: PBT-PA-BMS-SC3 Site Location: Default Site Location	Overview Display	
String Name	String Voltage String Status	
String 1 String 2 String 3 String 5 String 6	Solution Control Contro Control Control <t< th=""><th></th></t<>	
Admittance Measurement Interval: 24 Hours Site Setup RNMs and ROMs		Update Firmware
System Up Time: 0:07:03:03 D:H:M:S	Site Controller Time:	14:48:20 1-14-2014
Firmware Version: XP 06.2b5, PIC 1.6, LPIC 1.9	Site Controller MAC Address:	d4-0-d-0-4-2e
updated.	WERALLED DET DA DMC CC2 VI VILLA 2 25	14:48:21 1-14-2014
Copyrig	ht Phoenix Broadband Technologies, LLC 20. All Rights Reserved	12

The status of the batteries that are being monitored by a Site Controller can be viewed using any network-connected PC that has a web browser.

Type the IP address of the site controller in the browser's URL address space, for example "192.168.0.18". The controller will serve the intial web page which lists all battery strings discovered, their total string voltage and their status. On the bottom left hand corner of the web page you will see text which toggles between "Updated" and "Connected". This indicates normal operation, however, if you see the message "Trying to Connect" or "Unable To Connect" you may have problems with a firewall or

router blocking UDP port 30704. Contact your IT department for assistance.



The time displayed at the lower right of each web page is the PC time, not the Site Controller time.

6.1. Overview Display

From the initial web page the user can select any available string and view details.

The String buttons on this page are color coded to indicate the String status. Normal status is indicated by gray, red indicates a major alarm, yellow indicates a minor alarm, green indicates an admittance measurement is in process on the string, and magenta indicates a warning condition.

Site Name: PBT-PA-BMS-SC3			
Site Location: Default Site Location			
	Overview Disp	lay	
Site Controller Initializing			
String Name	String Voltage	String Status	
String 1 String 1	S 26.5 VDC	Normal	
String 2	S 0.0 VDC	Not Connected	
String 3	S 0.0 VDC	Not Connected	
String 4	S 0.0 VDC	Not Connected	
String 5	S 0.0 VDC	Not Connected	
String 6	S 0.0 VDC	Not Connected	
Admittance Measurement Interval: 24 I	lours		
Site Setup RIMs and ROM	s		Update Firmware
System Up Time: 0:00:01:42 D:H:M:S	Site Control	ler Time: 7:56:57 1	-16-2014
Firmware Version: XP 06.2b5, PIC 1.6, LF	PIC 1.9 Site Control	ler MAC Address: d4-0-d-0-	4-2e
Connected.			7:57:1 1-16-2014

When the Site Controller starts, the previous string configuration is loaded from the database. This configuration will be updated as new strings or jars are discovered. During the Site Controller initialization a message "Site Controller Initializing" will appear. While this message is present the Site Controller is checking for new sensors and collecting data (including admittance measurements) for all sensors.

Alarm checking and SNMP communications are disabled until initialization is complete and the message disappears, to prevent alarming or reporting erroneous readings.

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

Pressing the RIM/ROM button brings up RIM and ROM main page which is described later in this document. This button is color coded with the RIM and ROM alarm status.

The Update Firmware button is used to load new firmware into various system components. This capability is currently available for battery sensors and the float current sensor and is under development for other system components. Consult PBT for the latest information on availability of this feature.

System Up Time is the time the Site Controller has been running since the last reset.

6.2. Single String Display

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The Single String Display lists all jars associated with a string. Each string can be given its own name which is displayed near the top of the page.

This page will display up to 40 jars. For each jar present in the string the jar voltage and admittance change is displayed. The admittance change field will indicate "undefined" until the initial cell admittance has been set in the Jar Setup Display. If no admittance baseline is set the controller will display absolute values in the Admittance column. If the baseline is set the display will be a "delta" sign with the percentage or measured difference from the baseline.

Site Name: PBT-PA	-BMS-SC3	Single	String Display, St String 1	tring 1	Return to Overview Display Next String ->
Voltage,	Admittance	Voltage,	Admittance		
Cell 1 2.214 VDC,	Δ -9% Cell 1	2.224 VDC,	Δ -11 %		
Cell 2 2.211 VDC,	Δ -8 % Cell 1	2.173 VDC,	Δ-7%		
> Cell 3 2.220 VDC,	Δ -17 %				
Cell 4 2.217 VDC,	Δ-18%				
Cell 5 2.223 VDC,	Δ -10 %				
Cell 6 2.217 VDC,					
Cell 7 2.208 VDC,	Δ-4%				
Cell 8 2.224 VDC,	Δ-4%				
Cell 9 2.220 VDC,	Δ-6%				
Cell 10 2.213 VDC,	Δ -12 %				
					UGM String Setup
A Discharge Status:	Normal Previous Ev	ent: 210 Sec	Current Sensor, Add	ress 1	
Discharge Events:	1 Total Time:	210 Sec	A Float Current:	1.092 Amp	A Com Status: Normal
String Status:	Sensor(s) Fault		A Discharge Currer	t: No Sensor	
A String Voltage:	26.6 VDC		A Ripple Current:	0.0 AC Amp	
A Cell Voltage Delta:	0.016 VDC	Log Now	Measured at:	10:46:50 1-15-2014	Measure Ripple Current
A Sensor Com:	Faulted Sensor(s)				
Updated.					10:48:38 1-15-2014

The button face on this page is color coded to indicate the jar status. Normal status is indicated by gray, red indicates a major alarm, yellow indicates a minor alarm, green indicates an admittance measurement is in process on the jar, and magenta indicates a warning condition and blue means the battery balancing is currently active on this jar or string.

Buttons will change from Cell, for a 2 volt cell, to Jar for a multi-cell jar. Press a Jar or Cell button to view the detailed information on the jar.

The Discharge Status indicator displays the present state to this string either "Normal" or Discharging". The discharge event is detected by the Float Current Sensor or by the discharge string voltage threshold if no float current module is present. A count of the Discharge Events and the duration of the Present (or Previous) Event and the Total discharge Time are also displayed. The event counter and total time are stored in nonvolatile memory and can be reset from SNMP or by deleting the string. Alarms may be provisioned for the Discharge Status by pressing the associated A button.

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

The String Status field displays the present string monitoring status which is a summary of the sensor status as described below.

String Status	Description
Normal	The status of all sensors on this string are Normal
Disabled	The string is disabled through SNMP
Shorted	The Site Controller output is shorted somewhere in the sensor daisy chain
MissingSensors	More sensors were expected
TooManySensors	More sensors are present than the string can handle
SensorFault	One or more sensors are not communicating
Alarms	One or more sensors have alarms
Initializing	The string is initializing
SensorDisabled	One or more sensors are disabled through SNMP
StringDisconnected	Nothing is connected to the Site Controller string port
NoSensorCom	Something is connected to the port, but no sensors are communicating

The String Voltage reading displays the total string voltage measured by the sensors. For a Low Voltage string this voltage is measured directly by the sensor on the most negative jar. For a High Voltage string this voltage is the sum of the individual jar voltages. Alarms may be provisioned for this voltage by pressing the associated A button. The operator can select either method by using Telnet menu item #50.

The Cell Voltage Delta reading displays the difference between the highest and lowest jar voltage. Too much variation in jar voltages could be an indication that there are problems with some jars. Alarms may be provisioned for this voltage by pressing the associated A button.

The Sensor Com indicator will display "Normal" when the Site Controller is communicating with all the battery sensors in the string and will display "Failed" when the Site Controller has lost communications with one or more battery sensors. Alarms may be provisioned for this indicator by pressing the associated A button.

The Current Sensor box will appear when there is a Current Monitoring Interface, with its address set to the string number, connected to the Site Controller P-Bus A port. If the Float Current Sensor is connected to the Interface the Float Current reading will be displayed. If the sensor is not connected the reading will display "No Sensor". Alarms may be provisioned for this current by pressing the associated A button.



If the Discharge Current Sensor is connected to the Interface the Discharge Current reading will be displayed. If the sensor is not connected the reading will display "No Sensor". Alarms may be provisioned for this current by pressing the associated A button.

If the Float Current Sensor is connected to the Interface the Ripple Current reading will be displayed. If the sensor is not connected the reading will display "No Sensor". Ripple current readings are made automatically once per hour or on demand by pressing the "Measure Ripple Current" button. Alarms may be provisioned for this current by pressing the associated A button.

The Com Status indicator will display "Normal" when the Site Controller is communicating with all the Current Monitoring Interface and will display "Failed" when the Site Controller has lost communications with the Current Monitoring Interface. Alarms may be provisioned for this indicator by pressing the associated A button.

Refer to the String Setup Display for other Current Sensor Interface setup options.

The String Current field in the lower right hand corner of the String display web page displays the string charge or discharge current in amperes. The discharge current field is for use with a current sensor that is in development.

Pressing the Previous String or Next String buttons will move to the previous or next string on this Site Controller. Pressing the Return to Overview Display button brings up the Overview Display.

6.3. Single Jar Display

This web page displays the measurements and control for a single Jar. Alarming parameters are color coded with red for major alarms and yellow for minor alarms.

A user definable Jar (or Cell) Name is displayed for each jar. Some operators use this field to identify the manufacturer and model number of the jar, or the installation date. The name may be modified by pressing the associated S button.

The Jar (or Cell) Voltage measured by the battery sensor is displayed. Measurements are made and report each time the sensor is polled. Alarms may be provisioned for this current by pressing the associated A button.

The Jar (or Cell) Temperature measured by the battery sensor is displayed. Measurements are made and report each time the sensor is polled. Alarms may be provisioned for this current by pressing the associated A button.

For multi-cell jars the Jar Admittance and Cell Admittance are displayed. For single cell jars only the Cell Admittance is displayed. Battery sensors actually measure the Jar admittance, which for single cell jars is the same as the cell admittance. The multi-cell Cell Admittance is calculated from the Jar Admittance. Measurements are made at intervals specified in the Site Setup Display. The time of the most recent measurement is also displayed.

Perhaps the most useful parameter is the Cell Admittance Change. This is the difference between the present Cell Admittance and the user specified Initial Cell Admittance expressed as a percentage. The cell admittance change provides an indication of how the jar has changed over time. The date and time of the admittance measurement and the initial admittance setting add a time perspective to the change. Alarms

Site Name: PBT-PA-BMS-SC3	Single Cell Display, String 1, Cell 1 String 1	Return to String Display
S Cell Name: S A Cell Voltage: 2 Jar Admittance: 1 Jai Admittance: 1 S Initial Cell Admittance: N A Cell Admittance Change: 1	tring 1, Cell 1 472 VDC 1 C, (69 F) Measured at: 16:59:0 1-20-2014 250 S A Electrolyte Level: Normal 250 S (uncal) Measured at: 16:12:19 1-20-2014 tot Set Set at: Not Set defined	Calibrate Electrolyte Level
Sensor Status: Norma Sensor Control State: Enable	S Sensor Address: 17190 Sensor Firmware Ver: 01.00 Sensor Hardware Ver: 06.1 d Sensor LED Control: Normal	
Measure Now	Flash LED	Log Now
Updated.		15:59:45 1-20-2014

may be provisioned for the change by pressing the associated A button.

If the battery sensor is equipped with the electrolyte level detection option the Electrolyte Level will be displayed as either "Normal", "Low" or "Sensor Not Connected". If the sensor is not equipped with this option the Electrolyte Level will not be displayed.

For High Voltage sensors only the Sensor Address is shown for sensor identification.

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

Sensor Status	Description
Normal	This sensor is operating normally
Fault	There is no communications with this sensor
Measuring	This sensor is making an admittance measurement
SensorDisabled	This sensor was disabled through SNMP
StringDisabled	This string was disabled through SNMP
Missing	This sensor was expected based on the string voltage, but is not present
MeasurementFailed	The last admittance measurement failed

Admittance measurements are normally made at a rate set by the Admittance Measurement Interval set in the Site Setup Display. Pressing 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 Site Controller 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. If the sensor responds with "pending" after an admittance measurement was made, it means the sensor did not provide a good reading to the controller.

Pressing the Flash LED button commands the battery sensor to flash its LED alternating between Red and Green. The Sensor LED Control indicator displays the state of the LED either "Normal" or "Flash Green/Red". Additional LED states can be set by the SNMP Manager. The flashing LED can help onsite personnel locate a jar in a large deployment. Depending on what the Site Controller is doing it may take a minute for the LED to start or stop flashing when the button is pressed.

The Sensor Firmware Version and Sensor Hardware Version are also shown on this page. These are needed when contacting PBT for support.

Pressing the Previous Jar or Next Jar buttons will move to the previous or next jar on this string. Pressing the Return to String Display button brings up the Single String Display.

6.4. Virtual Strings

There are two different types of virtual strings. The site controller has the capability to combine separate string inputs to create a virtual string. It can also split the sensors on one input into several virtual strings. The following sections describe in detail how to setup the different types of virtual strings.

6.4.1. Combine Strings

Site Name: PBT-PA-BMS-SC3		Return to Overview Display
Requires Site Controlle	r Reset	Return to Overview Dispidy
Change Site Name:	tual String Type?	Setup the Alarm Outputs
Yes Change Site Location:	No	Discover Sensors Now
Change Admittance Measurement Interval (Hours)	24	Set the Site Controller Time
Minimum Alarm Time (Sec): 0		Log Off
Conductance Meter Notes:		Reset All Sensors
Setup System Logging	r Setup Virtual Strings	Reset Local Port Controller
Flash Drive Status: Not Installed	O Disable Virtual Strings	Reset Logging Controller
Event Logging	Combine Strings	
O Disable	 Split Strings 	Flash the Modern Power
Enable	Enable Physical String Display	
Updated.		15:6:1 3-12-2014

The site controller has a limitation of 40 sensors for each of the 6 inputs (240 total). If your battery string contains more than 40 cells jars then you can attach the first 40 sensors to input 1 and attach any subsequent sensors (up to 40 at a time) to inputs 2 through 6. The combine feature only works with High Voltage sensors.

To enable Combine Strings, on the site controller Overview Display select Site Setup and then

select Combine Strings. You will receive a confirmation dialog asking if you are sure you want to change the string type, select Yes to continue. The site controller will now reconfigure the current string and battery database, convert internal memory mappings, and set up the proper log file system for the virtual string type. These operations may take a few minutes and the site controller will be unresponsive during this process. After the conversion is complete the site controller will reset and rediscover any sensors. When initialization is complete, reorder the sensor addresses for each physical string and reset the string before adding that string to the virtual string.

NOTE: Reorder the sensor addresses for each physical input string and reset the string before adding that string to the virtual string.

Site Name: PBT-PA-BMS-SC3			
Site Location: Default Site Location			
	Overview Display		
			String A 💌
Physical Strings String Name	String Voltage	String Status	Include String 1
String 1 String 1	S 12.8 VDC	Normal	Include String 2
String 2 String 2	S 12.7 VDC	Normal	Include String 3
String 3	S 0.0 VDC	Not Connected	Include String 4
String 4	S 0.0 VDC	Not Connected	Include String 5
String 5	S 0.0 VDC	Not Connected	Include String 6
String 6	S 0.0 VDC	Not Connected	Close
Virtual Strings Virtual String Name Vir	tual String Voltage	Virtual String Status	Included Phy Strings
String A Virtual String A	S 25.5 VDC	Normal	1, 2,
String B	S 0.0 VDC	Not Connected	
String C	S 0.0 VDC	Not Connected	
Admittance Measurement Interval: 24 Hours			
Site Setup RIMs and ROMs			Update Firmware
System Up Time: 20:2:10:21 D:H:M:S	Site Control	ller Time: 10:4:5	8 3-12-2014
Firmware Version: XP 05.3, PIC 1.6, LPIC 1.9	Site Control	ller MAC Address: d4-0-d	-0-4-2e
Updated.			11:5:0 3-12-2014

When all of the physical strings have been reordered and reset, then you can add them to the virtual string. To do this, go to the overview display and click on the Manage Virtual Strings button. There is a dropdown box where you can select Virtual String A, Virtual String B, or Virtual String C. When combining strings there is a limit of 3 virtual strings. After selecting which virtual string to add, then check

the box next to each physical input you want to include in the virtual string.

After selecting physical strings to include, press the close button. If monitoring float current or using an Unintentional Ground Monitor (UGM) go to the virtual string setup page by clicking on the S button from the Overview Display, and define each by setting the corresponding address.

Site Name: PBT-PA-BMS-SC3		Site Name: PE	T-PA-BMS-SC3	
Virtual	String Display, St			Virtua
<- Previous String	Virtual String A	<- Previous Str	ing	
Voltage, Admittance Voltage,	Admittance	Voltag	e, Admittance	Voltage,
S1-1 2.122 VDC, 1288 S S2-5 2.128 VDC,	1252 S	> Cell 1 2.122	VDC, 1288 S	Cell 11 2.128 VDC,
S1-2 2.120 VDC, 1297 S S2-6 2.113 VDC,	1306 S	Cell 2 2.120	VDC, 1297 S	Cell 12 2.113 VDC,
S1-3 2.122 VDC, 1195 S		Cell 3 2.122	VDC, 1195 S	
S1-4 2.128 VDC, 1167 S Enable	Physical String	Cell 4 2.128	VDC, 1167 S	
S1-5 2.129 VDC, 1272 Checked	d	Cell 5 2.129	VDC, 1272 S	
S1-6 2.126 VDC, 1119 S		Cell 6 2.126	VDC, 1119 S	
S2-1 2.114 VDC, 1309 S		Cell 7 2.114	VDC, 1309 S	
S2-2 2.126 VDC, 1333 S Enable I	Physical String	Cell 8 2.126	VDC, 1333 S	
S2-3 2.125 VDC, 1331 S Uncheck	ked —	Cell 9 2.125	VDC, 1331 S	
S2-4 2.116 VDC, 1250 S		Cell 10 2.116	VDC, 1250 S	
<- Previous 40 Jars		<- Previous 4	0 Jars	
A Discharge Status: Normal Previous Event: 0 Sec	Current Sensor, Add	A Discharge St	atus: Normal Pre	vious Event: 0 Sec
Discharge Events: 0 Total Time: 0 Sec	A Float Current:	Discharge Ev	ents: 0 Tota	al Time: 0 Sec
String Status: Normal	A Discharge Curren	String Status	Normal	
A String Voltage: 25.4 VDC	A Ripple Current:	A String Voltag	e: 25.4 VDC	
A Cell Voltage Delta: 0.016 VDC Log Now	Measured at:	A Cell Voltage I	elta: 0.015 VDC	Log Now
A Sensor Com: Normal		A Sensor Com:	Normal	
Updated.		Connected.		

Finally, the user can enable or disable the display of the physical strings. There is a checkbox for this in the Site Setup web page (refer to the first figure in section 6.4.1). If this box is checked then the physical strings will be available in the Overview Display, if this box is unchecked then the user will not be able to access the physical strings from the Overview Display. This also changes how the individual cells

are displayed on the Virtual String Display. In the figure above, with Enable Physical String checked the individual cells are marked by String number dash cell number, for example the first cell on the left is from String 1 – Cell 1 (S1-1 in the figure). With Enable Physical String unchecked (right side of figure) it displays the virtual string as Cell 1 through Cell X, or most negative cell to most positive cell depending on the user's polarity selection.

6.4.2. Split Strings

The site controller has a limitation of 40 sensors for each of the 6 inputs (240 total). Under normal operation each input is considered a separate battery string. It is possible to have more than 6 strings by splitting the sensors on one or more of the inputs. For example, if you have ten 24 volt battery strings (each string is made up of two 12 volt jars), then you can put all 20 battery sensors on the same input into the controller, and then split them into 10 virtual strings. The battery sensors must be the High Voltage type.



CAUTION! Only use High Voltage battery sensors when splitting strings. Using Low Voltage battery sensors will damage the sensors and may present a shock hazard. Read the sensor installation instructions carefully.



To enable Split Strings, on the site controller Overview Display select Site Setup and then select Split Strings. You will receive a confirmation dialog asking if you are sure you want to change the string type, select Yes to continue. The site controller will now reconfigure the current string and battery database, convert internal memory mappings, and set up the proper log file system for the virtual

string type. These operations may take a few minutes and the site controller will be unresponsive during this process. After the conversion is complete the site controller will reset and rediscover any sensors.

When initialization is complete, reorder the sensor addresses for each physical string and reset the string before dividing that string into virtual strings.



After reordering and resetting the string you must define how you want to split the string. On the site controller Overview Display click on Manage Virtual Strings, then select from the dropdown box which physical string to split, then type in the number of jars per substring and the number of substrings. These two numbers when multiplied should equal the total number of sensors on the string input. After clicking Save

Changes a confirmation dialog will appear, click Yes to save the changes. The site controller will assign the first (Jars per Substring) to Virtual String 1, then the next (Jars per Substring) to Virtual String 2, and so on until it reaches (Substrings in String 1). For this reason it is imperative that you first reorder and reset the string.



NOTE: Reorder the sensor addresses for each physical input string and reset the string before splitting that string into virtual strings.

When monitoring float current, only one virtual string per physical input will report float current. The current shows up on the first virtual substring.

6.5. RIM and ROM Main Display

Site Name:	PBT-PA-BMS-SC3		Return to Overview Display
	Remote	Agents	
RIM 1	Default Name, Port A - Addr 1	ROM 1	Default Name, Port A - Addr 1
RIM 2	Default Name, Port A - Addr 2	ROM 2	Default Name, Port A - Addr 2
RIM 3	Default Name, Port A - Addr 3	ROM 3	Default Name, Port A - Addr 3
RIM 4	Default Name, Port A - Addr 4	ROM 4	Default Name, Port A - Addr 4
_		ROM 5	Default Name, Port B - Addr 1
RIM 6	Default Name, Port B - Addr 2		_
	_,	ROM 7	Default Name, Port B - Addr 3
RIM 8	Default Name, Port B - Addr 4	ROM 8	Default Name, Port B - Addr 4
Undated			16:29:51 1-00-0014

Pressing the RIM/ROM button in the Overview Display brings up the RemoteAgents Display. This screen has a button for every RIM or ROM discovered by the Site Controller. When the Site Controller is reset the previous population of RIMs and ROMs is loaded from the database. Up to Eight RIMS and ROMS can be supported by the controller. Additional RIM and ROMs are discovered by the Site Controller

as they get added. Pressing a RIM or ROM button will bring up the RIM or ROM screen. There is a maximum of 8 RIMS and 8 ROMS that can be attached to the Site Controller.

The operation of the RIMs is described in the Remote Input Module Installation and Operation Manual (700-000016-00).

The operation of the ROM is described in the Remote Output Module Installation and Operation Manual (700- TBD - 00). The provisioning section of this manual describes how to configure the ROM contact closure outputs to operate on specific Site Controller alarms.



6.6. UGM Display SC3-XL only

The operation of the UGM is described in the UGM Installation and Operation Manual (700-000020-00).

6.7. Provisioning

The process of setting up all the thresholds, labels, and other software-configured settings is called "Provisioning". Provisioning can be accomplished remotely either via an SNMP-compliant application-specific software package, or via the site-controller's built-in web interface. While, provisioning via SNMP is complex without specialized software and is beyond the scope of this document, these devices have been designed to work with a variety of software packages.

Provisioning via the site-controller's built-in web page is comprehensive and easy. The user can specify custom labels for the site controller name, the site location, the name of each string, and the name or type of each jar. In addition, the user can set alarm thresholds for every monitored parameter, including individual alarm thresholds for each jar. Other user-generated parameters include the interval at which batteries will be tested and an initial "reference level' for measurements and alarm generation.

Site Name:	PBT-PA-BMS-SC3	Return to Overview Display
	Enter Password:	
Updated.		16:44:47 1-20-2014

User-defined settings via the web page are password protected so that only authorized personnel can change these settings. There are two levels of password. The default user password is "user". The default administrative password is "admin". Passwords are case sensitive and can be up to 19 characters in length. The passwords can be changed from the Telnet configuration port described earlier in this document.

Once a valid password has been entered the selected page will be displayed. The password will timeout if there is no activity for 10 minutes or if the Web Browser is closed.



In each of the web pages, any display field that has user-definable alarm settings associated with it will display a button with an A inside it next to the field. Fields with other settings will display a button with an S. Clicking on the button will display a web page with the settings.

6.7.1. Provisioning Site Settings

The configuration button for the site settings is located at the bottom left of the Overview Display. Clicking this button will cause the Site Setup Display to be displayed. If the password was not previously entered the password will be requested.



To change the Site Name or Site Location move the cursor to the field and type the new name or location. The change will be saved when the cursor is moved to a new field or a new Web page is selected.

To change the Admittance Measurement Interval for this Site Controller, enter the desired interval, in hours.

The Conductance Meter Notes

field provides a location to note the type and serial number of the meter used to make the reference measurements. This is useful since there is substantial variation in the measurements made by different model meters.

If the administrator password was entered additional buttons will appear. These buttons are for expert users only and are not required for normal operation.

Setup the Alarm Outputs will allow configuration of 3 built in outputs on the Site Controller.

The configuration of these outputs is identical to the ROM configuration; see section 6.7.7 of this manual for instructions. These outputs can be wired from the Aux port on the Site Controller to external devices that accept contact closure inputs. Refer to 705-000009-00 SC3 AUX Port Wiring Diagram for further information.

Discover Sensors Now will force the Site Controller into to discover any new sensors that have been connected. The Site Controller will periodically go and discover new sensors but pressing the button forces it to discover immediately.

Set the Site Controller Time will set the real time clock in the Site Controller to the PC time. This is intended to be used to set the real time clock in Site Controllers that do not have access to a time server. The time is set by sending GMT from the PC to the Site Controller and applying the time offset programmed in the Site Controller. This may not result in the Site Controller time being the same as the PC time, allowing the time to be set in Site Controllers that are not in the same time zone as the PC. If the Site Controller is able to access a time server the time sent from the PC will be overwritten when the time update occurs at approximately 10 minutes past the hour.

Log Off will log off the current user. After logging off and returning to the overview display you will again be prompted for a password when entering in any configuration page.

Reset All Sensors will reset the battery sensors on all of the strings. The database is unaffected. The sensors will be rediscovered on the next polling cycle.

Reset Local Port Controller will reset the microcontroller that is responsible for the local port and the real time clock.

Reset Logging Controller will reset the microcontroller that is responsible for the thumb drive and USB ports 2 and 4.

Flash the Modem Power will switch the power output off for a second and then back on again.

Setup System Logging will allow the user to enable or disable logging system events on the flash drive. There is also an indication of the flash drive status.

Setup Virtual Strings is described in detail in section 6.4 of this manual.

6.7.2. Provisioning String Settings

In the Overview Display there is an S button corresponding to each battery string. Pressing this button will display the following page:

Site Name: PBT-PA-BMS-SC3	Return	n to String Display	
<- Previous String String	ng Setup Display, String 1 String 1	Next String ->	
Set String Name	Current Sensor Setup, Address 1 Current Sensor Setup, Address	1 ★ Current Multiplier	
Equalize Enable String Polarity: Jar 1 is most negative	Zero the Float Current HW Ver: 1.1, FW Ver: 1.2	Undo Zero Set	
Setup String Logging Automatic Discharge Detection Flash Drive Status: Ready 0.0 Periodic Logging Discharge Logging Disable Discharge Status: Normal String Voltage: 12.9 VDC Discharge Status: Discharge			
• Daily	Measure Admittance on All Jars Reset Discharge Log Now Reset This String	e Time & Event Count	
Connected.	8:23	5:20 1-21-2014	

To change the String Name enter a new name and press one of the buttons to apply the name to this string or to all the strings.

Checking the Equalize Enable box will enable equalization on this string.

When the Site Controller discovers the sensors the jars are numbered with jar one being the most negative. If jar one should be the most positive jar push the

String Polarity Change button. A warning message will appear. Either accept the change or cancel.

If a Current Measurement Interface is present for this string the Current Sensor Setup box will appear. The polarity of either the Float Current Sensor or the Discharge Current Sensor can be reversed in case they were installed incorrectly. Pressing the Zero the Float Current button will zero the current sensor the same as pressing the button on the Current Sensor Interface. Pressing the Undo Zero Set button removes the zero calibration. The P-Bus Voltage is measured at the Current Sensor Interface. The voltage should be above 4.5 VDC. Lower voltages indicate that the P-Bus may be overloaded.

If the Measure Admittance on All Jars button is pressed, an admittance measurement will be made on all jars in this string.

If the Reset This String button is pressed a reset command will be sent to all sensors on this string. This will force the Site Controller to reinitialize and re-discover the sensors.

If the Delete This String button is pressed the string will be deleted from the Site Controller. All user settings for this string will be lost. If there are sensors connected to this string port on the Site Controller they will be reset and rediscovered.



NOTE: If a string is Deleted all user setting for the sensors on the string will be lost. This includes Names, Addresses, Alarm Settings, and Calibration Settings.

Pressing the Return to Overview Display button will return to the Site Overview page.

6.7.3. Provisioning Jar Settings

Pressing the S button in the Single Jar Display will produce the Jar Setup Display shown below.



NOTE: For High Voltage sensors reorder the jars as described below before entering any other jar specific information.

To change the Jar Name enter a new name and press one of the buttons to apply the name to this jar or to

Site Name: PBT-PA-BMS-SC3 Cell Setup Display, Virtual String A, Cell 1 <- Previous Cell Cell Name: String 1, Cell 1 Cell Name: String 1, Cell 1	Return to Single Jar Display Next Cell ->
Set Out Name Set This Jar Only String 1, Cell 1 Set Entire String Cell Admittance: 1314 S (uncal) Initial Cell Admittance: 0 S This Jar Only Entire String	rnysical suing 1, cen 1
Set Instrument Measured Cell Admittance O Calibrate This Jar Only Copy Calibration to Entire String Spurious Resistance: 0 µOhms Uncalibrated Delete This Jar	
Connected.	8:36:59 1-21-2014

all the jars on this string.

The Cell Admittance Change alarm requires the specification of an Initial Cell Admittance. This can be done in one of two ways. See 6.7.4.3

To use the present Cell Admittance reading as the Initial Cell Admittance press one of the buttons in the Copy Cell Admittance to Initial Cell Admittance group. Pressing the This Jar Only button will copy the

Cell Admittance to the Initial Cell Admittance for this jar. Pressing the Entire String button will copy the Cell Admittance to the Initial Cell Admittance for each jar in the string.

To use a specified value for the Initial Cell Admittance enter the value in the field in the Set Initial Cell Admittance group, then press on of the buttons. Pressing the Set This Jar Only button will copy the value entered to the Initial Cell Admittance for this jar. Pressing the Set Entire String button will copy the value entered to the Initial Cell Admittance for each jar in the string.



NOTE: Low Voltage sensors are automatically discovered in string order so the following process is not required. The Change Sensor Address field will not appear on the screen for Low Voltage sensors.

Each High Voltage sensors has a factory programmed address. These addresses are recorded during the discovery process that occurs when the Site Controller is powered on. The sensors are discovered in a random order and assigned sequentially to the jars. This results in the random ordering of the jars shown in the Web page. To correct this ordering problem start with jar 1 and change the address of the sensor to the addresses recorded during installation. To change the sensor address associated with this jar, enter the desired address in the Change Sensor Address field. Push the Tab key to record the change. The change will

be stored in nonvolatile memory so the next time the string is initialized the jars will still be in the correct order.

When all addresses have been changed reset the String or cycle the Site Controller power to reinitialize the sensors with the correct jar numbers. This should be done before entering any jar specific information such as alarm limits, initial admittance, or admittance calibration.

Because there is a limit of 40 sensors per string, when replacing a sensor it may be necessary to delete the old sensor to make room for the new sensor. To remove a sensor from the database, press the Delete This Jar button. The jar will be erased from nonvolatile memory and all user settings for the Jar will be lost. The delete button can also be used to remove any extra sensors that during reconfiguration of strings of less than 40 sensors. For example if a sensor address is typed incorrectly and later typed correctly you may have one extra sensor in the string. If so, delete the sensor with the incorrect sensor address.

6.7.4. Provisioning the Sensor Calibration

Instruments used to measure conductance or admittance can exhibit substantial variation between various manufacturers and models of instruments. This variation is due to the different techniques used to make the measurements and the different measurements actually made. Some instruments measure DC resistance, others measure AC impedance at various frequencies, still others measure the resistive component of the complex impedance at various frequencies. These factors combine to produce variations of as much as 20% between instruments.

In addition to these variations there is also significant variation due to the placement of the instrument probes on the jar terminals. This is particularly important on high admittance batteries. The admittance measurement made by the sensor without any calibration is accurate within 5%, however this measurement may not agree with a specific instrument because of the factors mentioned above.

6.7.4.1. Calibrating using an Instrument

The calibration process allows the monitoring sensor to be calibrated after installation using a one-time measurement from a precision portable measuring instrument. Once a monitoring sensor or transponder is installed on the equipment being monitored, reference measurements from the precision instrument are entered into the monitoring system, and any errors between the instrument and the sensor are subtracted before the result is displayed or reported. With calibration, an inexpensive monitoring system gains all the advantages of stability, repeatability, real-time-continuous data collection, and trend analysis, while retaining a measurement accuracy that is comparable to the expensive portable instrument.

When monitoring a high capacity jar with an impedance/admittance monitoring system, the sensor is required to measure jar equivalent resistances in the order of 100 micro ohms. The resistance of the point of contact between the sensor and the jar strap or lug is typically in the order of 35-75 micro ohms. In high capacity batteries this 'spurious' contact resistance can produce errors of 20% or more. In the PBT Battery Monitoring System, the calibration process essentially subtracts the spurious contact resistance from the total measured resistance, leaving a stable, reproducible, and accurate measurement of true jar admittance that can be analyzed and trended to allow pre-emptive maintenance. There are three software mechanisms that are used to calibrate the admittance measurement:

Sensor Factory Calibration

The Site Control Unit recognizes the type of sensor that is used to monitor a high-capacity jar. Whenever it receives a measurement from this type of sensor, it subtracts a small fixed resistance (typically about 35 micro-ohms) from the reading before converting it to admittance and displaying it.

String-Level On-Site Calibration

The installer can enter a user-defined constant into the Site Controller which will cause all the batteries in a given string to be corrected, in addition to the built-in factory correction.

Individual Jar Calibration

The installer can enter an instrument measured admittance into the Site Controller which will cause an individual jar to be corrected, in addition to the string-level constant and the built-in factory correction.

6.7.4.2. Setting the Calibration

Pressing the S button next to the Initial Cell Admittance label in the <u>Single Jar Display</u> screen causes the Jar Setup Display screen to appear as shown below. This screen allows users to make jar specific changes as described above.

The first step in the calibration process is to make sure the connection between the sensor and jar is clean. Then record admittance measurements for each jar from a known good instrument such as the "Midtronics



Ultra[™]. If there is a significant difference between the sensor readings and the readings made with the known good instrument, then the instrument reading can be entered in the Set Instrument Measured Cell Admittance field. Example: If the sensor reading indicates an admittance of 3500 and the instrument measured reading is 3600 the user can type the instrument measured value of 3600 into the Set Instrument

Measured Cell Admittance field. When the instrument measured reading is entered, the actual calculated Spurious Resistance value (represented in micro-ohms) will be displayed below the input field. The calibration can then apply this value to a single jar by pushing the Calibrate This Jar Only button or to the entire string by pushing the Copy Calibration to Entire String button.

To calibrate an Admittance reading it is necessary for the site controller to make a new Admittance measurement. When a Calibrate button is pressed a "Calibration Pending" message will appear in place of the "Uncalibrated" message shown in the screen above. Within a few minutes the measurement will be made and the "Calibration Complete, Reference Jar 5" message will appear. The reference jar is the jar where the calibration value was entered. The calculated spurious resistance will also be displayed. After

calibration the "(uncal)" indicator in this screen and others will disappear. The calibration information is saved in the Site Controller nonvolatile memory.

If the correction (for sensor connection) value is applied to the entire string the calculated Spurious Resistance value will be displayed when viewing each jar. If, after applying a value to a string, a few individual batteries still appear to be outside an acceptable range, you can go to the specific jar and enter a corrected baseline reading for that single jar.

6.7.4.3. Provisioning the Baseline

The baseline allows the admittance to be tracked based on an Initial Cell Admittance value. Once this value is established, admittance change alarms can be generated based on the percent change from the initial value. The following sections describe two ways of establishing the baseline.

6.7.4.4. Baselining using the Present Measurement

For new jars PBT recommends setting the baseline using the present admittance measurement as a reference. With this approach the Admittance Change field will report the difference between the present sensor reading and the reading when the jar was new. This is the simplest and most accurate way to set the baseline. This method also works with jars that are not new, however keep in mind that the reference was taken at an unknown point in the jar; life span.

6.7.4.5. Baselining using Manufacturer's Specifications

The baseline can also be set using the jar manufacturer's specified Admittance (or conductance) as the basis for the measured admittance value. Sometimes the manufacturer specifies a DC resistance or a short circuit current which allows the admittance to be calculated. Contact PBT if you need help with this. With this approach the Admittance Change field will report the difference between the present sensor reading and the manufacturer's specification. Keep in mind that the manufacturer's specified Admittance (or Conductance) is based on measurements made with an instrument and is subject to all of the variation factors listed above. In addition most Manufactures specify a +/- 20 % tolerance on their specified value.

6.7.4.6. Setting a Baseline



Pressing the S button next to the Initial Cell Admittance label in the Single Jar Display screen causes the Jar Setup Display screen to appear as shown below.

To set a baseline based on a specification, enter the baseline admittance reading into the Set Initial Cell Admittance field. Press either the Set This Jar Only button to set the baseline for this jar, or Set Entire String button to copy this baseline to the entire String. The value will appear in the Initial Cell Admittance field and the date and time will be recorded for reference. The Cell Admittance Change field in the <u>Single Jar Display</u> will be updated to show the difference between the Cell Admittance and the Initial Cell Admittance. To provision the alarms press the A button next to the Cell Admittance Change field.

To set a baseline based on the present admittance reading press either the This Jar Only button or the Entire String button in the Copy Cell Admittance to Initial Cell Admittance group. The Present Admittance Cell Admittance value will be copied to the Initial Cell Admittance value and the Cell Admittance Change field in the Single Jar Display will be updated to show the difference between the Cell Admittance and the Initial Cell Admittance.

6.7.5. Provisioning Analog Alarms

When the A button next to a measured parameter is pressed the <u>Analog Alarm Setup</u> screen shown below will appear. There are 4 Alarm Limits that can be set independently and an Alarm Enable check box for each alarm limit. When the enable box is checked, the alarm will occur when the Present Value crosses the Alarm Limit. In the example below there is a Minor Alarm because the Present Value is below the Minor Low Alarm Limit.

Site Hulle. PBT-FA-Sin-3-503	Return to Single Jar Display
Analog Alarm Setup	
String 1, Jar 1, Cell Admittance Change	
Major High Alarm Limit: 40 🗖 Alarm Enable Minor High Alarm Limit: 20 🗖 Alarm Enable	
Present Value: 2 % Minor Low Alarm Limit: 40 Ø Alarm Enable Major Low Alarm Limit:	
Deadband: 1	
lindated	8.59.21 2-27-2014

The Deadband setting provides hysteresis so the alarm does not chatter if the Present Value is right at the alarm limit. 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 minus the Deadband. Likewise for a Low alarms, the alarm will occur when the present Value is less than the Alarm Limit. The

alarm will clear when the Present Value is greater than the Low Alarm Limit plus the Deadband.

Minor and major alarms operate independently so as the Present Value moves a minor alarm will become a major alarm and vice versa.

Values in Yellow indicate a Minor alarm, Red indicates a Major alarm, and normal values are black.

All alarm settings are nonvolatile and will be saved in the Site Controller database.

SNMP Traps and/or Emails may be sent whenever the alarm state changes and when the alarm returns to the normal state. Refer to the Telnet Setup section of this manual for information on setting the Trap destinations and Email addresses.

6.7.6. Provisioning Discrete Alarms

Whenever the A button next to a discrete indicator is pressed the <u>Discrete Alarm Setup</u> display will be shown. A description of the indicator and the present state will be displayed. The present state will be color coded with the alarm status, red for Major, yellow for Minor, and black for no alarm. Use the radio buttons to select either the Disabled, Minor or Major alarm. For parameters that allow alarming on multiple states, this screen will have an alarm setting for each state.

All alarm settings are nonvolatile and will be saved in the Site Controller database.

SNMP Traps and/or Emails may be sent whenever the alarm state changes and when the alarm returns to the normal state. Refer to the Telnet Setup section of this manual for information on setting the Trap destinations and Email addresses.

String 1, Discharge Status Alarm Present Digital State: Normal Set Alarm	Site Marile. PD1-PA-DW3-3C3	Digital Al	arm Setup	Return to String Display
Copy Alarm Setup to All Strings	String 1, Discharge Status Alarm Present Digital State: Normal	Alarm • Disable • Minor • Major		
			Copy Alarm Setup to All	Strings

6.7.7. Using controller to provision alarm ROM outputs

The ROM can be configured to operate its outputs when specific Jar or String alarms occur. To configure these alarms presses the Setup button for the desired output on the ROM display. The screen shown below will appear. Assign an appropriate name to the output and the states as shown in the example below. Output state 1 will be the normal state, and state 2 will be the alarm state. When the alarm is detected the

Site Name: PBT-PA-BMS-SC3	Setup Output	Return to ROM Display
ROM 1, Output 1, Output Definations Set Output Name Battery Alarms Set Output State 2 Name Battery Alarm Set Output State 1 Name Battery Normal	ROM 1, Output 1, Output Control Select ROM Output Control Mode SNMP or Web Control Site Controller - Major Alarms Site Controller - Major & Minor Alarms Site Controller - Major & Minor Alarm Select Specific Site Controller Alarms- String Voltage Alarm String Discharge Current Alarm String Jar Voltage Delta Alarm String Discharge Alarm	IS ✓ Jar Voltage Alarm ✓ Jar Admittance Alarm ✓ Jar Temperature Alarm ✓ Jar Electrolyte Alarm
Updated.		10:56:54 3-13-2014

relay will switch to state 2. When the alarm clears the relay will switch to state 1.

Select the desired Output Control Mode. For the Site Controller to control the output select any of the three Site Controller Modes. In the example we have selected Site Controller – Major Alarms. In this mode only major alarms will activate the output. For normal operation of the output select SNMP or Web Control.

Next select the specific alarms that will operate this output. In the example shown Jar Voltage Alarms and Jar Admittance Alarms will trigger the output.

Any number of ROM outputs can be configured in this manner. Each ROM output can be programmed differently. See ROM manual 700-000016-00 Rev 2.

SNMP

The Phoenix Broadband Battery Monitoring System provides an SNMP interface for third party software management. The advantage of our approach is that it allows operators to choose the software with which they wish to use as opposed to being locked into one software offering. Many operators will have their own SNMP management software and will want to integrate the controller into their existing network management infrastructure. SNMP is a well-known communication protocol which provides a standard interface to different management software platforms.



Phoenix Broadband offers an Enterprise Class software package designed specifically for monitoring DC power plant and UPS back up batteries. The "Altilium" software platform is an SNMP manager which provides many features users will require, including a friendly web based user interface, friendly controller provisioning (labels and alarms, etc.), reporting tools, flexible notification plans and administration privileges.

Other commercially available SNMP managers such as NetCool or DataTrax could be used to manage the Site Controller.

Phoenix Broadband also offers a simple software tool that can be used to manage the Site Controllers. While not an Enterprise Class management system the Phoenix Lookout software provides a convenient tool to manage a small group of systems. Lookout is available at www.PhoenixBroadband.com/Lookout and is provided for free without a Warranty of any kind. Refer to the Lookout manual included with the download for additional details.

7.1. **MIBs**

All of the information presented on the Web pages and complete configuration capability is available from SNMP.

SNMP uses the standard UDP ports 161 and 162. If the device does not respond to SNMP Requests or does not appear to send Traps, confirm that these ports are not blocked.

The Site Controller uses a combination of standard and proprietary MIBs which can be found at http://www.PhoenixBroadband.com/Downloads/MIBs/SiteController/SC3SiteControllerMIBS.zip. These MIBS can also be obtained at no charge by contacting Phoenix Broadband.

The Site Controller requires the following standard SNMP MIBS to compile the MIBs below:

SNMP-FRAMEWORK-MIB

SNMP-NOTIFICATION-MIB

SNMP-TARGET-MIB

SNMPv2-SMI

SNMPv2-TC

ENTITY-MIB

The Site Controller supports the following SNMP MIBS:

SCTE 36 2002 (HMS028) Root MIB

SCTE 37 2002 (HMS072) Tree MIB

SCTE 38-1 (HMS026) Property MIB

SCTE 38-11 (HMS-114) Headend Ident MIB

SCTE 84-1 (HMS-111) HE Common MIB

pbtRootMIB Phoenix Root MIB

pbtBatteryAgentMIB Phoenix Battery Agent MIB

pbtRemoteAgentMIB Phoenix Remote Agent MIB

pbtEntityStatusMIB Phoenix Extensions to the Entity MIB

These MIBS should be compiled in the order listed.

The Battery Agent MIB contains tables of objects for each string and jar. These tables contain name, status, and control objects as well as all of the voltage admittance and temperature readings. All of the setable objects are stored in Site Controller nonvolatile memory.

The digital alarms are configured using the discreteAlarmEnable object in the discretePropertyTable. There are two objects for each input. The first object (.1) is used to enable alarms on the low state of the input. The second object (.2) is used to enable alarms on the high state of the input. Each alarm can be set to one of 3 states Disabled(1), EnableMajor(2), or EnableMinor(3). Major Alarms appear in red on the Web page, and Minor Alarms appear in yellow.

The analog alarms are configured using the objects in the propertyTable. There are 4 objects to set the thresholds for each of the alarm capable object. Each alarm limit can be individually enabled or disabled.

7.2. Community Strings

The community strings are configured from the Telnet interface described in the configuration section of this document. The default community strings are set to "public".

If the device does not respond to SNMP Requests or does not appear to send Traps, confirm that the community strings are set properly in the SNMP Manager and that UDP ports 161 and 162 are not blocked.

7.3. **Traps**

Whenever an alarm occurs SNMP Traps are sent to up to 3 trap receivers. The Trap Destinations are configured from the telnet interface described earlier in this document. The traps are defined in the heCommonMIB. Each traps includes a text field that describes the trap.

7.4. MIB Browsers

SNMP devices are normally managed by a software system containing a SNMP Manager. The simplest method of evaluating SNMP operation is with a MIB Browser. A free evaluation version of a MIB browser can be downloaded from http://www.ndt-inc.com/SNMP/MIBrowser.html or http://www.mg-soft.com/download.html.

Updating Firmware

The Site Controller Firmware can be updated remotely using TFTP. To perform this update you will need a TFTP Client. A free TFTP Client can be downloaded from http://tftpd32.jounin.net/tftpd32_download.html.

🏘 Tftpd32 by Ph. Jounin	
Current Directory C:\Program Files\tttpd32	Browse Show Dir
About Settings	Help

Be sure to read and comply with the licensing agreement. Other free TFTP clients are available on the internet. This TFTP client is used in the following example.

Before uploading firmware to a Site Controller close any web browsers, or telnet clients that are connected to the device.

Run the TFTP Client and the window to the left will appear. Press the settings button and the window below will appear. Ignore the Base Directory setting and set all other options exactly as shown. Then press OK.

Select the Tftp Client tab and enter the IP Address of the device being updated in the Host field. The Port field should be set to 69. The Local File field should be set to the Firmware or Web file to be downloaded. Unlike previous Site Controllers, the files may be loaded in any order. Set the Remote file name as shown in the table below and the Block Size to default.

Press the Put button to upload the file to the Site Controller. A progress bar will appear as the upload starts. The firmware upload normally takes about 20 seconds. A Window similar to the one below will appear when the upload is complete.

🏘 Tftp	132 🛛 🔀
٩	362 blocks transferred in 15 seconds 0 block retransmitted MD5: aa893d00e1306076add296b67cf47274
	OK

Press OK and continue with the next file.

🔖 Tftpd32: Settings 🛛 🔀			
Base Directory			
C:\Program Files\tftpd32 Browse			
Global Settings TFTP Server DHCP Server TFTP Client SNTP server Syslog Server Syslog Server Tftpd32Syslog Save syslog messages To file			
Ping address before assignation Persistant leases			
■ Bind DHCP to this address 192.168.0.2 ■			
TFTP Security TFTP configuration None Timeout (seconds) Standard Max Retransmit High Tftp port Read Only local ports pool			
Advanced TFTP Options Image: Option negotiation Hide Window at startup Image: PXE Compatibility Create "dir.txt" files Image: PXE Compatibility Create "dir.txt" files Image: PXE Compatibility Create md5 files Image: PXE Compatibility Image: PXE Compatibility Image: PXE Compatibility Create md5 files Image: PXE Compatibility Image: PXE Compatibility Image: PXE Compatibility Image: P			
OK Default Help Cancel			

The local and remote files names for the 15 Site Controller files are shown in the table below. The Local file names may differ somewhat from the names shown depending on the version.

The Remote file names are case sensitive.

	Local File Name	Remote File Name
Firmware	SC3_627.rom	X2
Web files	SC3_327_web1.cob	WEB1
Web files	SC3_327_web2.cob	WEB2
Web files	SC3_327_web3.cob	WEB3
Web files	SC3_327_web4.cob	WEB4
Web files	SC3_327_web5.cob	WEB5
Web files	SC3_327_web6.cob	WEB6
Web files	SC3_327_web7.cob	WEB7
Web files	SC3_327_web8.cob	WEB8
Web files	SC3_327_web9.cob	WEB9
Web files	SC3_327_web10.cob	WEB10
Web files	SC3_327_web11.cob	WEB11
Web files	SC3_327_web12.cob	WEB12
Web files	SC3_327_web13.cob	WEB13
Web files	SC3_327_web14.cob	WEB14

TFTP uses UPD port 69. If you experience problems downloading firmware it is possible that port 69 is blocked by a firewall or router somewhere in you network. Consult with your IT department to correct this problem.

Summary of Port Usage

The different features of this product use a variety of ports. The following table contains a summary of the port utilization.

	Port	Protocol	Usage
	25	TCP	SMTP – Sending email
ĺ	69	UDP	TFTP – Firmware updates
ĺ	80	TCP	HTTP – Web page
ĺ	123	UDP	NTP – Time server
ĺ	161	UDP	SNMP – Gets and Sets
ĺ	162	UDP	SNMP - Traps
ĺ	9995	TCP	Telnet – Remote Log File Access
ĺ	9998	TCP	Telnet – Debug PortSetup
ĺ	9999	TCP	Telnet – Setup
	30704	UDP	Java Applet – Web page real time data

It may be necessary to request the network administrator to open some of these ports, in the firewall or router, for the associated feature to operate properly.

Resolving Common Problems

- 1. Problem The Site Controller resets approximately once an hour. Background The Site Controller updates its real time clock from a network time server approximately once per hour. If the site Controller is unable to communicate with the time server it will reset in an attempt to restore communications. Solution First check if the Site Controller is getting the time by looking at the time display above the telnet setup menu. If the time is correct the Site Controller 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 from the setup menu. This will disable the time server reset. Verify that the time server IP addresses are correct.
- 2. Problem The Web page opens but does not connect to the Site Controller. No real-time information is displayed. Solution This problem occurs when UDP port 30704 is blocked by a firewall or router in the network. The Java Applet running on the PC will send message to Site Controller UDP port 30704 to obtain the data required to update the Web pages. Consult with the IT department to determine where this port is being blocked. To verify the Web server in the Site Controller is functioning; set the Site Controller to a static IP address, and set your PC to this address +1. Connect the Site Controller Ethernet connection directly to the PC Ethernet using a crossover cable. If the Web page can be opened and updated when connected this way the Web Server is working properly and the problem is in the network.
- 3. Admittance measurement does not seem to update- Set the baseline (initial cell admittance) to zero.. This disables the baseline temporarily. Make another measurement. If the reading now populates the field then re-instate the baseline. The controller will throw away measurements that are more than two times the initial jar admittance as a means of eliminating erroneous readings.



2825 Sterling Drive Hatfield, PA 19440 (215) 997-6007

http://www.phoenixbroadband.com