



Remote Output Module (ROM) Installation and Operation

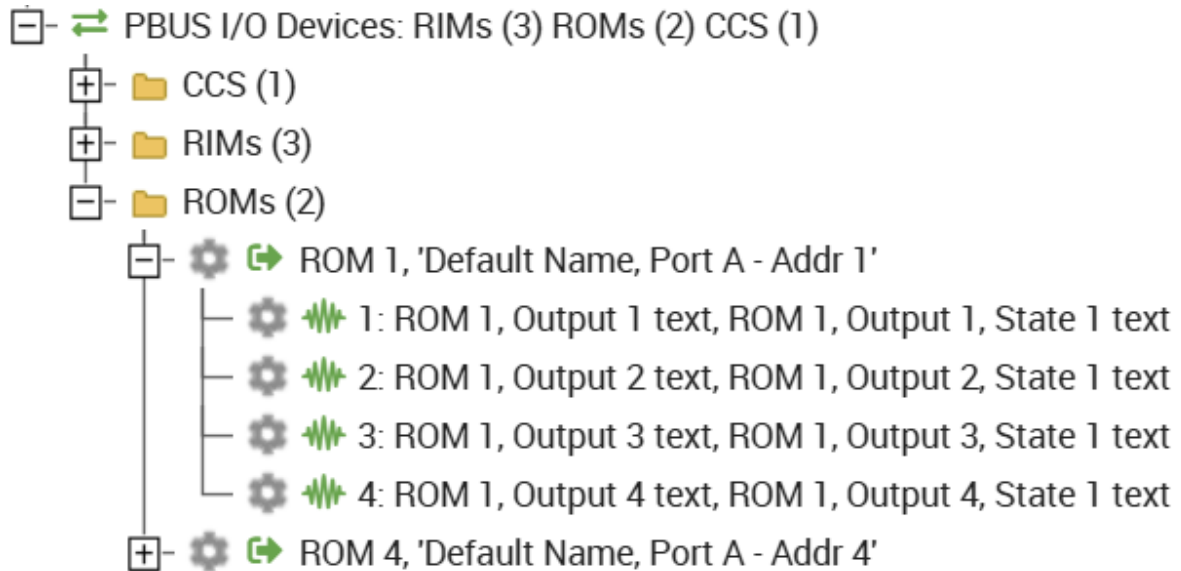




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▪ **Revision History**

Release	Date	Revision Description
Rev 0	01/12/2011	
Rev 1	04/18/2012	First release for internal review.
Rev 2	04/24/2012	Included changes from Walt's review
Rev 3	04/04/2016	Added ROM-2, cleaned up the warnings
Rev 4	08/08/2016	Added Environmental Specifications
Rev 5	11/08/2024	Updated text and photos to represent PBT's current line of products.

▪ **Safety Notes**

- ***High currents and voltages may be present on equipment terminals and inside 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.***



- Except as explained in this manual, there are no user-serviceable parts inside the PBT 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 of incorrectly assembled interconnection cables 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, and corrosive or explosive vapors.

Important Symbols:

**CAUTION!**

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

**NOTE:**

A NOTE to provide additional information to help complete a specific task or procedure

▪ **Contact Information**

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

Phoenix Broadband Technologies, LLC.
2825 Sterling Drive
Hatfield, PA 19440



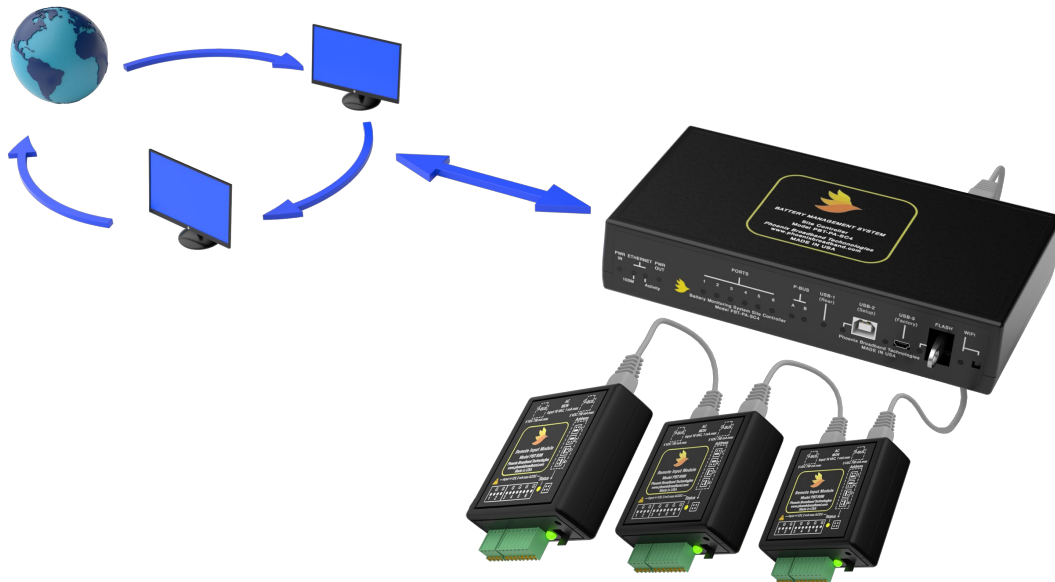
▪ **System Overview**

The Phoenix Broadband Technologies (PBT) Remote Output Module (ROM) provides a method for increasing the number of controlled outputs on PBT controllers. A primary application of the ROM is to increase the number of outputs on the **SC4** and **SCMini-XC** controllers. The screens used in this document are from the **SC4** and may vary slightly in other products.

The ROM has 4 form-C relay outputs that can be controlled remotely. The ROM-2 uses standard relays, the ROM-1 uses latching relays. Latching relays have an advantage in some applications because there is no state change if the power is lost. There is also a temperature measurement and an optional humidity measurement. The ROM is powered by the Site Controller or other PBT host device.

Up to 4 ROMs can be daisy chained together. When used with the **SC4** Site Controller up to 4 ROMs can be connected to each of the 2 P-Bus ports for a total of 8 ROMs or 32 outputs (the **SCMini-XC** has a single P-Bus port). The ROM is completely configurable using only a Web Browser.

The ROM can be combined in a daisy chain with other PBT P-Bus devices including the Remote Input Module (RIM) and the Float Current Sensor.





▪ **Unpacking the ROM**

The ROM comes packaged in a box with a few accessories.



The ROM box contains:

- 1 ROM with mating barrier strip
- 1 2-foot CAT-5 Cable
- 1 Self Adhesive Velcro Square



▪ **Mounting the ROM**

The ROM is shipped with a piece of self-adhesive, industrial Velcro that can be used to mount the ROM. We recommend that you apply the Velcro loop side to the ROM and the Velcro hook side to the mounting surface. Additional Velcro squares are available from PBT if you need to relocate the ROM. Consult the factory for other available mounting options.

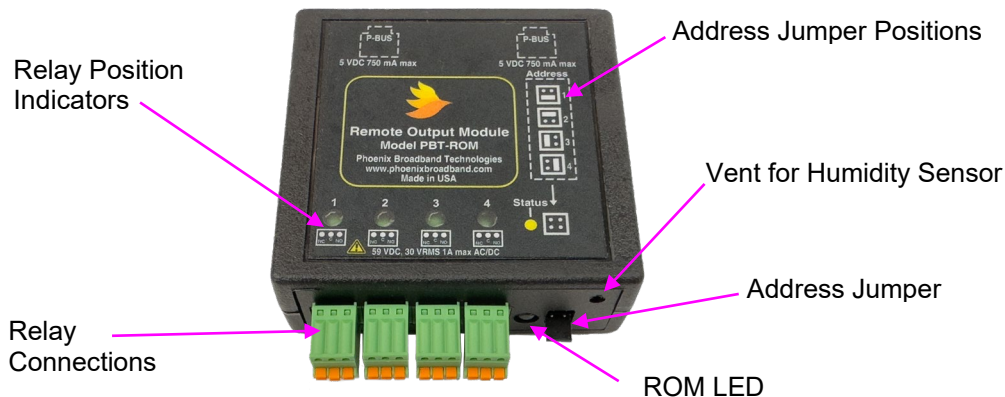
▪ **Setting the ROM Address**

Each ROM connected in a daisy chain, must have a unique address. The address is set using the jumper on the ROM front panel. Each ROM is shipped with the address set to one.

Remove the jumper by pulling it straight out. Replace the jumper in one of the 4 positions shown on the ROM label to set the address. The jumper should always connect 2 pins on the address header. The ROM will not operate properly if an address jumper is not installed.

When the ROM power is connected the LED will flash red a number of times indicating the address setting. For example; if the address is set to 4 the LED will flash red 4 times and then go green.

Verify the address setting by watching the LED when the ROM is connected to the host device in the following section.





▪ **Connecting the ROM to the Site Controller**

The ROM is connected to the Site Controller or other host device using a standard Ethernet cable. A 2-foot cable is provided with the ROM but any standard CAT-5 cable can be used. PBT recommends that the total cable length connected to any P-Bus port should not exceed 200 feet.



Use caution when making your own cables as incorrectly wired cables can damage the ROM, Site Controller or other Host device. Note that some CAT-5 cable testers only test the 4 wires used by Ethernet. The ROM uses all 8 wires. Make sure that your cable tester tests all 8 wires for opens and shorts.

We recommend connecting the ROM to the host device with the CAT-5 cable provided and verifying proper operation before attempting to make your own cable.



in this illustration the ROM is connected to the **SC4** Site Controller.

Connect the P-Bus A or B port on the Site Controller to either "P-Bus" port on the ROM. Connect the other "P-Bus" port on the ROM to the next PBT Remote Module. Up to 4 ROMs with different address settings may be connected in a daisy chain with RIMs or other compatible PBT devices. Up to 4 ROMs can be connected to each P-Bus port on the Site Controller.

The ROMs may be connected with the power on or off. When the power is applied, verify the address setting as described in the previous section. The host device should begin polling the ROM shortly after the power is applied. The ROM LED which is normally green will flash off momentarily when the ROM responds to the Host device.



▪ **Connecting the ROM Outputs**

The ROM has 4 latched Form – C relay outputs. The relay contacts are rated for 1 amp at 30 VDC. The relays are latching and do not change state when the power is cycled.



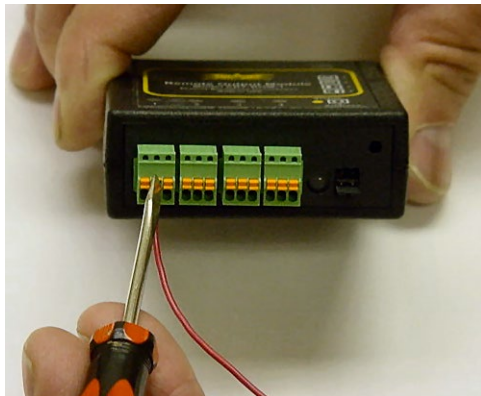
Caution: The ROM is intended for use with voltages below 48 VDC. When controlling higher voltage or high current loads a secondary control device is required. Refer to the specifications section of this document for the relay contact ratings. Connecting the ROM outputs to higher voltages or currents can damage the relays and will void the warranty.

Connect the ROM outputs to the points to be controlled. There is a separate barrier block for each output. These barrier blocks can be unplugged from the ROM. The ROM barrier block will accommodate 20-26 AWG wire. Strip 0.25 inch of insulation from the wire. Solid wire works best, but if you use stranded wire be sure to twist the strands tightly together. Push the wire into the desired barrier block connection as shown. There is a common, normally open and normally closed connection for each output.



Contact Phoenix Broadband Technologies if you are unsure of how to connect your device to the ROM.

To remove a wire from the barrier block, press the orange release button with a small screw driver and pull the wire free.



Relay Connections	
Pin 1 (left)	Normally Closed
Pin 2 (center)	Common
Pin 3 (right)	Normally Open

The LED for each Output will light when the Common Pin is connected to the Normally Open Pin. The LED will be off when the Common Pin is connected to the Normally Closed Pin. This is a latching relay, the relay state will not change when the power is removed from the ROM.



Web Interface



NOTE: Alarm configuration explanations are not in the scope of this manual.
Please refer to the appropriate controller manual for more information on alarms.

For the **SC4** refer to “700-000028-00 Rev 1.2 SC4 Manual”.

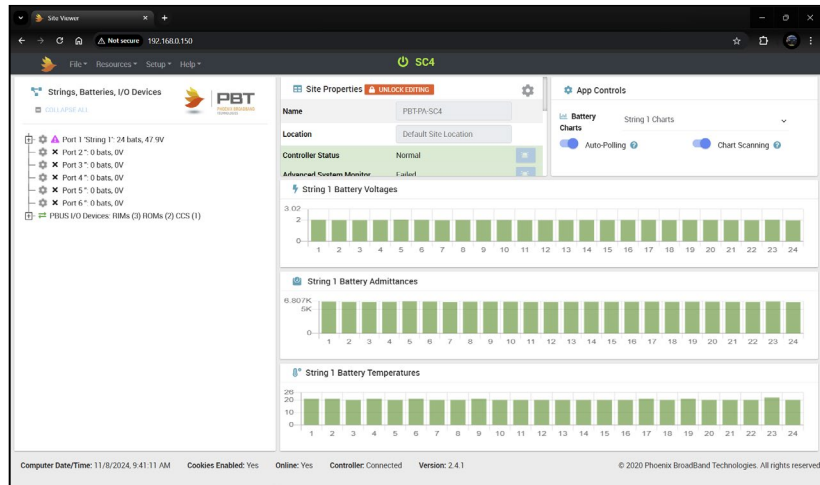
(<https://www.sens-usa.com/product/site-controller-unit-pbt-pa-bms-sc4>)

For the **SCMini-XC** refer to “700-000032-00 Rev 1.1 SCMini-XC Manual”.

(<https://www.sens-usa.com/product/small-systems-battery-monitoring-pbt-bms-scmmini-xc>)

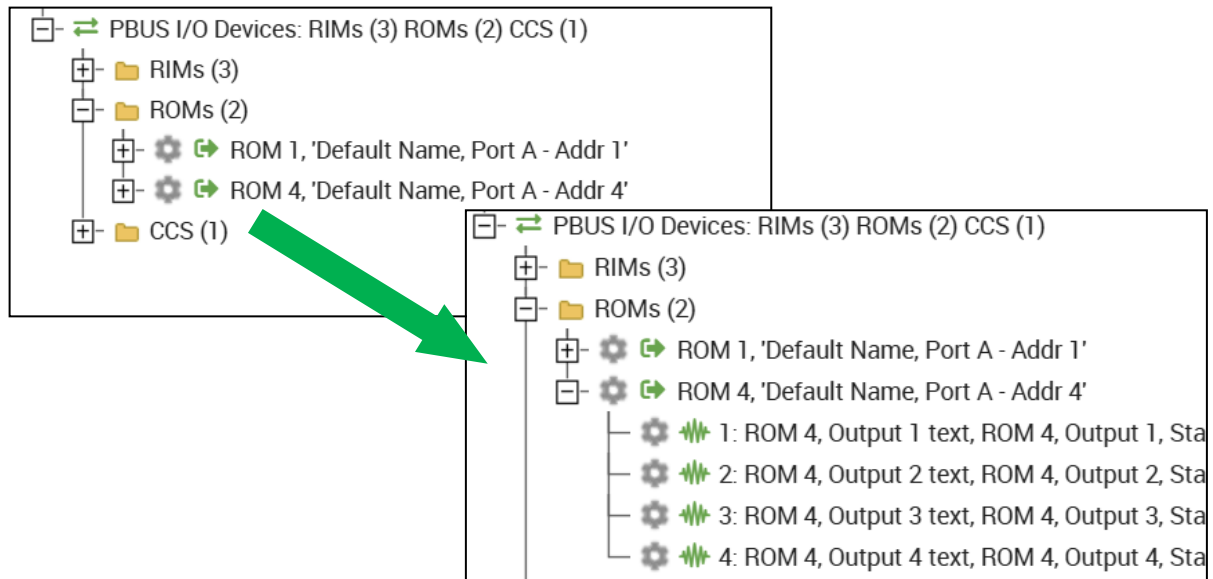
The ROM is completely configurable through a series of Web pages. The ROM Web pages are accessed from the Web page of the controller. In the case of the SC4 the main Web page looks like this.

To view the available ROMs click the + next to “**PBUS I/O Devices**” in the tree on the left side of the screen. Then click the + next to “**ROMs**”.



Up to 8 ROMs can be displayed. Only the connected ROMs are displayed. The screen below shows 2 ROM modules. The text and icons are color coded with the alarm status of each ROM, Green for Normal, Yellow for Minor Alarm, and Red for Major Alarm.

Clicking the + next to a ROM will display the outputs for that specific ROM.





▪ Common Icons

Throughout the controller web pages you will see icons that have specific meanings. There are more icons in the web pages than what we will cover in this manual. For more information related to the **SC4** or **SCMini-XC**'s web pages please refer to their respective manuals.

Icon	Description
	Denotes where a setting menu can be brought up once clicked.
	Denotes a configurable alarm but editing is locked so it cannot be opened.
	Denotes a configurable alarm with editing unlocked so it can be opened and modified if clicked.

▪ Unlocking Editing

To make any changes on the following pages, editing must be unlocked. You will see an orange, "Unlock Editing" box on the main page as well as every details and settings page we will cover in this manual.



Admin Password

Enter password to allow edit

SUBMIT CANCEL

Clicking this orange button will bring up the "Admin Password" dialog box. By default, the admin password is, "**admin**". Type this password into the box and then click, "SUBMIT". Once clicked, you will see a box pop up to the right that says "Password Success" and "You may now edit values."

You will notice that the orange, "Unlock Editing" box has turned to a green one that says, "Editing Unlocked". After 15 minutes editing will return to locked as a safety feature. You may need to unlock editing more than once depending on the time you spend configuring the ROM. Refreshing or closing your web browser will also return editing to the locked state.



▪ ROM Details and Settings

Clicking the gear icon at the ROM level will bring up settings and information related to the ROM overall, not the individual inputs.

Values like the ROM name, hardware revision, firmware revision, and

Details Settings UNLOCK EDITING

ROM 4 Details

← PREVIOUS ROM NEXT

Name	Default Name, Port A - Addr 4
Hardware Rev	0.1
Firmware Rev	2.0
Com Status	Normal



communication status are visible from this **“Details”** page.

Clicking the **“Settings”** button at the top of this page will show the **“ROM Settings”** tab. This page is where you can configure the temperature, communication and composite status alarms of the ROM.

Temperature

The ROM has a built-in thermometer. Clicking on the blue icon to the right of the Temperature allows you to define alarm limits around the temperature readings.

Humidity

If the ROM is equipped with the optional humidity sensor, the humidity measurement is displayed in percent relative humidity under **“Temperature”** on this screen (not shown).

The screenshot shows the 'ROM 4 Settings' page. At the top, there are tabs for 'Details' and 'Settings', and a red 'UNLOCK EDITING' button. The left sidebar contains a list of settings: ROM Settings (selected), Logging Settings, Actions, Alarm Settings, and Notifications. The main content area is divided into two sections. The first section, 'ROM Information', displays 'Firmware Version: 2.0', 'Hardware Version: 0.1', and 'Temperature: 23 °C / 73 °F' with a blue icon to its right. The second section, 'Remote Agent Status', shows 'Remote Agent Communications Status: Normal' and 'Remote Agent Composite Status: Normal', both with blue icons to their right. Navigation buttons include 'PREVIOUS ROM', 'COLLAPSE ALL', 'EXPAND ALL', and 'NEXT ROM'. A 'CLOSE' button is at the bottom right.

Remote Agent Communications Status

This indicates the state of the communications between the Host device and the ROM. The status will be **Normal** when there are reliable communications between the controller and the ROM. A status of **Failed** indicates that the Host is unable to communicate with the ROM.

Remote Agent Composite Status

This is a roll up of the analog and digital input alarms. If any input alarm of any severity is present, the Composite Status will indicate Alarm. If there are no input alarms the Composite Status will indicate **Normal**.

Clicking the **“Actions”** tab will bring up two more options.

Set ROM Name

This field is where you can change the name of the ROM from the default if you wish.

Delete ROM

This button will remove the ROM from the web page and controller database. Simply disconnecting the CAT5 from the ROM will not remove it from the controllers' databases.

The screenshot shows the 'ROM 4 Settings' page with the 'Actions' tab selected in the sidebar. The main content area has two sections. The first section, 'Set ROM Name', includes a text input field labeled 'Change ROM Name:' with the value 'Default Name, Port A - Addr 4'. The second section, 'Delete ROM', features a red button labeled 'DELETE ROM 4'. Navigation buttons are consistent with the previous screenshot.



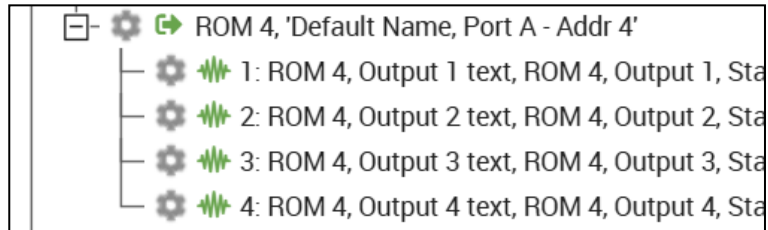
NOTE: Although there are other tabs in the pages we are reviewing, they are unpopulated. These are placeholders for possible future updates or revisions.



▪ ROM Output Details and Settings

Clicking the gear icon to the left of the appropriate Output will bring up the “**ROM Output Details**” page (not shown to save space).

This page will look like the “**ROM Details**” page we just went over.



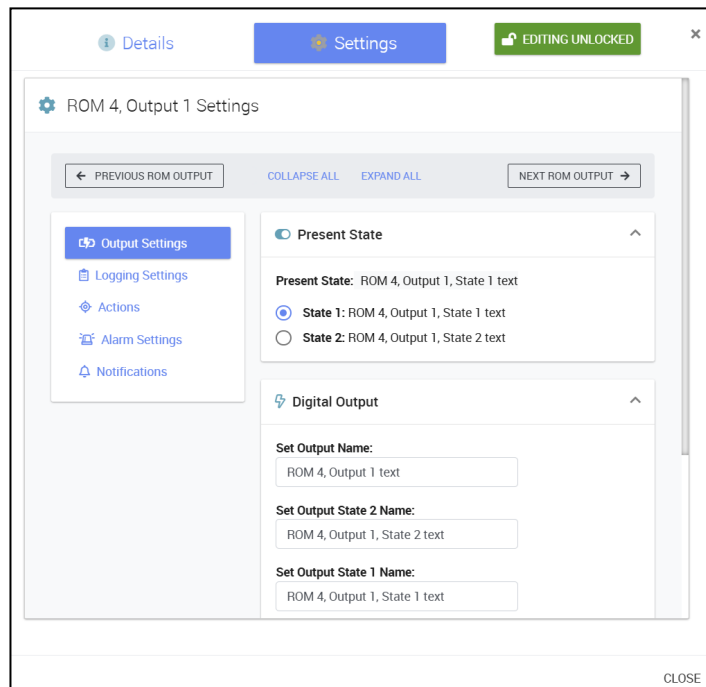
Click the “**Settings**” button to bring up the “**Output Settings**” page for the selected output.

Present State

The present state of the selected ROM output is shown. Use the radio buttons to change the state of the output. The LED on the ROM will light when the output is changed.

Outputs that are not available for manual control are grayed on this screen and the radio buttons will be inactive.

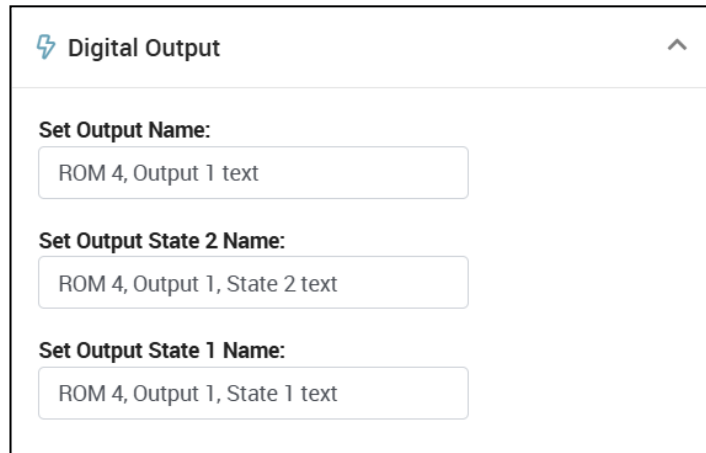
The ROM outputs can be controlled manually from this screen or from SNMP. The outputs can also be configured to operate autonomously based on combinations of alarm conditions in the controller.



Digital Output

In this section you can change the labels of the different outputs and states of the outputs. Remember to unlock editing to make any changes.

To change the labels, type the desired text in the field. The changes are saved when a Tab character is used to move to the next field, or you click out of the box. A confirmation box will pop up to let you know the changes have been saved.





Select ROM Output Control Mode

SNMP or Web Control

Use this option to control the output states via SNMP or within the web pages as mentioned above under "Present State".

Site Controller – Major Alarms

Site Controller – Minor Alarms

Site Controller – Major & Minor Alarms

Selecting any of the three options above will allow you to control the output state by whether an alarm is present or not for that specific option. After selecting one of these three options you'll notice a box will appear below (shown below) that will allow you to select individual string or jar level alarm(s) that will change the output.

This is a screenshot of a web interface dialog box titled "Select ROM Output Control Mode". It contains four radio button options. The first option, "SNMP or Web Control", is selected with a blue dot. The other three options are "Site Controller - Major Alarms", "Site Controller - Minor Alarms", and "Site Controller - Major & Minor Alarms", all of which are unselected.This is a screenshot of the same web interface dialog box, but now "Site Controller - Major Alarms" is selected. Below the radio button options, there are two sub-sections: "String Alarms" and "Jar Alarms". Each sub-section contains a list of six alarm types, each with a toggle switch. In the "String Alarms" section, all six toggles (String Voltage Alarm, Float Current Alarm, Discharge Current Alarm, Ripple Alarm, Voltage Delta Alarm, and Discharge Alarm) are currently turned off. In the "Jar Alarms" section, all six toggles (Jar Voltage Alarm, Admittance Alarm, Temperature Alarm, and Electrolyte Alarm) are also currently turned off.



For instance, if you want to change the output state if the string voltage is above the major alarm threshold, then you would choose, “**Site Controller - Major Alarms**” and then select, “**String Voltage Alarm**”.

These settings are saved immediately upon selecting them.

Select ROM Output Control Mode

☐ **SNMP or Web Control**

☒ **Site Controller - Major Alarms**

☐ **Site Controller - Minor Alarms**

☐ **Site Controller - Major & Minor Alarms**

String Alarms

Jar Alarms

☒ **String Voltage Alarm**

☐ **Jar Voltage Alarm**

☐ **Float Current Alarm**

☐ **Admittance Alarm**

☐ **Discharge Current Alarm**

☐ **Temperature Alarm**

☐ **Ripple Alarm**

☐ **Electrolyte Alarm**

☐ **Voltage Delta Alarm**

☐ **Discharge Alarm**



NOTE: Remember that the string and jar alarms are based on the configuration of the controller.
For help with making changes to these alarms, refer to the appropriate controller manual.



▪ **Specifications**

Number of Outputs:	4 Form C Relays
Relay Contact Rating:	UL/CSA Type TX-S 0.5 A 125 VAC 0.3 A 110 VDC 1.0 A 30 VDC Non-inductive loads
Temperature Sensor:	+/- 2 deg C accuracy from -40 to +80 deg C
Humidity Sensor (Optional):	+/- 3% accuracy from 20% to 80% RH +/- 5% accuracy from 0 to 19% RH and 81 to 100% RH
Max # Units:	4 ROM Modules per P-BUS port
Interface to Host:	P-Bus, RS-485 on RJ-45 connector
Power:	5 VDC, provided by the P-Bus
Environmental:	-40 C to 60 C, 0-95% Relative Humidity
Size:	2.7 x 3.2 inches
Weight:	4 oz. (with mounting bracket)