Remote Output Module (ROM)
Installation and Operation

Table of Contents

▪ *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

- ## *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 customerservice@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 various PBT products. A primary application of the ROM is to increase the number of outputs on the PBT SC3 Site Controller.

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 is 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 SC3 Site Controller up to 4 ROMs and be connected to each of the 2 P-Bus ports for a total of 8 ROMs or 32 outputs.   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 should contain:
      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.
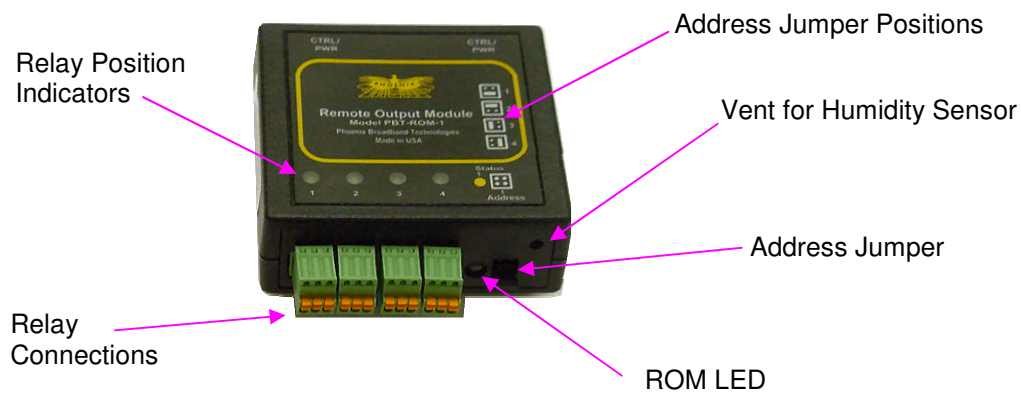
▪ *Connecting the ROM to the Site Controller*

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 you 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 SC3 Site Controller.

Connect the P-Bus A or B port on the Site Controller to either "COMM/PWR" port on the ROM. Connect the other "COMM/PWR" 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 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.
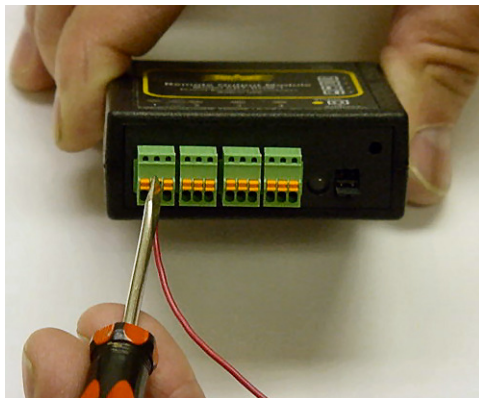
Relay Connections	
Pin 1 (left)	Normally Closed
Pin 2 (center)	Common
Pin 3 (right)	Normally Open

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 form the ROM.

▪ **Web Interface**

The ROM is completely configurable through a series of Web pages. The ROM Web pages are accessed from the Web page of the Host device. In the case of the Site Controller the main Web page looks like this.

To view the available ROMs push the **RIMs and ROMs** button at the bottom center of the page.

Up to 8 ROMs will be displayed in the column on the right. Only the connected ROMS are displayed. The screen below shows 2 ROM

modules. The buttons are color coded with the alarm status of each ROM, Black for Normal, Yellow for Minor Alarm, and Red for Major Alarm.

Click a ROM button to display the details for a specific ROM.

The following password screen will appear or if the password was entered previously the main ROM screen will appear.
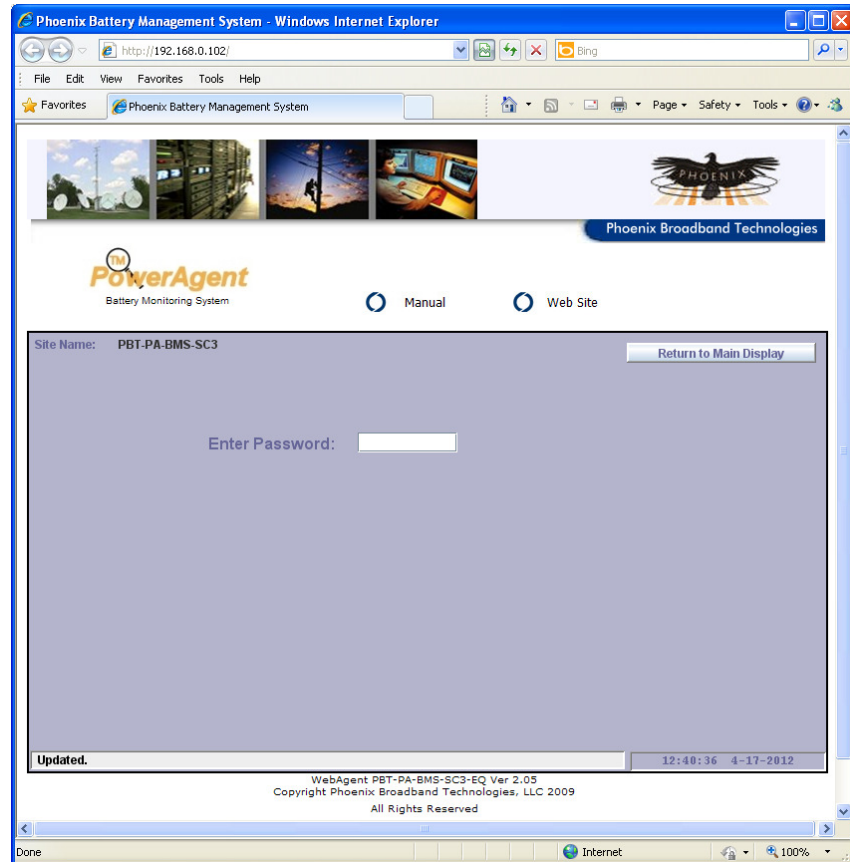
Password

Type the password followed by enter. The password is case sensitive. There are two passwords, one for User access and one for Administrative access.   The default passwords are "user" and "admin". The passwords can be changed from the telnet setup interface on the Site Controller or other host device.

Passwords will time out after 10 minutes of inactivity. When a timeout occurs tThe Site Controller will return to the main screen. If the password is required following the timeout the Password screen will reappear.

Once the password is entered the Main ROM screen shown below will appear.

Main ROM Screen

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

Below is the Main ROM screen which shows the present state of each ROM output. Use the radio buttons to change the state of an output. The LED on the ROM will light when the output is set to State 2. Outputs that are not available for manual control are grayed on this screen and the radio buttons will be inactive.

Click the **Setup** button to change the text associated with an output. The Setup Output screen is shown below. All of the text fields associated with the output can be changed to be descriptive of the device being controlled.

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. Click the Yes button in the confirmation dialog box that appears to save the change, No to return to the original text.
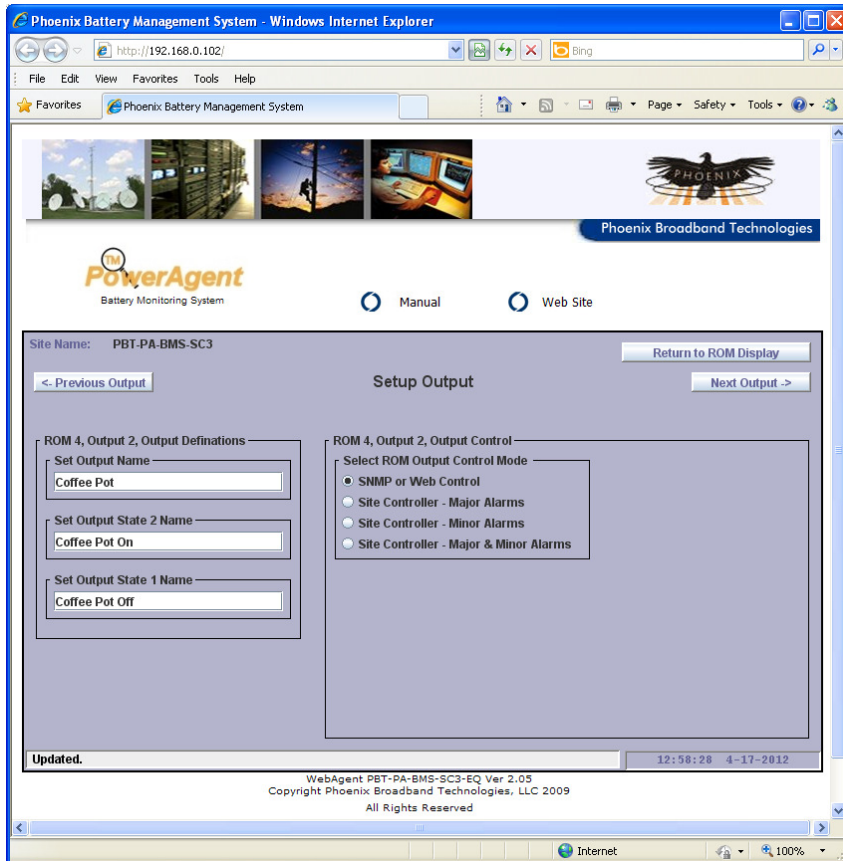
In the example to the left the name of the output has been changed to "Coffee Pot" and the two states have been changed to "Coffee Pot On" and Coffee Pot Off".

For outputs to be controlled manually from these screens or from SNMP the "SNMP or Web Control" radio button must be selected in the Output Control Mode group.

If any of the other radio buttons are selected the output will be controlled by the selected conditions in the host device. When any of these modes are selected the Select State radio buttons will be disabled.

To configure a ROM output to switch on a Site Controller alarm, select one of the 3 Site Controller options in the Rom Output Control Mode radio buttons. The ROM output can be configured to switch on Major Alarms only, Minor Alarm only, or both Major and Minor Alarms.

Next check the specific Alarms that will control the output. Any combination of alarms can be selected.

Each ROM output can be configured and controlled independently.

The alarm choices shown in the specific alarms box will vary

depending on the capabilities of the host device. The choices in this example are from the SC3 Site Controller.

In the example to the right ROM 4, output 1 has been configured to switch when a discharge alarm occurs.

Notice that the output 1 buttons are now disabled in the Main ROM screen. The buttons do however indicate the present state of the output.

The lower portion of the ROM Main screen displays the readings for a few analog and discrete parameters unrelated to the ROM outputs.

When an analog or discrete alarm is enabled the value will be color coded with its alarm status, Black for Normal, Yellow for Minor Alarm, and Red for Major Alarm.

Temperature

The temperature measured by the ROM is displayed in degrees C and F in the Environmental group at the lower left of the ROM Screen.   To setup the alarms for the temperature press the **Alarm** button adjacent to the temperature and refer to the Analog Alarms section of this document.

Humidity

If the ROM is equipped with the optional humidity sensor, the humidity measurement is displayed in percent relative humidity in the Environmental group at the lower left of the ROM Screen.   To setup alarms for the humidity press the **Alarm** button adjacent to the humidity and refer to the Analog Alarms section of this document.   If the ROM is not equipped with the humidity sensor the reading will be displayed as 'Unavailable", and the **Alarm** button will not be displayed.
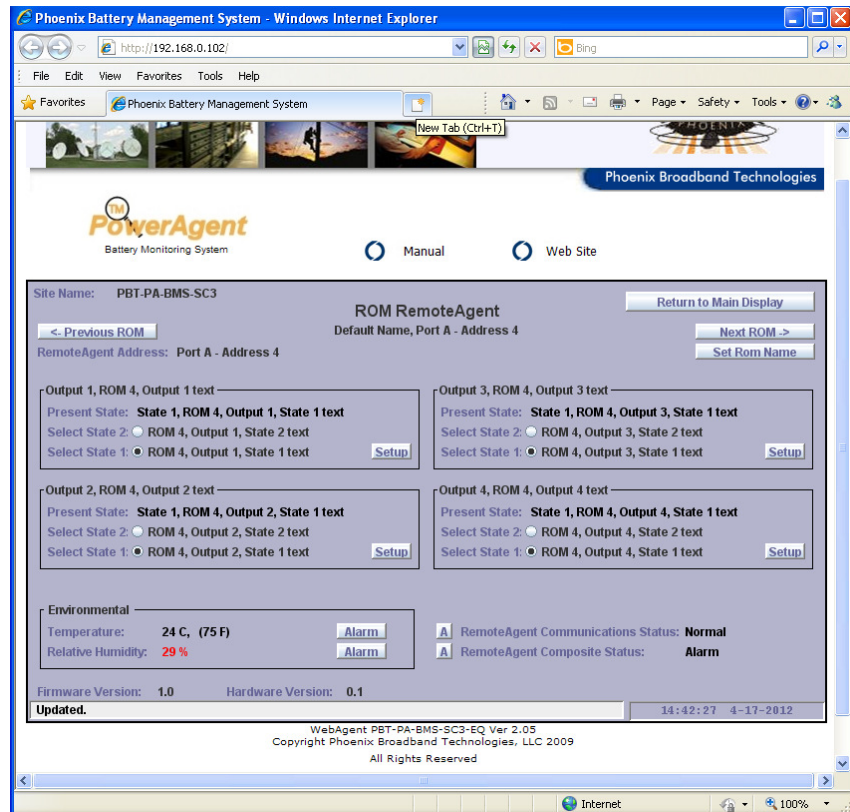
Remote Module Communications Status

The Remote Module Communications Status indicates the state of the communications between the Host device and the ROM. The status will be Normal when there is reliable communications between the Host and the ROM. A status of Failed indicates that the Host is unable to communicate with the ROM. To setup alarms for the Communications Status press the **A** button adjacent to the Communications Status and refer to the Digital Alarms section of this document.

Composite Status

The Composite Status is a roll up of the analog and digital input alarms. If any input alarm, of any severity is present the Composite Statu**s** will indicate Alarm.   If there are no input alarms the Composite Status will indicate Normal. To setup alarms for the Composite Status press the **A** button adjacent to the Composite Status and refer to the Digital Alarms section of this document.

Device Name

To give your ROM a meaningful name, click the **Set ROM Name** button in the Main ROM screen.

Type the desired name in the text box. Type a Tab to record the name in the database.

Deleting a ROM

Once a ROM is discovered it is added to a data base and is expected to be present. If the ROM is disconnected or fails for some reason a communications alarm will be produced.

To delete a ROM that is no longer needed disconnect the ROM and click the **Delete This Device** button. If the ROM is reconnected it will automatically be rediscovered by the Host Device.
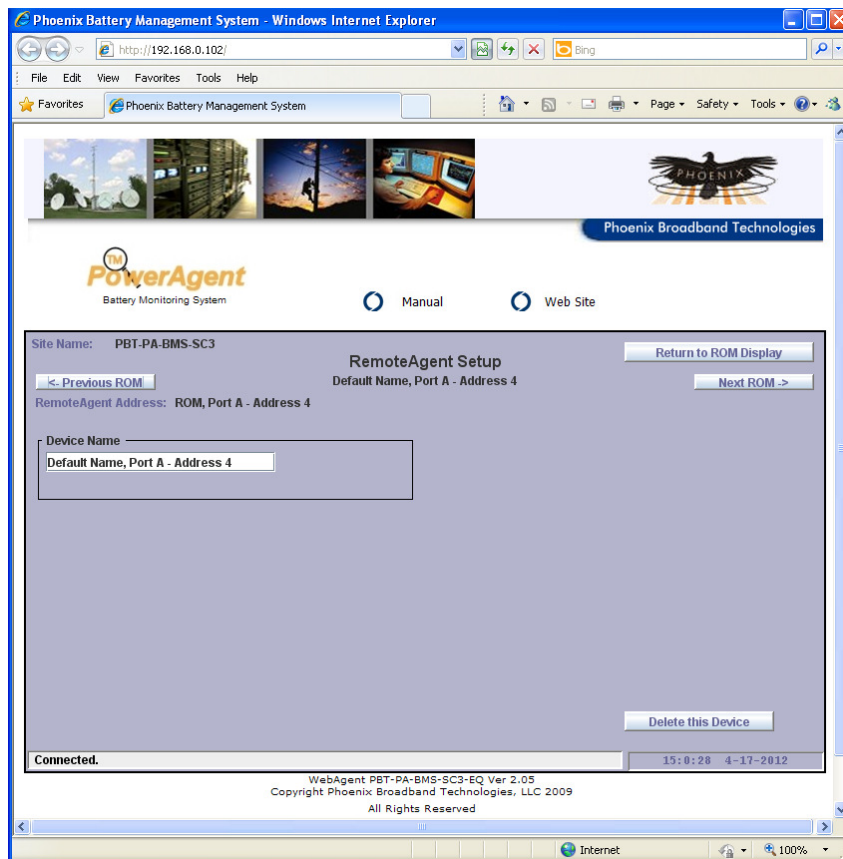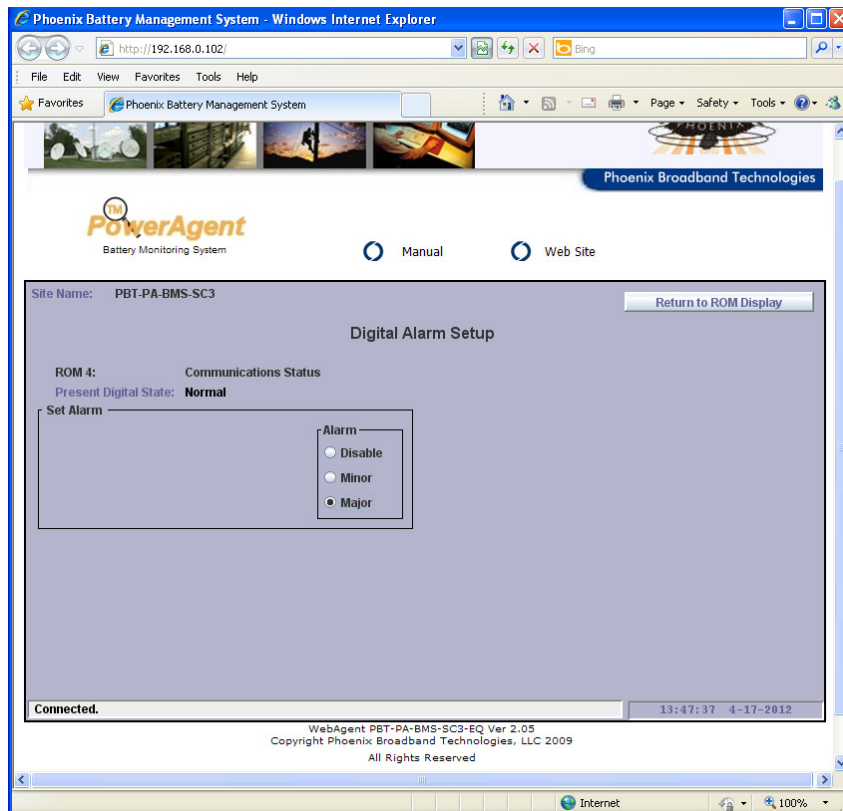
Digital Alarms

When the **A** button is pressed the Digital Alarm Setup screen shown below will appear. The Present Digital State of the parameter is displayed. Each alarm can be set to Disabled, Minor, or Major by selecting a radio button.

In the example to the left the major alarm is enabled for the ROM Communications Status. Since the communications is normal there is no alarm. If communications to the ROM were to fail a Major alarm would be produced.

A SNMP Trap and/or an Email may be sent when the alarm occurs and when the alarm returns to the normal state. Refer to the manual for the Host device for information on setting the Trap destinations and the Email addresses.

Analog Alarms

When the **A** or **Alarm** button next to an analog parameter is pressed the Analog Alarm Setup 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 Major Alarm because the Present Value is above the Major Low Alarm Limit.

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 vise versa.

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 manual for the Host device for information on setting the Trap destinations and Email addresses.

- **SNMP**

The Host device provides SNMP support for the ROM. All of the information presented on the Web pages and complete configuration capability is available from SNMP. The ROM requires two MIBs in addition to the MIBs required by the Host device. These MIBs pbtRootMIB and pbtRemoteAgentMIB are available to ROM customers by contacting Phoenix Broadband Technologies.

Community Strings

The community strings are configured from the Telnet interface on the Host device. The default community strings are set to "public".

Traps

SNMP Traps are sent to up to 3 trap receivers. Refer to the manual for the Host device for information on setting the Trap destinations. The traps are defined in the heCommonMIB. For ROM Output traps the trap text is taken from the user programmable fields. For analog traps the text comes from pbtRaOutputText (Output Name), for discrete traps the text comes from pbtRaOutputState1Text (Digital Output State 1 Text) or pbtRaOutputState2Text (Digital Output State 2 Text). Only the first 20 characters of these objects are used. These objects can be configured using SNMP or the ROM Web Page. When changes are made to these objects the Host device must be reset before the new text will appear in the traps.

- ## *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)