



Remote Input Module (RIM) Installation and Operation

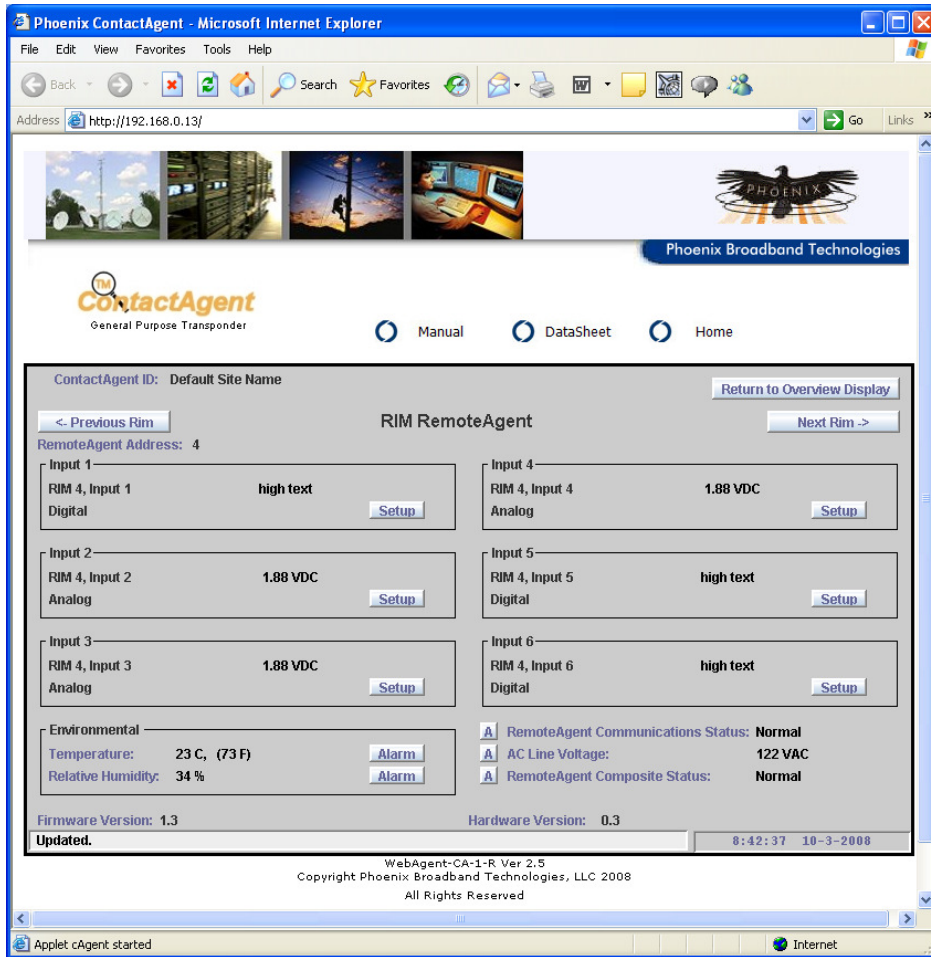




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▪ *Revision History*

Release	Date	Revision Description
Rev 1	09/19/2008	Released for review
Rev 2	09/23/2008	Edits from review.
Rev 3	09/26/2008	Edit SNMP section. Add composite status. RIM version 1.3. ContactAgent version 3.4.
Rev 4	4/5/2016	Added RIM-2,3,4,5, cleaned up the warnings, corrected address, replaced the logo
Rev 5	8/8/2016	Added Environmental and Power Specifications
Rev 6	1/16/2017	Added French Safety Notes



▪ **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 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, and corrosive or explosive vapors.


Consignes de sécurité


- **Protection contre les chocs électriques: du courant électrique de haute tension peut être présent dans les bornes des batteries et à l'intérieur du matériel. Veuillez vous assurer que vous comprenez et respectez tous les codes et règles de sécurité appropriés. Respectez les mesures de protection contre les risques produits par l'électricité, et faites preuve de prudence lors de l'installation ou de la réparation du matériel. L'installation, l'entretien et la réparation du matériel doivent être effectués uniquement par des personnels qualifiés, formés et habilités.**
- A l'exception de ce qui est indiqué dans ce Manuel, aucune des pièces situées à l'intérieur des éléments du système PBT ne peut être réparée par l'utilisateur. L'ouverture du matériel peut vous exposer à des risques de choc électrique et résulter en une annulation de la garantie du produit. Toute réparation doit être confiée à des ouvriers spécialisés.
- L'utilisation de câbles de connexion assemblés de façon incorrecte peut endommager le matériel, entraîner des risques pour la sécurité, et résulter en l'annulation des garanties portant sur le matériel.
- Ne dépassez pas les consignes de charge recommandée pour le produit.
- Assurez-vous que le matériel est correctement relié à la terre.



- Éviter de mettre le matériel en contact avec de l'humidité, des liquides, ou avec des vapeurs corrosives ou explosives.

Important Symbols:

	CAUTION! The use of CAUTION indicates safety information intended to prevent damage and/or injury
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	NOTE: A NOTE to provide additional information to help complete a specific task or procedure
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▪ **Contact Information**

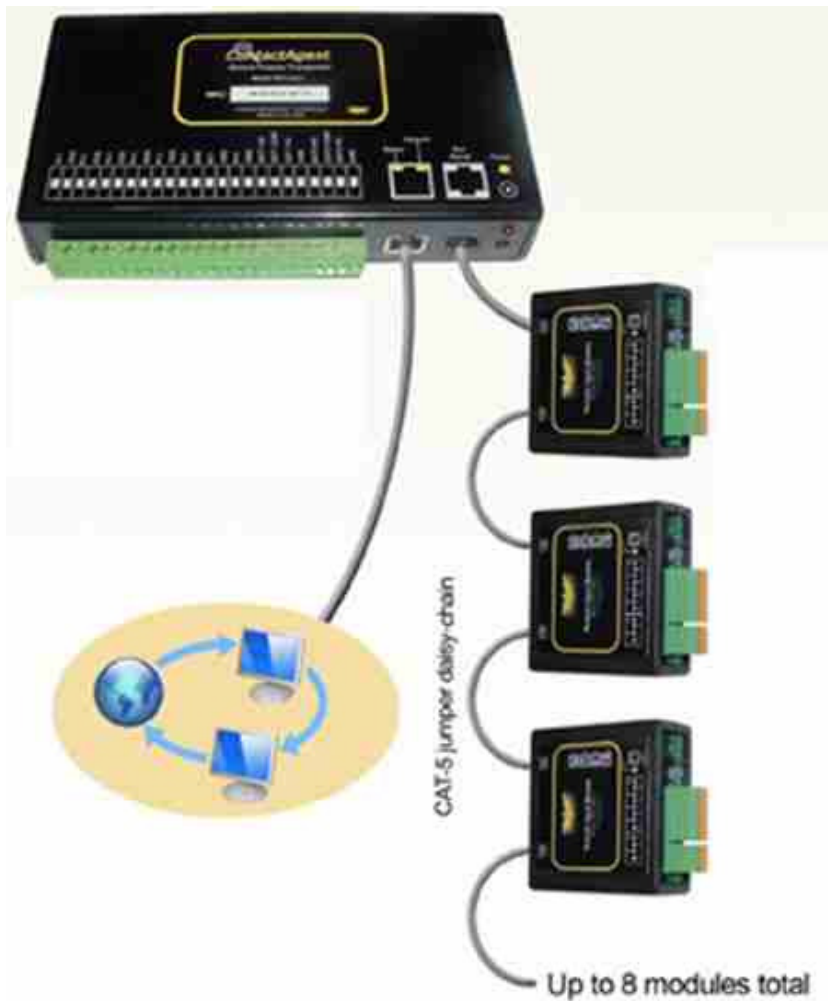
If you have any questions about the installation or use of the equipment described in this manual, contact Phoenix Broadband Technologies at (215) 997-6007 or email customerservice@phoenixbroadband.com.

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



▪ **System Overview**

The Phoenix Broadband Technologies (PBT) Remote Input Module (RIM) provides a method for increasing the number of monitored inputs on various PBT products. A primary application of the RIM is to increase the number of monitored inputs on the PBT **ContactAgent™** General Purpose Transponder, however the RIM can also be used with other PBT products such as the SC3 and SC4 Site Controllers. The screens used in this document are from the ContactAgent and may vary slightly in other products.



The RIM has 6 inputs that can be configured to monitor analog or digital signals. There is also a temperature, AC line voltage and optional humidity measurement. The RIM is powered by the **ContactAgent™** or other PBT Host device.

Up to 4 RIMs can be daisy chained together, increasing the **ContactAgent™** inputs to a total of 32. The RIM is completely configurable using only a Web Browser.

The RIM can be combined in a daisy chain with other compatible PBT devices including the Remote Output Module (ROM).

There are 5 different Model numbers in the RIM family with inputs designed for specific purposes.

RIM-1	6 general purpose inputs configurable for contact closure or DC or AC voltages
RIM-2	2 precision temperature sensor inputs and 4 general purpose inputs
RIM-3	AC current sensor Inputs
RIM-4	6 precision temperature sensor inputs
RIM-5	3 combo discharge/charge sensor inputs



▪ **Unpacking the RIM**



The RIM box contains:

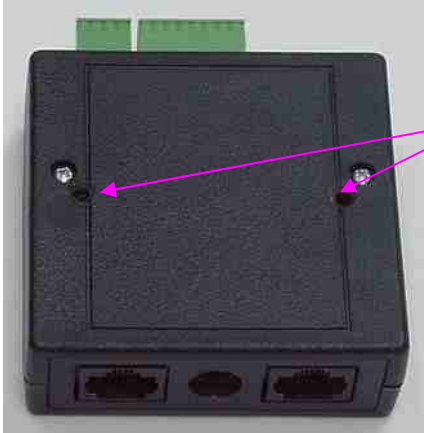
- 1 RIM with mating barrier strip
- 1 2 foot CAT-5 Cable
- 1 AC Line Voltage Transformer
- 1 RIM Mounting Bracket
- 2 RIM Mounting Bracket Screws
- 1 Self Adhesive Velcro Square

The RIM is powered from the Host device. The transformer is only used if AC Line Voltage Measurement is required.



▪ **Mounting the RIM**

The RIM is shipped with several mounting options. A bracket is provided that can be installed on the back of the RIM. This bracket can be used to mount the RIM on a wall or on an equipment rack rail. A piece of self adhesive, industrial Velcro is also provided that can be used to mount the RIM. An optional rack shelf that mounts the **ContactAgent™** and the RIM is available.

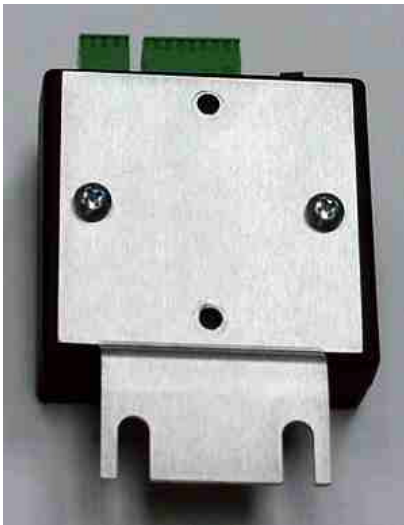


The mounting bracket is attached the back of the RIM with the two self tapping screws provided.

Holes for self tapping screws

The bracket can be mounted in any one of 4 positions depending on the desired orientation on the RIM. Two examples of the bracket installation are shown below.

Once the bracket is secured to the RIM, the bracket can be secured to a wall using customer provide hardware appropriate for the wall construction.



the rack rail design.

The hole spacing in the bracket is designed to fit a 1U space on an equipment rack rail. The bracket can be secured to a rack rail using customer provided hardware appropriate for





- **Setting the RIM Address**

Each RIM connected in a daisy chain, must have a unique address. The address is set using the jumper on the RIM front panel. Each RIM 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 RIM label to set the address. The jumper should always connect 2 pins on the address header. The RIM will not operate properly if an address jumper is not installed.

When the RIM 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

RIM Address Jumper

LED will flash red 4 times and then go green.

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



▪ **Connecting the RIM to the ContactAgent**

The RIM is connected to the **ContactAgent**™ or other host device using a standard Ethernet cable. A 2 foot cable is provided with the RIM but any CAT-5 cable up to 200 feet in length can be used.



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

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



Connect the Aux Serial port on the **ContactAgent**™ to either “COMM/PWR” port on the RIM. Connect the other “COMM/PWR” port on the RIM to the next PBT Remote Module. Up to 4 RIMs with different address settings may be connected in a daisy chain with ROMs or other compatible PBT devices.

The RIMs 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 RIM shortly after the power is applied. The RIM LED which is normally green will flash off momentarily when the RIM responds to the Host device.



▪ **Connecting the RIM Inputs**

The RIM can monitor dry contact closure or low voltage digital signals. It can also monitor DC or AC analog signals. The voltage presented to the RIM input must be ground referenced and must be in the range of +12 to -12 Volts.



Caution: Connecting the RIM inputs to voltages outside of this range may damage the RIM and void the warranty.



Connect the RIM inputs to the points to be monitored. The RIM 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 an input and a ground connection for each input. The inputs are pulled up in the RIM.

For dry contact closures connect one side of the contact to a RIM input and connect the other side to the RIM ground.

For low voltage measurements (+12 to -12 volts) connect the low voltage signal to the RIM input and the signal reference (ground) to the RIM ground pin.

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



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

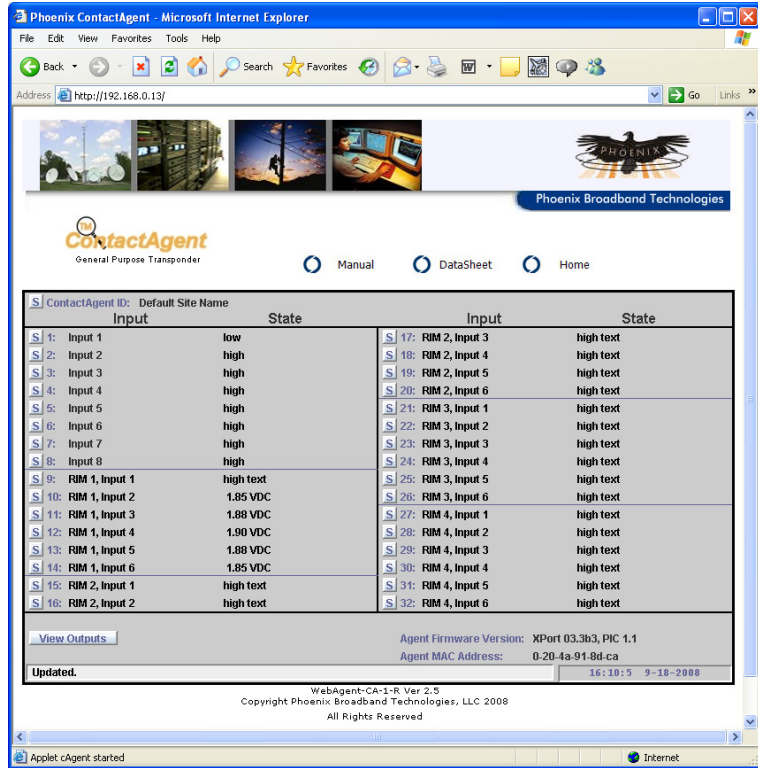


▪ **Web Interface**

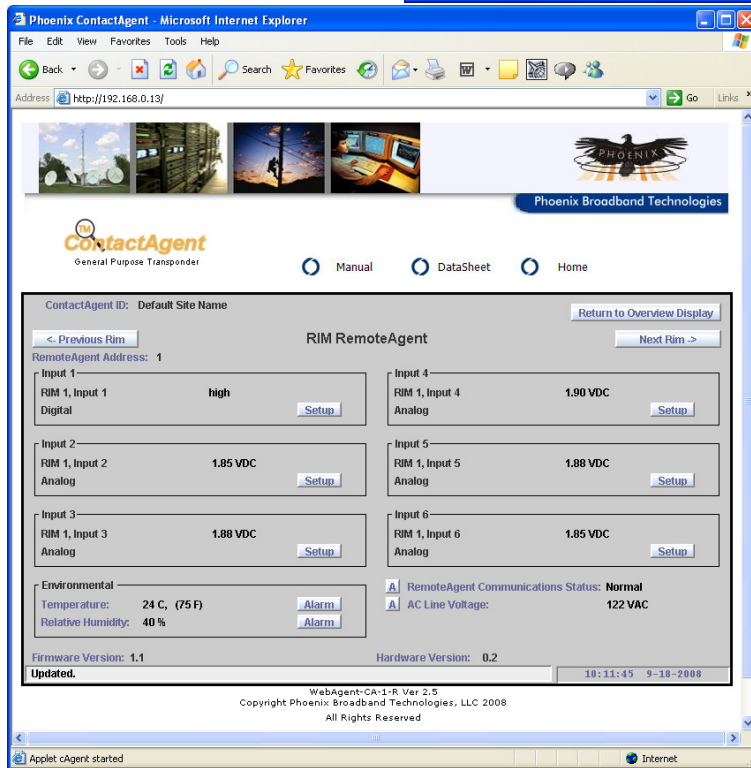
The RIM is completely configurable through a series of Web pages. The RIM Web pages are accessed from the Web page of the Host device. In the case of the **ContactAgent™** the main Web page looks like this.

Only the connected RIMS are displayed. The device shown here has 4 RIM modules. The present state of each RIM is shown on this page.

To select a RIM click on any of the 6 “S” (Setup) buttons for the desired RIM. The screen shown below will appear.



Configuring the Inputs

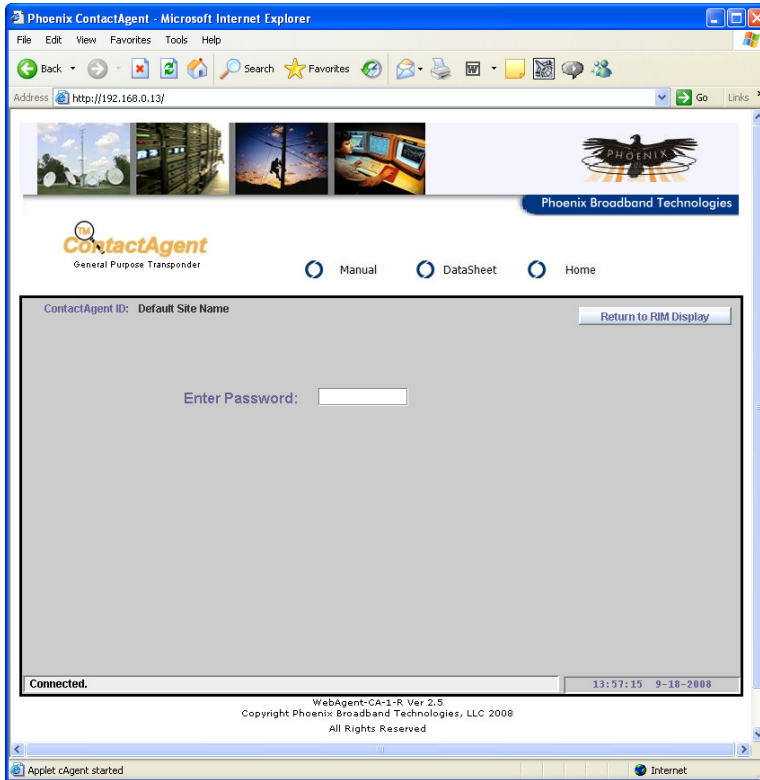


This screen shows the present value of each RIM Input. When an input alarm is enabled the value for the input will be color coded with its alarm status, Black for Normal, Yellow for Minor Alarm, and Red for Major Alarm.

To configure an input press the setup button for the desired input. The following password screen will appear or if the password was already entered the Input Setup 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 Host device (**ContactAgent™**).

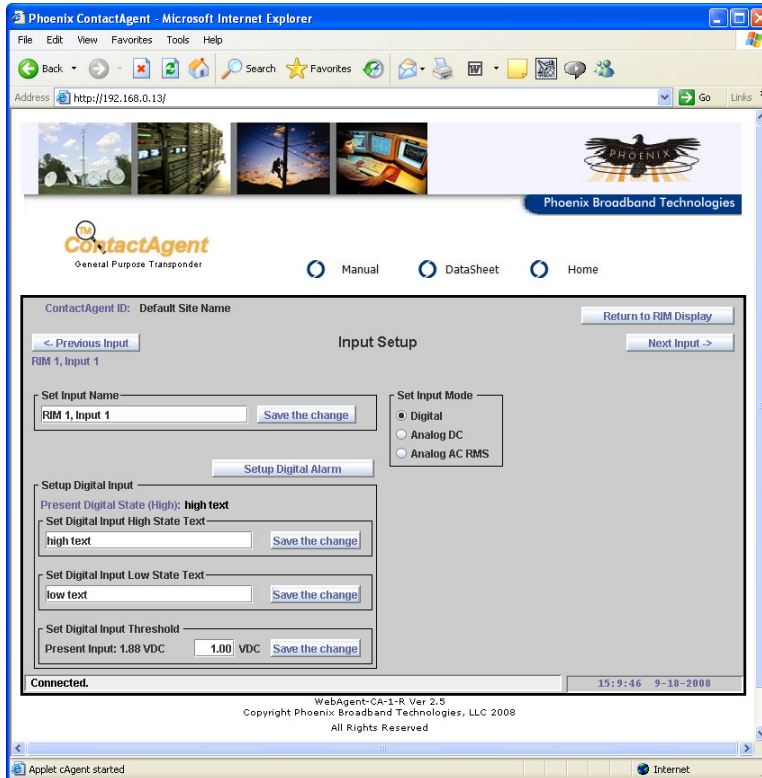
The password will time out after 10 minutes of inactivity. If the password is required following the timeout the Password screen will reappear.

Once the password is entered the Input Setup Screen shown below will appear.



Input Setup

To change the Input Name, type the desired name in the text box and press the Save the Change button.



Select Digital Input Mode for a measurement that can be displayed as one of two states, for example: On or Off. Select Analog DC Input Mode for a measurement where a DC voltage input represents a value, for example a power supply voltage. Select Analog AC Input Mode for a measurement where an AC voltage represents a value, for example AC line voltage.

If the **Digital Input Mode** is selected the screen will appear as shown to the left.

A digital input can be in one of two states. We refer to these states as High or Low. When the DC voltage at the input is above the **Digital Input Threshold**, that input is in the High state. When the input is below the Digital Input threshold the input is in the

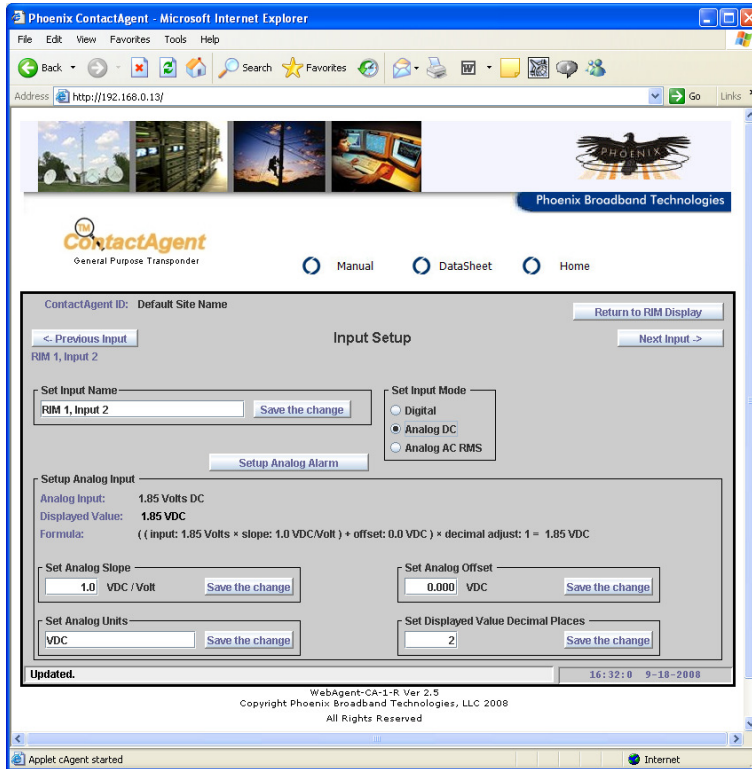
Low state. To set the text displayed when the input is in the High state, type the desired string in the **Set Digital Input High State Text** box and press the **Save the Change** button. To set the text displayed when the input is in the Low state, type the desired string in the **Set Digital Input Low State Text** box and press the **Save the Change** button.

To change the threshold where the input switches from the Low state to the High state enter the voltage in the **Set Digital Input Threshold** box. This voltage setting must be between -12.00 VDC and 12.00 VDC. The present input voltage is displayed in this group to aid in setting the threshold.

The actual switching thresholds include +/- 0.25 volts of hysteresis. For example; If the threshold is set to 5.00 VDC the state will switch from Low to High when the input voltage increase above 5.25 VDC, and switch from High to Low when the input voltage decrease below 4.75 VDC. An input that is not connected will rest at about 1.85 VDC.

To setup the Digital Alarms press the **Setup Digital Alarms** button and refer to Digital Alarms section further on in this document.

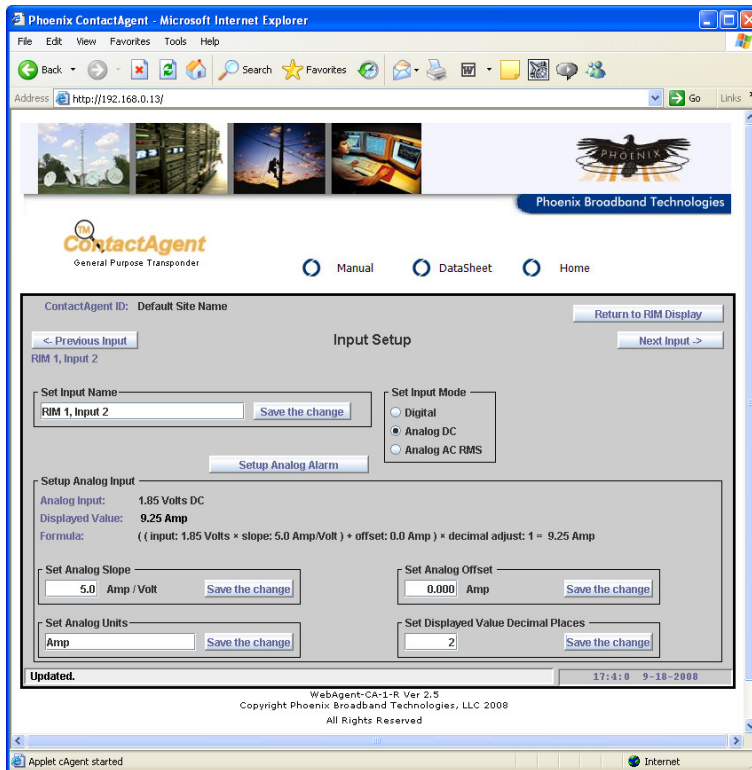
If the Analog Input Mode or Analog RMS Input mode is selected the screen will appear as shown below.



When either Analog mode is selected the RIM provides the capability to decode the reading and convert it to the correct units and display format. A slope and offset value can be entered to decode the reading. The units and number of decimal places can also be entered.

Set the **Analog Slope** by entering a number in the field and pressing the **Save the Change** button. Set the **Analog Offset** by entering a number in the field and pressing the **Save the Change** button.

Set the **Analog Units** by entering the units in the text box and pressing the **Save the Change** button. Set the **Displayed Value Decimal Places** by entering the number of decimal places (0 to 3.)



The Formula shows how the Displayed Value is calculated using the factors that you have entered

In the first screen on this page, the Input is configured to display the voltage present at the input. The voltage at the input is shown in the **Analog Input** display as 1.85 VDC. The **Displayed Value** is 1.85 VDC.

In the second screen on this page, the input is configured to read current. The current sensor used provides 0.2 Volts per Amp or 5 Amps per Volt. The voltage at the analog input is 1.85 volts resulting in a Displayed Value of 9.25 Amps.

press the “Setup Analog Alarms” button and refer to Digital Alarms section further on in this document.

To setup the Analog Alarms



When the AC Analog RMS Mode is selected the RIM measures the RMS voltage at the input rather than the DC voltage. This mode is normally used when measuring the voltage of an AC signal. The RMS measurement is waveform independent. If a 10 volt peak to peak sine wave is connected to a RIM input the RMS voltage will be reported as 3.57 V RMS. The accuracy of the RMS measurements is +/- 5 % of the full scale voltage.

The slope and offset calculations are performed the same in RMS mode as they are in DC Mode.

Temperature

The temperature measured by the RIM is displayed in degrees C and F in the Environmental group at the lower left of the RIM 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 RIM 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 RIM 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.

AC Line Voltage

The RIM comes with a plug-in transformer for monitoring the

AC Line Voltage. This transformer is not required to power the RIM. If the transformer is connected to the AC MON connector on the RIM the **AC Line Voltage** will be displayed on the lower right of the RIM screen. If the transformer is not connected to the RIM "Not Connected" will be displayed. To setup alarms for the **AC Line Voltage** press the **A** button adjacent to the **AC Line Voltage** and refer to the Analog Alarms section of this document.

Remote Module Communications Status

The **Remote Module Communications Status** indicates the state of the communications between the Host device and the RIM. The status will be Normal when there is reliable communications between the Host and the RIM. A status of Failed indicates that the Host is unable to communicate with the RIM. 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.

The screenshot displays the Phoenix ContactAgent web interface in a Microsoft Internet Explorer browser window. The address bar shows the URL http://192.168.0.13/. The page features a navigation menu with links for Manual, DataSheet, and Home. The main content area is titled "RIM RemoteAgent" and displays the following information:

- ContactAgent ID: Default Site Name
- RemoteAgent Address: 1
- Input 1: RIM 1, Input 1 Digital, high text, Setup
- Input 2: RIM 1, Input 2 Analog AC RMS, 22.45 Amp, Setup
- Input 3: RIM 1, Input 3 text Analog, 1.88 VDC, Setup
- Input 4: RIM 1, Input 4 Analog, 1.90 VDC, Setup
- Input 5: RIM 1, Input 5 Analog, 1.85 VDC, Setup
- Input 6: RIM 1, Input 6 Analog, 1.85 VDC, Setup
- Environmental: Temperature: 24 C, (75 F), Alarm; Relative Humidity: 36 %, Alarm
- RemoteAgent Communications Status: Normal
- AC Line Voltage: 123 VAC
- Firmware Version: 1.1
- Hardware Version: 0.2
- Connected.
- WebAgent-CA-1-R Ver 2.5
- Copyright Phoenix Broadband Technologies, LLC 2008
- All Rights Reserved
- Time: 11:18:17 9-19-2008



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 Status** 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.

Digital Alarms

When the **Setup Digital Alarms** button is pressed the Digital Alarm Setup screen shown below will appear. The **Present Digital State** of the selected RIM input is displayed, along with the user defined text for the present state. Digital alarms may be set independently for each state of the input. Each alarm can be set to Disabled, Minor, or Major by selecting the radio button. Normally the alarm is enabled (Major or Minor) for only one state, however it is possible to have one state report a Minor alarm and the other state report a Major alarm.



In the example to the left the major alarm is enabled for the high state and the alarm is disabled for the low state. Since the input is in the high state the major alarm is being reported as indicated by the red text.

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 **Setup Analog Alarms** button 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 below 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 vice 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 RIM. All of the information presented on the Web pages and complete configuration capability is available from SNMP. The RIM requires two MIBs in addition to the MIBs required by the Host device. These MIBs pbtRootMIB and pbtRemoteAgentMIB are available to RIM 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 RIM Input traps the trap text is taken from the user programmable fields. For analog traps the text comes from pbtRaInputText (Input Name), for discrete traps the text comes from pbtRaInputLowText (Digital Input Low State Text) or pbtRaInputHighText (Digital Input High State Text). Only the first 20 characters of these objects are used. These objects can be configured using SNMP or the RIM 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 Inputs:	6 digital/analog (user-definable) Refer to the model number table in the System Overview section
Analog Measurements:	+/- 12VDC; 0-8 VRMS
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 RIM Modules per host device P-BUS port
Interface to Host:	RS-485 on RJ-45 connector; power supplied by daisy chain
AC Line Measurement:	90 to 140 VAC, RMS, sine, 50/60 Hz
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 (without mounting bracket)
Weight:	4 oz. (with mounting bracket)