RFIDEAS

Configuration Utility User Manual

Modbus pcProx® PoE

Used worldwide, our badge readers are very robust and read nearly every card type across the globe.

Thank You!

Congratulations on the purchase of your Modbus PoE device. RF IDeas hopes you enjoy using the reader as much as we enjoyed creating and developing them. Configuration is easy, so you will be able to quickly take advantage of a more secure environment in your business, school, or organization.

Visit www.RFIDeas.com and follow the Support ⇨ Learning Center link for more details about our additional product lines.

We look forward to your comments and suggestions for our various product lines. We are always discovering new applications and have several software developer's licensing our technology so the solution you are looking for may already be developed.

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Thank you,

The RF IDeas Staff

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Phone: +1 (847) 870 - 1723
Toll Free: (866) 439 - 4884
Fax: (847) 483 - 1129
Email: Sales@RFIDeas.com
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Glossary of Terms

Terms	Definitions
ACP	ASCII Command Protocol
BootIP	Ethernet Boot Protocol
CSN	Card Serial Number
EIP	Ethernet Industrial Protocol
PoE	Power over Ethernet
PLC	Programmable Logic Controller
SDK	Software Developer's Kit – Software Developer's Kits from RF IDeas provide the high level command capabilities to integrate software applications to our devices.
UID	Unique Identifier

Information Symbols

Symbol	Meaning	Definition
	**Note**	Notes are useful information related to the text.
	**Important**	Important information can include prerequisites, limitations, and caution.

Contents

Chapter 1.The Basics

1.1 Standard

The PoE reader follows the IEEE 802.3af-2003 standard.

1.2 Power Supply

Power is supplied in common mode over two or more of the differential pairs of wires found in the Ethernet cables and comes from a power supply within a PoE-enabled networking device such as an Ethernet switch or can be *injected* into a cable run with a *midspan* power supply.

Power is supplied to the reader over the Ethernet connection in common mode over two or more pairs of wires on a PoE enabled network. The power is provided by a PoE router, Ethernet switch or can be injected into the cable with an additional midspan power supply available over the counter in most computer hardware stores or from catalog providers.

1.3 Equipment Needed

- RJ45 patch cable
- PoE capable network port, local router or power injector.
- PC (for initial setup) running:
    - Microsoft Windows
    - Shortbus Modbus Scanner
    - Telnet or other serial communications software and/or pcProxconfig5 application

Chapter 2.Getting Started

2.1 Setting up the Modbus Reader for use

The configuration of the reader in most installations requires minimal changes for implementation. However, there are options for configuring the reader. In any situation, setup may need to be done in at least one of the methods described in this manual. Follow the details to establish the communication settings and credential formats you will need to get the end application running right the first time. A typical installation will involve the following:

1. Make basic network connections.
2. Establish an IP address for the reader.
3. Configure the data mode: Listen or Polling
4. Configure the reader credential type(s) and associated data format.
5. Install the reader at the installation site.

2.2 Making the Basic Network Connections

The reader must be connected to a PoE capable connection to provide power to the reader and its communication dongle. For direct connection to the PLC, a simple network crossover cable can be used once the reader is configured.

Connect the reader to the PoE capable port. If one is not available, or for temporary configuration purposes, a power injector can be used. If using a power injector, refer to the manual included with the power injector for instructions on proper connection. Once the PoE network provides power to the reader a beep will be heard and the LED will illuminate red indicating the physical connection has been made and the port is powering the reader.

2.3 Establishing an IP Address

Once the physical connections have been made, the reader will request an IP address from the router or server. A dynamic address can be assigned by the network. Dynamic addresses can change as other devices are added to the network the PoE device is connected to. Static IP addresses are constant and therefore recommended.

On the administrator PC the DHCP Server may be used to assign an IP address (or use a standalone BootP server). An IP address pool should be established for large quantity reader deployment. For a direct reader connection; a static IP address may be required.

2.4 Reader Configuration

The reader requires some configuration prior to use. There are many ways to configure the reader. Once assigned, the IP address and internal mode can be configured through a web browser or through telnet to port 9999.

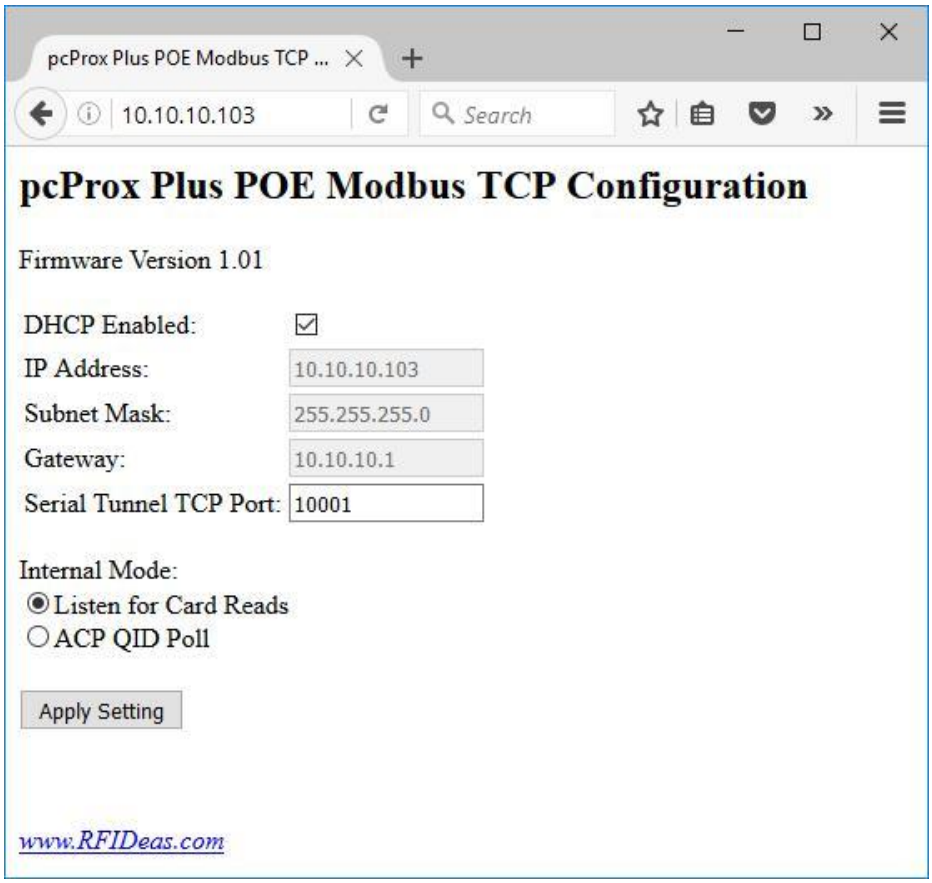
The reader can also be configured to change credential ID types supported, set the device logical unique ID and format the ID data output. To do this the pcProx Configuration utility can be downloaded and connected to a session using port 10001. Or, direct configuration can be performed through a Telnet session to port 9999.

In any situation, the reader will first need to have its IP address assigned and the internal data mode be set.

2.5 Configuring IP and Internal Data Mode Using Web Browser

From the web browser, type in the local IP address assigned to the PoE Modbus reader as shown.

Example: //10.10.10.103



Configuration Options

DHCP Enabled: When checked, this will enable the DHCP protocol. Unchecked will allow static IP address configuration.

IP Address: Displays the current IP address in the text box. Here the IP address of the PoE Reader can be edited if BOOTP is disabled. The address can be either dynamically assigned DHCP or a static IP address.

Subnet Mask: Displays the current Subnet mask in the text box. Here the subnet mask used by the PoE reader can be edited. Typically, the subnet mask will be 255.255.255.0 for most networks.

Gateway: Displays the current Gateway used by the PoE reader. Here the Gateway path can be edited. Set to 0.0.0.0 if the gateway will not be used.

Serial Tunnel TCP Port: Displays the current port address of the serial over Ethernet tunnel. Here the TCP Port used by the serial tunnel can be edited. Default is 10001 and typically does not need to be changed.

> The TCP serial tunnel should not be set to port 80, 502, or 9999. Port 80 is reserved for the web configuration menu, port 502 is already permanently configured for MODBUS communication, and 9999 is reserved for the telnet configuration menu.

Internal Mode: Here two radio button choices are shown. Select either “Listen for Card Reads” or “ACP QID Poll” depending on your intended use. See “Configuring the Internal mode”

Internal Mode

By default, the internal data mode is set to Listen Mode. If this is the mode desired and a standard RF IDeas reader is attached (81 in the model name), this step can be skipped. If the reader is a SDK model (82 in the model name) the mode must be set to polling mode.

The PoE for PLC reader module offers two data modes to send data over the Modbus network to the PLC: Listen mode and Polling mode.

Listen Mode: Utilizes the reader’s asynchronous serial communication to send ID data. When an ID is presented under listen mode:

- Sequence number is incremented
- ID bit count field is set to one
- ID data will be present

The data sent to the PLC will be valid as long as the ID remains present in the reader’s communication field. Once the card is removed the reader module will clear the ID data available to the PLC. This mode will set a one in the ID Bit Count field when data is available giving a Boolean method of triggering on card presence in addition to the sequence number. Listen mode offers the ability to adjust the data sent from the reader to simplify some programming at the PLC level. The

valid ID length can be set in the reader so only valid data lengths are acknowledged when present. Depending on the data sent, listen mode can be the fastest method of retrieving ID data.

Polling Mode: Sets the reader to poll for updated ID data continuously. When an ID is presented to the reader in polling mode:

- Sequence number is incremented
- ID Bit Count Field reports the ID bit count
- ID Data will be present

The data sent to the PLC will be valid as long as the ID remains present in the reader's communication field. Once the card is removed the reader module will clear the ID data available to the PLC. This method offers the addition of an ID Bit Count in the assembly instance that can be used to verify the ID is the correct data length. The valid ID length can also be set in the reader so only valid data lengths are acknowledged when present.

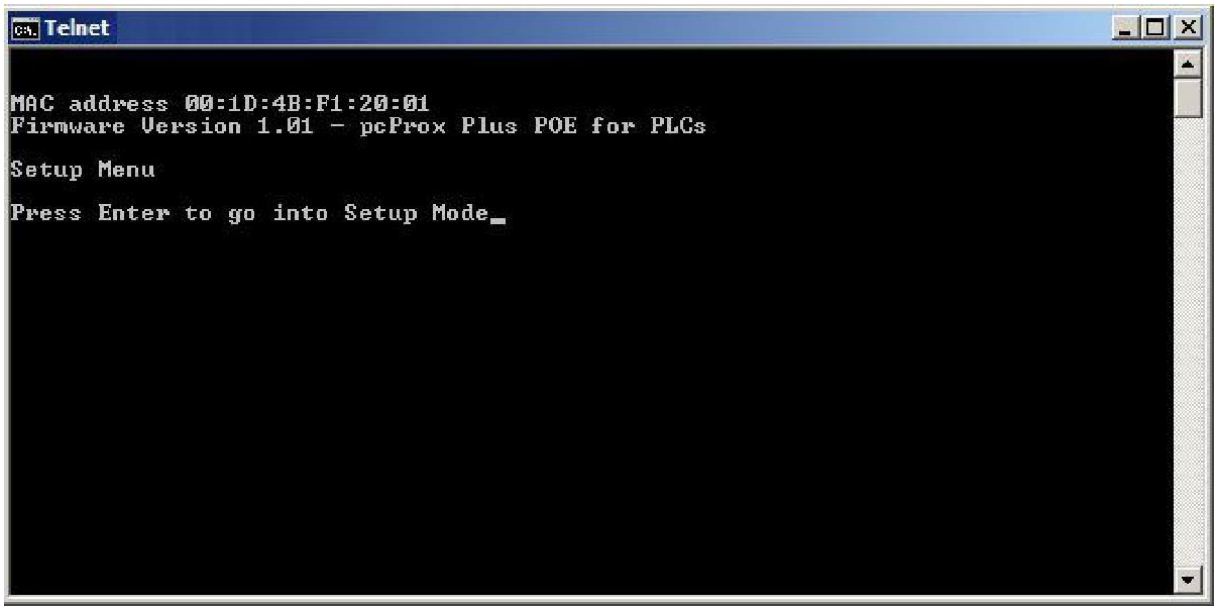
2.6 Configuring IP and Internal Data Mode Using a Telnet Session

From Windows, click start > Run and then type CMD to access the command line window.

From the command prompt, type telnet, the assigned IP address of the PoE reader followed by 9999.

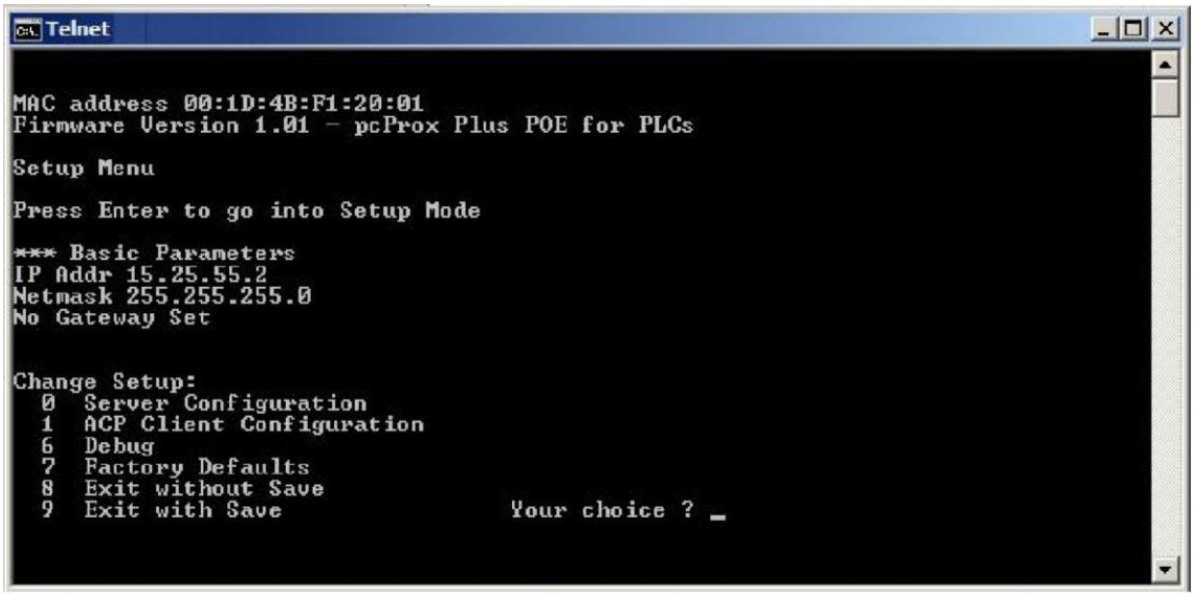
Ex: c:\>telnet 52.46.49.44 9999.

Once connected, the user will be prompted to enter setup mode:



This will bring up the configuration menu options. If the telnet session fails to connect, verify the IP address has been entered correctly.

Telnet Menu Options



0 – Server Configuration

Edit the server IP address currently assigned to the PoE reader

Enter the IP address when prompted.

The device will display the current entry in brackets (xx). Pressing enter will advance to the next entry.

After the IP address has been edited, the user will be prompted to enter the subnet mask in the same manner. Once all edits have been made, “set Gateway IP Address (N)” will appear.

Press Y then enter to change to an alternate gateway address. Otherwise press enter at the prompt to leave the entry as it is. In most configurations, it is not necessary to edit the Gateway setting.

The user will then be prompted with “Serial Tunnel TCP Port: (10001)?” Here the user can change the port address of the serial over Ethernet tunnel. The default is set to 10001. It can be changed to any non-conflicting port address that is not presently in use (Port 80 is reserved to the web configuration menu. Port 9999 is reserved to the Setup menu). In a typical configuration, it is not necessary to edit this port setting. Pressing enter will accept all changes and return to the main menu. At this point the setting have not been saved. To save the changes, press 9 and enter from the main menu.

1 – ACP Client Configuration

Sets the “ACP Client Mode” and “ACP Poll Interscan Delay”. The user can select either “listen” or “Poll” modes. “Listen” allows the device connected to listen for a card to be read.

“Polling” allows the user to continuously poll the reader every 250 ms to 2 seconds for changes in the ACP QID (Queued ID).

Pressing 1 and then enter will display “ACP Client Mode (0=Listen, 1=Poll): (1)?”. The default is set to 1.

Pressing enter again will display “ACP Poll Interscan Delay (250..2000 ms): (250)?

See Input / Output Assembly options

6 – Debug

Sets the PoE to continuously read out the packet transfers. Press Escape to stop the process.

7 – Factory Defaults - Resets the PoE to defaults.

8 – Exit without Save

This option will exit the setup menu without saving any changes made since the start of the session.

9 – Exit with Save

This option will exit the setup menu and save any changes made since the start of the session.

2.7 Configuring the Reader from pcProx® Config Utility

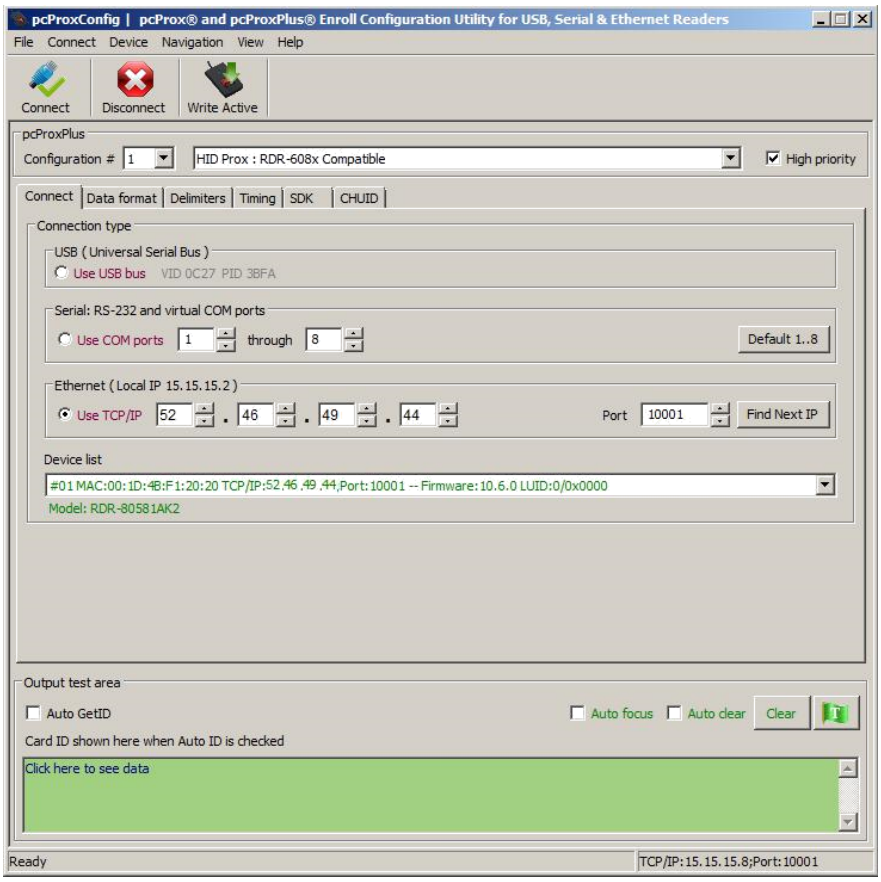
By default, all readers are shipped to detect standard ID formats and a typical data length for the model. Data formatting can be changed to the appropriate format through a variety of commonly used settings to achieve the data output required in the application. The pcProx® Plus line of readers can be configured to the desired ID type by choosing from different standard brands and/or formats.

If additional configuration is necessary for the reader to work in the intended application, this can be done by using the pcProx Config application or directly through the serial over Ethernet tunnel using a telnet session.

Configuration using pcProx Config:

Download and install the pcProx Config application version 5.2.19.1 or higher for the reader type purchased, from our website at www.rfideas.com/support/downloads

Open the pcProx Config utility.



Click on the radio button under ***Ethernet*** next to "***TCP/IP***".

Enter the IP address of the reader and click, ***Connect*** in the menu bar.

Once connected, the reader will appear in the device list drop down menu.

Configure the data format, timing or other settings as needed and click the ***Write Active***.

For pcProx plus models, choose the configuration number from the drop-down menu and then choose the appropriate ID type for each configuration. When finished, choose ***Write Active*** from the menu bar.

Configuring Multiple Identical Readers

If you need to configure more than one reader with the same configuration settings the process can be simplified by using hardware configuration files. To create one, set up a reader to the configurations needed in the end application. Once the settings are edited on

the first reader by “Write Active”; save them to a template file.

To do so:

1. Click on File>>Save device data to Hwg+ file
2. Type in an easy to remember name for your file.
3. Save the file to a known directory on your PC.
4. Disconnect the reader.
5. Connect the next reader to be configured.
6. Click connect from the menu bar.
7. Choose File>>Open hw/hwg+ file.
8. Navigate to the directory where the file was previously saved.
9. Click on the file and then click open.
10. Click on “Write Active” from the menu bar.

The settings are now activated on the new reader. Repeat this process for each reader in the installation.

2.8 Configuring the Reader Using ACP Commands

The Modbus PoE for PLC reader uses some ACP commands internally. However, there are many commands that can be used to choose configuration ID types, change data formatting and adjust parity bits among other commands. In listen mode, the reader uses delimiters for framing the ID data. Any changes to pre or post data delimiters will be over-written by the reader. In polling mode, all pre and post delimiters are not used. This manual will provide a brief overview for accessing the commands and their general structure. For more information or to see a full list of available commands, see the ASCII Command Protocol manual.

ACP Overview

ASCII Command Protocol (ACP) allows direct configuration of the device without downloading an application or creating a proprietary interface. The feature is available on CDC, Serial, PoE and Ethernet based readers. The serial Prox reader communicates using ASCII commands.

The reader then parses the command, performs the operation, and may display the result or an error code. All command strings begin with the prefix rfid: and end with a Return key (Enter), CR or LF.

Communication

Modbus and PoE based readers will communicate through a serial tunnel over the Ethernet connection. The Modbus PoE readers will require a telnet session to communicate to the reader.

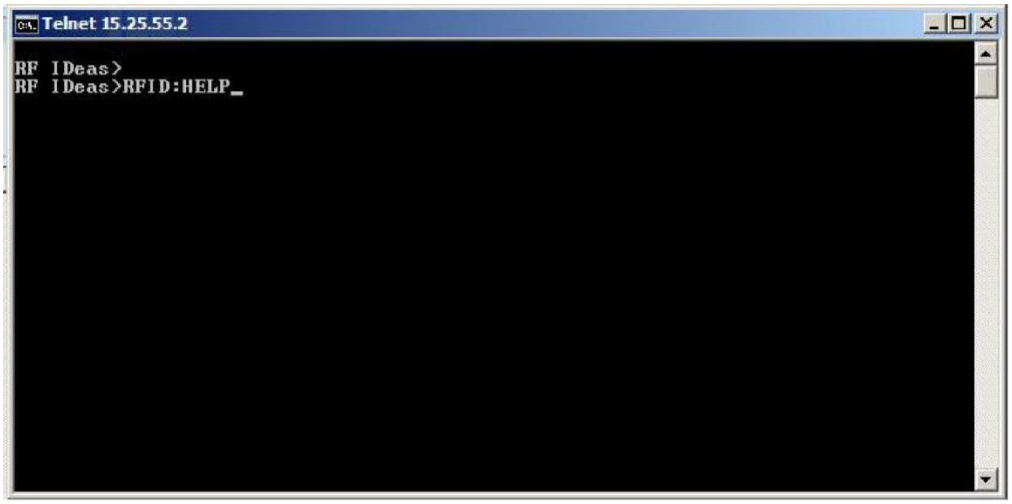
ACP commands can be sent directly to the reader through the serial tunnel port. This port is defaulted to port 10001 unless changed within the configuration setup menu accessed through the web browser.

From Windows

Go to `Start` ⇨ `Run` and type `CMD` then press `Enter` to open a dos window (From Windows 7, Go to `Start` then type `CMD` in the search box and press `Enter`)

At the command prompt, begin a telnet session by typing: telnet {IP address} 10001 where {IP address} is the IP address assigned to the reader.

Example: c:\>telnet 52.46.49.44 10001



When the telnet session is started, press enter to display the RF IDeas prompt.

At the prompt, type ***RFID:HELP*** to see a listing of variables and their command syntax.

To see what the reader is currently set to for the current configuration type ***RFID:VAR***

Make the necessary changes to the reader configuration. Type ***RFID:CFG.WRITE*** to save the changes (in RAM) to FLASH memory and activate the settings that were modified.

Command Structure

Commands are not case sensitive. Characters assigned to variables however, are case sensitive.

- All commands begin with rfid followed by one or more token strings with a period delimiter character between multiple tokens.
- Functions must end with a CR or LF.
- Any control characters other than CR, LF, and backspace terminate the command.
- Variables can be assigned a value with an equal sign followed by the value or queried with a question mark.
- The Escape key cancels a command.

The general syntax is:

Rfid: TOKEN { DELIMITER TOKEN } { { =Value} | {?} }

Command structure falls into one of three groups:

1. Perform a function.
2. Assign a variable.
3. Query a variable.

Perform a Function

A function performs an operation that may or may not display any results. A function may not be queried. An example of a function is to write the variable settings to flash memory using **rfid:cfg.write CR**.

Certain functions that display a value or series of values display the string between curly braces for easy parsing. For example, the **rfid:qid** function output displays:

{0x00BB,1,0x00,80;0x000000801CD1931B2F14}

Assign a Variable

There are three types of variables:

1. Boolean
2. Integer
3. Character

Examples of Boolean Assignments

rfid:op.beep=0
rfid:op.beep=true
rfid:op.beep=False
rfid:op.beep=F

Examples of Integer Assignment

rfid:out.led=0003
rfid:out.led=3

All 16-bit integer values require a hexadecimal entry
For Example: pcProx Plus card types: ***rfid:cfg.card.type=0xEF04***

Examples of Character Assignment

rfid:Delim.Chr.fac=':' CR
rfid:Delim.Chr.fac='x3a' CR

Examples of pcProx® Plus Configuration

To set configuration #1 to read Mifare CSN the following commands would be entered:

rfid:cfg=1 CR
rfid:cfg.card.type=0x7F41 CR
rfid:cfg.write CR

The reader will then respond with {ok}

To then set configuration #2 read HID proxII the following commands would be entered:

rfid:cfg=2 CR
rfid:cfg.card.type=0xEF04 CR
rfid:cfg.write CR

The reader will then respond with {ok}

Query a Variable

A Variable can be queried to display its current value. Variables are set and stored in RAM and are lost when the utility is closed. Use **rfid:var** to display the list of current ram settings. The **rfid:cfg.write** function writes the RAM variables to flash memory. If a variable is changed incorrectly, the settings can be replaced with those from flash using the **rfid:cfg.read** command.

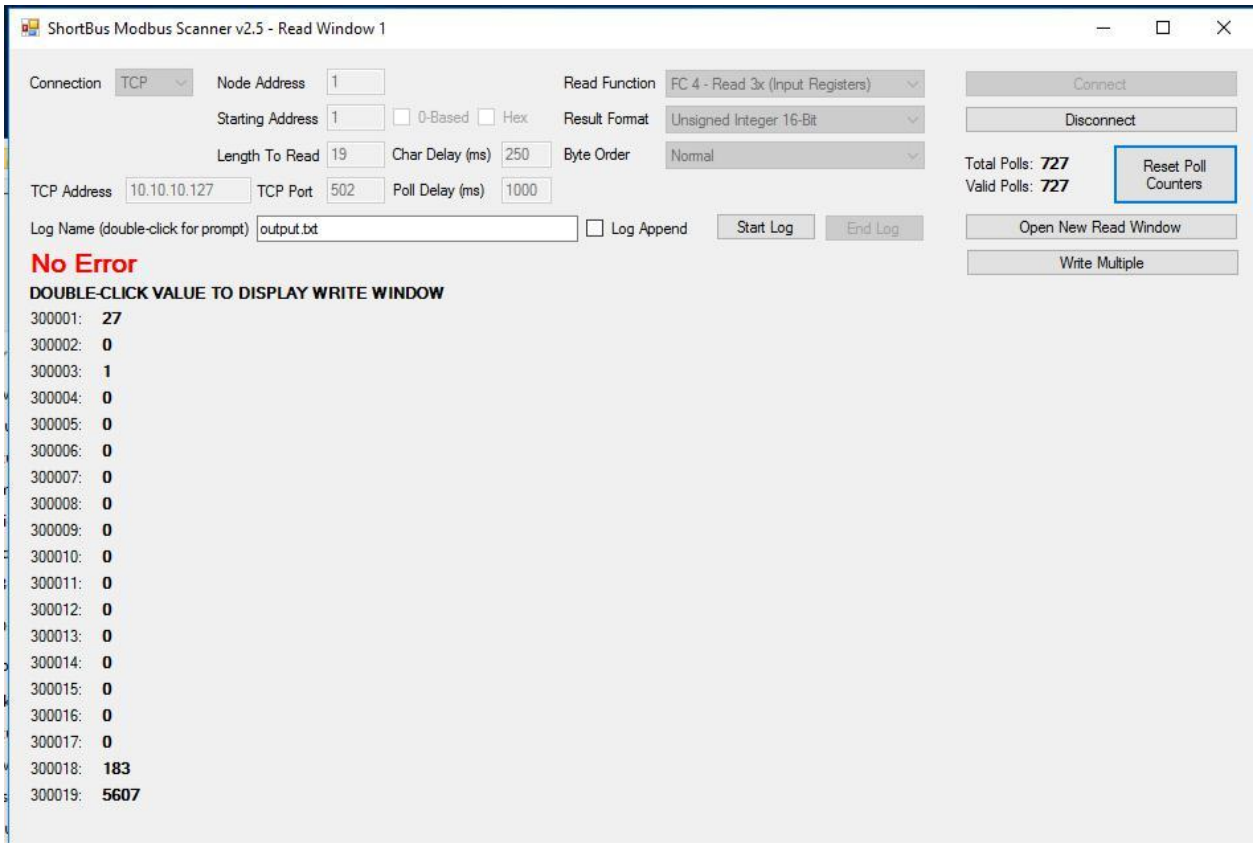
- The output of the variable displays between curly braces.
  Example: RF IDeas>rfid:out.led?
  {3}

Booleans display as true or false.

Chapter 3.Modbus Scanner

3.1 Shortbus Modbus Scanner

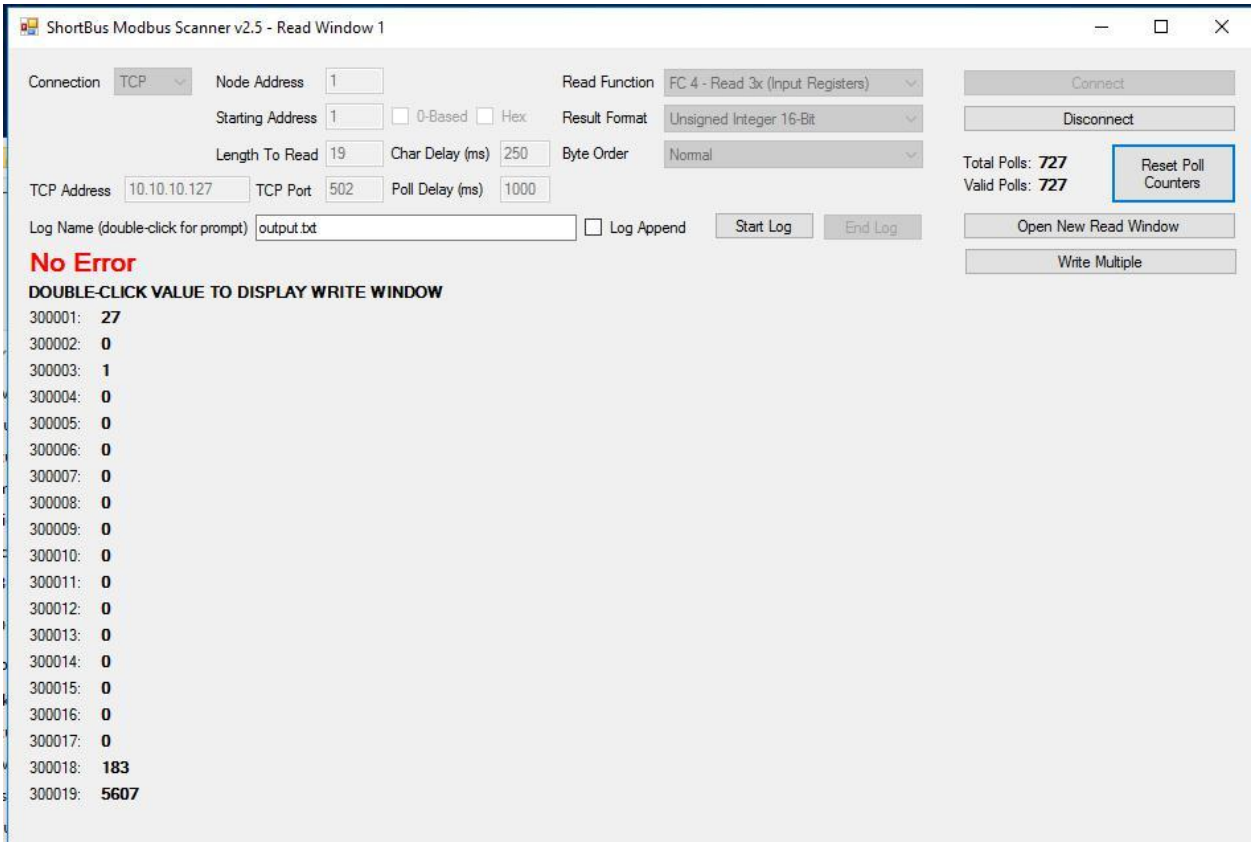
1. FIND DEVICE
    a. Use Lantronix “Deviceinstaller” to search for Modbus devices. Note the IP address
    b. Use a web browser and go directly to the IP address of the device. Change any parameters desired.
2. MODBUS SCANNER
    a. Use “Shortbus Modbus Scanner” or equivalent
    b. Set “***Connection***” pulldown to TCP and load in TCP address from #1 above
    c. Set “***Read Function***” to FC4 – Input Registers
    d. Set “***Result Format***” to Unsigned Integer 16-bit (or any other preferred date format)
    e. Set “***Length To Read***” to 19
    f. Press ***Connect***
    g. Present card



3. MODBUS INPUT REGISTERS
    a. Input Register 1: Sequence number (auto increment with each card presented)
    b. Input Register 2: LUID
    c. Input Register 3: Bit count

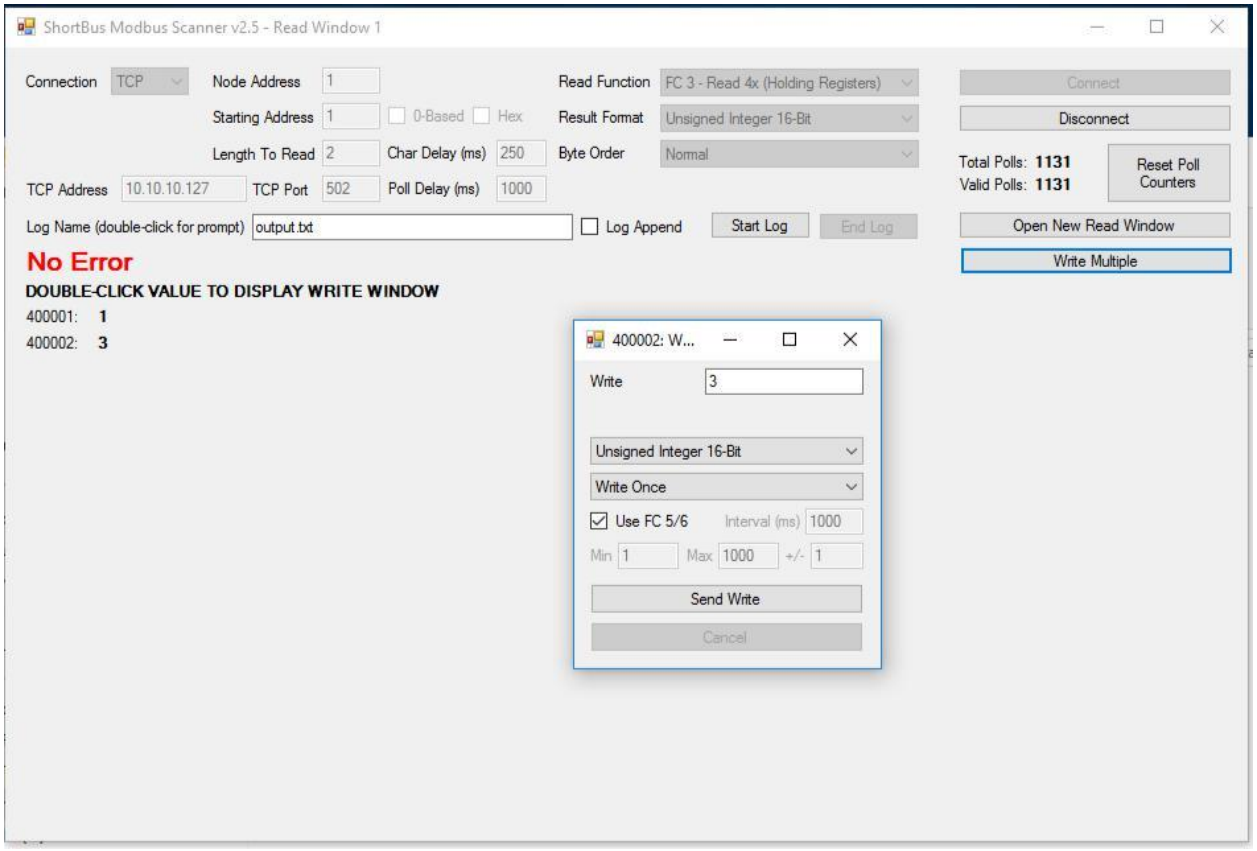
d. Input Register 7-19: Card data

4. MODBUS OUTPUT REGISTERS
    a. Holding Register 1: LED Control
        - bit 0 = red
        - bit 1 = green
        - both = yellow
    b. Holding Register 2: BEEP Control
        - 1 – single short beep
        - 2 – two short beeps
        - 3 – three short beeps
        - 4 – four short beeps
        - 5 – five short beeps
        - 101 – single long beep
        - 102 – two long beeps
5. EXAMPLE: HID PROX READ
    a. Card number printed on card is 05607
    b. Shortbus read below:



- Register 19 is 5607 which is the card number

6. EXAMPLE: BEEP 3 short beeps
    a. Reconnect Shortbus with only 2 registers, reading the Holding registers in Integer format
    b. Double click data in register 2.
    c. Click check box “Use FC 5/6”.
    d. Type in 3 for 3 short beeps.
    e. Click on “Send Write”



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FCC Compliance Statement

FCC ID: M9MPCPROXHUSB100 (HID USB Model)
FCC ID: M9MPCPROXM101 (Indala Model)
FCC ID: M9MRDR6X8X (Kantech, Indala, Casi-Rusco)
FCC ID: M9MPCPROXC101 (Casi-Rusco Model)
FCC ID: M9MRFID1856I100 (MIFARE/iCLASS Models)
FCC ID: M9MRDR7580 (iCLASS MIFARE and Other 13.56MHz)
FCC ID: M9MRDR7581 (iCLASS MIFARE and Other 13.56MHz)
FCC ID: M9MRDR7081AKE (iCLASS MIFARE and Other 13.56MHz)
FCC ID: M9MRDR8XX8U (Plus combo Model)
FCC ID: M9MRDR8058X (Multi-protocol Combo Model)
FCC ID: M9M758XCCL (MIFARE and Contact Model)
FCC ID: M9MRDR80081 (Plus SIO Combo Model)
FCC ID: M9MRDR60DX (125kHz USB Dongle Model)
FCC ID: M9MOEM805NX (Multi-protocol Combo Model)
FCC ID: M9MSB758X (Mifare 13.56MHz)
FCC ID: M9MLC6T8X (132 kHz USB Model)
FCC ID: M9MLC608XU0 (125 kHz Virtual Com Model)
FCC ID: M9MLC6X8X (Multi-protocol 125kHz)
FCC ID: M9MLC805X (Multi-protocol Combo Model)
FCC ID: M9MHP8058X (Multi-protocol Combo Model)
FCC ID: M9MLC7X11U (13.56MHz USB Model)
FCC ID: M9MBUPCPROXH100 (HID RS-232 Model)
FCC ID: M9MBUPCPROXA100 (AWID)
FCC ID: M9MPCPROXP100 (Pyramid)
FCC ID: M9MRDR7081 (iCLASS Module based)
FCC ID: M9MRDR7P71 (FIPS 201 13.56MHz)
FCC ID: M9MRDR7L81 (Legic 13.56MHz)
FCC ID: M9MRDR7081AKF (iCLASS MIFARE and Other 13.56MHz)
FCC ID: M9MRDR75DX (iCLASS MIFARE and Other 13.56MHz)
FCC ID: M9MRDR758X (iCLASS MIFARE and Other 13.56 MHz)
FCC ID: M9M8058XCCL (Multi-protocol and Contact Model)
FCC ID: M9M7580CCL (MIFARE and Contact Model)
FCC ID: M9MRDR70EX (13.56MHz Express Model)
FCC ID: M9MLC608X (125KHz USB Model
FCC ID: M9MSB708X (iCLASS 13.56MHz)
FCC ID: M9MSB6X8X (Multi-protocol 125kHz)
FCC ID: M9MLC60DX (125 KHz USB Model)
FCC ID: M9MLC758X (13.56 MHz USB Model)
FCC ID: M9MLC6X11U (125 kHz USB Model)
FCC ID: M9MLC8058U (Multi-protocol Combo Model)
FCC ID: M9MLC8008XU (Multi-protocol Combo Model)

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Note: This device complies with Part 15 of the FCC Rules and Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. This product complies with FCC OET Bulletin 65 radiation exposure limits set forth for an uncontrolled environment.

The reader may not recognize value cards in the presence of high RF fields. If the current reading is erratic, the user shall take the following step: Move the equipment from any known transmitters nearby. For more information contact Tech Support at (866) 439 - 4884.

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