User's Manual

MOD9200D MODBUS Transceiver

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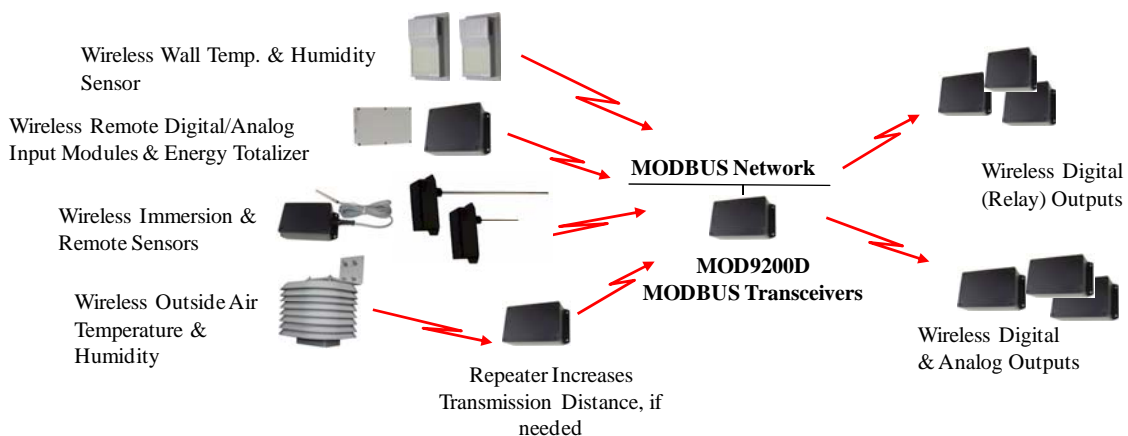
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I. Introduction

MOD9200
MODBUS Gateway

The MOD9200 MODBUS network receiver utilizes reliable Spread Spectrum Mesh Network Radio technology. When used with other wireless sensors the system can transmit remote sensor readings, status/alarm indications and control signals to a centralized networked monitoring station or controller without the need for extensive wiring. The MOD9200 is compatible with any control system or Programmable Logic Controller (PLC) panel that utilizes the TCP/IP or RS485/RS232 RTU/ASCII MODBUS communication protocols.

a. MOD9200 Gateway System

- MOD9200 MODBUS Network Receiver
- Receives input from up to 50 remote wireless sensor modules and/or wireless output modules (RD2402 & RD2431) per Transceiver
- Signal repeater/router can be used to extend the wireless sensor transmission distance if needed
- Ethernet Network Connection or RS485/RS232 Connection
- MOD9200 Configuration Software

Wireless Wall Temp. & Humidity Sensor

Wireless Remote Digital/Analog Input Modules & Energy Totalizer

Wireless Immersion & Remote Sensors

Wireless Outside Air Temperature & Humidity

Repeater Increases Transmission Distance, if needed

MODBUS Network

MOD9200D MODBUS Transceivers

Wireless Digital (Relay) Outputs

Wireless Digital & Analog Outputs

Sub-System Overview

Automation Components Inc.
2305 Pleasant View Rd.
Middleton, WI 53562
MOD Rev 8.0, 2011

II. MODBUS Transceiver Installation & Network Setup

a. Transceiver Installation

- Choose a location close to the computer, network hub or RS485 loop.

- Mount the gateway on the wall using four #8 screws.

- 24 VAC Input - Connect 24VAC 60 Hz and earth ground to the input terminals using 18 AWG wire as shown in the product data sheet.

- TCP/IP - If using TCP/IP use RJ45 Category 5 Ethernet cable to connect the Gateway (J2) to the network hub or computer. (See Figure 1).

- RS232 - If using RS232 RTU/ASCII use the MOD9200-RS232 cable (sold separately) to connect the Gateway (J1) to the serial port on the computer (See Figure 1).
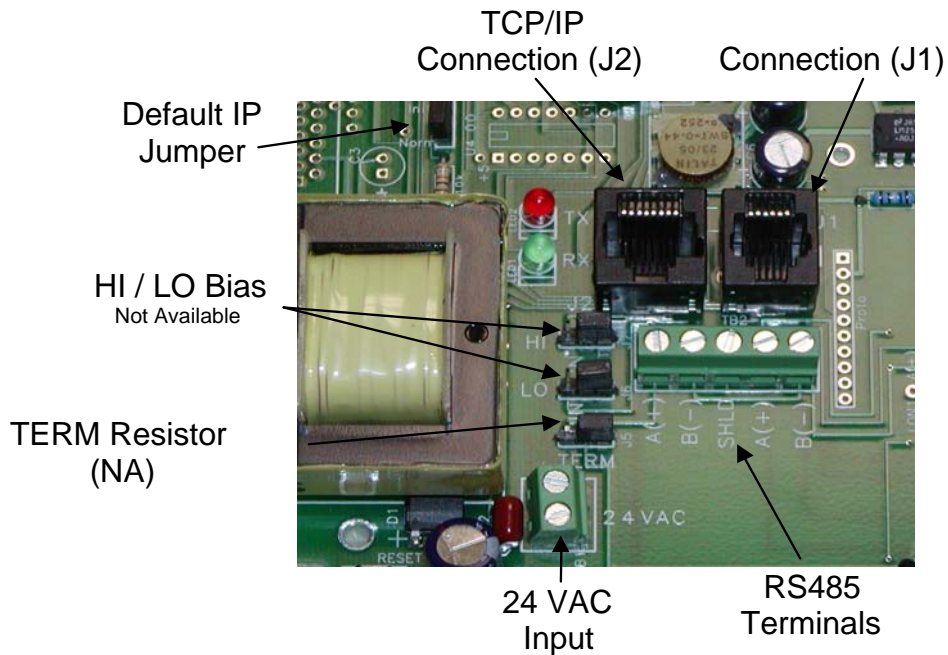
Figure 1

- RS485 - If using RS485 RTU/ASCII use 18 gauge shielded twisted pair wire to connect the Gateway (Terminals A+ & B-) to the MODBUS master. When running the RS485 loop into a breaker panel use wire with appropriate insulation for the voltage present (See Figure 1).

- Multiple RS485 Devices - If more than one RS485 device is used the devices should be "daisy chained" or "straight-line connected" by connecting all the "A" wires to the "A" terminals and the "B" wires to the "B" terminals. <u>Do not use</u> spur lines or a star configuration.

- <u>RS485 Terminating Resistor</u> - If the MOD9200 is at the end of a RS485 loop a terminating resistor should be installed to match the electrical impedance characteristic of the twisted pair loop and prevent signal echoes from corrupting the data.

b. Network Setup

(Note: Even if you are planning to use the RS485 RTU/ASCII MODBUS protocol option a network connection or crossover cable is required during the initial setup of the gateway for transporting the Gateway Configuration File via FTP)

- Connect the MOD9200 Gateway to a 10/100Base-T Ethernet network or use a crossover cable to connect directly to the PC.

   Note: Only (1) TCP/IP connection is allowed at a time – either a MODBUS Polling Master or the Programmer Configuration Tool – DO NOT try to use both at the same time.

- Apply 24 VAC 60 Hz power to the MOD9200 Gateway.
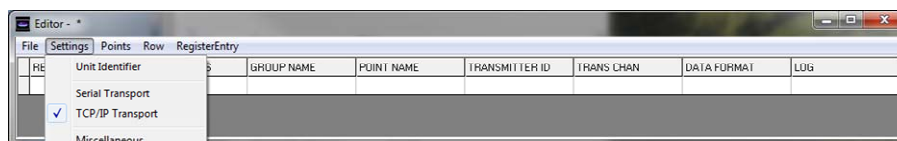
c. Setting A New IP Address

- The MOD9200 is shipped from the factory with an IP address of 192.168.0.1 and a subnet mask of 255.255.255.0 .

   Note: To initially connect to the Gateway the networked PC must have a static IP address in the form of 192.168.0.X where X is > 1 with a subnet mask of 255.255.255.0.
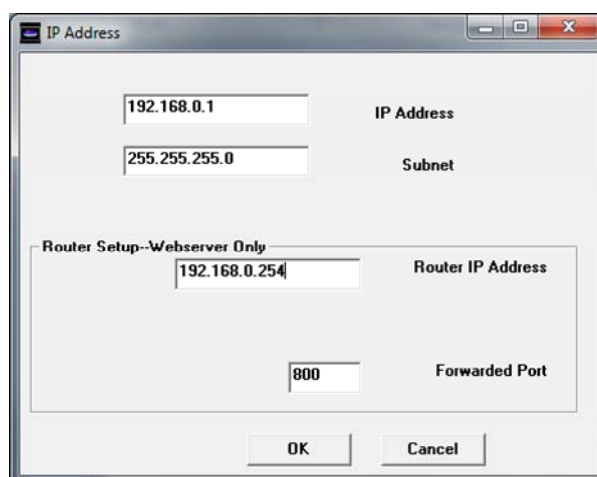
- The IP Address is changed by changing the IP Address in the Gateway Config File. Open either an existing config file or a new config file

using the Programmer Software.

- Click on Settings > TCP/IP Transport.

- Enter the new IP Address and Subnet Mask and click OK. The new IP Address will take affect when the Config File is downloaded to the Gateway.

- **<u>Router Setup – Webserver Only</u>** – **NOT USE**. Applicable for RM9500 WebLogger Setup ONLY.

d. Manually Resetting The Factory Default IP Address

- The Gateway can manually be reset to the default IP Address by moving the jumper (J6) from "Norm" to "Init".

- Turn off the power to the Gateway and move the jumper from "Norm" to "Init". Turn on power and the Gateway can be communicated with using the Factory Default IP Address 192.168.0.1 Subnet Mask 255.255.255.0. The Config File is no longer active while the jumper is in the "Init" position . A new Config File can be downloaded to the Gateway if desired.

- To reactivate the Config File - turn off the power to the Gateway and move the jumper back to "Norm". Turn the power back on and the Config File will become active. The Gateway will have the IP Address that was set in the Config File.

TCP/IP APPLICATION NOTE: When using the MOD9200D in TCP/IP mode the MODBUS Master "polling interval" should be set to occur within 2 minutes 59 seconds or less. If no polling activity occurs within 3 minutes the MOD9200D will automatically close the network connection and the MODBUS Master will have to close and re-open the connection to re-establish communications. The MODBUS Master should not attempt to re-open the network connection for at least 3 ½ minutes after the network connection has been closed. ---- Only (1) TCP/IP connection is allowed at a time.

III. Configuration Software

a. Configuration Software Description

- The MODBUS data registers of the Gateway need to be configured prior to use.

  The configuration program "Trs Programmer.exe" can be found on the disk or CD ROM on the back cover of this manual will configure the data register as follows:

  - Assign the Input Register function – Analog or Discrete
  - Assign wireless Digital Output (Coil) Register function
  - Assign wireless Analog Output (Holding) Register function
  - Assign the register address
  - Assign the Wireless Sensor ID and transmission channel
  - Assign the data type

- The MOD9200 Transceiver can have up to 100 (addresses 0 to 99) data registers configured to be either Analog or Discrete, 50 digital outputs and 50 analog outputs.

- Error registers are directly mapped to the data registers + 400 (addresses 400 to 499). For example errors for data register 55 will be in error register 455.

b. System Requirements

- PC (Notebook or desktop) with Windows 98, XP, Vista or Windows 7

- Ethernet connection

- 10 MB of hard drive memory available

c. Configuration Software Installation

- If other applications are running close them before inserting the ConfigTool CD into the CD ROM Drive. The Programmer setup program should automatically start running. Follow the on screen instructions to complete the installation.

- If the Programmer setup program does not start automatically click on Start > Run > Browse and click on the Programmer CD ROM. Double
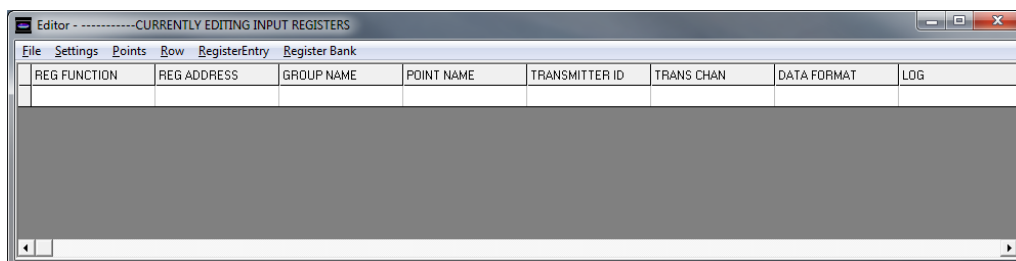
click on "setup.exe". Follow the on screen instructions to complete the installation.

d. Creating A MODBUS Configuration File

- To create a new MOD9200 configuration file open the Programmer by clicking on Start > Programs > Trs Programmer 6.XX.
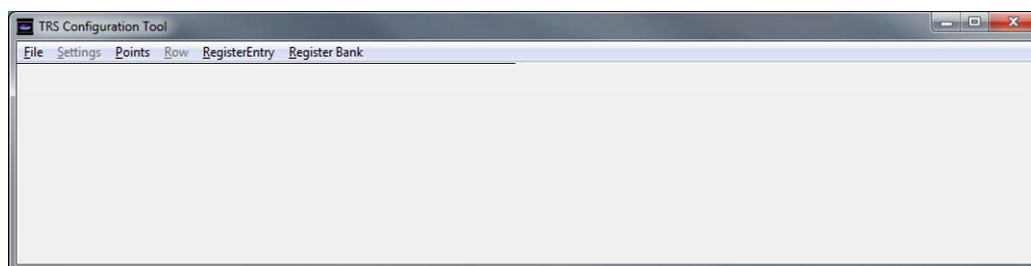
- To open a new configuration table Click on File > New Gateway File. A blank configuration table will open.


- The default startup is the Input Register configuration table and System Setup page..

- By clicking the "RegisterBank" tab, you can go to the Digital Output (Coil) register configuration table or Analog Output (Holding) Register configuration table.

e. **Input Register Configuration**

- Each row of the configuration table is a unique data register having 8 special attributes.

REG FUNCTION	--	Identifies the function of the register – Analog or Digital (Discrete) Note: If selecting the Digital (Discrete) function be sure to set the appropriate Digital Capture Time (Page 15)
REG ADDRESS	--	Assigns the address of the data register (0 to 99). Automatically assigns the address of the error register (400 to 499 i.e. data register address + 400)
GROUP NAME	--	Assigns a group name to the data register. Multiple data registers can have the same group name. This is useful for monitoring and data logging programs.
POINT NAME	--	Assigns a unique name to the data register to help identify the location of the sensor/transmitter. Multiple point names can have the same group name.
TRANSMITTER ID	--	Assigns a wireless sensor/transmitter address to the data register. Each wireless sensor is factory configured with a unique hexadecimal address.
TRANS CHAN	--	Assigns a wireless sensor/transmitter data channel to the data register. A wireless sensor/transmitter may have up to four (4) analog channels and (4) digital status/alarm channels.
DATA FORMAT	--	Assigns the data type to the register – temperature (RTD or Thermistor 20K), analog voltage, totalizer or humidity. This register is left blank if the REG FUNCTION is Digital (Discrete).
LOG	--	Assigns the data register to a log file so the data can be logged over time. This field is only used when the gateway will be used with a data logging program such as SensorVuII

- First we will assign the REG FUNCTION by clicking in the REG FUNCTION cell to open a drop down menu. Select the appropriate function.
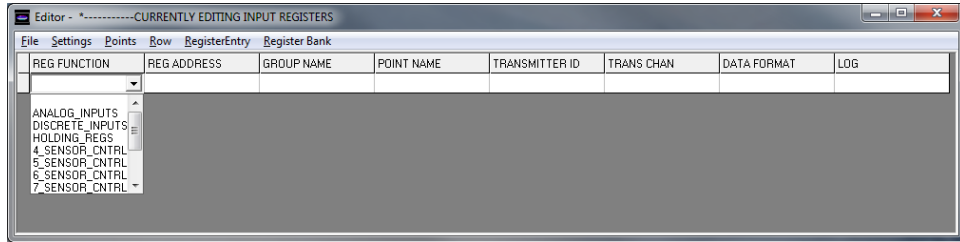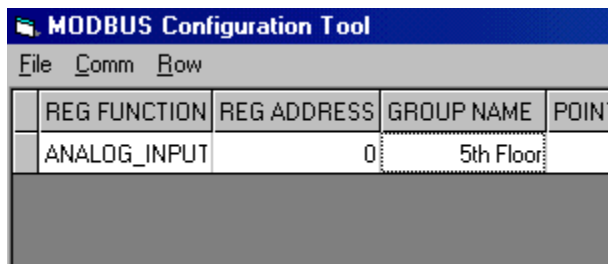

- Use the mouse to move to the next column to assign the REG ADDRESS by clicking in the cell. When the "RegisterEntry AutoSet is turned on, REG ADDRESS is automatically filled with the next sequential number from 0 to 99.
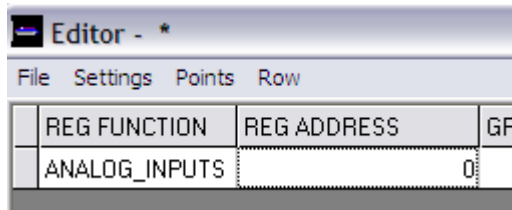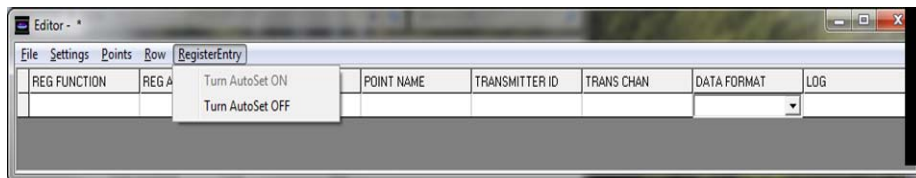

- Again use the mouse to move to the next column. Enter a GROUP NAME for the data set by typing the group name in the cell.
  Enter the name in the cell by using the mouse to click on the next column.

  Note: DO NOT use delimiters - , ; : < > [ ] { } ( ) / \ - in the Group Name.

- Enter a POINT NAME for the data point by typing the name in the cell. Enter the name in the cell by using the mouse to click on the next column.

   Note: DO NOT use delimiters in the Point Name.
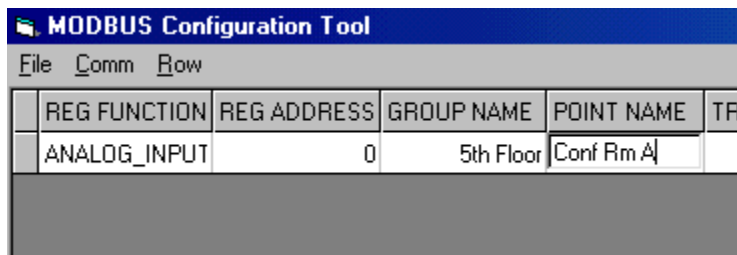
- Assign a sensor/transmitter to the data register by clicking in the TRANSMITTER ID cell to open a drop down menu. Use the scroll bar to scroll to the correct address or automatically scroll to the address by typing the hexadecimal address in the cell. To select the address click on the appropriate ID in the drop down menu. Each transmitter is factory configured with a unique ID – refer to the sensor product data sheet for the location of the transmitter ID.
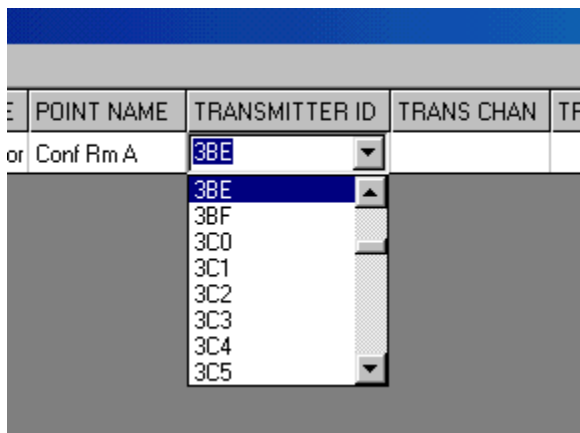
- Assign the appropriate sensor transmission channel to the data register by clicking in the cell to open a drop down menu. Click on the appropriate transmission channel (01 to 04) to select.
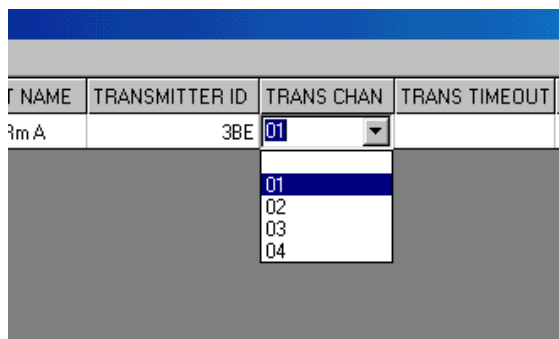
- The active transmission channels are factory configured as follows:

Device	Analog CH-01	Analog CH-02	Digital CH-01
WT2630A	Space Temp (Therm 20K)		
WT2630B	Space Temp (Therm 20K)	SetPoint (Analog)	Override (Discrete) See page 15 to set the Digital Capture Time
WT2630C	Space Temp (Therm 20K)		Override (Discrete) See page 15 to set the Digital Capture Time
WH2630A,C	Humidity		
WH2630B,D	Space Temp (Therm 20K)	Humidity	
OA2630A	Outdoor Temp (Therm 20K)	Outdoor Humidity	
OT2630A	Outdoor Temp (Therm 20K)		
OH2630A	Outdoor Humidity		
DT2630A,B	Duct Temperature (Therm 20K)		
DH2630A,D	Duct Humidity		
DH2630B,C,E,F	Duct Temperature (Therm 20K)	Duct Humidity	
FT2630A,B	Fluid Temperature (Therm 20K)		
CTM2630	Totalizer 01 Count – CH-03; Totalizer 02 Count – CH-04		
RT2630A,B,C,D	See Device Label for Analog (4) and Digital (4) Configuration		
RT2620A,B	See Device Label for Digital (4) Configuration		
SST2630A	Temperature (Therm 20K)		
SST5630A	Temperature (RTD 1K)		

- Select the appropriate DATA FORMAT value by clicking in the cell to open a drop down menu.
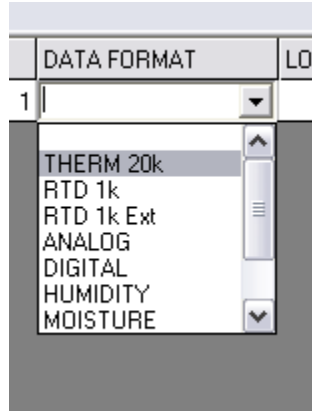
- The LOG column is used to identify the file the register will be logged to when using SensorVuII Monitoring and Logging software. Enter the name of the appropriate "log file" specified in the SensorVuII LOG CONFIG menu. The file names are case sensitive.
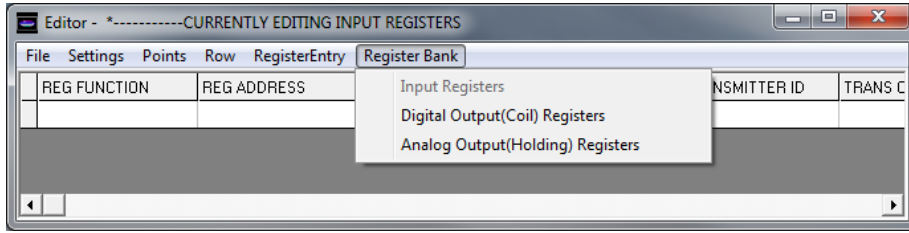

- To create a new data register row click on Row > Append. Continue to do this for each row/data register that needs to be configured.

- The completed configuration example for an office building is as follows:
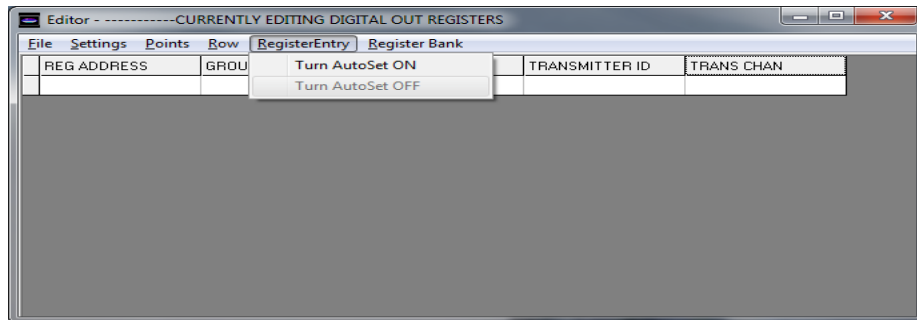

- The columns may be resized by placing the cursor over one side of the column. When the cursor changes to two arrows hold down the left mouse button and drag the side of the column to resize it.

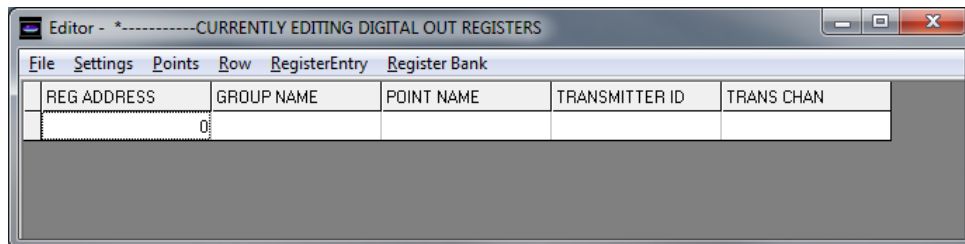**f. Digital Output (Coil) Register Configuration**

- Select the Digital Output (Coil) Register table by clicking the "RegisterBank" tab.

- First we will assign the REG ADDRESS by clicking in the cell. Before entering register addresses, ensure the "RegisterEntry" AutoSet is turned off as shown:
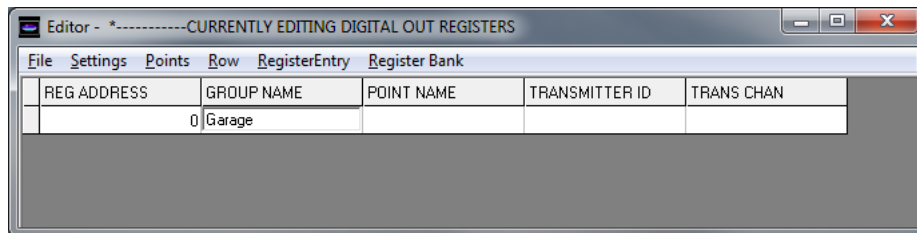

- Enter the Register address in the REG ADDRESS window. The valid range is 0 to 49.
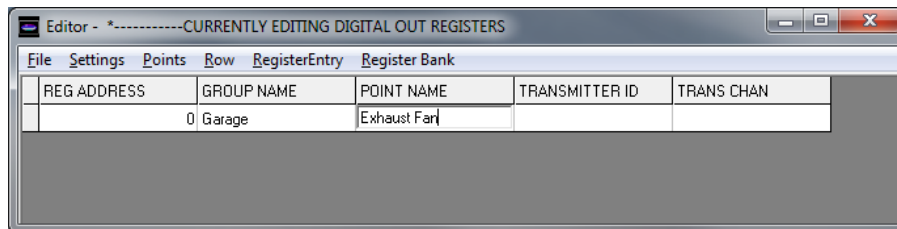
- Again use the mouse to move to the next column. Enter a GROUP NAME, if desired, for the data set by typing the group name in the cell.
  Enter the name in the cell by using the mouse to click on the next column.

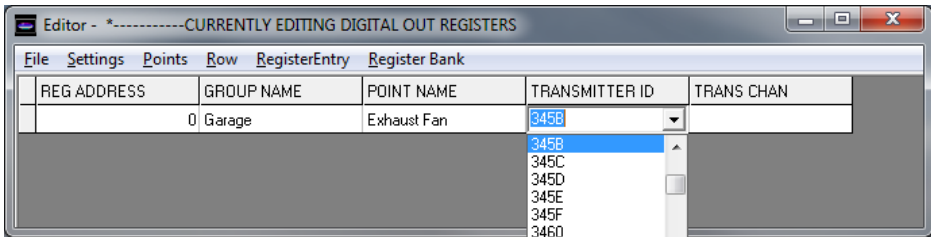 **Note: DO NOT use commas or semicolons in the Group Name.**

- Enter a POINT NAME, if desired, for the data point by typing the name in the cell. Enter the name in the cell by using the mouse to click on the next column.
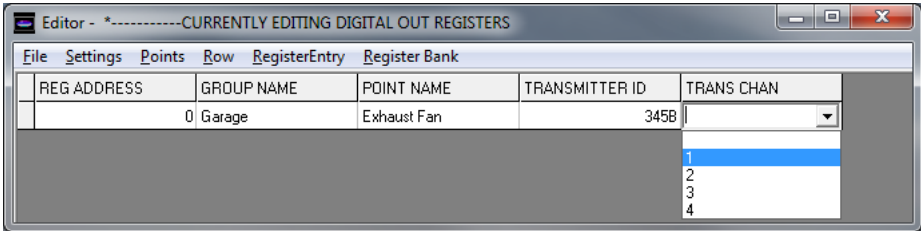
  Note: DO NOT use commas or semicolons in the Point Name.

- Assign a sensor/transmitter to the data register by clicking in the TRANSMITTER ID cell to open a drop down menu. This is the device ID of the remote output devices (RD2402 & RD2432). Use the scroll bar to scroll to the correct address or automatically scroll to the address by typing the hexadecimal address in the cell. To select the address click on the appropriate ID in the drop down menu.

- Assign the appropriate digital or relay output "TRANS CHAN" to the data register by clicking in the cell to open a drop down menu. Click on the appropriate transmission channel (01 to 04) to select.
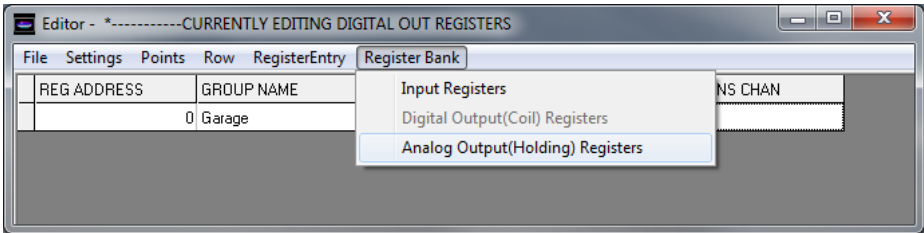

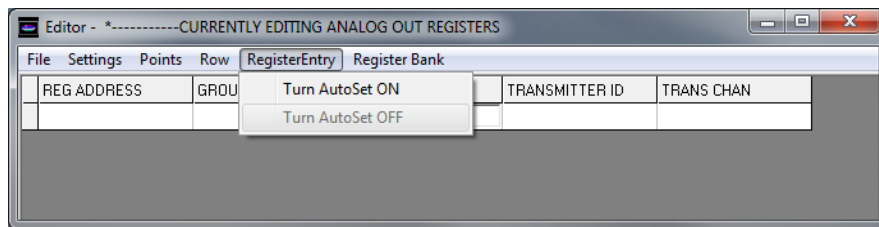- The active transmission channels or output number are factory set as follows:

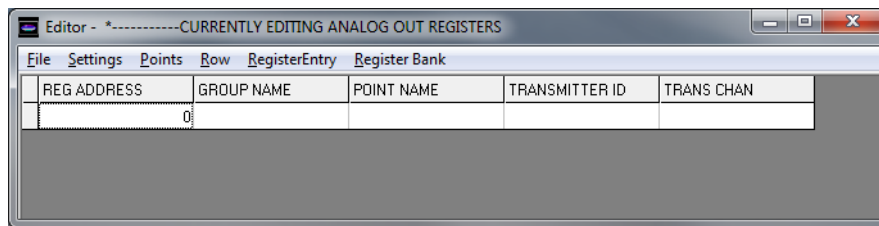| Device	Digital	Analog	
RD2402	1 to 2 for relay #1 and relay #2	NA	Wireless Relay output module
RD2432	1 to 4 for relay #1 to relay #4	1 to 4 for analog output 1 to 4	Wireless digital & analog output module

g. Analog Output (Holding) Register Configuration

- Select the Analog Output (Holding) Register table by clicking the "RegisterBank" tab.

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- First we will assign the REG ADDRESS by clicking in the cell. Before entering register addresses, ensure the "RegisterEntry" AutoSet is turned off as shown:
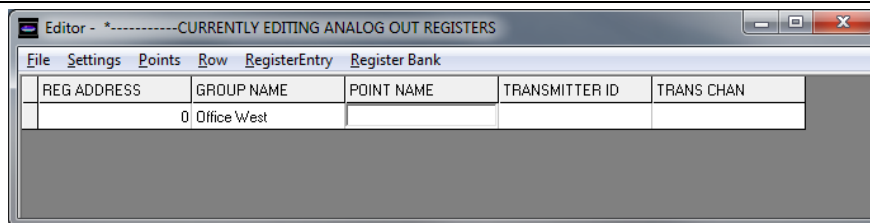
- Enter the Register address in the REG ADDRESS window. The valid range is 0 to 49.
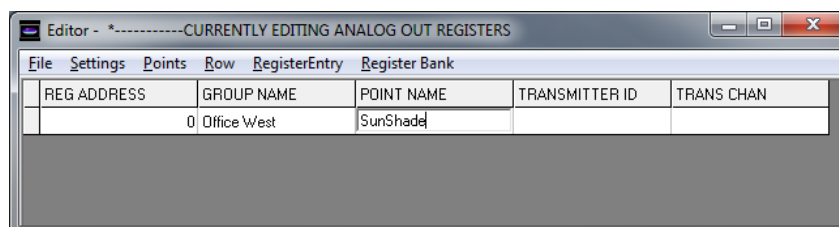
- Again use the mouse to move to the next column. Enter a GROUP NAME, if desired, for the data set by typing the group name in the cell.
  Enter the name in the cell by using the mouse to click on the next column.

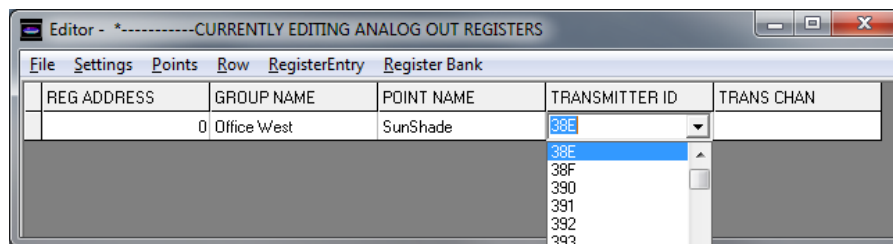 **Note: DO NOT use commas or semicolons in the Group Name.**

- Enter a POINT NAME, if desired, for the data point by typing the name in the cell. Enter the name in the cell by using the mouse to click on the next column.
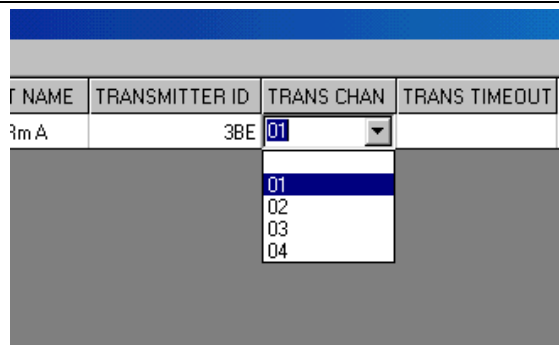 **Note: DO NOT use commas or semicolons in the Point Name.**

- Assign a sensor/transmitter to the data register by clicking in the TRANSMITTER ID cell to open a drop down menu. This is the device ID of the remote output devices (RD2432). Use the scroll bar to scroll to the correct address or automatically scroll to the address by typing the hexadecimal address in the cell. To select the address click on the appropriate ID in the drop down menu.


- Assign the appropriate digital or relay output "TRANS CHAN" to the data register by clicking in the cell to open a drop down menu. Click on the appropriate transmission channel (01 to 04) to select.

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- The active transmission channels or output number are factory set as follows:

| Device	Digital	Analog	
RD2402	1 to 2 for relay #1 and relay #2	NA	Wireless Relay output module
RD2432	1 to 4 for relay #1 to relay #4	1 to 4 for analog output 1 to 4	Wireless digital & analog output module

**h. Setting the Mesh Network ID for the repeater/router devices**
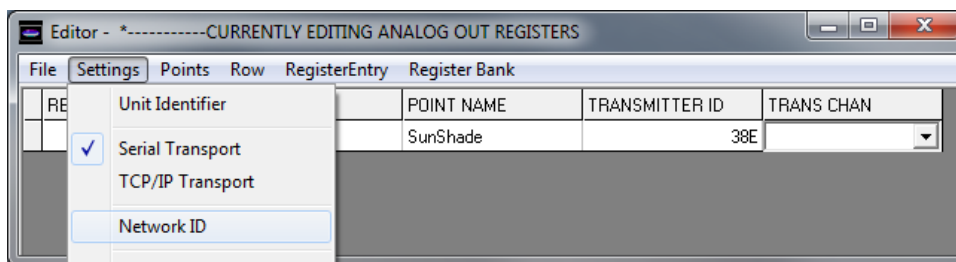
- The mesh network ID of the MOD9200 Gateway can be set to specific network # from 1 to 64. The MOD9200 functions as a network coordinator. Any repeater/router that has the same network ID will be able to communicate and channel sensor information to the MOD9200

i. Miscellaneous Menu

- The transmitter timeout interval, default temperature degrees (C/F), and Digital Input Capture Time are set globally for all sensors using the Miscellaneous Dialog Screen.

- Click on Settings > Miscellaneous
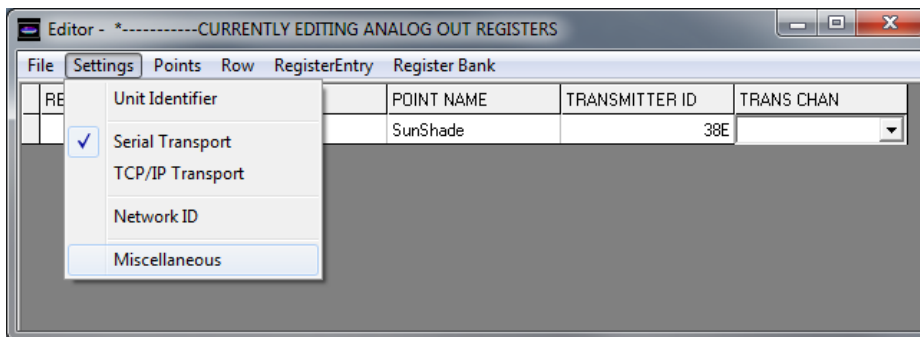
- Set the **transmitter transmission timeout interval** (*requires a minimum of 30 min.*) by clicking in the Transmitter Timeout cell to open a drop down menu. Use the scroll bar to scroll down to the appropriate value (1 to 60 min.) or type the value in the cell to automatically scroll to the appropriate value. This will be used to generate an error message if the transmitter fails to transmit in the specified time interval.
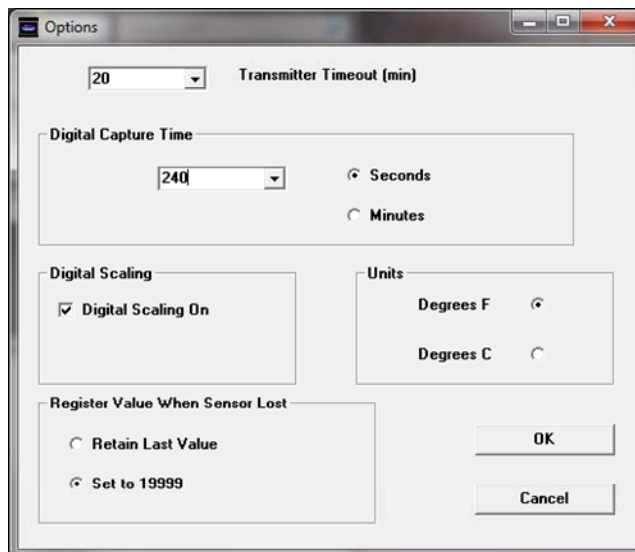

- To select the timeout interval click on the appropriate value in the drop down menu.

- The **Digital Input Capture Time** can be set to hold a momentary contact closure such as the override button on the WT2630B/C for a period of time

(Default is 0 min. & recommended value is 1 min.) so the controller has time to recognize the contact closure.

- **The Digital Capture Time can be set up to 240 minutes (4 hours) in applications where an extended period of time is needed such as "unoccupied period by-pass".**

- Set the Digital Capture Time interval (seconds or minutes) by clicking on "Seconds" or "Minutes". Click in the Digital Capture Time cell to open a drop down menu. Use the scroll bar to scroll down to the appropriate value (0 to 240) or type the value in the cell to automatically scroll to the appropriate value. To select the timeout interval click on the appropriate value in the drop down menu.

- **Digital Scaling On** check box – Should be "UNCHECKED". Check only when configuring the MOD9200BNT BACnet® receiver or the MOD9200LON LonWorks® Receiver.

- **Units** - Select the appropriate default temperature scale F/C.

- **Register Value When Sensor Lost** – The user has the options to select whether the sensor value should remain unchanged or set to 19999 when the communication link is lost with the sensor (after the transmitter timeout period).

j. Configuring The Gateway For TCP/IP MODBUS

- Click on the menu Comm > TCP/IP to select the TCP/IP configuration menu.
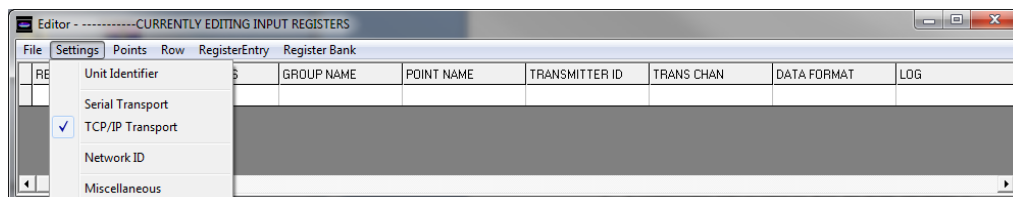
- Type in the appropriate IP address and click "OK". The TCP/IP transport protocol is automatically setup.
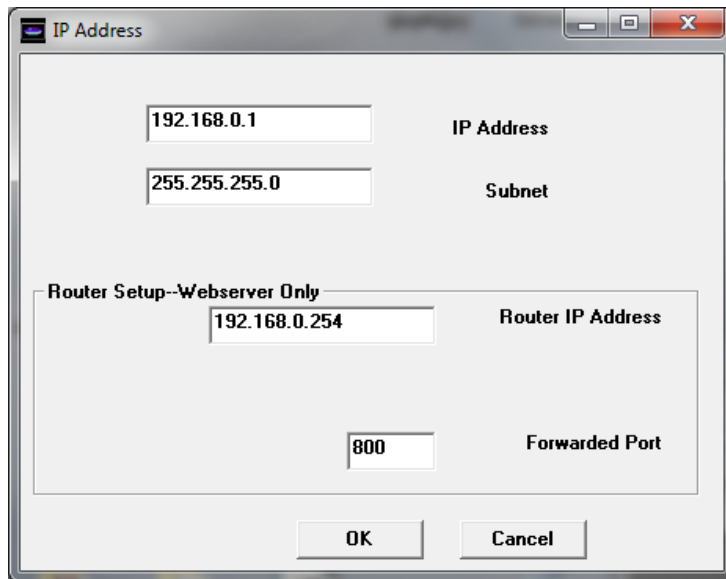
k. Configuring The Gateway For RS485/RS232 RTU/ASCII MODBUS Protocol

- When using the MODBUS Serial Line communications protocol the Gateway needs to be assigned a unique Identifier (Slave) Address to differentiate it from other serial devices on the network. To enter the Gateway Unit ID (Slave Address) into the Configuration File click on the Menu Comm > Unit Identifier.
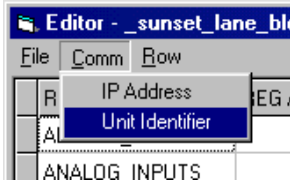
- Click on the drop down menu arrow and select the Gateway Unit ID from the drop down menu and click "OK". The default Unit ID is "1".

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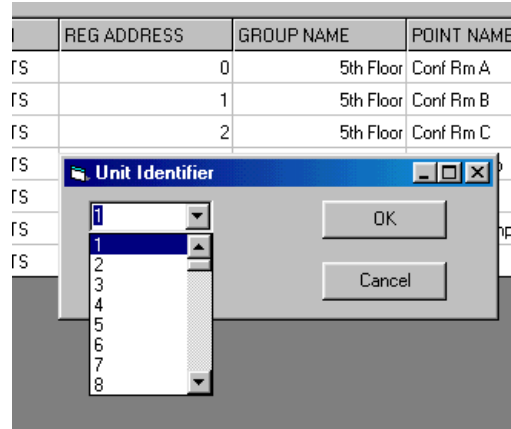
- Click on Menu - Comm > Serial Transport to activate the Serial Comm Port dialog box.
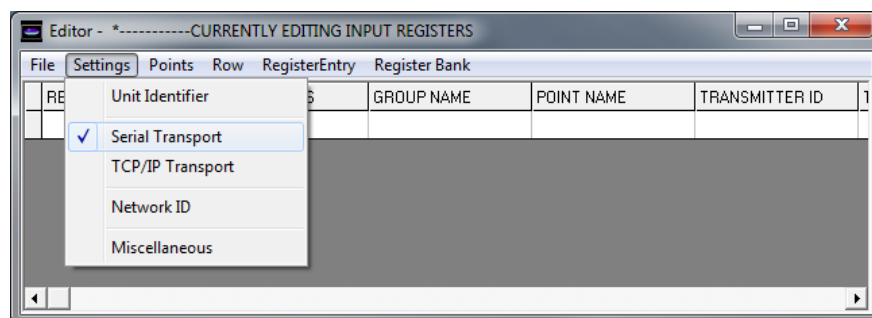
- Use the Serial Comm Port configuration dialog box to select the appropriate internal communication parameters (Connect Speed, Connect Preferences, and Transport Mode) for the Transceiver.
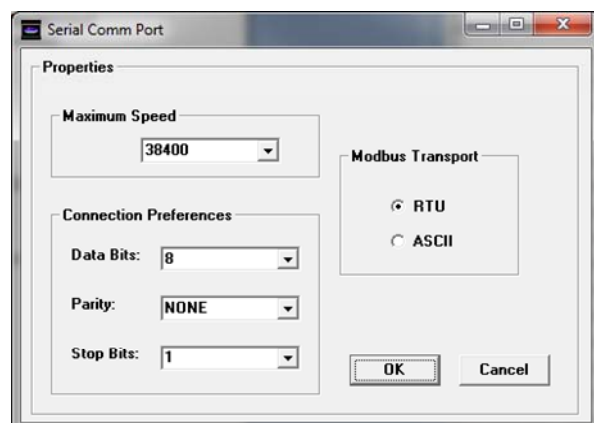
- There are two different serial transmission modes defined in MODBUS – the RTU mode and the ASCII mode. They define the bit contents of the message fields transmitted serially on the line and determine how information is packed into the message fields and decoded.

- The MOD9200 <u>transmission mode and serial port parameters need to be exactly the same</u> as those configured for the Master.

- Select the Maximum Speed - In the Serial Comm Port configuration window click on the drop down selection arrow and select the Maximum Speed for communication – speeds range from 9600 bps to 38400 bps.

- Communications speed needs to be the same as in the Master configuration.
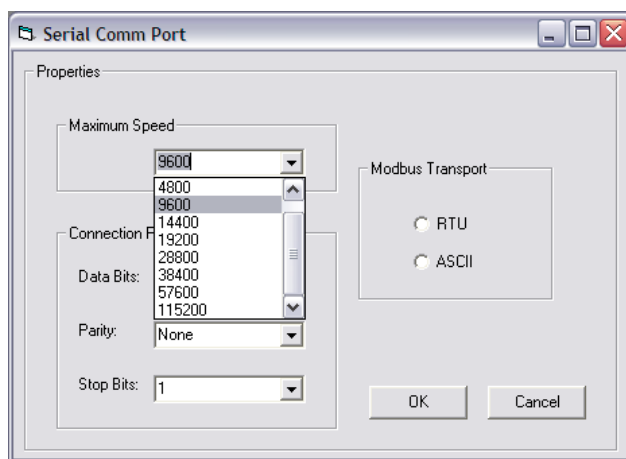
- Select the number of Data Bits – click on the selection arrow and select either 7 or 8 bits. The RTU transport mode requires 8 bits. Standard ASCII transport mode requires 7 bits and Extended ASCII requires 8 bits.

- The number of Data Bits needs to be the same as in the Master configuration.

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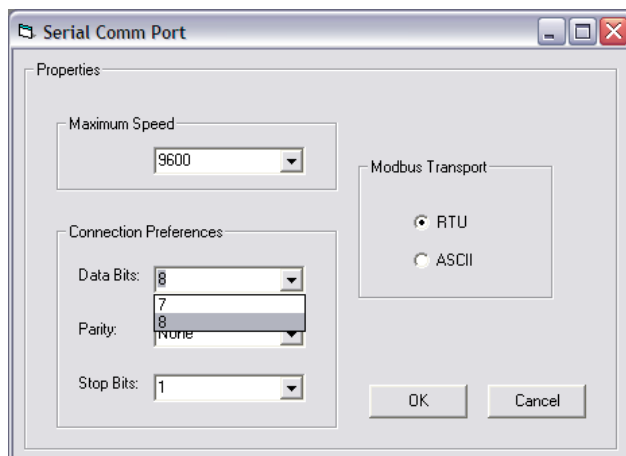
- Parity is used for simple error checking. Select the proper Parity – even, odd or none – by clicking on the selection arrow and selecting either "even", "odd", or "none". If "none" is selected "2" stop bits are required.

- Parity needs to be the same as in the Master configuration.
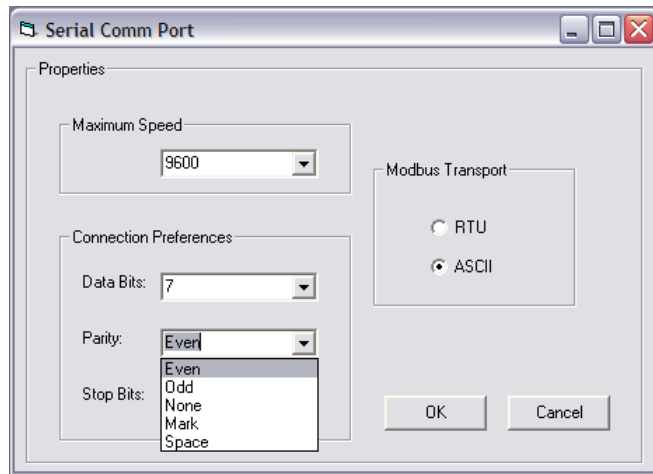
- The appropriate number of Stop Bits depends on the Parity selected. If "even" or "odd" parity is selected "1" stop bit is used. If a Parity of "none" is selected "2" stop bits are used. Select the Stop Bits by clicking on the selection arrow and selecting either "1" or "2". Stop Bits need to be the same as in the Master configuration.
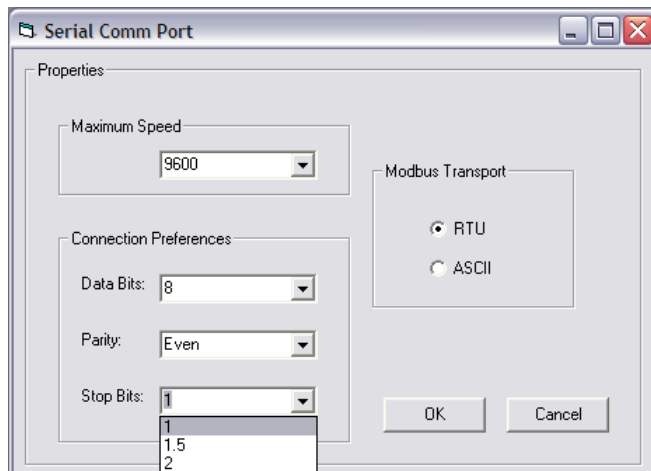
- Select the appropriate Modbus Transport Mode – RTU or ASCII and click "OK" to save the serial communication parameters to the Configuration File.

The transport mode selected needs to be the same as in the Master configuration.

- To Save the configuration file click on File > Save. It is recommended that the configuration ".ini" file be saved in the trs\config folder already setup.
i.e. C:\trs\config

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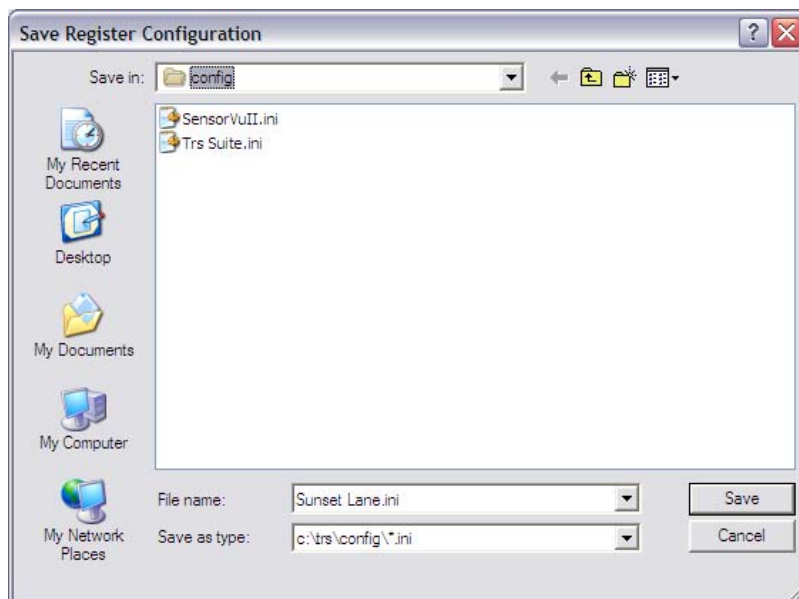
l. **Sending The Configuration File To The MOD9200**

Note: Even if you are planning to use the RS485 RTU/ASCII MODBUS protocol option a network connection or crossover cable is required during the initial setup of the gateway for transporting the Gateway Configuration File via FTP

- Always Save the configuration file to the folder "trs\config" before sending it to the MOD9200 Gateway.

- To send the new configuration file to the MOD9200 Gateway click on File > File Transfer and a dialog box will appear.
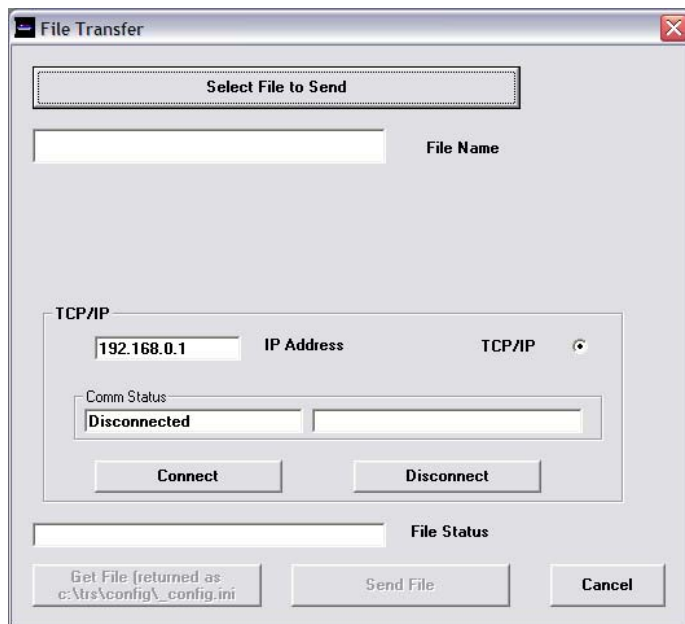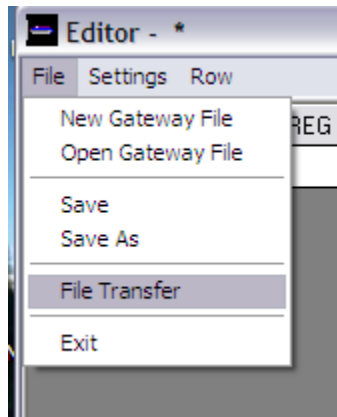
- Click on "Select File" and a window will open. Move to the trs\config directory and select the appropriate file from the list – "Trs Suite.ini".
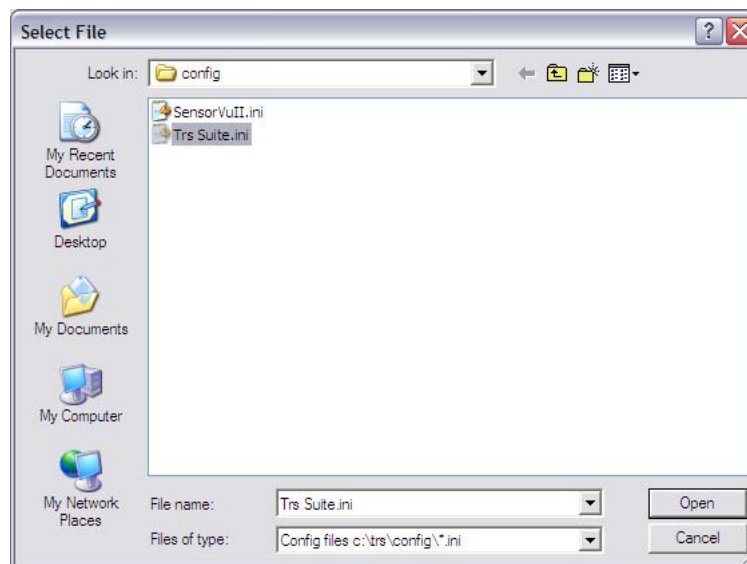
- Click on "Open" to automatically enter the selected file path as the File Name.

- Enter the current IP Address of the Gateway (Note: This can be different than the IP Address entered into the configuration file.)
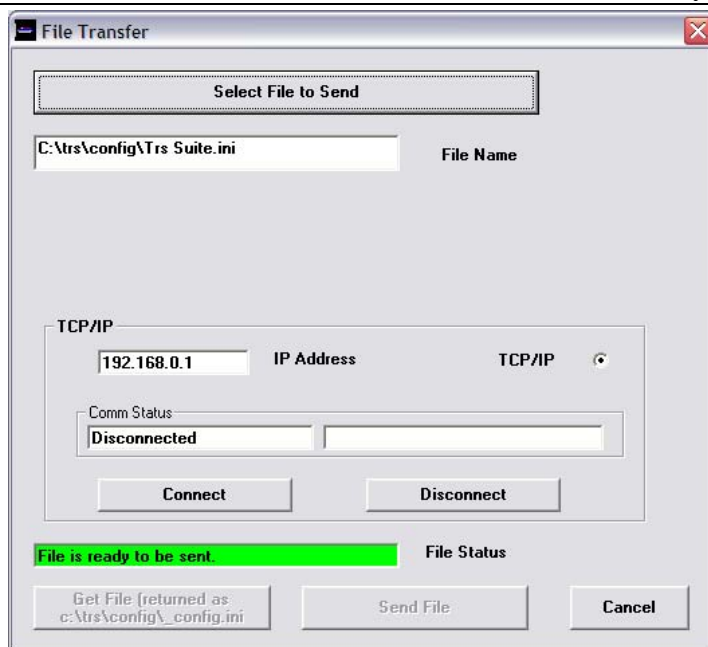
- Click on "Connect" and the status of the connection will be displayed in the Comm Status window. When the Gateway is connected click on "Send File" to the send the config file to the Gateway.

m. Activating The Config File

- Once the config file has been sent to the Gateway it will become active immediately. If you have changed the IP Address in the config file you will lose your connection and have to reconnect using the IP Address and Subnet Mask that was sent in the **new config file**.

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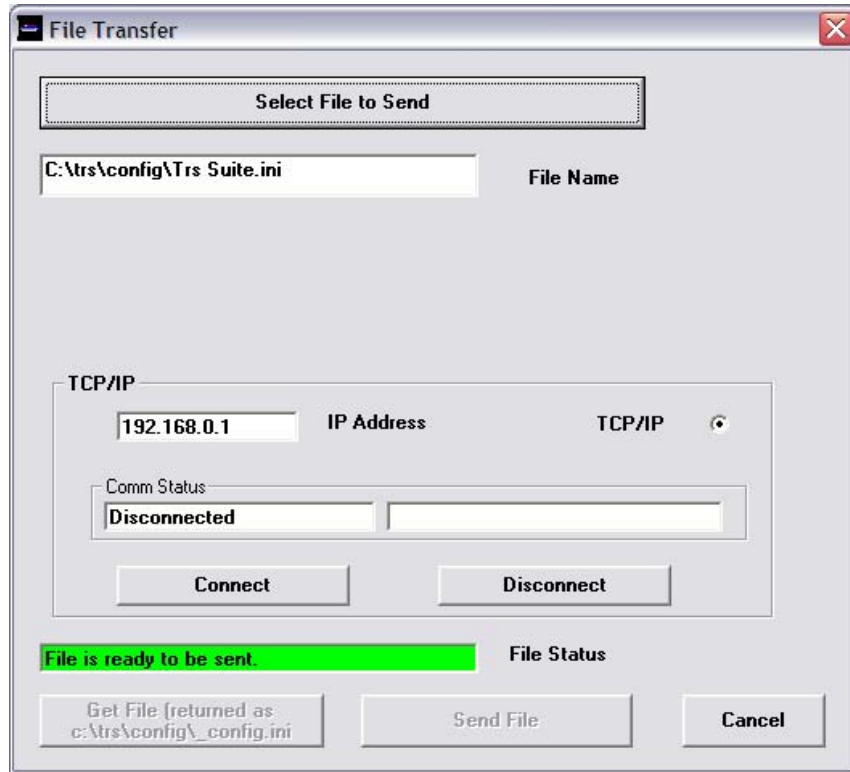
- To confirm that the appropriate configuration file is saved on the Gateway – reopen the File Transfer Dialog and click on "Get File" to retrieve a copy of the active configuration file from the Gateway. The Editor will automatically save this file in the folder "trs\config" with the file name of " _config.ini".

- Click on File > Open Config File and select the "_config.ini" file. Click on "Open" to open the file in the Editor. Confirm that the file is the same as the original configuration file.

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NOTE: The "_config.ini" file is a dynamic file. If multiple MOD9200 Gateways are being administered from the same PC the "_config.ini" file will be a copy of the configuration file from the last Gateway administered.

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IV. Data Acquisition

a. MODBUS Standard

- MODBUS is an application layer messaging protocol for client/server communication between devices connected on different types of buses or networks.

-
- The MOD9200 functions as a MODBUS Server in the MODBUS Client/Server Model and utilizes the MODBUS messaging services over TCP/IP or RS485/RS232 to communicate to a MODBUS Client.

- For implementation information please refer to the Modbus Standard Library at www.modbus.org . Both the MODBUS Application Protocol Specification and the MODBUS Messaging On TCP/IP Implementation Guide are available for download there.

b. MOD9200D MODBUS Transceiver Application Parameters

- When interfacing 3rd party monitoring software or controllers to the MOD9200 Gateway be sure to set the appropriate MOD9200 Gateway Unit Identifier (see page 18) and for TCP/IP connect to the MOD9200 Gateway Port: 0502. If either the Serial RTU mode or Serial ASCII mode are used connect through the appropriate COM serial port.

- **TCP/IP APPLICATION NOTE: When using the MOD9200D in TCP/IP mode the MODBUS Master "polling interval" should be set to occur within 2 minutes 59 seconds or less. If no polling activity occurs within 3 minutes the MOD9200D will automatically close the network connection and the MODBUS Master will have to close and re-open the connection to re-establish communications. The MODBUS Master should not attempt to re-open the network connection for at least 3 ½ minutes after the network connection has been closed.   ----   Only (1) TCP/IP connection is allowed at a time.**

- The MOD9200 MODBUS Gateway receives data from up to fifty (50) wireless sensors and updates its data registers on a real time basis.

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- Input/Output Configuration Map:

    - Analog and Digital Inputs:
      Programmer Software Input Register 00 to 99 –to- MODBUS
      Input Register 30001 to 30100

    - Digital (Relay) Outputs:
      Programmer Software Digital Output (Coil) Register 00 to 49 –to-
      MODBUS Coil Register 01 to 50

    - Analog Outputs:
      Programmer Software Analog Output (Holding) Register 00 to 49
      –to- MODBUS Holding Register 40001 to 40050

- **The Input Registers**

  - The MODBUS Input Register 30001 to 30100 are used to receiver all
    sensor inputs.

  - All wireless sensor information (analog and discrete input) will be
    displayed as numeric values.

  - All digital status/alarms will be received and stored by MOD9200 as 1 or
    0 (1=input contact closed & 0=input contact open). The Digital Capture
    Time can be set to "hold" momentary contact closures long enough to be
    "picked up by the system".

  - The Digital Capture Time can be set up to 240 minutes (4 hours) in
    applications where an extended period of time is needed such as
    "unoccupied period by-pass".

  - All analog data will be received and stored as integer values. For data
    types THERM 20k, RTD 1k, RTD 1k Ext, and HUMIDITY the least
    significant digit of the integer value is the decimal number (i.e. 8000 will
    mean 800.0).

  - For the data type ANALOG there is no decimal and data is displayed in
    counts (0 to 4095). For example the setpoint pot of the WT1630B is setup
    as an ANALOG data type with ranges from "0" (Cool) to "4095" (Warm).

  - For the data type TOTALIZER there is no decimal and data is displayed in
    counts (24 bits). When the count reaches 16,777,215 (24 bits) the count
    value rolls over to 0 and begins again.

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- **The Digital Output (Coil) Registers**

  - The MODBUS Coil Register 01 to 50 are used for command remote wireless digital outputs (relays) module i.e. ED2402D & the SD2432D devices. Values to be entered (or sent) is 1=on and 0=off.

  - The MODBUS Coil Register 101 to 150 will be automatically assigned by the MOD9200. These 50 registers will display the status of the relays commanded via the previous Register 01 thru 50. After the remote unit executed the command issued by the MOD9200, It will send a feedback status of the relays to the MOD9200.

- **The Analog Output (Holding) Registers**

  - The MODBUS Holding Register 40001 to 40050 are used to command remote wireless analog outputs (0-10VDC or 0-5VDC) module such as the SD2432D devices. Value to be entered (or sent) is from 0 to 4095 counts representing the full output range.

  - The MODBUS Holding Register 40101 to 40150 will be automatically assigned by the MOD9200BNT. These 50 registers/objects will display the status of the analog output commanded via the previous Register 40001 thru 40050. After the remote unit executed the command issued by the MOD9200, It will send a feedback status of the analog output value to the MOD9200.

- **The Alarm Registers**

  - The MODBUS Register 30401 to 30500 are the alarm registers for all the input and output data points (Input Register 30001 to 30100, Coil Register 101 to 150 and Holding Register 40101 to 40150). Each point utilizes 6 binary bits of information representing the alarm conditions of the "Input Register", "Digital Output Coil Register" and "Analog Output Holding Register".

Holding Register   **Input register**
(Bit 5 & 6)   **(Bit 1 & 2)**

000000
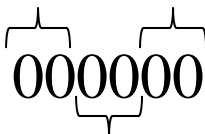
Coil Register
(Bit 3 & 4)

- The Present Value of each register displays a decimal value representing the alarm status of all 3 point types. Each point type returns an individual alarm value in decimal format. All 3 point types decimal values are added together to represent the status of the 3 alarm status.

- The decimal values of different point types are:

    - The Input Register alarms
        - "0"= Normal
        - "1"= Low Battery Alarm (Bit 1 set)
        - "2"= Lost Communication Alarm (Bit 2 set)

    - The Digital Output (Coil) Register alarms
        - "0" Normal
        - "8"= Lost Communication Alarm (Bit 4 set)

    - The Analog Output (Holding) Register alarms
        - "0" Normal
        - "32"= Lost Communication Alarm (Bit 6 set)

- Alarm Status Examples:

    - Example 1 – Input Register 30108 returns a value of 33 representing Input Register 30008 (Low Battery Alarm), Coil Register 08 (Normal) & Holding Register 40008 (Lost Communication).

    - Example 2 – Input Register 30108 returns a value of 40 representing Input Register 30008 (Normal), Coil Register 08 (Lost Communication) & Holding Register 40008 (Lost Communication).

    - Example 3 – Input Register 30128 returns a value of 42 representing Input Register 30028 (Lost Communication), Coil Register 28 (Lost Communication) & Holding Register 40028 (Lost Communication).

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- Example 4 – Input Register 30128 returns a value of 9 representing Input Register 30028 (Low Battery Alarm), Coil Register 28 (Lost Communication) & Holding Register 40028 (Normal).

d. BTM9010 SensorView Monitoring & Logging Application

- The SensorVuII Monitoring and Logging software interfaces directly to the MOD9200D Gateway over an Ethernet network. The combination results in a real time monitoring and logging system (BTM9010) designed to work with a Windows™ based PC with an Ethernet/LAN port.

- The logged file is compatible with Excel™ and other Office applications. The logged information can be easily retrieved for additional energy and performance analysis.

- The BTM9010 system is suitable for energy monitoring and audit applications, building performance diagnostics, high-temperature building treatment and other applications.

V. Quick Setup Instructions

a. <u>Installing The MOD9200 MODBUS Gateway</u>

1. Locate the Gateway close to a computer, 10/100 Base-T network hub or RS485/RS232 connection.

2. Connect the Gateway to the TCP/IP network using RJ45 Category 5 Ethernet cable or a crossover cable (see Fig. 1 page 4).

3. Apply 24 VAC 60 Hz power to the input terminals of the Gateway. The Gateway current draw is less than 0.1 Amp.

4. The Gateway is shipped with an IP address of 192.168.0.1 and a subnet mask of 255.255.255.0 (see page 8 for instructions on changing the IP address).

Note: To initially connect to the Gateway the networked PC must have a static IP address with a subnet mask of 255.255.255.0.

5. The Gateway is ready to be configured.

b. <u>Installing The MOD9200 Configuration Software</u>

1. Insert the Programmer 6.00.X disk or CD into the CD ROM Drive – the setup program should start automatically.

If the setup program does not start automatically – click on Start > Run > Browse and select the CD ROM Drive with the ConfigTool disk. Double click on "setup.exe".

Follow the on screen instructions to complete the installation.

2. To open the program click on Start > Programs > ConfigTool. To create a new configuration file see the instructions. To send an existing configuration file to the MOD9200 Gateway see the instructions on previous pages.

3. After sending a configuration file the Gateway will automatically reset itself and initialize the new configuration file.

4. If the Gateway is configured to use the MODBUS Serial transport protocols – RTU or ASCII the Gateway needs to be connected to the appropriate serial communication connections.

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