435UA – ASCII to OPC UA Gateway

Product User Guide

Software Build Date: April 30th 2015
Version 1.0

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Overview

The 435UA gateway seamlessly connects up to 2 ASCII devices to an OPC UA Client.

By following this guide, you will be able to configure the 435UA gateway.

Required Tools and Data

You will need the following tools:

- The 435UA gateway
- The provided CD-ROM
    - IPSetup.exe can also be downloaded:

      http://www.rtaautomation.com/product/460-gateway-support/
- A PC with an internet browser
    - Browser configuration is Firefox / Internet Explorer / Google Chrome compatible
- The supplied Ethernet crossover cable
- A 7-30 VDC power source

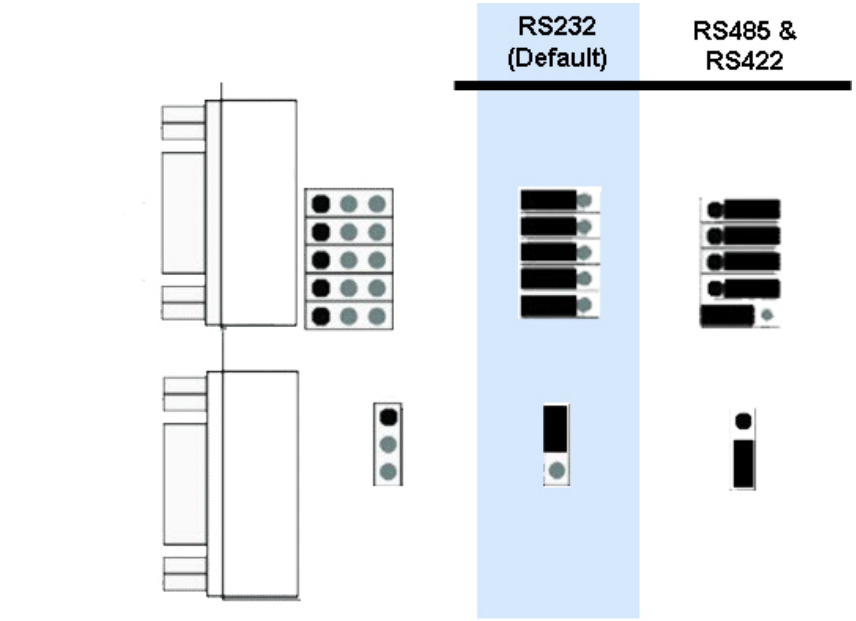
You need to verify the following Serial Communication Characteristics from your ASCII device(s):

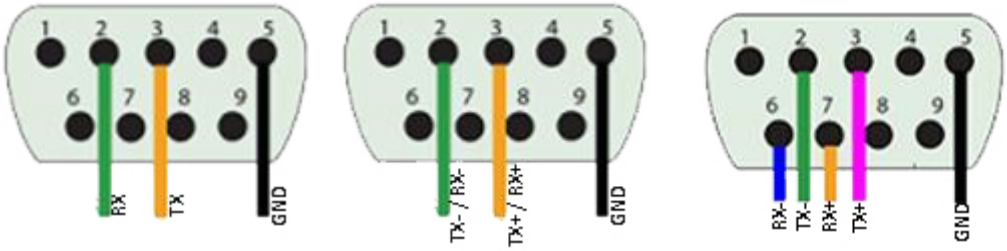
- Mode : RS232, RS485 or RS422
- Baud Rate
- Parity
- Data Bits
- Stop Bits
- Flow Control: None, XON/XOFF, or RTS/CTS

Port Connections

The factory default port settings for Port 0 and Port 1 are RS232. If the default port settings are not compatible with your ASCII device, Port 0 can be configured for RS232, RS485, or RS422. Port 1 can only be configured for RS232.

Jumper Configuration





Port 0 & Port 1	**Port 0**	**Port 0**
RS232	RS485	RS422

The default jumper configurations are setup for the following serial modes:

- **Port 0 – RS232**
- **Port 1 – RS232**

If you require a different serial mode, please refer to the diagrams above for jumper/wiring changes.

Accessing the Main Page

The following steps will allow you to connect to the browser based configuration of the gateway. By default, DHCP is enabled in the gateway. When the unit is first powered up, it will try for 10 seconds to connect to a DHCP server to obtain an IP Address automatically. If it fails, it will assign a static default IP Address of 192.168.0.100.

Using DHCP

1) Using a regular Ethernet cable, connect the gateway to your network that has a DHCP Server running.
2) Insert the provided CD-ROM into a computer also on the network.
3) Run the IPSetup.exe program from the CD-ROM.
4) Find the assigned IP Address of the unit under "Select a Unit".
5) Click **Launch Webpage**. The Main page should appear.

Assigning a Static IP Address

1) Using the supplied crossover cable, connect the gateway to your PC.
2) Insert the provided CD-ROM.
3) Run the IPSetup.exe program from the CD-ROM.
4) After 10 seconds, hit the Search Again button. You should see the unit appear under the "Select a Unit" box.
5) Configure the IP Settings of the gateway to be on the same subnet as your PC.
6) Click **Launch Webpage**. The Main page should appear.

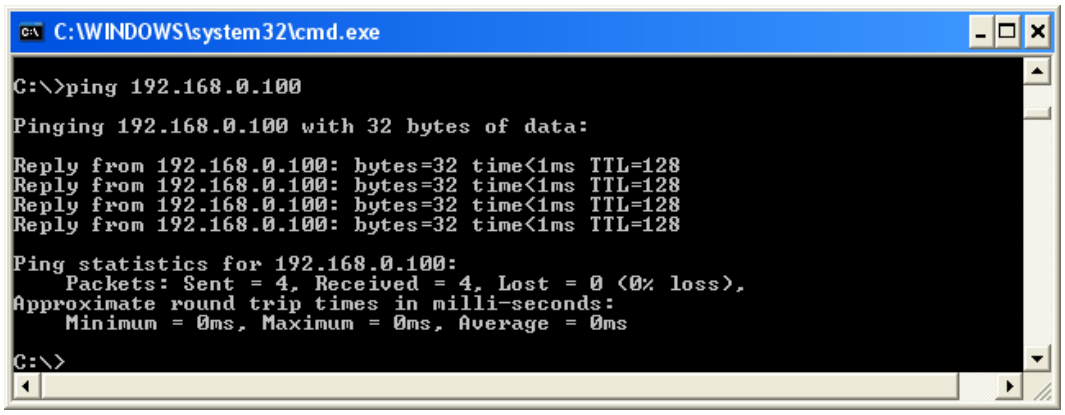
Default setting is set to DHCP.
If DHCP fails, default IP Address is 192.168.0.100 with a default Subnet of 255.255.255.0.

Error: Main Page Does Not Launch

If the Main Page does not launch please verify the following:

1. Check that the PC is set for a Static IP Address
    a. Open a MS-DOS Command Prompt
    b. Type “ipconfig” and press enter
    c. Note the PC’s IP Address, Subnet, and Default Gateway
        i. An invalid IP Address would be: 169.254.x.x
2. The gateway must be on the same Network/Subnet as the PC

Once you have both devices on the same network, you should be able to ping the gateway using a MS-DOS Command Prompt.



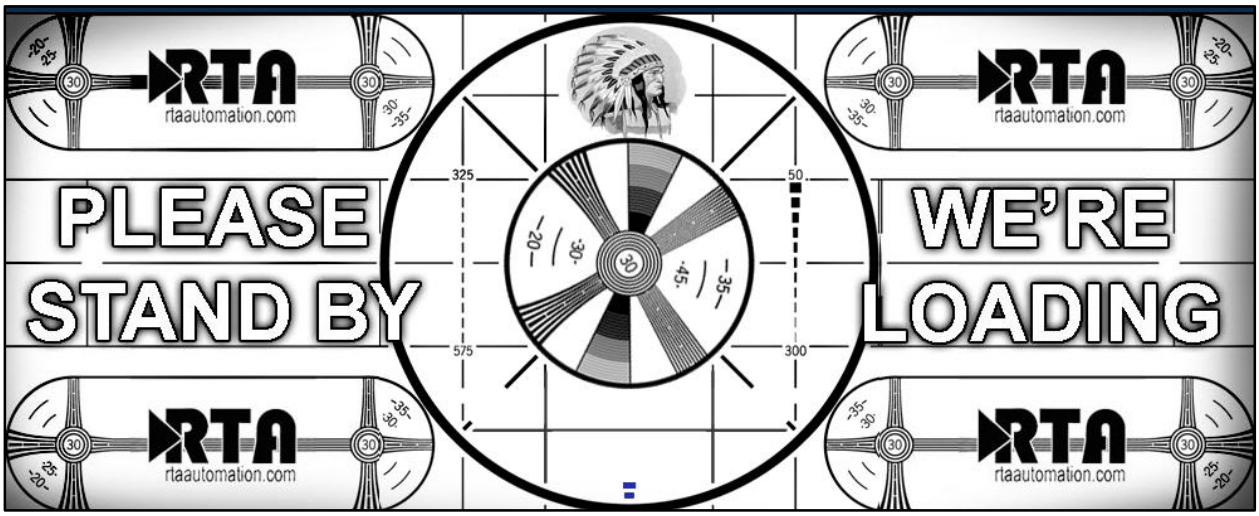
If you are able to successfully ping your gateway, open a browser and try to view the main page of the gateway by entering the IP Address of the gateway as the URL.

If problems persist, please consult our Network Settings User Guide which can be found on the provided CD.

Committing Changes to the Settings

- Changes made to the settings of the gateway will not take effect until the gateway is restarted.
- Changes will not be stored if the gateway's power is removed and restored.
- The gateway detects changes and will prompt you with a red notice box to restart the gateway after change.

- **NOTE:** The gateway does not need to be restarted after every change. Multiple changes can be made before a restart, but they will not be committed until the gateway is restarted.
- When all desired changes have been made, press the **Reboot Gateway** button.
- The webpage will redirect to our rebooting page shown below.



- After the gateway has restarted, which can take up to 10 seconds, the gateway will automatically redirect to the main page. You will know the save was successful if the red box is no longer present.

Main Page

The main page is where important information about your gateway and its connections are displayed.

Navigation (green box below):

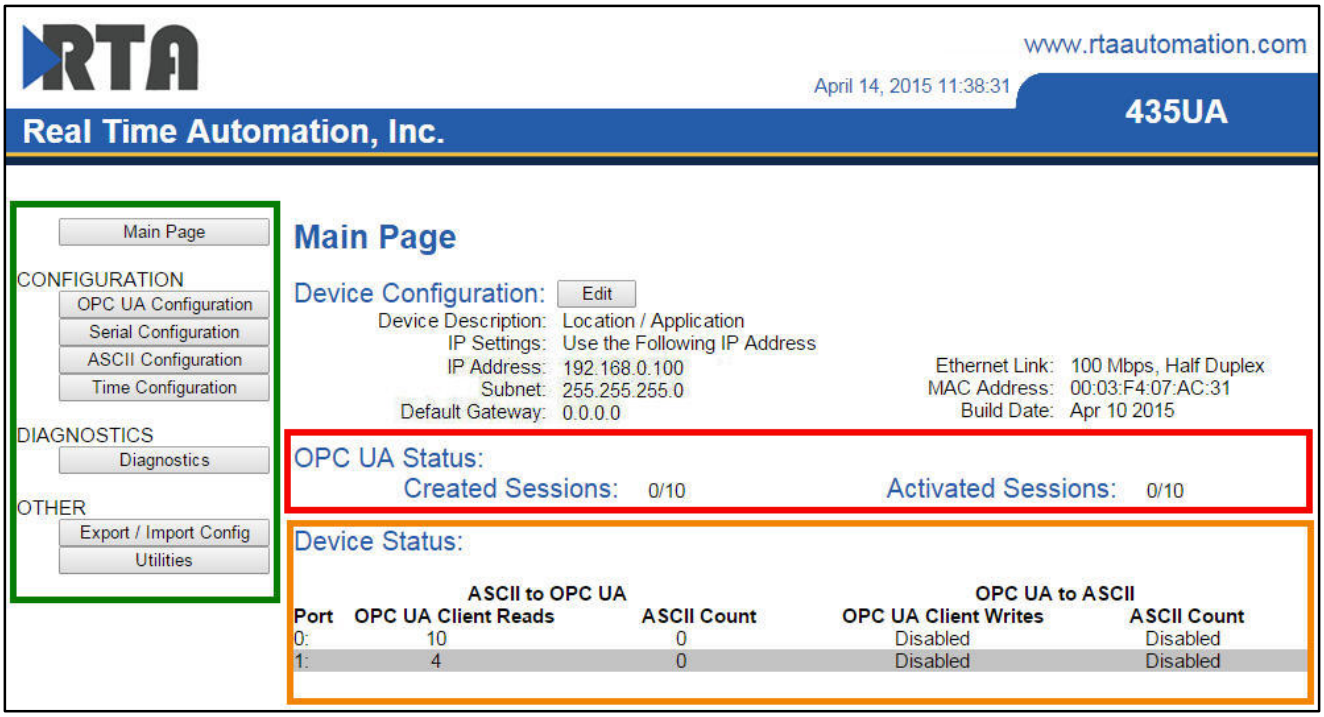
You can easily navigate between pages (Main, Configuration, Diagnostics, and Other pages) using the buttons on the left hand side.

OPC UA Status (red box below):

This quickly shows the high-level status of any OPC UA sessions.

Device Status (orange box below):

This quickly shows the high-level status of any ASCII Ports that are enabled in the Serial Configuration. The values on this page mimic the same values that are displayed on the Diagnostics Page.

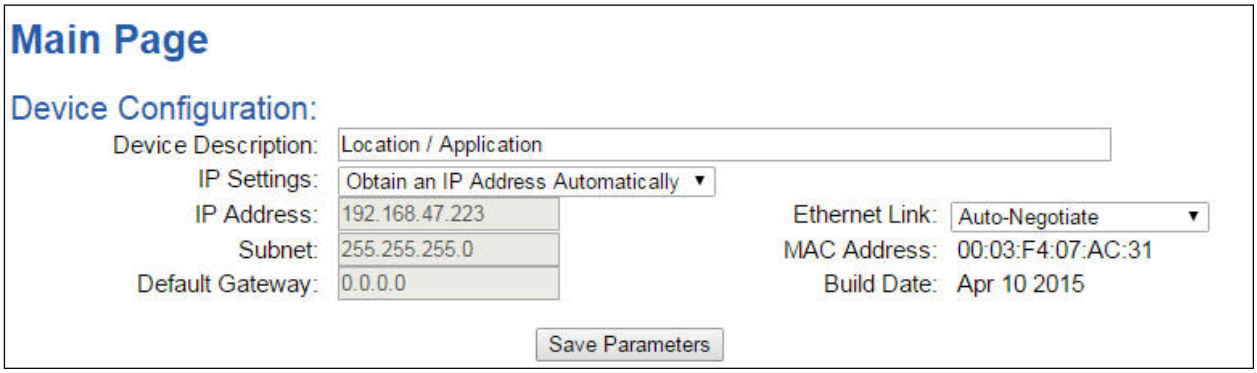


Device Configuration

1) From the main page, click the **Edit** button which is located next to *Device Configuration*.
2) Enter in a User Description to help identify the gateway.
3) Enter IP Address, Subnet, Default Gateway, and DNS information.

NOTE: Changes can only be made on the webpage to the IP Address, Subnet, and Default Gateway when the IP Settings parameter is set to "Use the Following IP Address".

4) Select which Ethernet Link settings to use.



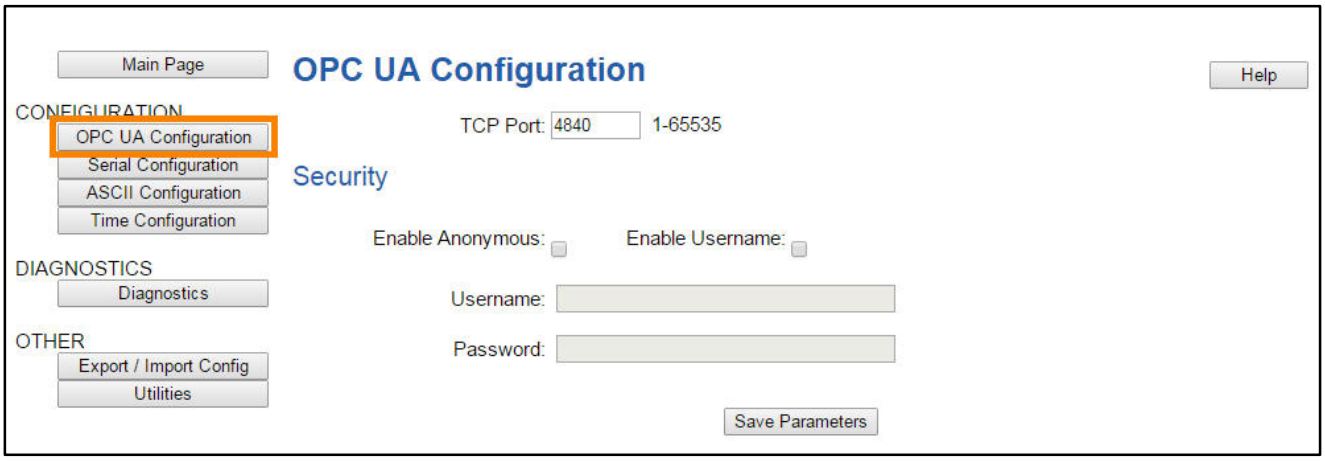
5) To save all values, click the **Save Parameters** button.

If you are changing the IP Address of the gateway, the change will not take effect until the unit has been rebooted. After reboot, you must enter the new IP Address into the URL.

It is recommended to leave the DNS Gateway set to 0.0.0.0 and the Ethernet Link as Auto-Negotiate.

OPC UA Configuration

1) Click the **OPC UA Configuration** button under the *CONFIGURATION* section.



2) TCP Port: Enter in the TCP Port for the OPC UA Server.
   NOTE: Changing this value from the default value of 4840 is not recommended.
3) Security: OPC UA Clients may connect as either Anonymous or a Username with Password.
   NOTE: One or both of Anonymous or Username must be configured or the OPC UA Client connection will be rejected.

   To enable Anonymous access:

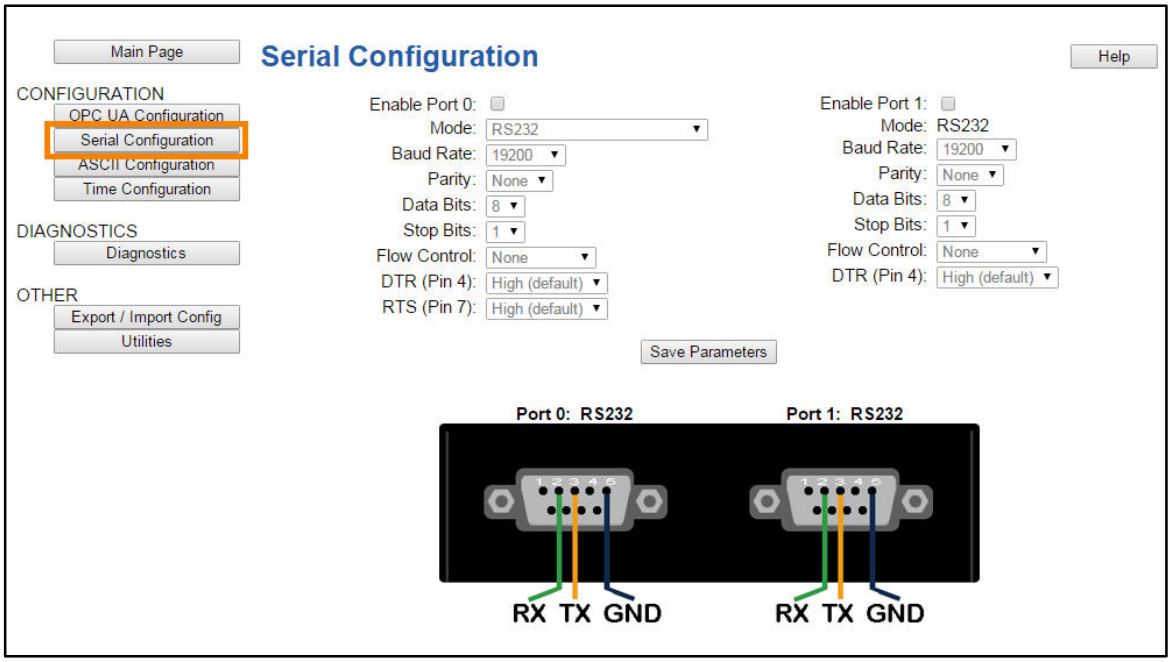
   a. Check the Enable Anonymous checkbox.

   To enable Username:

   a. Check the Enable Username checkbox.
   b. Enter a Username
   c. Enter a Password

Serial Port Configuration

1) From any page, click the **Serial Configuration** button under the *CONFIGURATION* section.

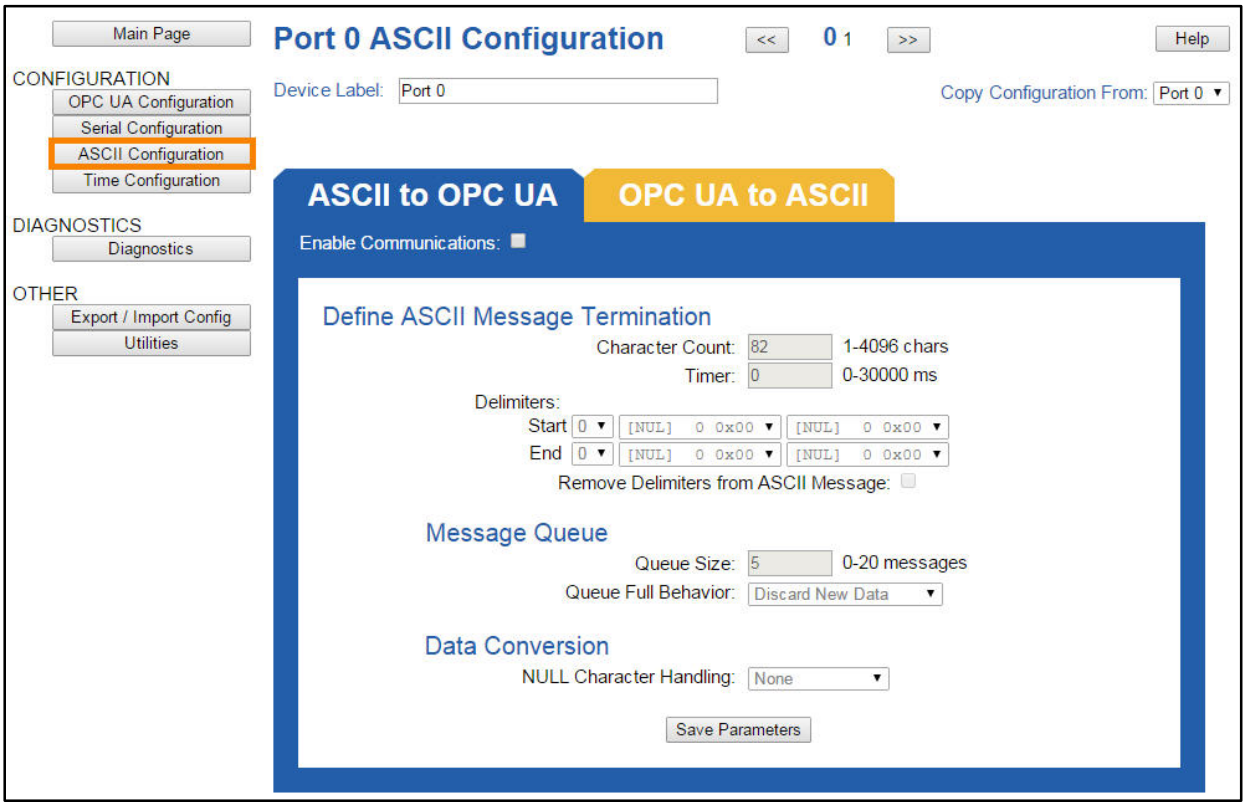


2) Configure the Ports you wish to use by clicking the Enable Port checkbox.
3) Match the serial settings to the serial device being connected. If any of these fields are incorrect, proper communication will not be possible.

See *Port Connections* section on page 7 for more information on Mode and hardware configuration.

Setting up ASCII to OPC UA Communication

1) Click the **ASCII Configuration** button under the *CONFIGURATION* section.



2) Check the Enable Communications checkbox to modify the fields below.

Defining an ASCII Message

3) To define an ASCII message, you must select one or more of the following end cases: Character Count, Timer, or Delimiters.

   a. **Character Count:** Enter in the max number of characters that the device could output.

      Example: If your device sends a four digit temperature, set the length to 4.

   b. **Timer:** Use this option if your device sends data of varying lengths and does not have end delimiters. This is the amount of time we will wait after the last character of a message before considering the message complete.

   c. **Delimiters**

      i. Start Delimiter Count: Select how many Start Delimiters to look for in the ASCII message. Use this feature if the ASCII message has common starting delimiter(s), (characters at the beginning of every message).

      ii. End Delimiter Count: Select how many End Delimiters to look for in the ASCII message. Use this feature if the ASCII message has common end delimiter(s). <CR><LF> is a common example.

      iii. Remove Delimiters: If using any Start or End Delimiters and you do not want them to be sent to the PLC, then enable this checkbox.

Message Queue

4) Queue Size: Enter the number of complete messages you want the gateway to hold before discarding.
5) Queue Full Behavior: If the Queue is full, the gateway will discard messages one of the following ways:
    a. Discard New Data: Gateway will discard any new messages.
    b. Overwrite Oldest Data: Gateway will overwrite oldest message with new data.

Data Conversion

6) NULL Character Handling: Select how the gateway will handle the NULL Character.
    a. None: (Default): Does no additional conversion on the data before sending it to the PLC.
    b. Remove NULL: Removes all NULL characters from the ASCII Message before sending it to the PLC.

Setting up OPC UA to ASCII Communication

1) Click the **ASCII Configuration** button under the *CONFIGURATION* section.
2) Click on the OPC UA to ASCII tab in yellow to bring it to the front.

3) Check the Enable Communications checkbox to modify the fields below.

Defining an ASCII Message

4) To define an ASCII message, you must select one or more of the following end cases: Character Count, Timer, or Delimiters.
    a. **Character Count:** Enter in the max number of characters that the device could output.

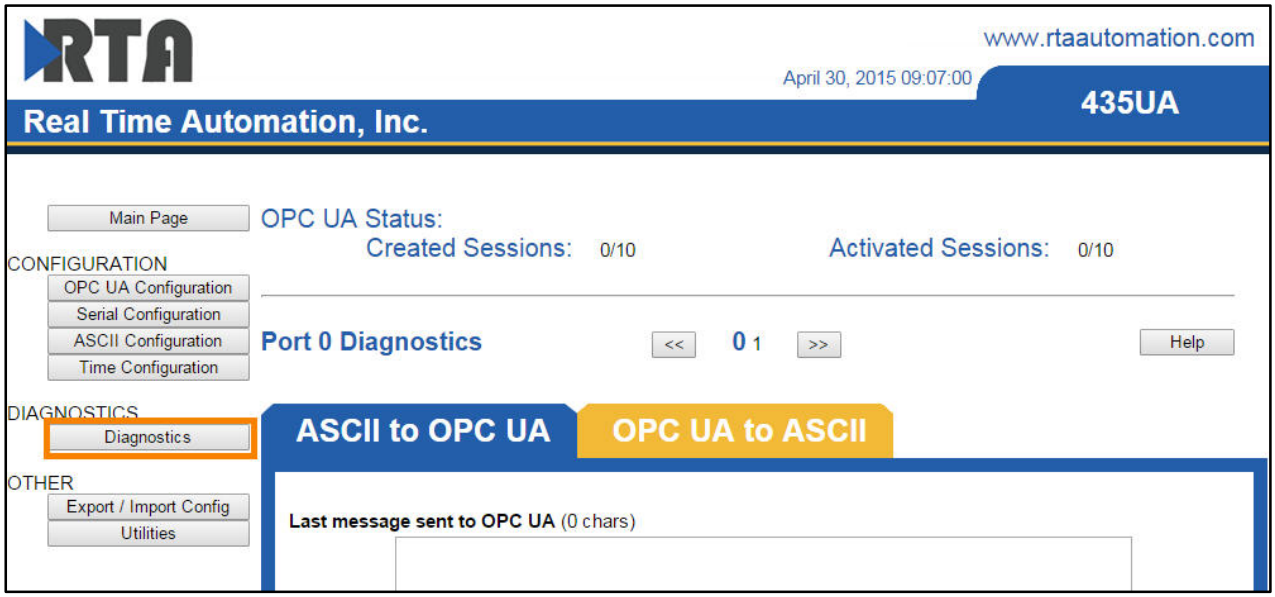
        Example: If your device sends a four digit temperature, set the length to 4.
    b. **Timer:** Use this option if your device sends data of varying lengths and does not have end delimiters. This is the amount of time we will wait after the last character of a message before considering the message complete.
    c. **Delimiters**
        i. Start Delimiter Count: Select how many Start Delimiters to look for in the ASCII message. Use this feature if the ASCII message has common starting delimiter(s), (characters at the beginning of every message).
        ii. End Delimiter Count: Select how many End Delimiters to look for in the ASCII message. Use this feature if the ASCII message has common end delimiter(s). <CR><LF> is a common example.
        iii. Remove Delimiters: If using any Start or End Delimiters and you do not want them to be sent to the PLC, then enable this checkbox.

Data Conversion:

5) NULL Character Handling: Select how the gateway will handle the NULL Character.
    a. None: (Default) Does no additional conversion on the data before sending it from the gateway to the ASCII device.
    b. Prepend NULL: Adds a NULL character to the beginning of each character that is to be sent from the gateway to the ASCII device.
    c. Postpend NULL: Adds a NULL character to the end of each character that is to be sent from the gateway to the ASCII device.

Diagnostics and Troubleshooting

1) From any page, click the **Diagnostics** button under the *DIAGNOSTICS* section.



OPC UA Status

Created Sessions: Indicates how many OPC UA Sessions have been created out of number available OPC UA Sessions.
Activated Sessions: Indicates how many OPC UA Sessions have been activated out of number available OPC UA Sessions.

Port & Direction Selection

Port Selection: Use the **<<** and **>>** buttons to navigate to the desired port.

Direction Selection: Use the **ASCII to OPC UA / OPC UA to ASCII** tabs to select the direction you want to view.

Buttons

Clear Buffers:

This button clears the ASCII queue buffer and the current message being processed. The "Last message sent" buffer for both directions will not be cleared when this button is clicked.

Clear Counters:

This button clears all the counters and error statements.

Diagnostics – ASCII to OPC UA

Last message sent to OPC UA (chars):

This buffer shows the last message that was successfully read by to the OPC UA Client.

Next message stored in ASCII queue (chars):

This buffer shows the next ASCII message waiting to be read by the OPC UA Client.

Current message being processed (chars):

This buffer shows the real time data that the ASCII device is sending out to the 435UA gateway. All data in this buffer is pending due to one of the three end cases not being met. Those end cases are Character count field not being reached, Timer has not expired, or End Delimiters have not been sent from the ASCII device.

Send Test Message to OPC UA:

Use this field to send a test message to the OPC UA Client.

Diagnostic Counters

ASCII Event:

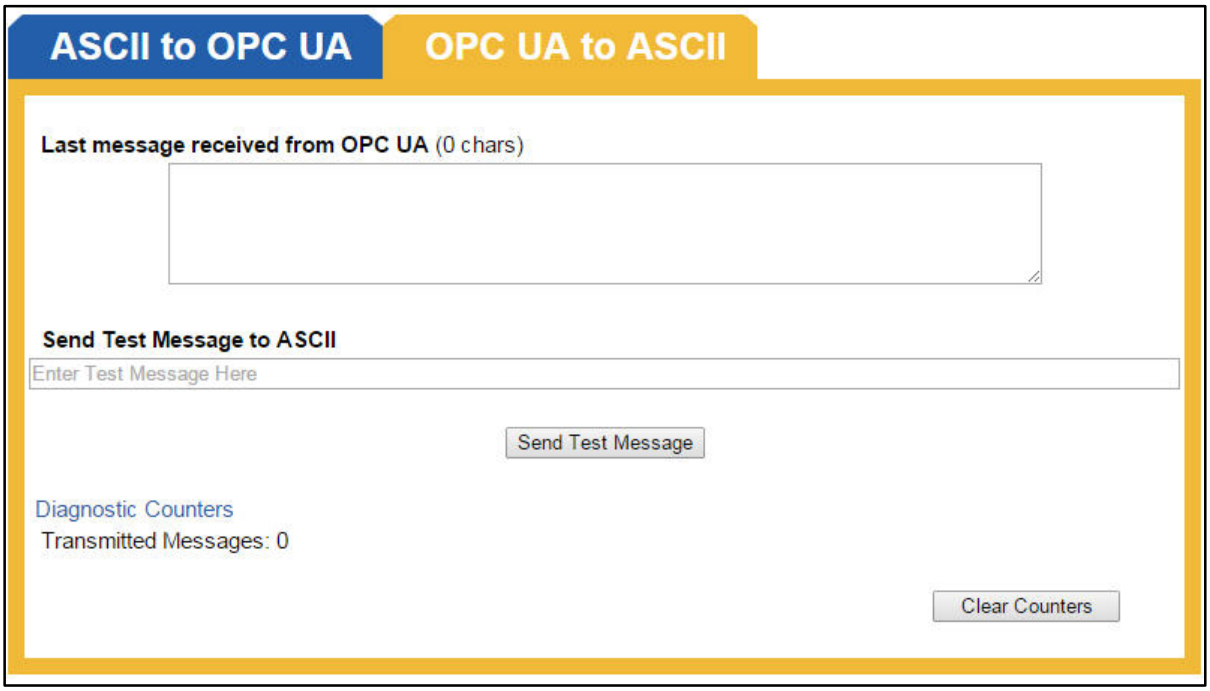
Delimiter: This counter will increment if a successful ASCII message was received with start and/or end delimiters being read.

Length: This counter will increment if a successful ASCII message was received after the character count has been reached.

Timeout: This counter will increment if a successful ASCII message was received after the timer value has been reached.

Discards: This counter will increment if a message was thrown away due to the ASCII queue buffer being full.

Diagnostics and Troubleshooting – OPC UA to ASCII



Last message received from OPC UA (chars):

This buffer shows the last message that was written to the ASCII device.

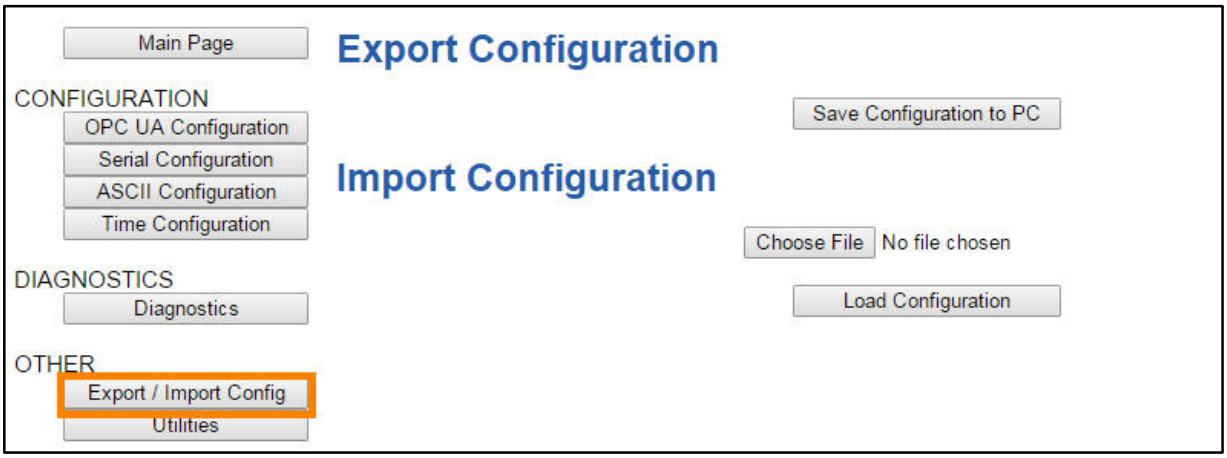
Send Test Message to ASCII:

Use this field to bypass the OPC UA Client and send a test message out to the ASCII device from the gateway. All delimiter information configured in the ASCII Configuration section will be applied when message is sent.

Transmitted Messages: Number of messages transmitted to the ASCII device.

Save/Load the Configuration

Click the **Export/Import Config** button under the *OTHER* section.



Save the Configuration

1) Click the **Save Configuration to PC** button.
2) A prompt will then ask the type of file to save as. Any type will suffice.
   - ◊ This will save all of the configuration except for the Gateway's IP Network Settings, since this must be unique.
3) Save this file to the PC.

Load the Saved Configuration

1) Click **Choose File** and search for the configuration to load to the 435UA.
2) Click **Load Configuration**. If successful, you will be redirected to the main page and be forced to reboot the gateway. If the load failed, you will be prompted with an error.

Install the 435UA

You have now setup the 435UA for communication and are ready to place the device in the field.

If you have any questions, please contact Real Time Automation at:

Toll free 1-800-249-1612
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www.rtaautomation.com
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