

# **SIEMENS**

## **Series 4292 Wireless Sensor System**

### **User Guide**



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# Configuration and Operation

## System Overview

The Series 4292 Wireless Sensor System utilizes no-maintenance, battery-powered sensors that transmit temperature, humidity, CO<sub>2</sub>, and contact status to gateway at a 916MHz frequency that minimizes interference from WiFi networks and improves transmission through walls, floors, and windows. Each gateway receives data from up to 100 sensors and interfaces the BAS via BACnet® MSTP, BACnet® IP, or Modbus RTU and TCP.

Innovative power management technology enables 25-year battery life (15 years on a CO<sub>2</sub> sensor). Fixed sensor transmission intervals to the gateway that maintain the most recent sensor reading. This ensures constant data availability to the BAS while maximizing battery life.

Sensor data is transmitted up to 300 feet, line-of-sight to a gateway. Repeaters can be used for extended distances, or hops between floors and walls.

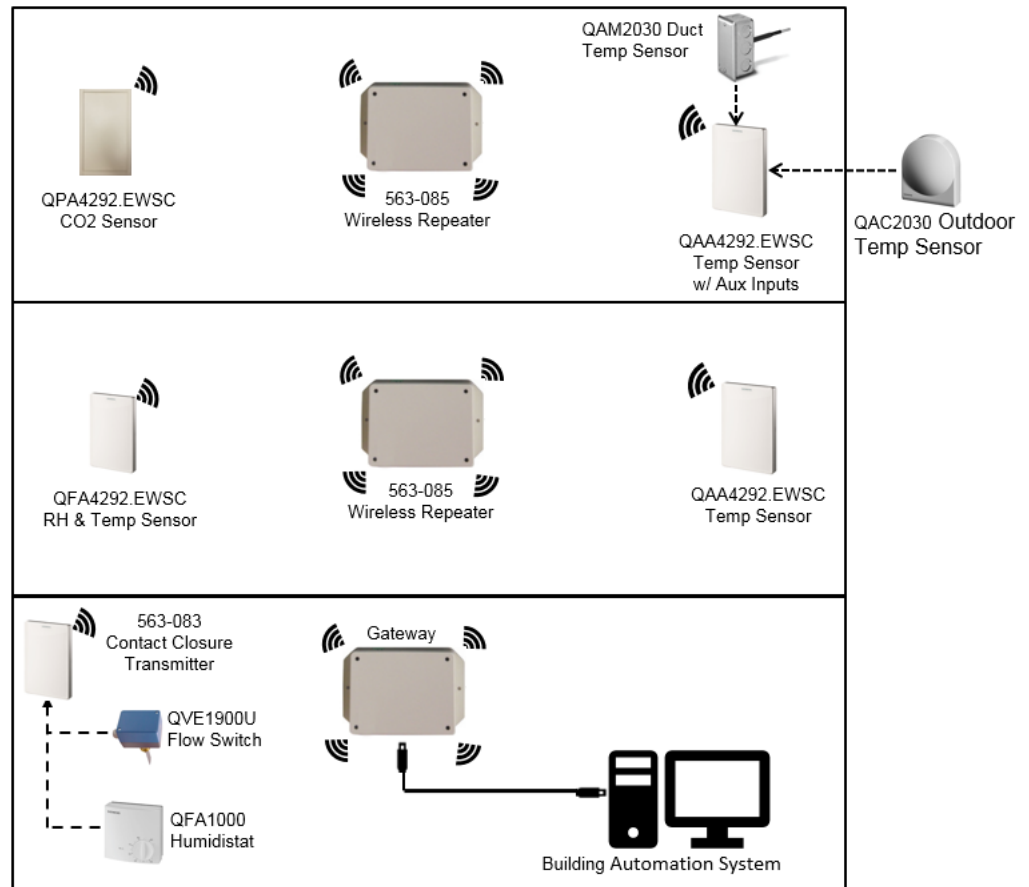
Series 4292 wireless sensors can be configured off-site and deployed in minutes at the project site, resulting in reduced installation costs and minimal occupant disruption.

## System Architecture

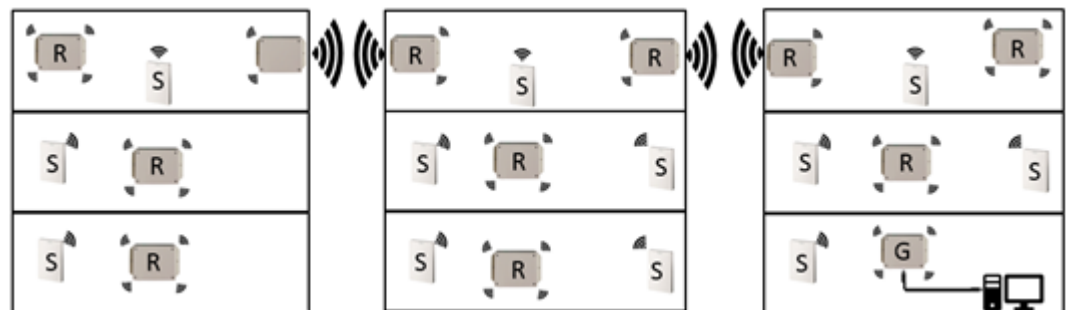
The Series 4292 Wireless Sensor System architecture consists of up to 100 sensors that transmit data to the gateway which in turn interfaces with a building automation system or other building controller. Gateway options provide a choice of BACnet MS/TP, BACnet IP, Modbus RTU or Modbus TCP protocols for easy connection to any building automation system.

Wireless repeaters may be necessary if the wireless transmission distance exceeds 300' (line of sight) from the gateway or when the sensors and gateway are separated by building floors or walls that may diminish signal strength. The sensor transmits data back to the gateway via the mesh style repeater, or series of repeaters, up to 10 total "hops" back to the gateway.

Additional analog sensors (NO/NC contacts and 10k  $\Omega$  Type 2 thermistors) may also be tied into the wireless net-work via the contact closure transmitter (Part Number 563-083) and the temperature sensor (Part Number QAA4292.EWSC).



Communication between buildings, less than 250' apart, is also possible via the use of strategically placed repeaters. Use the Site Survey Tool to validate signal strength in these applications and ensure optimum number and location of repeaters.



## Data Point Table

		Sensor Type			
		QAA4292.EWSC	QFA4292.EWSC	QPA4292.EWSC	563-083
Sensing Points	S1	Room Temp (°F)	Temperature (°F)	Weighted average of 5 prior CO <sub>2</sub> readings (ppm)	X1 Current State 0=Open, 1=Closed
	S2	Remote Temp 1 (°F) (10k $\Omega$ Type II Thermistor)	Humidity % rh	Instantaneous CO <sub>2</sub> reading (ppm)	Count of X1 state changes during last 120s
	S3	Remote Temp 2 (°F) (10k $\Omega$ Type II Thermistor)	Dew Point (°F)	Not Used	% of time X1 is closed during last 120s
	S4	Not Used	Not Used	Not Used	Not Used
	S5	Not Used	Not Used	Not Used	X2 Current State 0=Open, 1=Closed
	S6	Not Used	Not Used	Not Used	Count of X2 current state changes during last 120s
	S7	Not Used	Not Used	Not Used	% of time X2 is closed during last 120s



## Product Ordering Information

Product	Model Number	Description
<b>Sensors</b>	QAA4292.EWSC	Wireless temperature sensor, internal sensor + 2 external 10K RTD ports
	QFA4292.EWSC	Wireless temperature and humidity/dewpoint sensor
	QPA4292.EWSC	Wireless CO <sub>2</sub> sensor
	563-083	Wireless dry contact closure transmitter (2 inputs)
<b>Gateways/ Repeater</b>	563-084	BACnet/IP Gateway
	563-087	BACnet/MSTP Gateway
	563-088	Modbus RTU/TCP Gateway
	563-085	Wireless Repeater
<b>Accessories</b>	563-089	Site Survey Tool
	535-104	24V Power Supply (Required for Gateways and Repeaters)

## Related Documentation

- [A6V11521281: Series 4292 Wireless Sensor System Installation Instructions](#)
- [A6V11536846: Series 4292 Wireless Sensor System Technical Specification Sheet](#)
- [A6V11541947: Series 4292 Wireless Sensor System Site Survey Tool Operating Instructions](#)
- [Field Server Protocol Driver Sheet BACnet PIC Statement](#)

## Software Installation and Commissioning

### Gateway Configuration

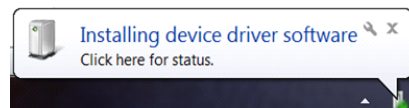
The USB driver and Tera Term Terminal Emulator installation MUST be completed first so that a personal computer can communicate to a gateway.

### Installing the USB Driver for the Wireless BAS Gateway

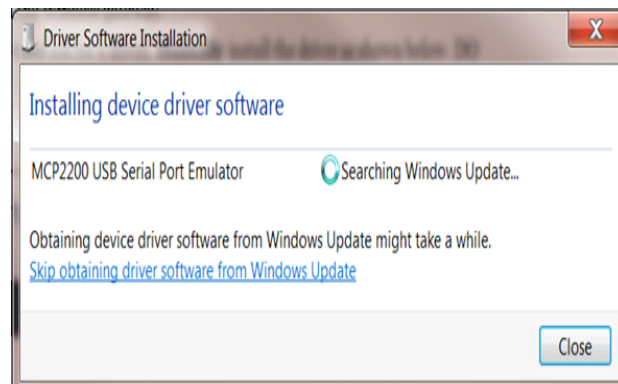
A USB driver file is required for the Wireless Sensor BAS Gateway to communicate with a personal computer for configuration and data output. The USB driver can be downloaded [here](http://idealwirelessensors.com/files/Gateway-USB-Driver-2014-10-09.zip). <http://idealwirelessensors.com/files/Gateway-USB-Driver-2014-10-09.zip>

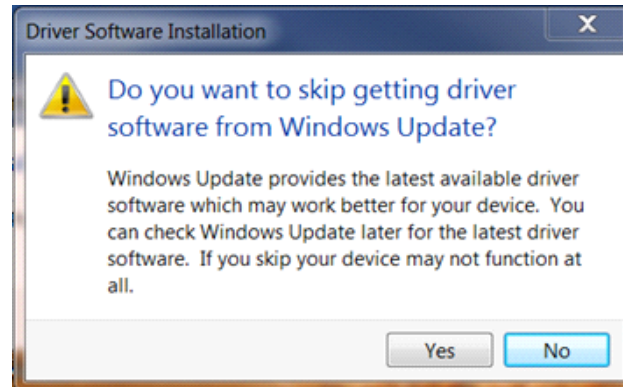
## USB Driver Installation (Windows 7 shown)

1. Download the file.
2. Unzip to a preferred location.(right Click - Extract All).
3. Plug in the 24V power supply to the gateway. (Siemens PN **535-104** 24 Vdc power supply sold separately.) The conductor labeled (+) terminates into the port on left labeled **24V**; the other conductor is the ground and terminates into the middle port labeled **Ground**. The right port is unused.
4. Connect the Wireless BAS Gateway to the personal computer using the USB-A to USB-B cable supplied with the gateway. Plug the USB cable into the computer, then plug the other end into the PC INTERFACE port on the Wireless gatewayThe computer should recognize new hardware. Manually install the driver as shown below. DO NOT use Windows automatic driver search.
5. When the following pop up appears, click on it.

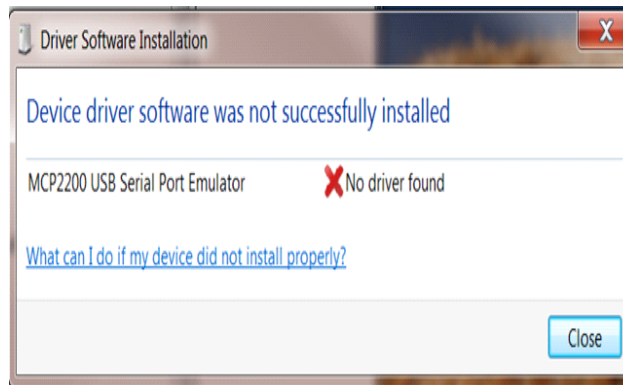


6. Select **Skip obtaining driver software from Windows Update**, then click on **Yes** on the confirmation screen.

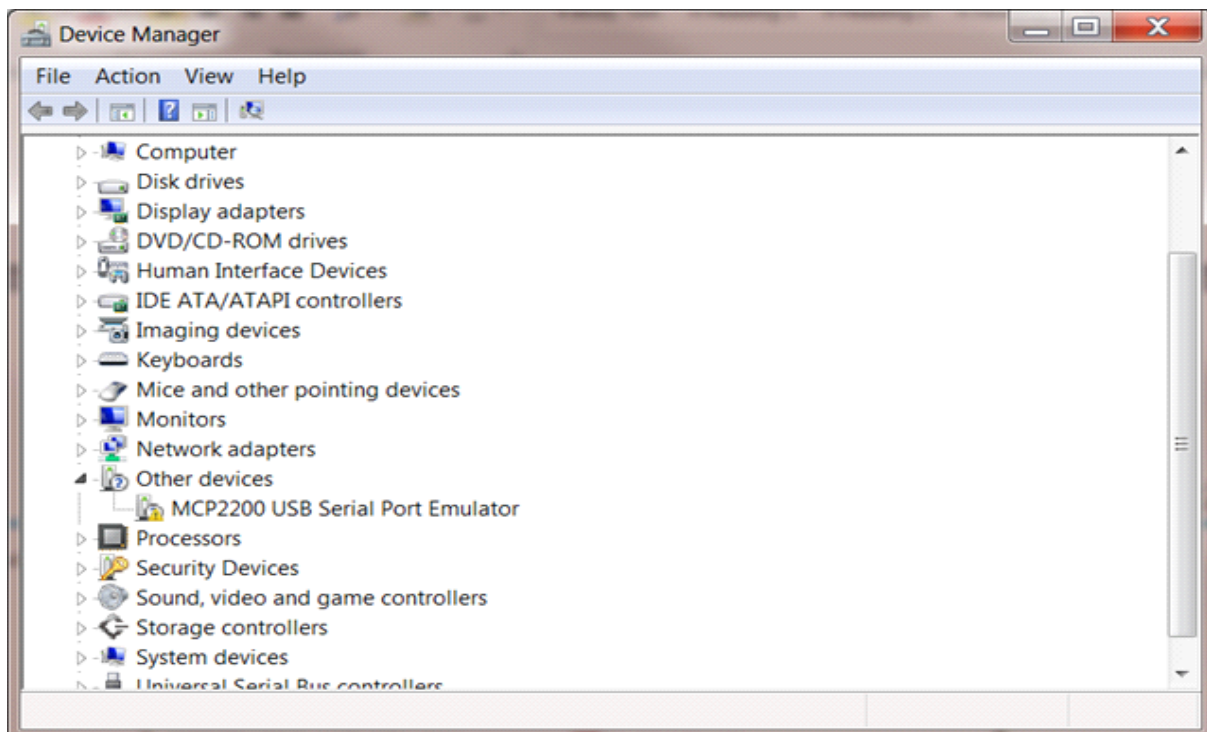




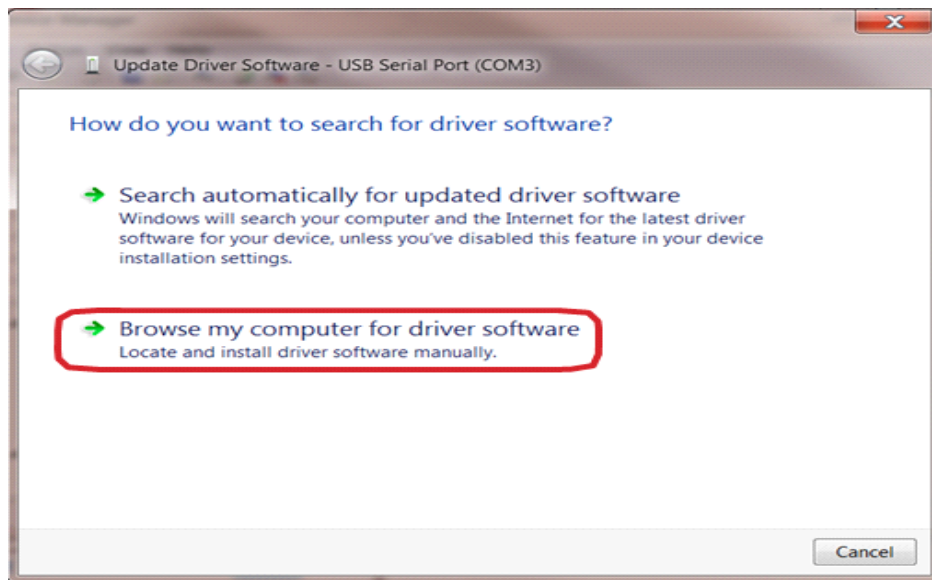
7. Select **Close** when the following window is displayed:



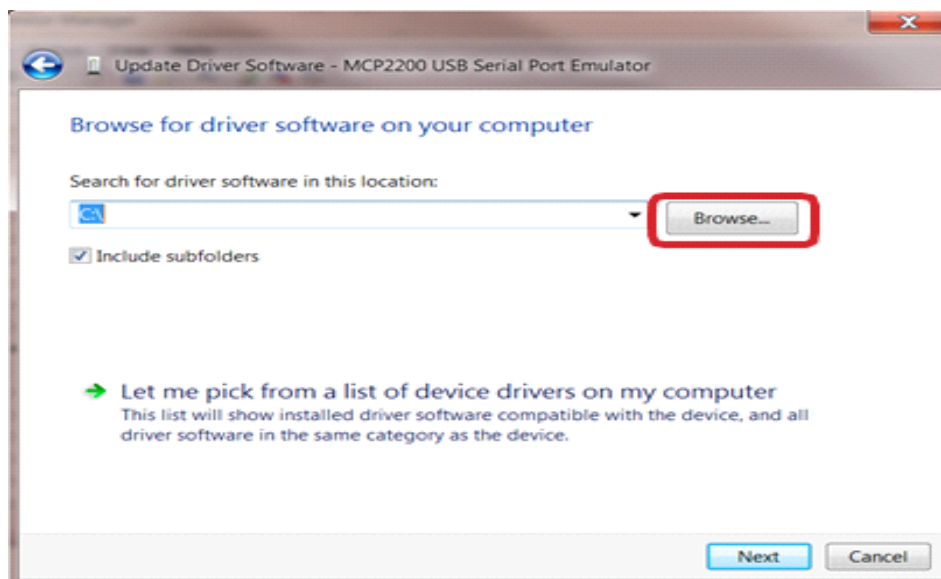
8. Open the Control Panel and then Device Manager to open the following window. Scroll down to Other devices and click the arrow to expand devices. Right click on **MCP2200 USB Serial Port Emulator** and select **Update Driver Software...**

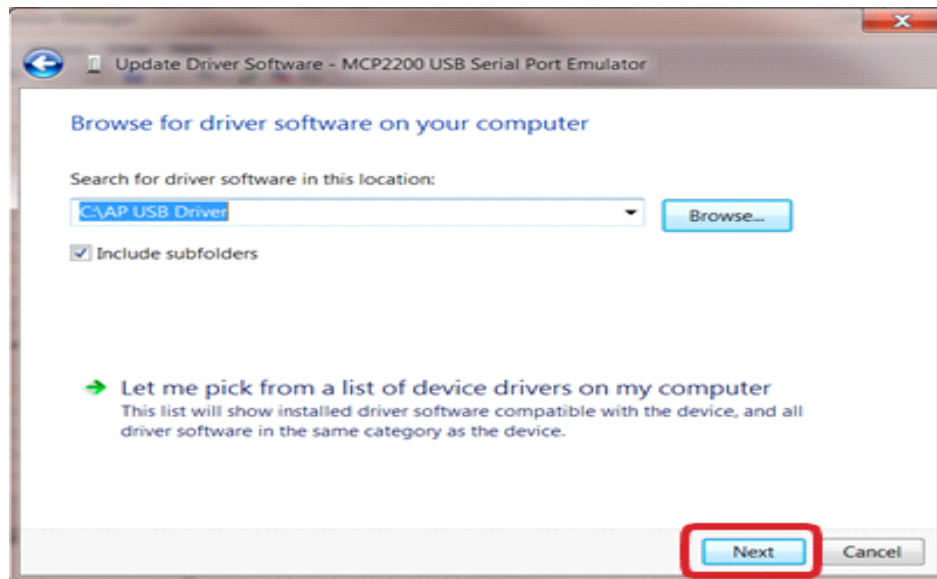


9. Select **Browse my computer for driver software**.

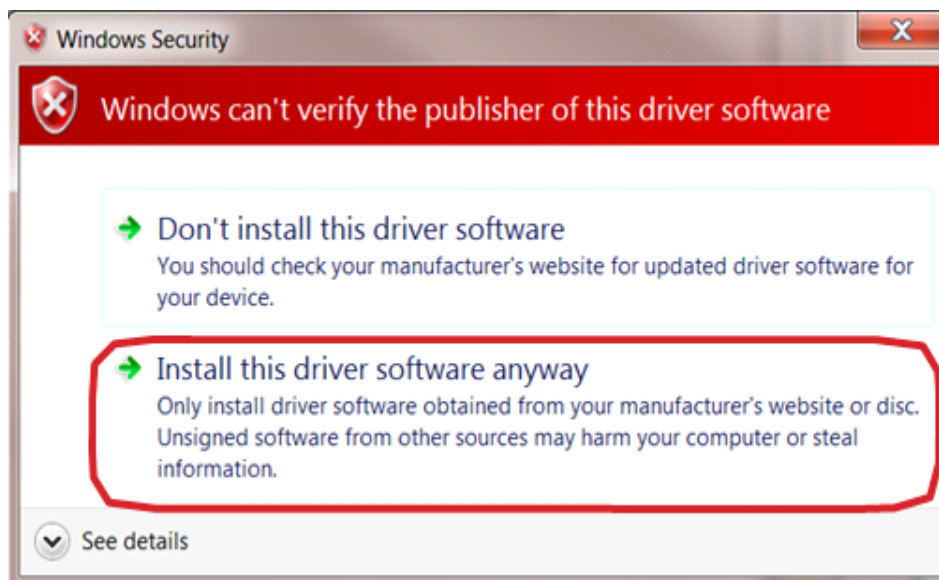


10. Select **Browse** and then navigate to the folder you unzipped the device driver to in Step 2. Click **OK**, then Click **Next**.

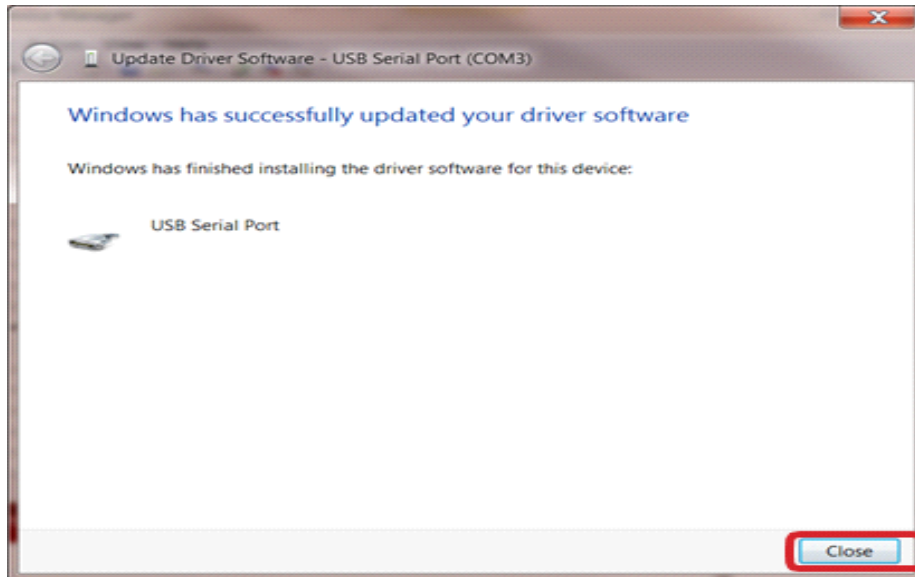




11. The following screen will appear. Click **Install this driver software anyway** to proceed.



12. When completed this screen will display. Click **Close** to proceed.

**NOTE:**

The driver only needs to be located and installed once. After the initial installation, if you connect a new gateway to the same computer, you can have Windows automatically find the correct driver without locating it manually.

## Installation and Configuration of Tera Term

Tera Term or an equivalent terminal emulator program is needed to display data from the gateway and for configuration of certain parameters. For Windows XP and earlier versions you may also use HyperTerminal which is included with Windows (no installation is required).

Within the Siemens network, Tera Terminal can be installed from the Install Software section of the UCMS Control Center.



UCMS Control Center

Outside the Siemens network, Tera Terminal can be downloaded [here](https://osdn.net/projects/ttssh2/downloads/70355/teraterm-4.101.zip/).  
(<https://osdn.net/projects/ttssh2/downloads/70355/teraterm-4.101.zip/>)

Save the files to a location of your choice. Do not launch Tera Term until after the USB driver has been installed. These instructions describe how to configure Tera Term, but the following settings are needed with any terminal emulator that is used:

Baud rate: 19200 bps

Data bits: 8 bits

Parity: None

Stop bits: 1 bit

Flow control: None

Emulation: ANSI or Auto Detect

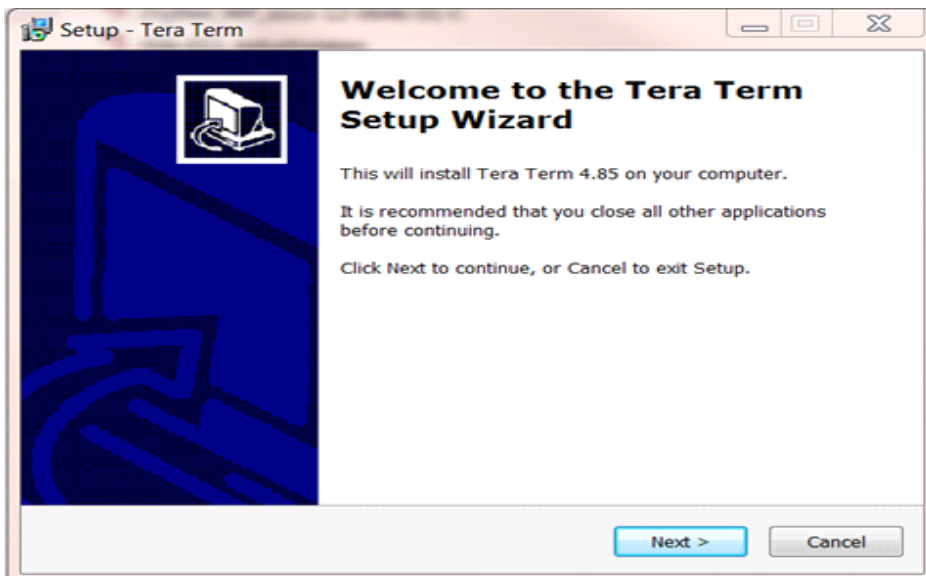
## Windows XP or Windows 2000

Tera Term is recommended. If you choose to use HyperTerminal, which is provided with Windows XP and earlier versions, access the program using the following menu options: Start Menu > All Programs > Accessories > Communications > HyperTerminal

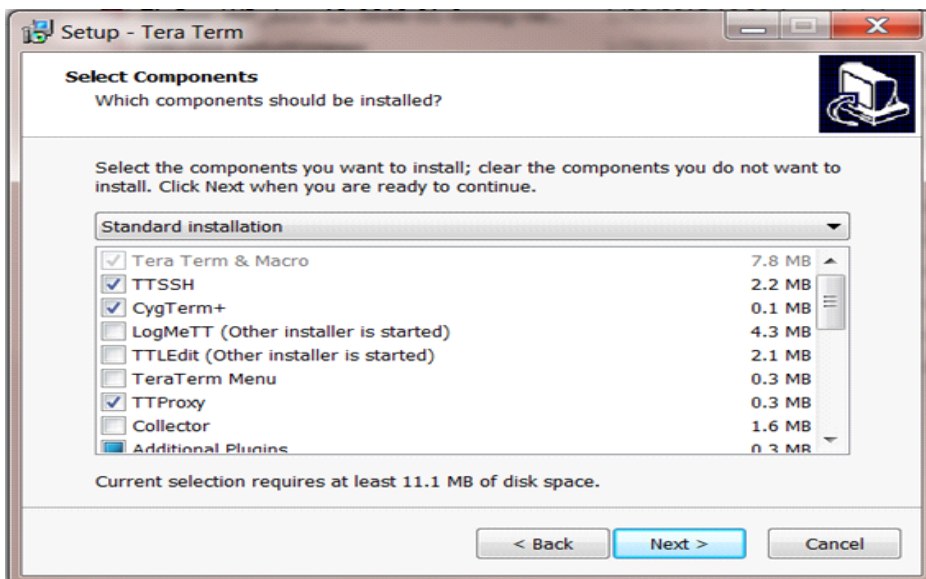
## Windows Vista or Windows 7

Go to the directory where Tera Term was saved and double click on **teraterm-4.XX.exe** to begin installation.

Upon starting the installation, you will be shown the following dialog box. Follow the prompts on each screen to complete installation of Tera Term.

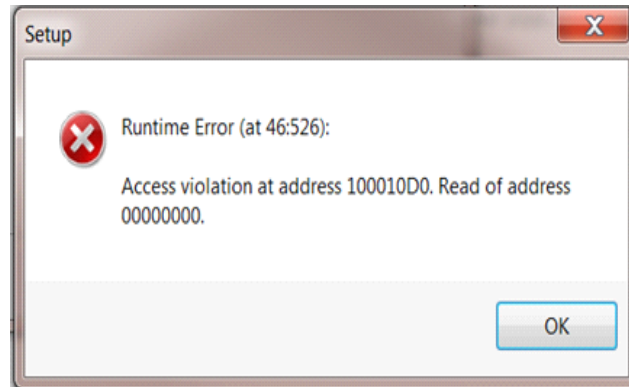


1. When the following screen is displayed, click **Next** for Standard installation.

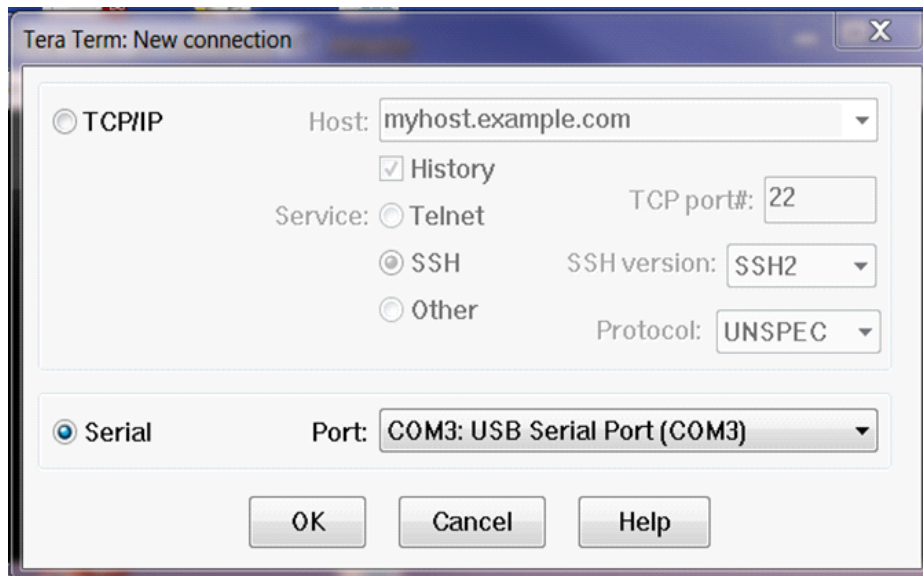


2. If the following error is displayed, click **OK**. This will not impact installation.





3. Ensure that the USB cable is connected to the Gateway and the computer.
4. Launch Tera Term from the Desktop shortcut or Programs menu. The following dialog box will appear:



5. Select **Serial**.
6. Select the COM Port which is being used for the access point and click **OK**.

**NOTES:**

If you cannot select **Serial** ensure that the driver is installed properly and the Gateway is connected to the personal computer using the USB cable.

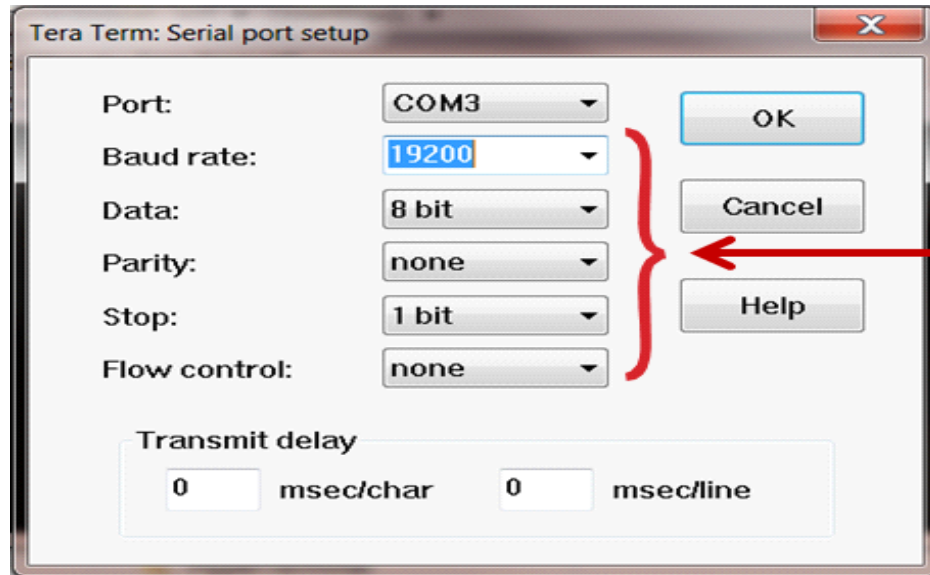
If more than one COM port is shown you can use Device Manager to determine the the correct COM port. To access Device Manager on your personal computer, select the following menu options:

Start Menu > Control Panel > System

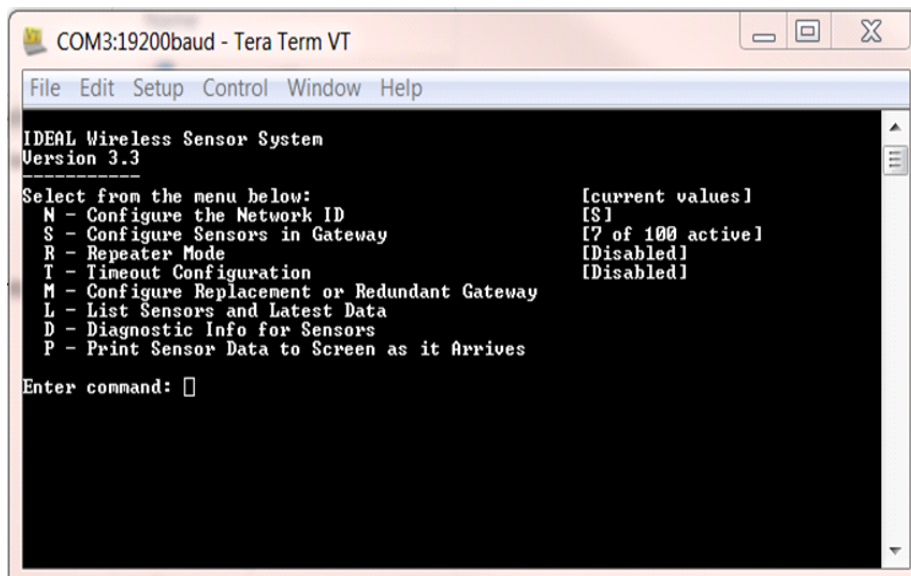
Click on **Device Manager** (You may have to open the **Hardware** tab).

1. Scroll down until you see **Ports (COM & LPT)** and click the +sign to expand the list.
2. Select **Setup** and then **Serial Port** in Tera Term. Choose the port settings as shown and click **OK**.





3. Select Setup then Save Setup. Do NOT change the File name, keep the default TERATERM. This will save the above settings so they don't need to be re-entered the next time you use Tera Term.
4. Now that Tera Term is configured, press any key until you see the Gateway options menu.



## Building Automation System Gateway

The gateway is the device that receives data from the wireless sensor nodes and interfaces to a BAS through industry standard protocols. The gateway is also used to configure the sensor nodes prior to deployment.

The WSG has integrated mounting flanges and can be mounted to surfaces such as wood or drywall with appropriate screws. Avoid mounting the gateway directly to a metal surface as this can affect wireless reception. If mounting on a metal surface is the only option, it is recommended to insert non-metallic material of at least 1/4" between the gateway and metal surface to create a stand-off distance. The gateway

can be powered by 24 Vac or 24 Vdc. (535-104) 24 Vdc power supply sold separately.)  
*The conductor labeled (+) terminates into the port on left labeled 24V; the other conductor is the ground and terminates into the middle port labeled Ground and right port is unused.*

## Gateway Configuration

Each gateway is pre-configured with a Network ID and a communication channel. The Network ID can be changed as needed, or to configure a gateway as a redundant node for higher availability BAS operation. The gateway is configured through two ports as follows:

**NOTE:**

See *USB Driver Installation (Windows 7 shown) and Installation and Configuration of Tera Term* to install the USB driver and Tera Term. This MUST be completed for a personal computer to communicate to a gateway.

Parameter	Configuration Port
Network ID	USB port - <b>PC INTERFACE</b> There are 26 pre-set values for the Network ID designated by the letters A-Z.
Communication Channel	USB port - <b>PC INTERFACE</b> There are 4 communication channels designated by numbers 1-4. (The channels are based on the IEEE 802.15.4 standard.)
Sensor Binding	USB port - <b>SENSOR INTERFACE</b> Sensors are configured (bound) to the gateway through a USB cable from the gateway to the sensor node.
Wired Network ID	Ethernet port
IP address	Ethernet port

## Configuring and Associating a Wireless Sensor Node to a Gateway

**NOTE:**

See *Series 4292 Wireless Sensor System Installation Instructions* ([A6V11521281](#)) for details on sensor installation and configuration.

A wireless sensor node must first be configured and associated to a particular gateway (access point) before data will be received by that gateway. This is a simple procedure that only takes a few seconds per sensor node. The items that are configured are Network ID and Sensor ID, and these items are automatically assigned by the gateway.



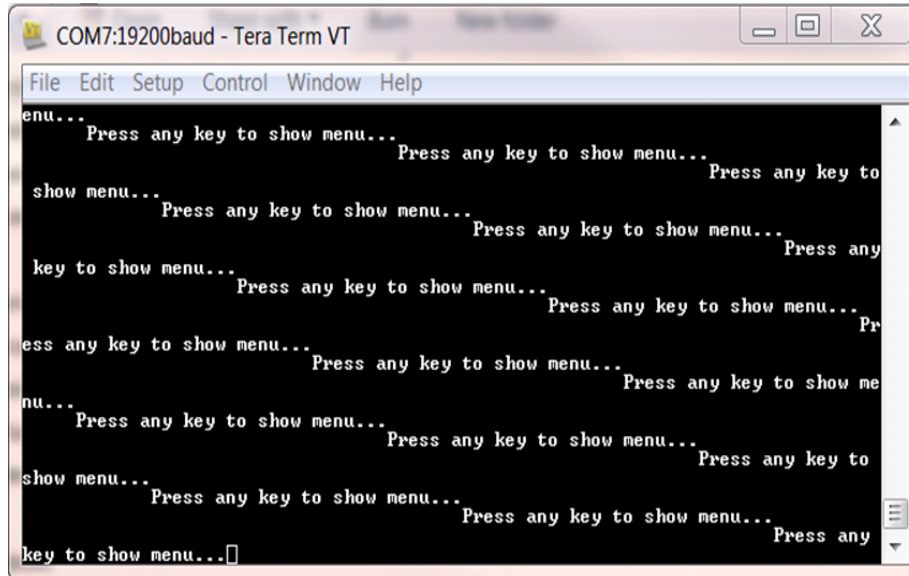
Wireless Gateway - Interface Ports and Status LEDs



Wireless Gateway - Power Connector

## Welcome Screen

When the USB driver has been properly installed and Tera Term is properly configured, the message **Press any key to show menu...** will display in the Tera Term window.

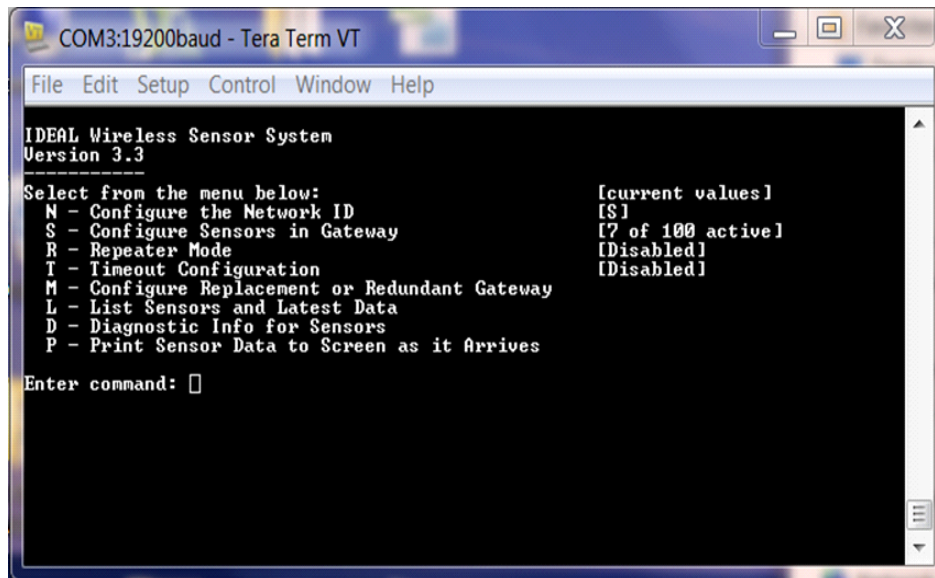


### NOTE:

If you see information from wireless packets appearing on the screen and want to see the main menu, type **SHIFT+P** to cancel **print mode**.

## Main Menu - Gateway

When any key is pressed, the system menu will appear as shown below. The system menu also provides an indication of the Network ID, the number of devices configured to the gateway and other settings.



## Option C – Configure the Communication Channel

Menu option C is used for configuring the Communication Channel. Two communication channels are available to choose from. The screen capture below highlights the entries needed to change the communication channel.

```

Enter command or press any key to show menu: IDEAL Wireless Sensor System
Version 4.1
-----
Select from the menu below: [current values]
C - Configure the Communication Channel [1]
N - Configure the Network ID [B]
S - Configure Sensors in Gateway [5 of 100 active]
R - Repeater Mode [Disabled]
T - Timeout Configuration [Disabled]
M - Configure Replacement or Redundant Gateway
L - List Sensors and Latest Data
D - Diagnostic Info for Sensors
P - Print Sensor Data to Screen as it Arrives

Enter command: IDEAL Wireless Sensor System
Version 4.1
-----
- Configure Communication Channel
WARNING - All Sensors configured to this Gateway will need to be updated
Do you wish to continue? [Y/N] y
***** Changing Channel: Now on channel 2
***** Network parameters modified
Enter command or press any key to show menu: IDEAL Wireless Sensor System
Version 4.1
-----
Select from the menu below: [current values]
C - Configure the Communication Channel [2]
N - Configure the Network ID [B]
S - Configure Sensors in Gateway [5 of 100 active]
R - Repeater Mode [Disabled]
T - Timeout Configuration [Disabled]
M - Configure Replacement or Redundant Gateway
L - List Sensors and Latest Data
D - Diagnostic Info for Sensors
P - Print Sensor Data to Screen as it Arrives

Enter command: █

```

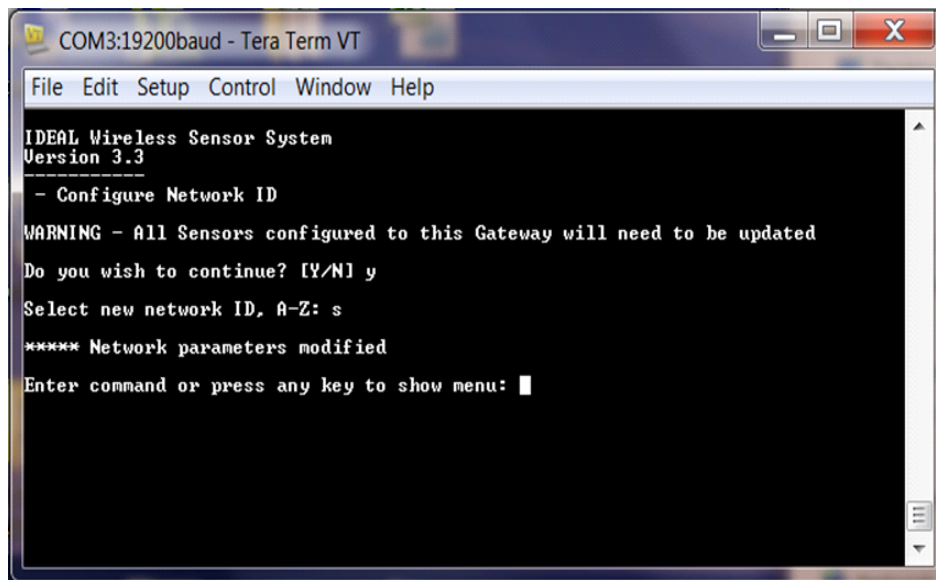
The system will warn you about changing channels, and you must select if you want to continue. If you click **Y** for yes, at the next prompt, click **1** or **2** to designate your channel preference, and the channel will be immediately changed. If you click **N** or press any other key, configuration will be cancelled and you will return to the main menu options.

**NOTE:**

Select the Communication Channel before any sensors are configured by the gateway, as the gateway assigns the Communication Channel to the sensors through the USB port.

## Option N – Configure the Network ID

Menu option **N** is for configuring the Network ID. The Network ID is a unique identifier that ensures data packets are received by the proper wireless gateway. There are 26 IDs available for use in the system, which are represented by the letters A through Z.



The system will warn you about changing the Network ID and you must select if you want to continue. If you click **Y** for yes, at the next prompt, click **A-Z** to designate your Network ID preference, and the Network ID will be immediately changed. If you click **N** or press any other key, configuration will be cancelled and you will return to the main menu options.

This option allows for easy user selection as well as a range of choices that is large enough to accommodate large-scale deployment of sensors and gateways in close proximity. Selecting the Network ID can be done in upper or lower case.

**NOTE:**

Select the Communication Channel before any sensors are configured by the gateway, as the gateway assigns the Communication Channel to the sensors through the USB port.

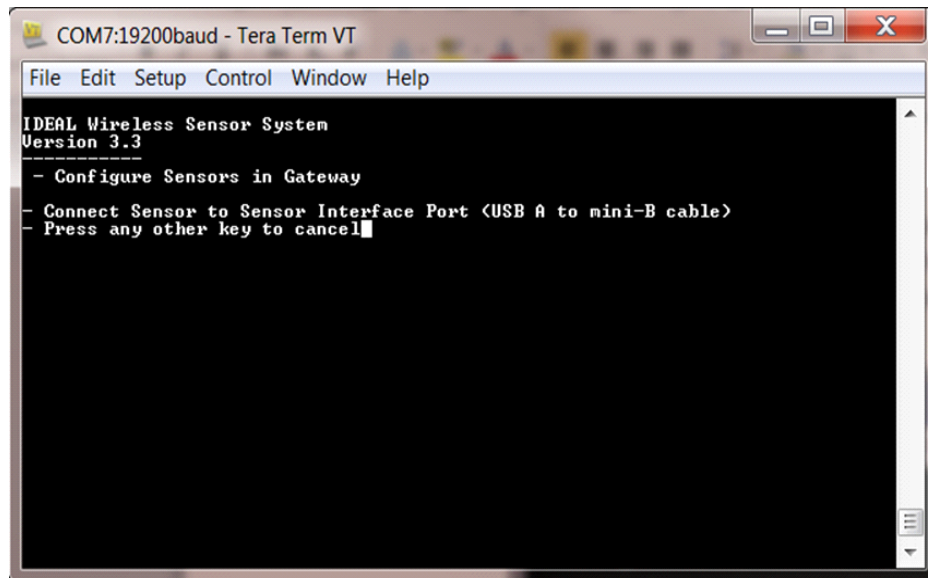
## Option S - Configure Sensors to Gateway

Menu option **S** is for adding or removing sensors that are configured (associated) to the gateway. Up to 100 sensors can be configured to a gateway and the Sensor IDs (1-00) are typically assigned automatically by the gateway. The configuration process assigns the Sensor ID and Network ID to each node, and also tells the gateway the

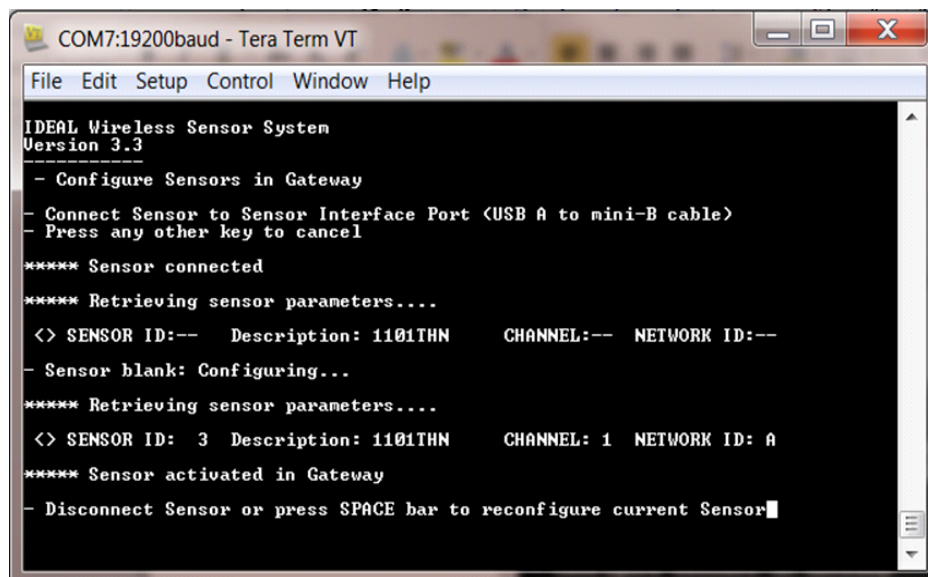
model number of the node. Configuration must be performed before a node is deployed.

A sensor can be connected to the gateway with a USB cable at any time before or after selection menu option **S**.

When the USB configuration port is connected, the status light on the gateway will BLINK continuously until the sensor is configured. The light will be solid when the sensor configuration is complete, and turn off when the sensor is disconnected. When the message below is displayed, the gateway is waiting for a sensor to be connected using USB cable to the gateway through the gateway port labeled SENSOR INTERFACE.



The system will wait until a sensor is connected, a key is pressed to cancel, or the operation times out and returns to the main menu. Once a blank sensor is connected, the screen will look like the following:



Information is retrieved from the sensor, which is blank, and the system will automatically assign it the next Sensor ID available, in this case, 9. The gateway also assigns the sensor its Network ID for communication. This sensor is now functioning normally and transmitting data to the gateway.

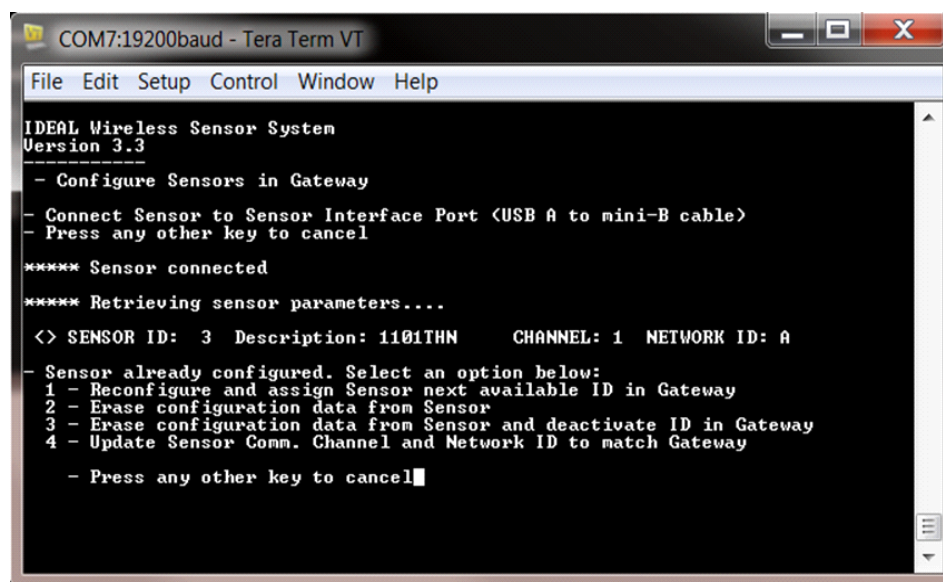


The sensor descriptions shown on the screen will be different than the Siemens Series 4292 part numbers. A cross reference is as follows:

Description Shown in Tera Term	Siemens Part Number	Description
58-N-1201-TX-N	QAA4292.EWSC	Temperature Sensor with 2 Remote 10k Ohm Type 2 Thermistor Inputs
58-N-1201-TH-N	QFA4292.EWSC	Temperature/Humidity/Dew Point Sensor
58-N-1202-CO2-R	QPA4292.EWSC	CO <sub>2</sub> Sensor
58-N-1201-C-N	563-083	Contact Closure Transmitter with 2 Inputs

Sensor descriptions may be changed by using **Option M-4 Manually Activate or Deactivate Sensors**.

The message below is displayed when the connected sensor has a Sensor ID that is already configured in the gateway. When this occurs, additional options are provided as shown.



Click the corresponding number to perform the action described.

**Option 1** will reconfigure the sensor with the next Sensor ID available in the system. Do this when adding a sensor to a network that was already part of a different network, but was not erased from the previous gateway.

**Option 2** will erase all configuration data from the sensor.

**Option 3** will erase all configuration data from the sensor and remove it from the gateway.

**Option 4** will update the sensor to match the gateway's communication configuration.

**NOTE 1:**

This option is only available if the configuration data of the sensor and gateway is different.

**NOTE 2:**

If a configuration error occurs due to a faulty connection of the USB port/cable such as electrical noise, the system may display some unknown data but will conclude with a



message that the sensor configuration has not been changed. Press the **SPACE BAR** to try configuration again, or disconnect and reconnect the USB cable.

After the primary gateway is configured with the desired sensors, it is recommended to capture the configuration data by using Option L, discussed below, to list the sensors on the screen. Using either the **Print Screen** button or copying/pasting the data from the screen into a text file can be used.

## Option L – List Sensors and Latest Data

Menu option L displays the list of sensors configured to the gateway, including the sensor model and data from the latest packet received.

```

COM3:19200baud - Tera Term VT
File Edit Setup Control Window Help
IDEAL Wireless Sensor System
Version 3.3
- List Sensors and Latest Data
dT - Seconds since last data packet
BATT - Battery Voltage in deciVolts (i.e. 36 = 3.6V), 0 for Low Battery
S1-8 - Sensor data (units vary by sensor type)
SENSOR dT BATT DESC S1 S2 S3 S4 S5 S6 S7 S8
1 53 37 BDRM THDP 69.9 39 43.8 0 0 0 0 0
2 16 37 GARAGE 70.1 -58.0 -58.0 0 0 0 0 0
3 9 52 KITCHENC02 76.7 818 0 0 0 0 0 0
4 66 37 LIVING RM 70.7 33 40.2 0 0 0 0 0
5 46 0 1201CR 0 0 0 0 0 0 0 0
List Complete
Enter command or press any key to show menu:

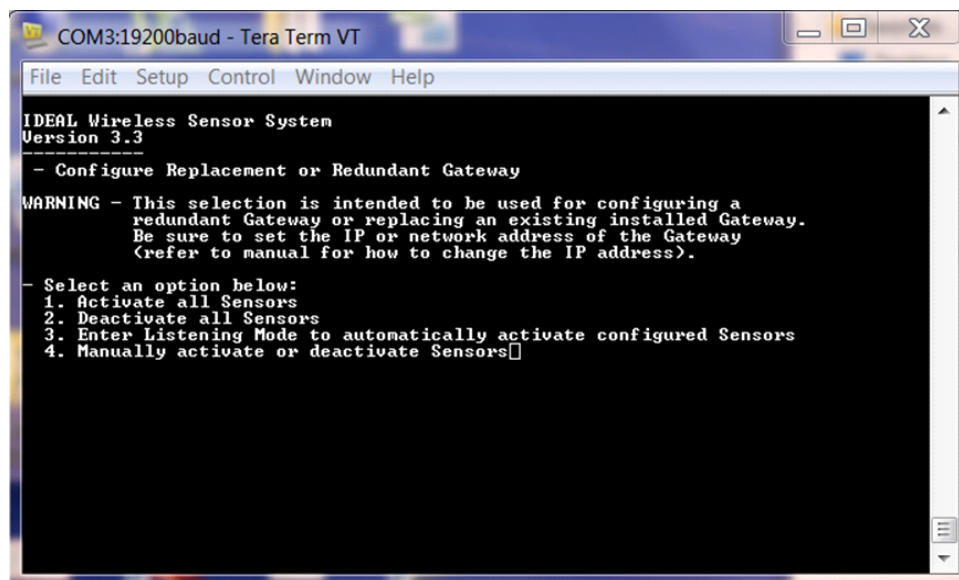
```

### NOTE:

If the model number is not entered during manual configuration of the gateway, the model number of the sensor will be blank. This does not impact the operation of the system in any way with regard to the BAS interface (for example, BACnet, Modbus).

## Option M - Configure Replacement of Redundant Gateway

A unique capability of the gateway is the ability to configure one for redundant operation. The redundant gateway can be on “hot stand-by” for a remote switchover or on “warm stand-by” where the network cable needs to be moved from the primary to the stand-by unit. The configuration for redundancy is also the same as configuring for replacement in the unlikely event a gateway fails or is damaged. A redundant or replacement gateway can be configured in just a few minutes.



Click the corresponding number to perform the action described.

**Option 1** activates all sensors in the gateway up to the maximum available.

**Option 2** deactivates all sensors in the gateway, allowing for a quick reboot of the system.

**Option 3** puts the gateway into Listening Mode. This is extremely useful if a gateway in a deployed network malfunctions or is damaged, because it allows you to simply replace the bad gateway with a new one by listening for any sensors that were talking to the previous gateway. Input the network configuration and Network ID that the deployed sensors were operating on. The gateway will listen for 5 minutes, and automatically add sensors as they are “heard.” This mode can be terminated at any time by pressing **Shift+L**, or repeated if all sensor devices have not been found.

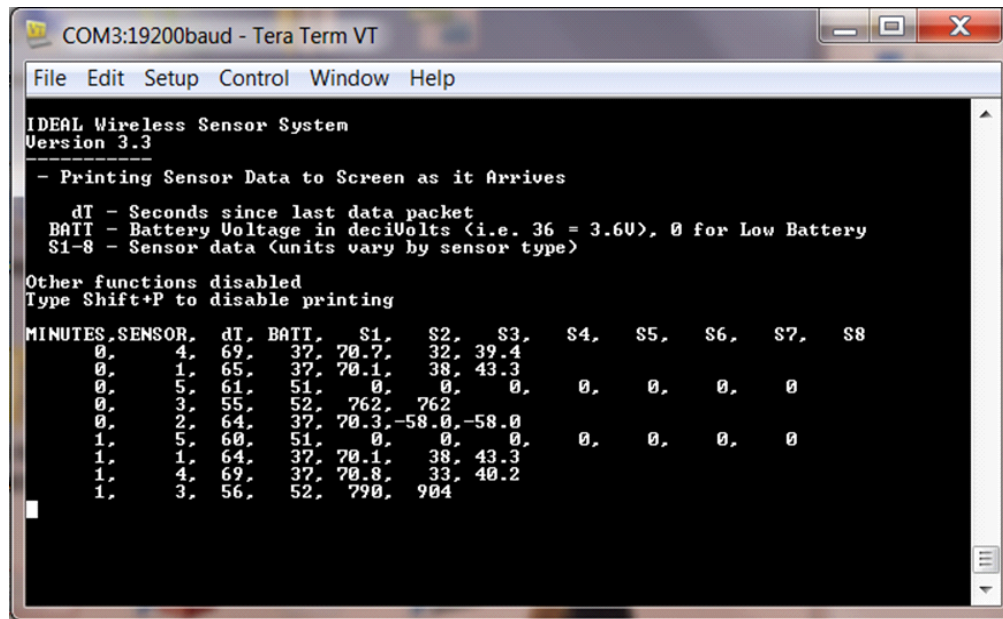
**Option 4** allows you to manually add or remove sensors from the gateway. Also, use this option to update a sensor’s description (helpful if Listening mode was used to activate sensors).

**NOTE:**

The operation described here does not configure the wired network parameters of the replacement/redundant gateway, but only the wireless sensors that are to be configured to it. See the *Network Configuration Guide* section of this document for configuring the wired BAS interface (for example, BACnet, Modbus).

## Option P – Print Sensor Data to Screen

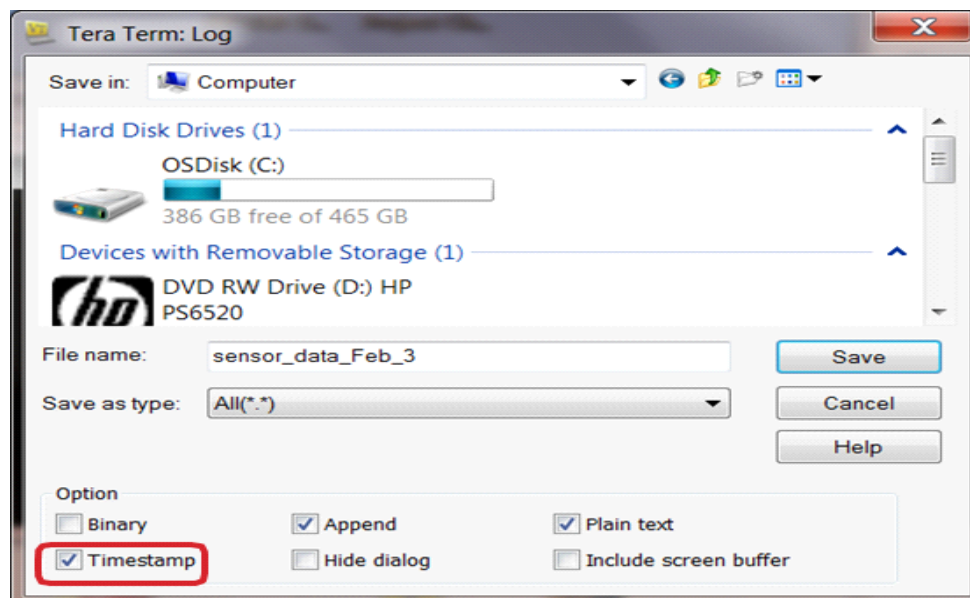
Menu option **P** displays the incoming sensor data on the screen and allows the data to be captured to a text file (data logging) through Tera Term, another terminal emulator program, or a custom designed application. When this mode is enabled it will continue until terminated by typing **SHIFT+P**.

**NOTE:**

The header information and oldest data will scroll off the top of the screen as new information is added to the bottom.

If desired, the sensor data can be captured to a text file as it is printed. The data can be saved, along with a time stamp, in a comma delimited text file (CSV) which can be post processed using Excel or other software tool.

To save the data to a text file select **File** then **Log...** Type the desired File Name. If you want to include a timestamp with each data line, select **Timestamp** at the bottom of the window under **Option**.



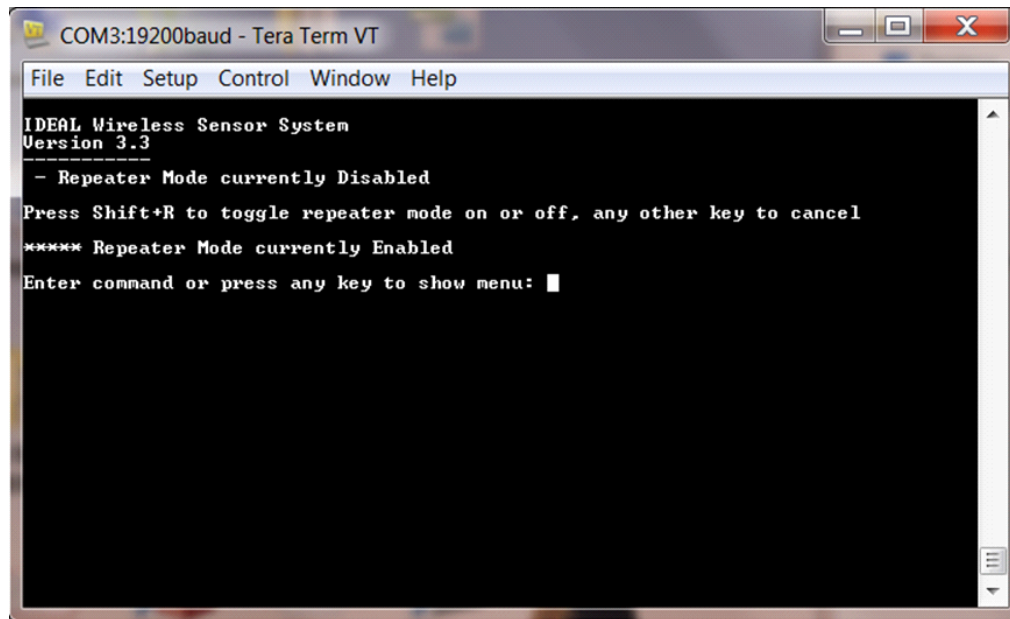
Following is an example of a time stamped text file created using the Print feature and the Log option of Tera Term:

MINUTES	SENSOR	dT	BATT	S1	S2	S3	S4	S5	S6	S7	S8
0	3	56	52	813	754	-58.0	-58.0	0	0	0	0
0	2	64	37	71.4	-58.0	-58.0	0	0	0	0	0
0	5	60	52	0	0	0	0	0	0	0	0
0	1	64	37	74.1	34	43.9	0	0	0	0	0
1	3	55	52	811	800	0	0	0	0	0	0
1	4	69	37	71.4	28	36.6	0	0	0	0	0
1	2	64	37	71.4	-58.0	-58.0	0	0	0	0	0
1	5	61	52	0	0	0	0	0	0	0	0
1	1	65	37	73.9	34	43.7	0	0	0	0	0
2	3	56	52	817	841	0	0	0	0	0	0
2	4	69	37	71.4	28	36.6	0	0	0	0	0
2	2	64	37	71.4	-58.0	-58.0	0	0	0	0	0
2	5	60	52	0	0	0	0	0	0	0	0
2	3	55	52	809	776	0	0	0	0	0	0
3	1	64	37	73.7	34	43.6	0	0	0	0	0
3	4	69	37	71.4	29	37.5	0	0	0	0	0
3	2	64	37	71.2	-58.0	-58.0	0	0	0	0	0
3	5	61	52	0	0	0	0	0	0	0	0
3	3	55	52	798	750	0	0	0	0	0	0
4	1	65	37	73.7	33	42.8	0	0	0	0	0
4	2	64	37	71.4	-58.0	-58.0	0	0	0	0	0
4	4	69	37	71.4	28	36.6	0	0	0	0	0
4	5	60	52	0	0	0	0	0	0	0	0
4	3	55	52	798	796	0	0	0	0	0	0
5	1	64	37	73.5	34	43.4	0	0	0	0	0
5	2	64	37	71.4	-58.0	-58.0	0	0	0	0	0
5	5	60	52	0	0	0	0	0	0	0	0
5	3	55	52	792	768	0	0	0	0	0	0
5	4	68	37	71.4	28	36.6	0	0	0	0	0
6	1	65	37	73.4	33	42.5	0	0	0	0	0
6	3	56	52	783	747	0	0	0	0	0	0
6	5	61	52	0	0	0	0	0	0	0	0
6	2	65	37	71.4	-58.0	-58.0	0	0	0	0	0
6	4	69	37	71.7	28	36.8	0	0	0	0	0
7	1	64	37	73.4	33	42.5	0	0	0	0	0
7	3	56	52	782	778	0	0	0	0	0	0
7	5	60	52	0	0	0	0	0	0	0	0
7	2	63	37	71.4	-58.0	-58.0	0	0	0	0	0
8	4	69	37	71.7	28	36.8	0	0	0	0	0
8	1	65	37	73.2	33	42.4	0	0	0	0	0
8	3	55	52	778	761	0	0	0	0	0	0
8	5	61	52	0	0	0	0	0	0	0	0
8	2	64	37	71.4	-58.0	-58.0	0	0	0	0	0
9	4	69	37	71.7	28	36.8	0	0	0	0	0
9	3	55	52	769	730	0	0	0	0	0	0
9	1	64	37	73.2	34	43.1	0	0	0	0	0
9	5	60	52	0	0	0	0	0	0	0	0
9	2	64	37	71.2	-58.0	-58.0	0	0	0	0	0
10	3	56	52	772	785	0	0	0	0	0	0

## Option R - Repeater Mode

Menu option **R** is Repeater mode and allows the gateway device to function as a repeater for extended range. Multiple repeaters can be used with a single BAS gateway and allow for an unlimited extension of data range from the wireless sensors in any topology. The repeaters do not form routes for each sensor; they simply repeat data that arrives using the same Network ID for which they are configured. Repeaters will not repeat data from other repeaters and the gateway and repeaters will not display repeated data from the same sensor node.

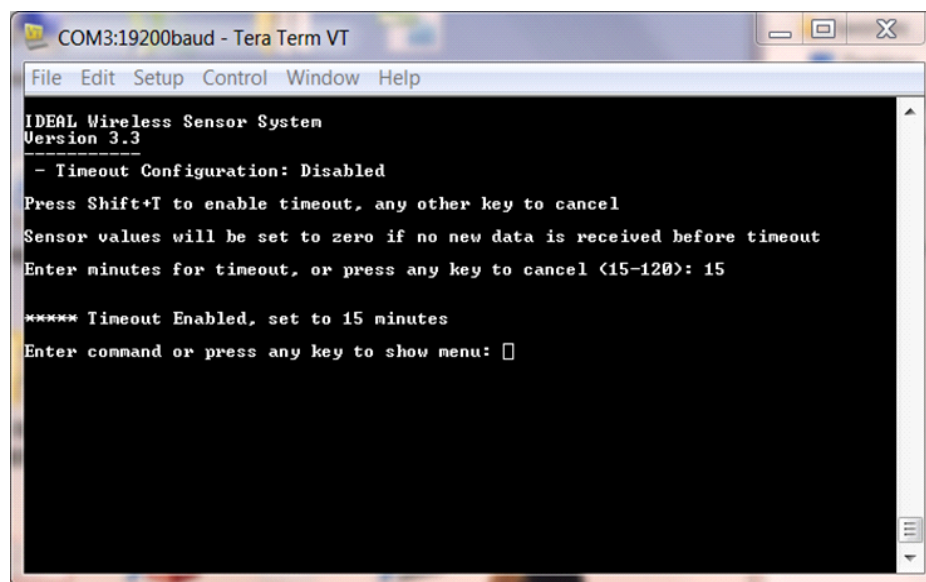
Proper use of the gateway as a repeater requires the use of the same Network ID as is used for the gateway. These parameters can be selection through menu option **N** as listed earlier in this guide. The repeater should be located within range of the gateway, and a range of 300 feet is recommended for most environments. Some environments may require a shorter distance.



Pressing **SHIFT+R** will toggle the Repeater mode on or off.

## Option T - Timeout Configuration

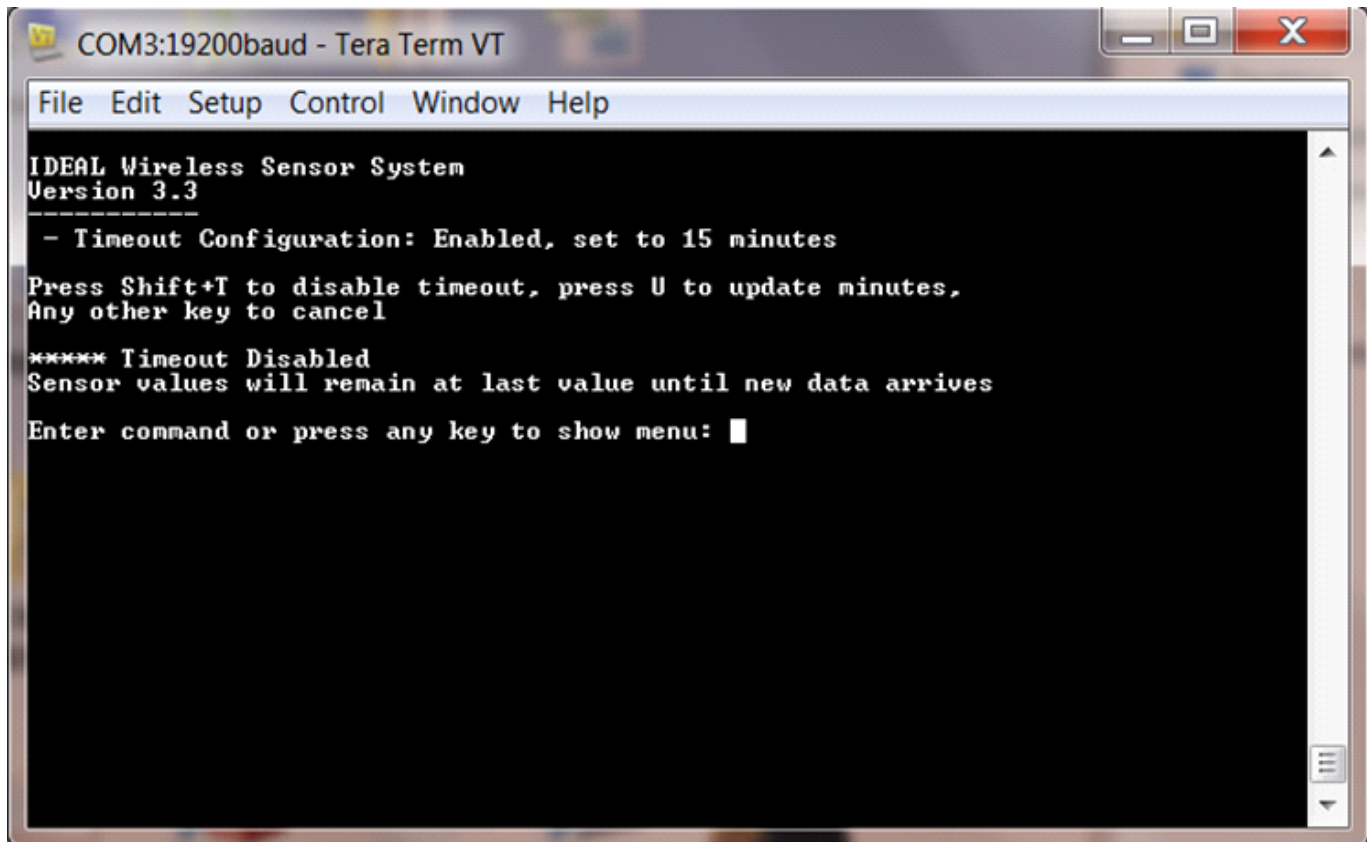
Menu option T allows you to enable a global timeout for the sensors activated in the system. This timeout will set the data of a sensor, which has not been heard from in the specified time, to zero. This can be used to set alarms for sensors that have stopped communicating.



Press **SHIFT+T** to enable the timeout. Once enabled, you are required to set the number of minutes before a sensor gets timed out. This can be 15 to 120 minutes (2 hours). This is a global timeout, so all sensors activated in the system will be subject to this setting.

To deactivate, reenter this option, and press **SHIFT+T** again.





```
COM3:19200baud - Tera Term VT
File Edit Setup Control Window Help
IDEAL Wireless Sensor System
Version 3.3
-----
- Timeout Configuration: Enabled, set to 15 minutes
Press Shift+T to disable timeout, press U to update minutes,
Any other key to cancel
***** Timeout Disabled
Sensor values will remain at last value until new data arrives
Enter command or press any key to show menu: █
```

You can also update the timeout setting at this point. Click **U** to update the timeout.

## Option D - Diagnostic Information for Sensors

Menu option **D** provides network diagnostic information for each sensor for monitoring network robustness, performance, and troubleshooting. Each repeater node in the network increments a hop counter and updates the received signal strength for each data packet. Diagnostic information could be used to determine if additional repeaters are needed to meet certain network specifications such as having more than one path to the gateway or potentially reducing the number of hops to the gateway.

```

COM3:19200baud - Tera Term VT
File Edit Setup Control Window Help

IDEAL Wireless Sensor System
Version 3.3
-----
- Diagnostic Info for Sensors

  dT - Seconds since last data packet
  BATT - Battery Voltage in deciVolts (i.e. 36 = 3.6V), 0 for Low Battery
  RSSI - Received Signal Strength Indicator of Communications Channel
  TOTAL PATHS - Total number of packet routes between Sensor and Gateway
  LEAST HOPS - Shortest route between Sensor and Gateway
  MOST HOPS - Longest route between Sensor and Gateway
  BEST RSSI - Lowest hop RSSI of the packet route with highest RSSI
  BEST HOPS - Hop count of the packet route with highest RSSI

SENSOR dT BATT  DESC    TOTAL PATHS  LEAST HOPS  MOST HOPS  BEST RSSI / HOPS
1      19  37   BDRM THDP      1          1          1        -57 / 1
2      53  37   GARAGE         1          1          1        -57 / 1
3      37  52   KITCHENC02     1          1          1        -54 / 1
4      44  37   LIVING RM      1          1          1        -54 / 1
5      59  52   1201CR         1          1          1       -104 / 1
9      61   0                   1          1          1        -50 / 1

Press any key to continue list, or C to cancel

```

# Network Configuration Guide

## System Overview

The wired network interface for the Series 4292 Wireless Sensor BAS Gateway(WSG) is a ProtoCessor module from FieldServer Technologies, and is configured separately from other aspects of the gateway. The ProtoCessor module is referred to as a “FieldServer” in the instructions that follow.

Siemens will pre-configure the network interface as it is ordered. In the event network parameters need to be modified, use the following instructions.

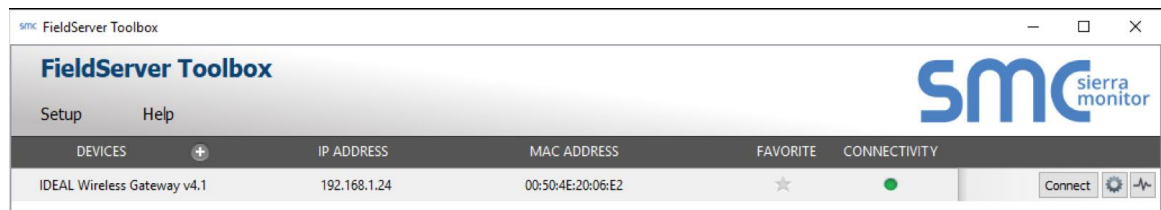
The gateway has three types of wired network protocols: Ethernet, RS-485, and FTT-10. These physical interfaces support a range of network protocols depending on the particular interface. All changes to the wired network parameters are performed through an Ethernet interface.

1. **Install FieldServer Toolbox.** The FieldServer Toolbox will enable you to discover the wireless gateway and connect to it. If you already know the gateway IP address you may also enter the gateway IP directly into a browser to connect to it.

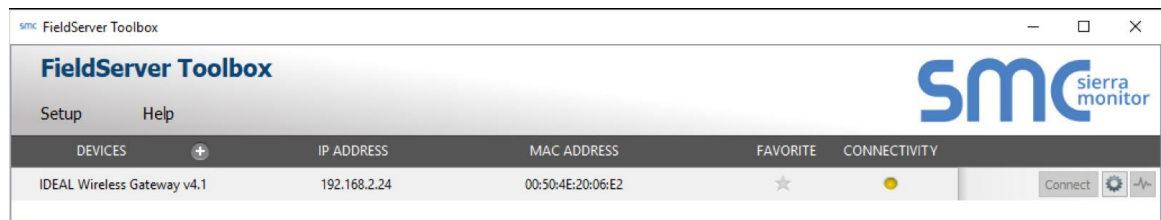
Web page with link to install file:

<https://www.sierramonitor.com/content/fieldserver-toolbox-0>

2. **Select the wireless gateway.** After installing and starting the FieldServer Toolbox, a screen similar to the one below is shown. If there are no firewall issues, a list of available and recently connected (not shown) wireless gateways will appear.





Initially, the wireless gateway IP address is **192.168.1.24**. If the host network does not match this default setting the connectivity indicator will be yellow. Clicking on the gear icon will allow you to change the IP address of the wireless gateway so it matches the host network.





3. **Wireless Gateway Main Menu.** Press the **Connect** button to access the Main Menu.

DEVICES	+	IP ADDRESS	MAC ADDRESS	FAVORITE	CONNECTIVITY	
IDEAL Wireless Gateway v4.1		192.168.1.24	00:50:4E:20:06:E2	☆	●	Connect  

4. **Configuration Parameters.** The protocol\_select parameter will be set to the protocol that was specified for the wireless gateway type ordered. The protocol type may be changed by selecting the appropriate number. The parameters following protocol\_select will change depending upon the protocol selected. The Parameter Description field explains what each parameter does. Select **System Restart** after making Configuration Parameter changes.

### Configuration Parameters

Parameter Name	Parameter Description	Value	
protocol_select	<b>Protocol Selector</b> Set to 1 for BACnet IP Set to 2 for BACnet MSTP Set to 3 for Metasys N2 Set to 4 for Modbus RTU/Modbus TCP Set to 5 for SNMP Set to 6 for XML	1	Submit
bac_device_id	<b>BACnet Device Instance</b> This sets the BACnet device instance. (1 - 4194303)	50	Submit
bac_ip_port	<b>BACnet IP Port</b> This sets the BACnet IP port of the Gateway. The default is 47808. (1 - 65535)	47808	Submit
bac_cov_option	<b>BACnet COV</b> This enables or disables COVs for the BACnet connection. Use COV_Enable to enable. Use COV_Disable to disable. (COV_Enable/COV_Disable)	COV_Disable	Submit
bac_bmd_option	<b>BACnet BBMD</b> This enables BBMD on the BACnet IP connection. Use BBMD to enable. Use - to disable. The bdt.ini files also needs to be downloaded. (BBMD/-)	-	Submit

[HELP \(?\)](#)
[Network Settings](#)
[System Restart](#)
[Diagnostics & Debugging](#)

5. **Ethernet Network Settings.** Edit the Ethernet Network Settings by selecting **Network Settings** at the bottom of the Configuration Parameters screen.

The screenshot shows the 'Configuration Parameters' screen with a table of parameters. The parameters are:

Parameter Name	Parameter Description	Value
protocol_select	<b>Protocol Selector</b> Set to 1 for BACnet IP Set to 2 for BACnet MSTP Set to 3 for Metasys N2 Set to 4 for Modbus RTU/Modbus TCP Set to 5 for SNMP Set to 6 for XML	1
bac_device_id	<b>BACnet Device Instance</b> This sets the BACnet device instance. (1 - 4194303)	50
bac_ip_port	<b>BACnet IP Port</b> This sets the BACnet IP port of the Gateway. The default is 47808. (1 - 65535)	47808
bac_cov_option	<b>BACnet COV</b> This enables or disables COVs for the BACnet connection. Use COV_Enable to enable. Use COV_Disable to disable. (COV_Enable/COV_Disable)	COV_Disable
bac_bbmd_option	<b>BACnet BBMD</b> This enables BBMD on the BACnet IP connection. Use BBMD to enable. Use - to disable. The bdt.ini file also needs to be downloaded. (BBMD/-)	-

At the bottom of the screen, there are four buttons: **HELP (?)**, **Network Settings**, **System Restart**, and **Diagnostics & Debugging**.

After adjusting the Network Settings, select **Update IP Settings** to save the changes and then select **System Restart**.

The screenshot shows the 'Network Settings' screen with a 'Note' at the top: 'Updated settings only take effect after a System Restart. If the IP Address is changed you will need to direct your browser to the new IP Address after the System Restart.'

The parameters are:

Parameter Name	Parameter Description	Value
protocol_select	<b>Protocol Selector</b> Set to 1 for BACnet IP Set to 2 for BACnet MSTP Set to 3 for Metasys N2 Set to 4 for Modbus RTU/Modbus TCP Set to 5 for SNMP Set to 6 for XML	1
bac_device_id	<b>BACnet Device Instance</b> This sets the BACnet device instance. (1 - 4194303)	50
bac_ip_port	<b>BACnet IP Port</b> This sets the BACnet IP port of the Gateway. The default is 47808. (1 - 65535)	47808
bac_cov_option	<b>BACnet COV</b> This enables or disables COVs for the BACnet connection. Use COV_Enable to enable. Use COV_Disable to disable. (COV_Enable/COV_Disable)	COV_Disable
bac_bbmd_option	<b>BACnet BBMD</b> This enables BBMD on the BACnet IP connection. Use BBMD to enable. Use - to disable. The bdt.ini file also needs to be downloaded. (BBMD/-)	-

Below the parameters, there are several fields for network settings:

- N1 IP Address:** 192.168.1.24
- N1 Netmask:** 255.255.255.0
- N1 DHCP Client State:** DISABLED
- Default Gateway:** 192.168.1.1
- Domain Name Server1:** 0.0.0.0
- Domain Name Server2:** 0.0.0.0
- MAC Address:** 00:50:4E:20:06:E2

At the bottom of the screen, there are four buttons: **HELP (?)**, **Network Settings**, **System Restart**, and **Diagnostics & Debugging**.

6. **Diagnostics and Debugging.** On the **Configuration Parameters** screen, select **Diagnostics and Debugging** in the lower right hand corner of the screen.

**NOTE:** Only commonly used fields are covered in this section of the guide.

Parameter Name	Parameter Description	Value
protocol_select	<b>Protocol Selector</b> Set to 1 for BACnet IP Set to 2 for BACnet MSTP Set to 3 for Metasys N2 Set to 4 for Modbus RTU/Modbus TCP Set to 5 for SNMP Set to 6 for XML	1 <input type="button" value="Submit"/>
bac_device_id	<b>BACnet Device Instance</b> This sets the BACnet device instance. (1 - 4194303)	50 <input type="button" value="Submit"/>
bac_ip_port	<b>BACnet IP Port</b> This sets the BACnet IP port of the Gateway. The default is 47808. (1 - 65535)	47808 <input type="button" value="Submit"/>
bac_cov_option	<b>BACnet COV</b> This enables or disables COVs for the BACnet connection. Use COV_Enable to enable. Use COV_Disable to disable. (COV_Enable/COV_Disable)	COV_Disable <input type="button" value="Submit"/>
bac_bbmd_option	<b>BACnet BBMD</b> This enables BBMD on the BACnet IP connection. Use BBMD to enable. Use - to disable. The bdt.ini files also needs to be downloaded. (BBMD/-)	- <input type="button" value="Submit"/>

7. **Changing the Password.** To change the password on the wireless gateway, expand **Setup** in the main navigation menu by clicking on the arrow next to Setup and then select **Passwords** from the expanded list. After changing the password, select **Update Password**.

The screenshot shows a web browser window with the URL 192.168.1.24/html/fsgui.htm#31\_OID. The page title is "Gateway Profile Configuration". The left navigation menu shows "IDEAL Wireless Gateway v4.1" expanded, with "Setup" selected, and "Passwords" highlighted. The main content area is titled "Passwords" and has a "Note" section stating: "The current Admin password (if set) is required to change all passwords. To disable password protection, set an empty Admin password. IMPORTANT: You may be required to log in again after changing a password." Below the note is a form with fields for "Account Name" (set to "Admin"), "Current Admin Password", "New Password", and "Confirm New Password". There are "Cancel" and "Update Password" buttons at the bottom.

8. **Data Arrays.** To view the Data Arrays on the wireless gateway, expand **Data Arrays** in the main navigation menu by clicking on the arrow next to Data Arrays and then select the field you want to view from the expanded list.

The screenshot shows the web interface for the IDEAL Wireless Gateway v4.1. The left sidebar contains a navigation menu with options like About, Setup, View, Connections, Data Arrays (expanded), Nodes, Map Descriptors, and User Messages. The main content area displays the 'Status' tab, which contains a table of system parameters.

Name	Value
Driver_Configuration	PCC1078
DCC_Version	V1.02a (A)
Kernel_Version	V6.22e (B)
Release_Status	Normal
Build_Revision	256
Build_Date	Thu Feb 11 17:01:59 2016 +0200
BIOS_Version	2.3.3
FieldServer_Model	ProtoCessor FFP485
Carrier_Type	SPR Carrier
Data_Points_Used	277
Data_Points_Max	1500
Application Memory:	
Memory_Percent_Used	1.66%
Memory_Used	1,673 kB
Memory_Available	100,465 kB
Avg_Cycle_Time	1
Min_Cycle_Time	1
Max_Cycle_Time	1506
Cache_Usage_(RDB)	0
Cache_Usage_(WRB)	0
Last_Time_Rebooted	Fri Jan 4 23:11:30 2019

At the bottom of the interface, there are buttons for 'Home', 'HELP (F1)', 'System Restart', 'System Time Synch', and 'Reset Cycle Times'.

These are the descriptions for the most commonly used Data Arrays:

**DA\_PWR** Shows the battery voltage for the sensors in decivolts (37 = 3.7V, 52 = 5.2V)

**DA\_SECS** Shows Delta Time which is how many seconds since the data has been updated

**DA\_S1** Shows all of the S1 Sensor Values

**DA\_S2** Shows all of the S2 Sensor Values

**DA\_S3** Shows all of the S3 Sensor Values

**DA\_S4** Shows all of the S4 Sensor Values

**DA\_S5** Shows all of the S5 Sensor Values

**DA\_S6** Shows all of the S6 Sensor Values

**DA\_S7** Shows all of the S7 Sensor Values

**DA\_S8** Shows all of the S8 Sensor Values

# Appendix A

Data from the sensors is mapped as follows in the gateway.

## Data Arrays

The gateway is capable of supporting multiple protocols depending on the specific module that is used and how it is configured.

Parameter	Configuration Port
COMM_CHANNEL	Communication channel of system
COMM_NET_ID	Communication network ID of system
ACTIVE_SENSORS	Number of sensors active in system
SENSORS_WITH_LOW_BATTERY	Number of sensors that are sending a low battery signal
REPEATER_MODE	1 means gateway is set as a repeater
TIMEOUT_CONFIG	Value (minutes) of timeout setting; 0 means mode is disabled
SENSORS_IN_TIMEOUT	Number of sensors currently in timeout, if mode enabled
SOFTWARE_VERSION	Version of gateway software
Nx_PWR	Battery voltage, or RSSI of RF powered sensors
Nx_DELTA_T	Time (seconds) since the last packet was received
Nx_S1	Sensor input 1
Nx_S2	Sensor input 2
Nx_S3	Sensor input 3
Nx_S4	Sensor input 4
Nx_S5	Sensor input 5
Nx_S6	Sensor input 6
Nx_S7	Sensor input 7
Nx_S8	Sensor input 8
Nx_TXID	Transmitter ID (only valid in RF powered sensors)

### NOTE:

x is a number from 1 to 100, corresponding to each sensor node in the system. A BACnet object is defined for all notes, regardless of whether or not they are active in the system.

## MODBUS Register Map

Array	Starting Address	Length	Type	Description
TXID	30001	100	Integer	Transmitter ID - only used for RF-powered nodes
PWR	30101	100	Integer	Battery voltage, displayed as 2-digit integer (e.g. 3.6V = 36, 5.4V = 54 54) or RSSI (1-5) or received RF-power.
SECS	30201	100	Integer	Time (seconds) since last update. This is refreshed at 10-second intervals in groups of 10 (for example. 1-10, 11-20, 21-30, and so on).
S1	30301	100	Integer	Sensor input 1, scaled up 10X
S2	30401	100	Integer	Sensor input 2, scaled up 10X
S3	30501	100	Integer	Sensor input 3, scaled up 10X
S4	30601	100	Integer	Sensor input 4, scaled up 10X
S5	30701	100	Integer	Sensor input 5, scaled up 10X
S6	30801	100	Integer	Sensor input 6, scaled up 10X
S7	30901	100	Integer	Sensor input 7, scaled up 10X
S8	31001	100	Integer	Sensor input 8, scaled up 10X
STATUS	31101	100	Integer	Gateway Status Parameters,, not used in this demo

The Sensor ID is the index in the arrays listed above. For example, to find the S1 data for Sensor 15, go to address 3.

## STATUS Descriptions

Address	Status	Description
31101	COMM_CHANNEL	Communication channel of system
31102	COMM_NET_ID	Communication network ID of system
31103	ACTIVE_SENSORS	Number of sensors active in system
31104	SENSORS_WITH_LOW_BATTERY	Number of sensors that are sending a low battery signal
31105	REPEATER_MODE	<b>1</b> means gateway is set as a repeater
31106	TIMEOUT_CONFIG	Value (minutes) of timeout setting; mode disabled if <b>0</b>
31107	SENSORS_IN_TIMEOUT	Number of sensors currently in timeout, if mode enabled
31108	SOFTWARE_VERSION	Version of gateway software
31109	RESERVED	
31110	RESERVED	

## SNMP Object Definitions – MIB File

Object Identifier	Description
STATUS	Array containing the below info
COMM_CHANNEL	Communication channel of system
COMM_NET_ID	Communication network ID of system
ACTIVE_SENSORS	Number of sensors active in system
SENSORS_WITH_LOW_BATTERY	Number of sensors that are sending a low battery signal
REPEATER_MODE	"1" means gateway is set as a repeater
TIMEOUT_CONFIG	Value (minutes) of timeout setting; mode disabled if "0"
SENSORS_IN_TIMEOUT	Number of sensors currently in timeout, if mode enabled
SOFTWARE_VERSION	Version of gateway software
Data Arrays	
PWR	Battery voltage, or RSSI of RF powered sensors
DELTA_T	Time (seconds) since the last packet was received
S1	Sensor input 1
S2	Sensor input 2
S3	Sensor input 3
S4	Sensor input 4
S5	Sensor input 5
S6	Sensor input 6
S7	Sensor input 7
S8	Sensor input 8
TXID	Transmitter ID (only valid in RF powered sensors)

### NOTE:

Each data array contains points, all labeled "node\_XXX" where XXX is a number from 001 to 100, representing every sensor available in the system. All array points are available regardless of whether or not they are active in the system. Each data array is configured for up to 8 sensor inputs per device.

### XML Configuration

A gateway with XML configured as the output can be accessed using HTTP-GET and HTTP-POST commands. Using this method, the data arrays in the Processor unit are accessed directly. The following table identifies the arrays and the information contained within.

**NOTE:**

Ethernet port for XML connection is internal to the WSG unit. Remove the cover to access Ethernet port. The enclosure has a notch in the side wall to seat the Ethernet cable so the lid can be re-attached.

Data Array	Description
DA_STATUS	Array containing the below info
- Offset 0	Communication channel of system
- Offset 1	Communication network ID of system
- Offset 2	Number of sensors active in system
- Offset 3	Number of sensors that are sending a low battery signal
- Offset 4	1 means gateway is set as a repeater
- Offset 5	Value (minutes) of timeout setting; mode disabled if 0
- Offset 6	Number of sensors currently in timeout, if mode enabled
- Offset 7	Version of gateway software
DA_PWR	Battery voltage, or RSSI of RF powered sensors
DA_SECS	Time (seconds) since the last packet was received
DA_S1	Sensor input 1
DA_S2	Sensor input 2
DA_S3	Sensor input 3
DA_S4	Sensor input 4
DA_S5	Sensor input 5
DA_S6	Sensor input 6
DA_S7	Sensor input 7
DA_S8	Sensor input 8
DA_TXID	Transmitter ID (only valid in RF powered sensors)





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