Quest Temperature Monitoring System User's Guide

Quest Heat Equipment
A division of Therma-Stor, LLC
4201 Lien Road
Madison, WI 53704
Phone: (800) 553-7533
Fax: (608) 222-1447

www.HeatUpBedBugs.com

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Contents

Chapter 1:
Introduction to the Quest Temperature Monitoring System

Overview

The Quest Temperature Monitoring System monitors temperature and transmits the data back to your computer for use in HOBOnode Viewer software from onsetcomp.com.

Quest Monitors are easy to deploy and move. There are no cables to run through walls, you are not limited by physical cable length limits, and there is less chance for losing measurements from cable damage.

Components

The following components make up a Quest Temperature Monitoring System:

- Quest Receiver
- Quest Monitor(s)
- Viewer Utility (free download)

Battery Options

The receiver is shipped with rechargeable alkaline batteries, which can be charged through the USB connection to your computer. Monitors are shipped with non-rechargeable lithium batteries, which are recommended for high-heat environments.

Theory of Operation

Standard

The system uses the IEEE 802.15.4 wireless data standard in the 2.4Ghz spectrum. This is an ISM band technology, which is license-free worldwide. This radio technology was chosen to maximize battery life and minimize cost.

Communications Protocol

The system uses a time slot based communications protocol. Each monitor is assigned a slot when it is found by the receiver. All monitors take their measurements at the same time at the start of the one minute cycle and then transmit their data during their assigned time slot.

Network ID

Because it is possible to have more than one system running in the same area, it is important that unique network IDs are assigned so that the networks can co-exist peacefully. A unique network ID consists of two elements: an RF channel, and a Unique ID (any number from 0 to 4095).

If two systems are being configured, it is best to select different channels for them to use. Although they can share a channel, there is a potential for interference. New monitors come from the factory with a blank network ID. Once a device is linked to a receiver, it will only respond to that receiver. The network ID can be cleared from a device if you need to change it by cycling the receiver “off” and then back “on” (see page 20).

Packets

In the simplest exchange, a monitor is connected directly to a receiver. In this case, the monitor will send a packet to the receiver. The receiver receives and verifies the packet’s validity (unique network ID, CRC et.), sends a Reply packet to the

device, and forwards the packet to host software. For reliability purposes, packet/reply exchanges are retried between monitors four times.

Lost Monitor

A device becomes lost when it has not had a successful packet/reply exchange four times in a row. By default, the receiver will automatically search for lost monitors once per hour.

Sending Commands

Commands sent to devices must be carried in the reply packet generated in the packet/reply exchange. It may take up to a couple of minutes to receive commands depending on the number of devices in the network. The main commands are **Start Manual Search**, **Stop Manual Search** and **Auto Search**.

Viewer Utility Requirements

Operating Systems

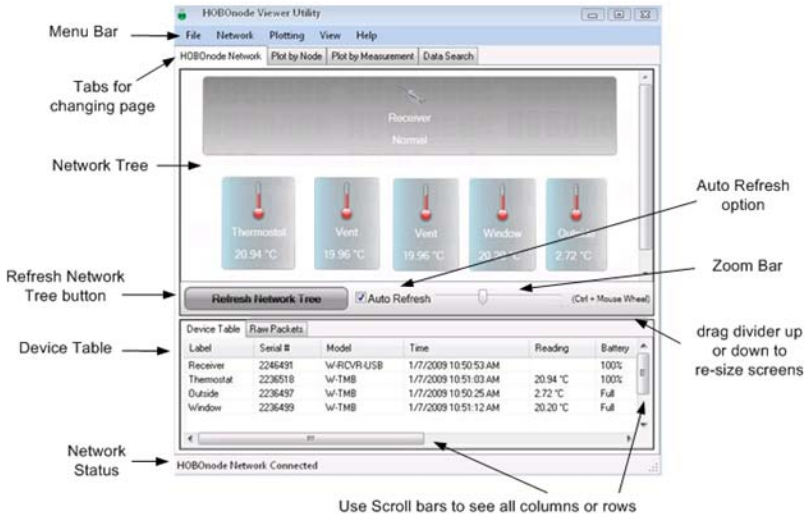
- Windows® XP SP2 or SP3
- Windows Vista®
- Windows 7
- Microsoft® .NET® 3.5

Minimum Hardware

- Pentium3® CPU 2Ghz or greater
- 1 Gigabyte of RAM or greater
- 32-bit or 64-bit CPU
- 100 Megabytes free disk space
- USB Port
- Direct Internet access for email/phone alarms

Viewer Utility

The illustration below shows the Viewer Utility main window. For more details on windows and functionality, see Chapter 5.



Chapter 2:
Setting Up and Deploying the System

Set up your system and verify proper operation in the office before you deploy any components.

Summary of Tasks

Perform the following tasks to configure the system:

1. Download the Viewer Utility.
2. Run the Setup Wizard.
3. Set Up the Receiver.
4. Activate Monitors.
5. Link the Monitors to the Receiver.
6. Add Labels to Monitors (Optional).
7. Configure Alarms (Optional)
8. Verify Proper Operation.
9. Deploy the System.
10. Re-link Devices.

Task 1: Download the Viewer Utility software

1. Use the Viewer Utility to set up the system and monitor the devices. The Viewer Utility is only supported for Windows. You must be logged in as an administrator to install the software. The HOBOnode Viewer Utility can be downloaded from http://www.onsetcomp.com.

   NOTE: The Viewer Utility requires Microsoft .NET Framework (version 3.5) installed. If you do not have .NET installed, it will automatically be downloaded with the Viewer Utility.

2. Restart your computer after the installation is complete.

IMPORTANT: Set the Power Options on your computer to "never" turn off the hard disks or enter hibernation mode. Power options can be accessed from the Windows® Control Panel. If the computer is allowed to hibernate or turn off the hard drive, data and graphs for these timeframes will be lost.

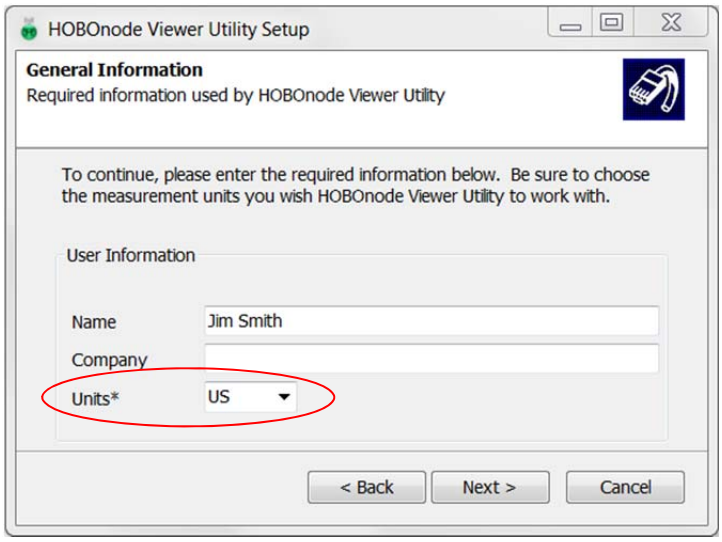
Task 2: Run the Setup Wizard

The Setup Wizard will automatically run at the end of the installation. If it does not, then open the software, select the **File** menu, and select **Setup Wizard**.

NOTE: To run the application on Windows Vista or Windows 7, right-click the HOBOnode Viewer Utility.exe and select *Run as Administrator*. For Vista Pro, you can run the application as in Vista Home, or you can disable *User Access Controls* from the **Control Panel** > **Security Center**.

1. Click **Next** in the Wizard welcome window.

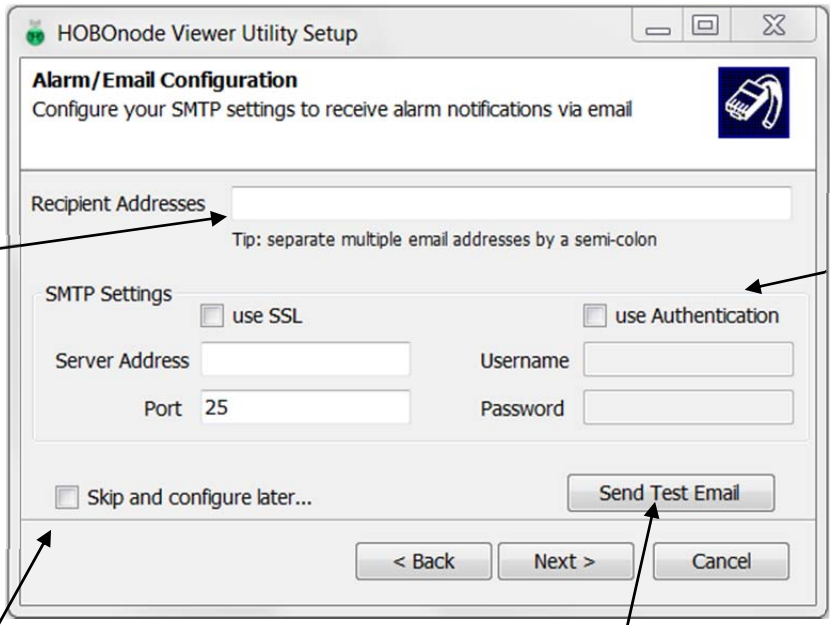
2. In the **General Information** pane, make sure you select your desired units. Once you select the units, they cannot be changed so make sure you select the correct one.



3. Click **Next** to proceed. The **Alarm/Email Configuration** dialog appears.

4. Configure email settings (optional; internet connection required).

   If you want to have alarm notifications sent to your email address, you must enter the address (or addresses) and configure the SMTP Settings.



Enter the email address(es) that you want to receive a message when an alarm trips. You can also enter an email address for your mobile phone.

See *Email Configuration* for details.

Configure the SMTP Settings to send email from the system to your mail server.

If you are within a corporate network, see your Network Administrator for this information.

If you are using private email, you can get this information from the provider.

See *SMTP Settings* for details.

Click here if you want to skip this configuration.

After you enter all the information, click here to send a test email.

   In the **Recipient Addresses** box, enter the email addresses for any accounts that you want to receive alarm notifications. To have a text message sent to your cell phone, enter the email address of your cell phone number. Ask your cell provider for the format (this is often available online).

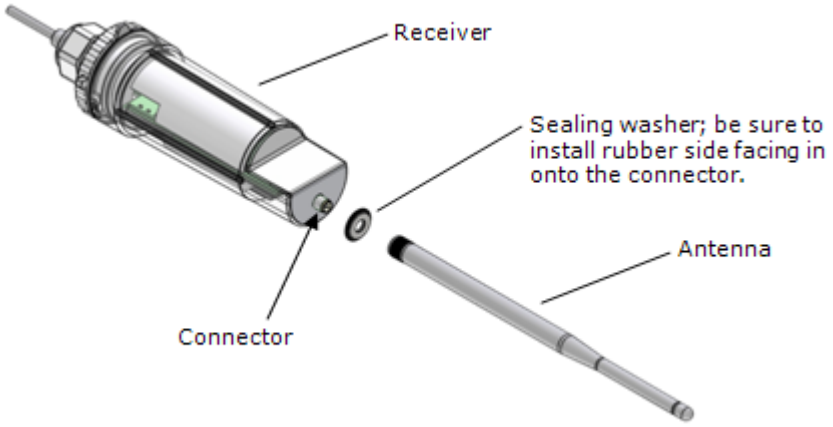
   You must configure the SMTP Settings to allow mail to get from the network to your email account. See SMTP Settings for details.

Check *Skip and configure later* if you want to bypass this screen. To configure alarm notification later, go to **File** > **Setup** to re-run the Setup Wizard.

5. Click **Next** to proceed. The **Complete Setup** dialog appears.
6. If you want the Viewer Utility to launch each time you start your computer, check the *Run at startup* box.
7. Click **Finish** to complete the installation.

Task 3: Set Up the Receiver

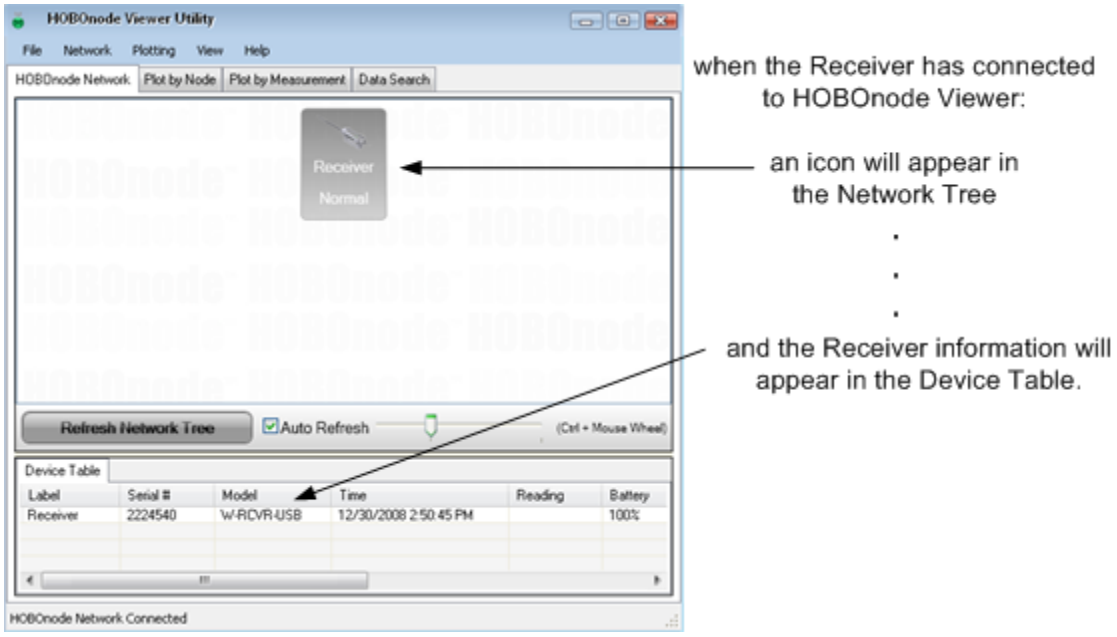
1. Install the antenna on the receiver. **Important:** Be sure to install the sealing washer, rubber side in, onto the connector as shown below. Screw on the antenna to connect it to the receiver.



2. Connect the receiver to a computer. USB 2.0 active extension cables are available from various retailers. You can connect up to a maximum of 80 ft.

> **IMPORTANT:** You can only connect one receiver to a computer. If you have multiple monitoring systems, each one must be run from a separate computer.
>
> Make sure you do not plug the receiver into a USB port that may be shut down due to your power settings. It is recommended that you do not enable options such as Turn off Hard Disks, Hibernation, or Shut Down on your computer. If you connect the receiver to a USB port on your monitor, do not enable the shut down option on your computer monitor. If the receiver is without power for more than three days, you will need to perform a manual search to re-link to devices.

When the receiver has connected, the receiver information will appear in the Device Table and the Receiver icon will appear in the Configuration Tree. This may take up to two minutes.

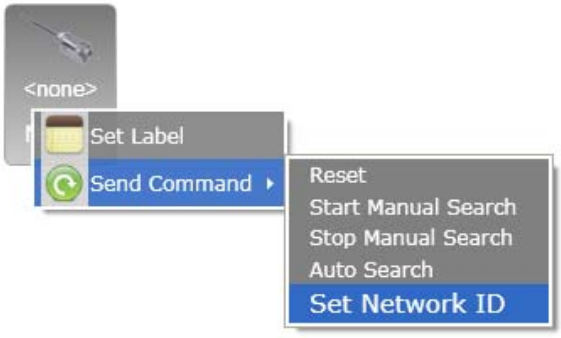


3. Set the Network ID for the receiver. Before you activate monitors, you should set the Network ID for the receiver to make your system unique from any other wireless networks that may be in the area.

   NOTE: This is for your monitoring system only. If there is another wireless network in the area, choose an RF Channel different than those already in use (RF Channels only apply to 802.15.4 devices).

   a. Right-click the Receiver icon in the Network Tree.

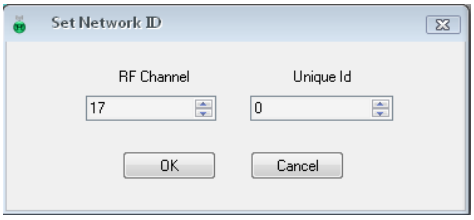
   b. Select *Send Command* > *Set Network ID.*



   c. In the **Set Network ID** window, select an RF Channel (11–25) and Unique ID (0–4095) to make your network unique from any others that may be in the area.

   If you experience any connection problems, try assigning a different RF Channel.

   If you are setting up more than one network, use unique RF Channels for each.

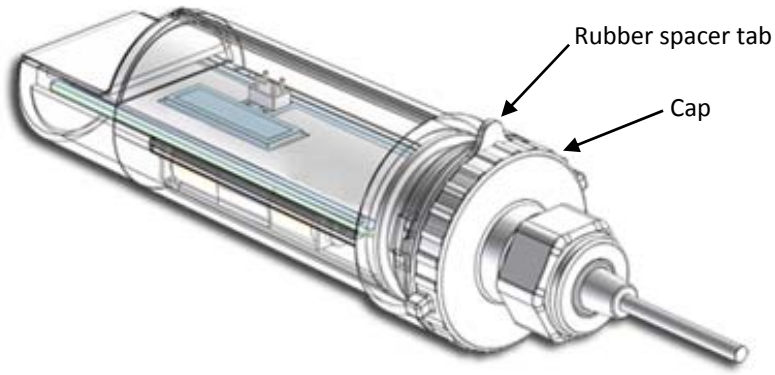


d. Click **OK**.

Task 4: Activate Monitors

You must activate the monitors so they can be linked to the receiver. Once you have activated a monitor, you will not have to reactivate it unless you deactivate it or you change the Network ID of the receiver.

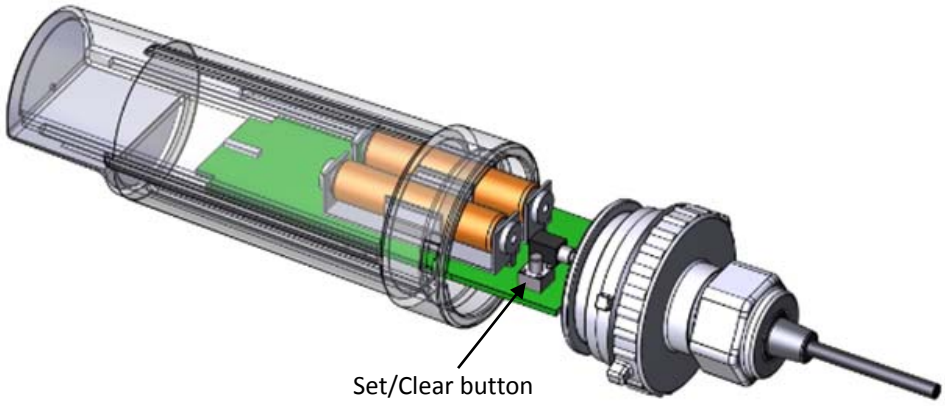
1. Remove the monitor from the base
2. Using the tab, pull the rubber spacer out from the groove between the case and the cap.



3. Remove the cap on the case by twisting it counterclockwise. Slide the PC board partially out of the case, just far enough so you can reach the Set/Clear button.

   NOTE: If the desiccant pack falls out when you remove the cap, make sure you replace it.

4. Locate the brown **Set/Clear** button on the board and push it down for two seconds.



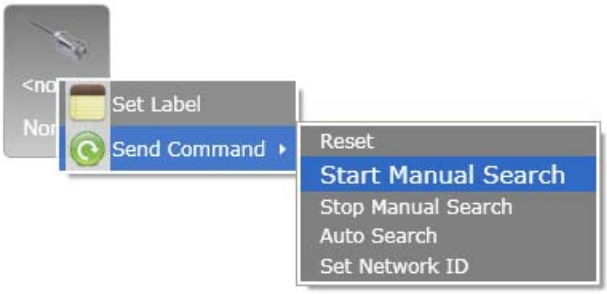
   The three LEDs will flash briefly to indicate that the device is activated. If the monitor does not activate, then it may have already been activated. To clear the monitor, hold down the button for five seconds, then try the activation procedure again.

5. Slide the PC board back into the case, aligning the tab on the cap with the groove in the case. Twist the cap clockwise to secure. When sliding the PC board into the case, align the edge of the board with the grooves in the side of the case so that the board slides all the way back into position.
6. Reinstall the rubber spacer, aligning the tab with the ridge on the top of the case as shown in step 2.

Task 5: Link the Monitors to the Receiver

Now that the monitors are activated, they are ready to be linked to the receiver.

To link monitors, right-click the receiver icon and select **Send Command** > **Start Manual Search**.

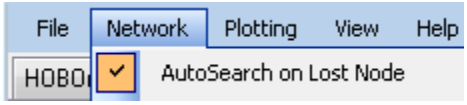


While the receiver is searching for monitors, the yellow Search LED on the receiver will blink and Searching will appear in the receiver icon in Viewer Utility, as shown below.

When the monitor is linked, an entry will appear for the monitor in the Serial Number table and an icon for the monitor will appear in the Network Tree under the Receiver.

NOTE: If you see that the entry has appeared in the Serial Number table but the icons have not yet appeared in the Network Tree, click the **Refresh Network Tree** button.

If you have **AutoSearch on Lost Node** enabled (default), the network will automatically attempt to reconnect to a monitor (node) if it is lost. The receiver auto searches every hour for lost monitors.



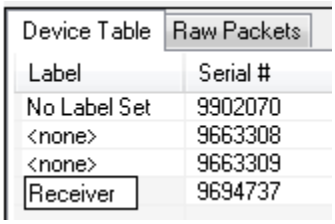
To stop a search manually at any time, right-click the Receiver icon and select **Send Command** > **Stop Manual Search**. The receiver will stop searching automatically after 20 minutes. You should not stop a search until all monitors have been linked and appear in the Network Tree. Otherwise, you may need to perform another search.

Task 6: Add Labels to Monitors and Receiver

You should add labels to your monitors and receiver to identify them in the Network Tree and the Serial Numbers table.

To add a label, right-click the icon and select **Set Label**.

Or, click in the **Label** column in the Device Table and type over the existing text.



The label will appear on the icons in the Network Tree, as shown below.

Task 7: Configure Alarms

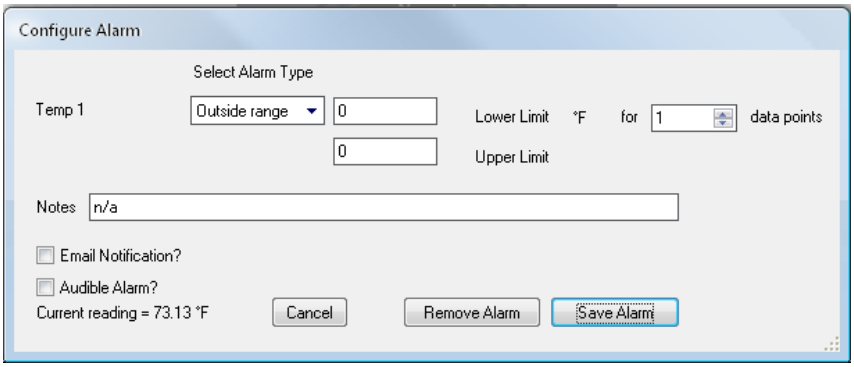
To configure alarms for a sensor, right-click the monitor's icon and select **Configure Alarm**.

The **Configure Alarm** window appears.

1. Set the parameter: *Above*, *Below*, or *Outside Range*.
2. Enter the Value.
3. Enter the Number of Data points. This is the number of consecutive readings that must be outside of the limits for the alarm to be triggered or cleared.
4. Enter Notes (Optional).

5. Check the **Audible Alarm** box to be given an alarm from your computer or the **Email Notification** box if you want to be notified via email when the alarm trips.

   If you have not already set up Alarm/Email Configuration, you will be taken to the Viewer Utility Setup Wizard. Click **Next** at each window until you get to the **Alarm/Email Configuration** window. See *Running the Setup Wizard* for details on setting up alarms.

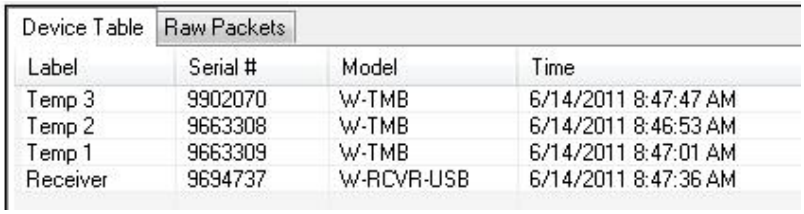


When alarms are configured, they are also displayed on the plot as shown below. The red portion of the plot indicates the upper limit of the alarm threshold, while the blue portion shows the lower limit.

Task 8: Verify Proper Operation

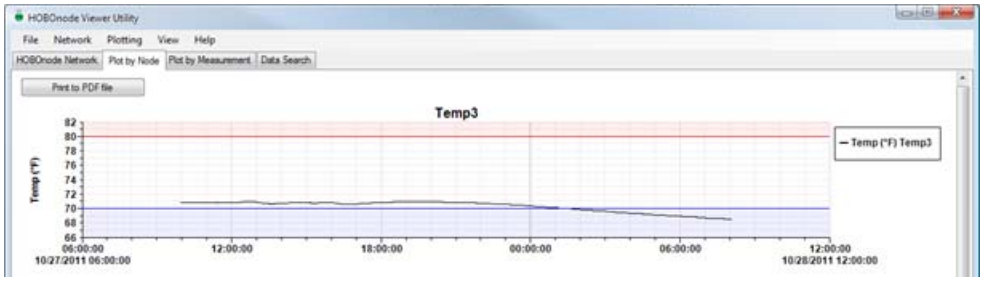
View Device Information

In the Viewer Utility, select the **Device Table** tab to view information about each monitor and make sure the information is accurate.



View Plots

In the Viewer Utility, view data plots and verify that valid readings are being recorded.



Task 9: Deploy the System.

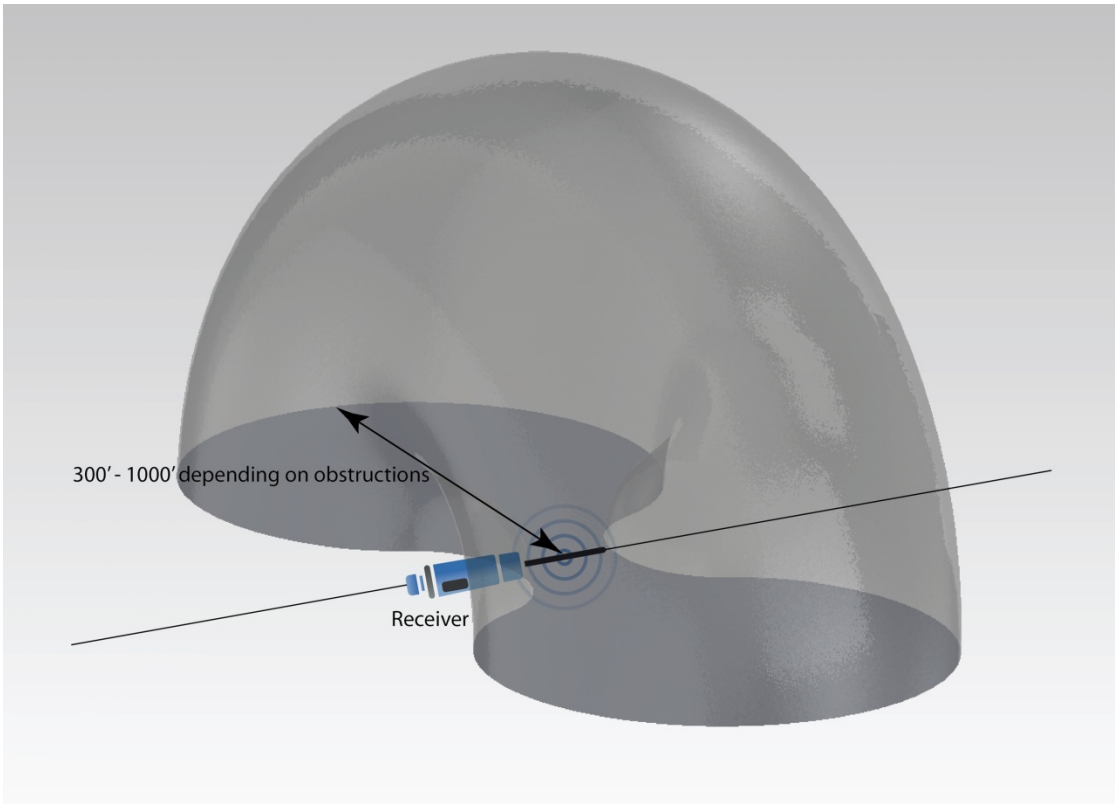
Follow these guidelines for deploying the system:

- Position your devices to minimize obstructions between the devices to optimize signal strength and range. The chart below gives some general guidelines on how much certain materials will obstruct your signal.

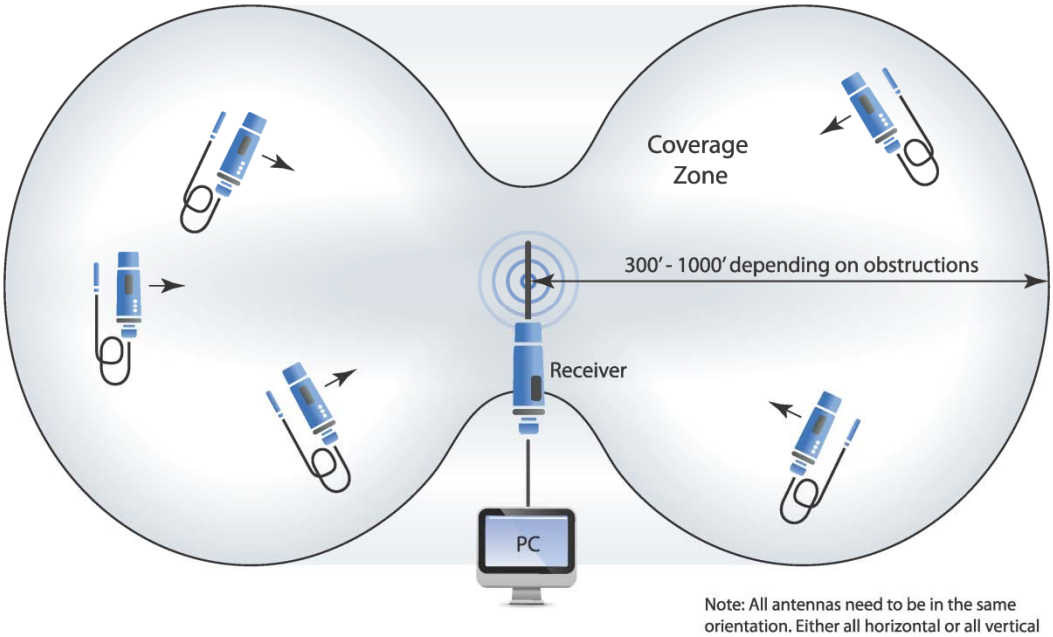
Materials	**Degree of Attenuation***	**Examples**
Air	None	Open space, inner courtyard
Wood	Low	Door, floor, partition
Plastic	Low	Partition
Glass	Low	Un-tinted windows
Tinted glass	Medium	Tinted windows
Water	Medium	Aquarium, fountain
Living creatures	Medium	Crowds, animals, people, plants
Bricks	Medium	Walls
Plaster	Medium	Partitions
Ceramic	High	Tiles
Paper	High	Rolls of paper
Concrete	High	Load-bearing walls, floors, pillars
Bulletproof glass	High	Bulletproof windows
Metal	Very high	Reinforced concrete, mirrors, metal cabinet, elevator cage

* Attenuation is the gradual loss of signal intensity when passing through a medium.

- The receiver antenna should be horizontal for best reception and to maximize its range with the monitors mounted horizontally. The following illustrations show the typical reception area when the antenna is horizontal.

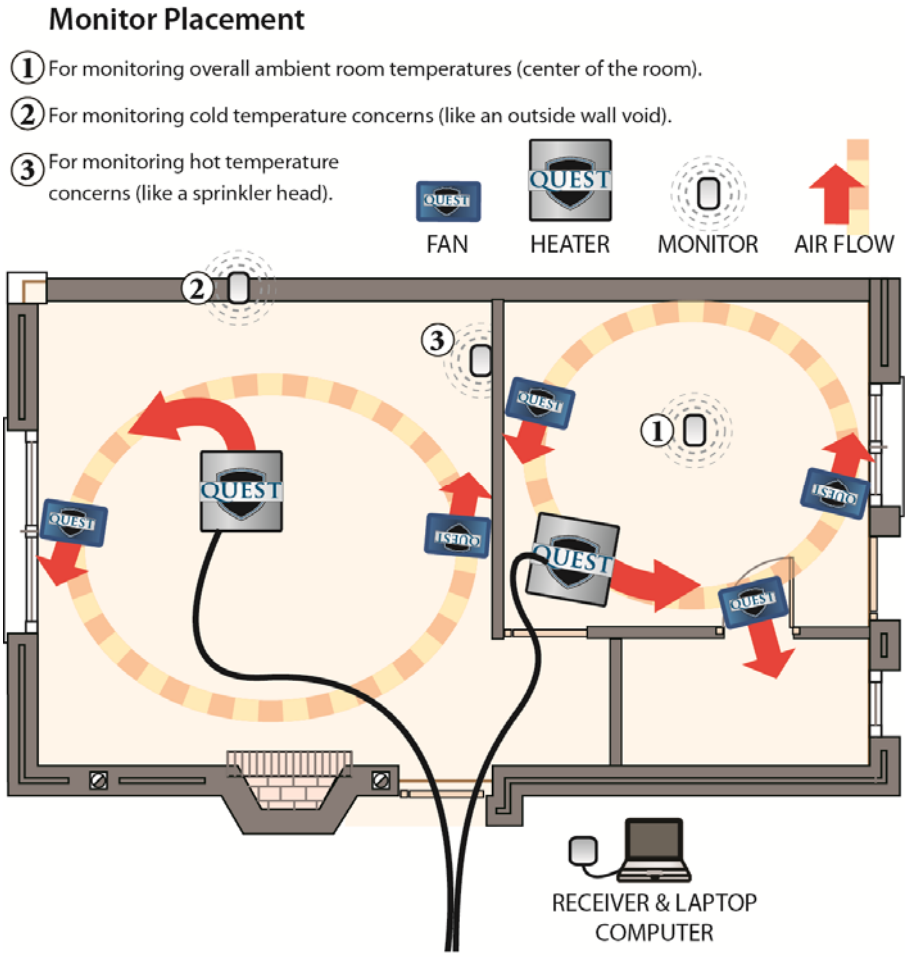


Bird's-eye View (with all antennas oriented horizontally)



Note: All antennas need to be in the same orientation. Either all horizontal or all vertical

- Monitors and receivers should be deployed horizontally to maximize reception. Use the brackets for setting the monitors and receiver on tables, counters, or the floor. This is a sample layout for monitor placement in a house.



- Place the temperature sensor so that at least 10 cm (4 inches) of the sensor cable is in the medium that is being measured. The temperature sensor is approximately 0.32 cm (1/8 inch) from the end of the stainless steel tip.
- When placing the temperature sensor probe, care should be taken to thermally isolate the sensor from the mounting surface to ensure accurate air temperature readings.
- Do not pull on the sensor cable. Do not hang transmitters from the sensor cable.

Task 10: Re-link Devices

Once all the monitors are deployed, you must re-link them if the signal was lost during deployment. In the Viewer Utility, go to **Send Command** > **Auto Search**. You may need to reposition the units and Auto Search again to achieve a connection.

Chapter 3:
Working with Data

Viewing Data

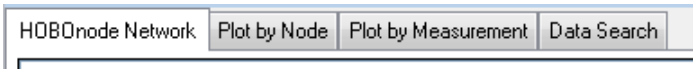
You can view data plots by node (monitor) or by measurement. To view plots, use the Plot By Node and Plot by Measurement tabs at the top of the window. If either tab is not visible, select **View** > **Plots** and then **Node** or **Measurement** to show them.

You can modify plots using options in the **Plotting** Menu, where you can display points, set maximum points, and restore bounds.

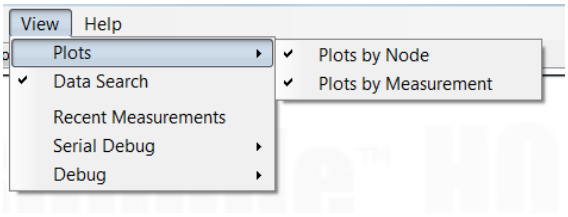
To clear all plots select **View** > **Clear Plot** from the menu. This clears all of the plots from the view you currently have active (by Monitor or by Measurement).

View Options

Use the tabs in the main window to work with data.

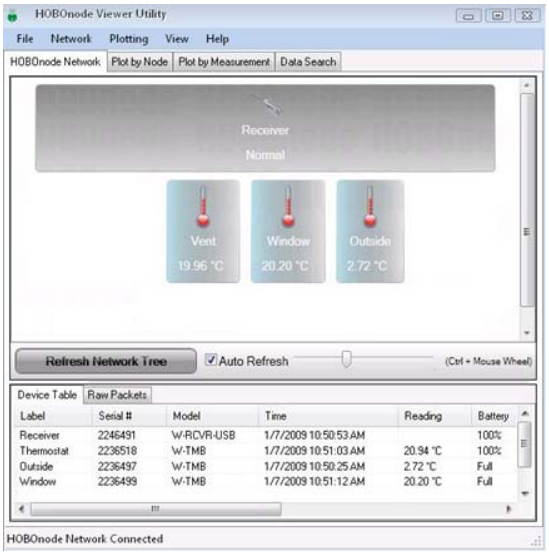


NOTE: You can hide the **Plot by Node** and **Plot by Measurement** tabs by deselecting them from the **View** > **Plots** menu.



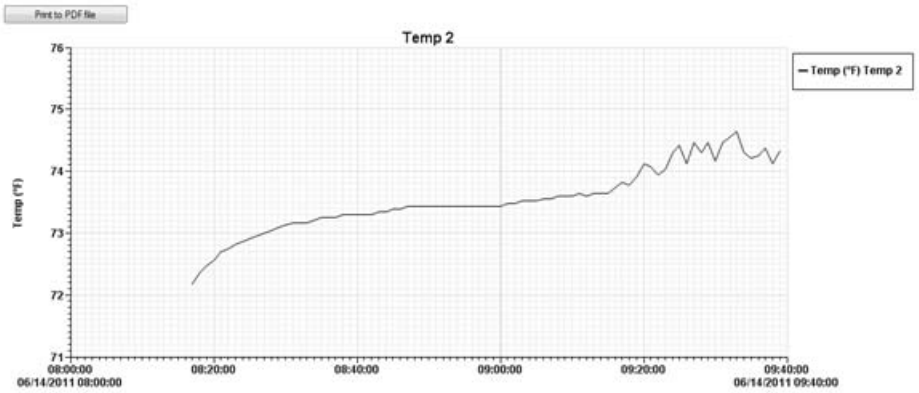
Viewing the Network

Select the HOBOnode Network tab to view all the system components in the Network Tree, and to view the Device Table for each component. The monitors will be aligned vertically under the receiver to which they are linked. You can right-click an icon to access command options.



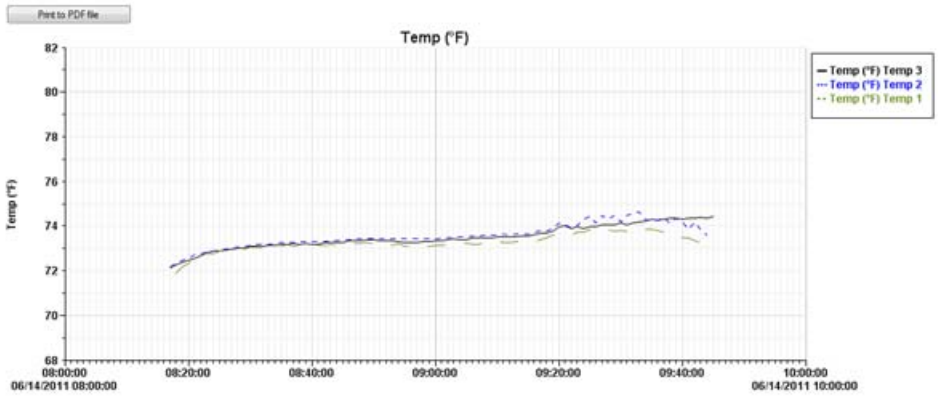
Viewing Data by Node

Select the **Plot by Node** tab to view a separate graph for each monitor in your network.



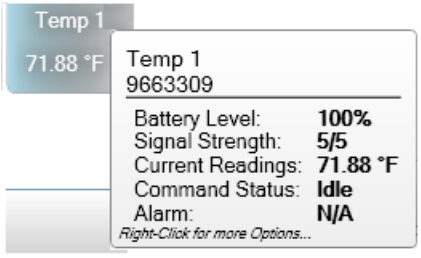
Viewing Data by Measurement

Select the **Plot by Measurement** tab to view a graph by each measurement type in your network. All sensors for a particular type will be plotted on one graph.



Viewing Device Status

Hover the cursor over a device icon in the Network Tree to see various information on the device (shown below):

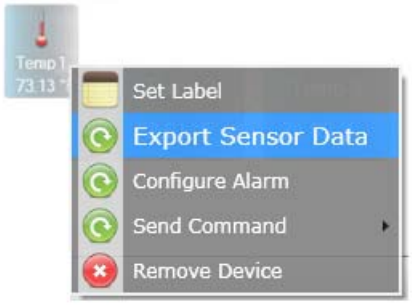


Exporting Data

You can export data to a text file for viewing in Microsoft Excel or some other program.

Export from Single Monitor

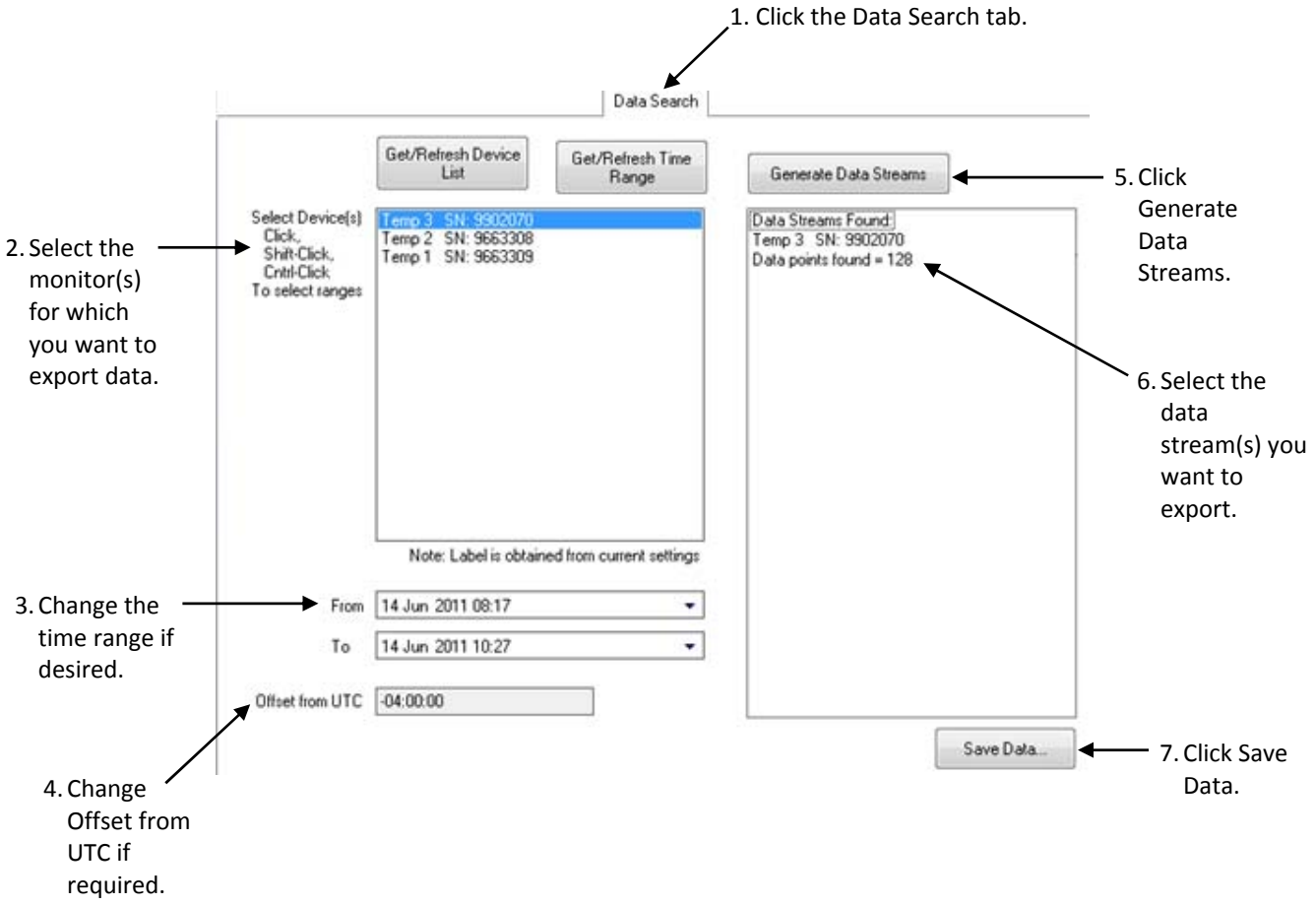
To export data from a single monitor, simply right-click the monitor icon in the Viewer Utility and select Export Sensor Data.



Export from Multiple Monitors or Specific Time Range

To export data from multiple monitors, or if you want to export data from a specific time frame, select the **Data Search** tab and follow the procedure shown in the following illustration.

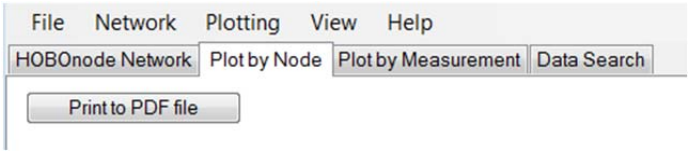
All data is stored in UTC based on the PC time zone setting when the Viewer Utility is first launched. You can export the data in whatever local time zone you desire using the UTC Offset option.



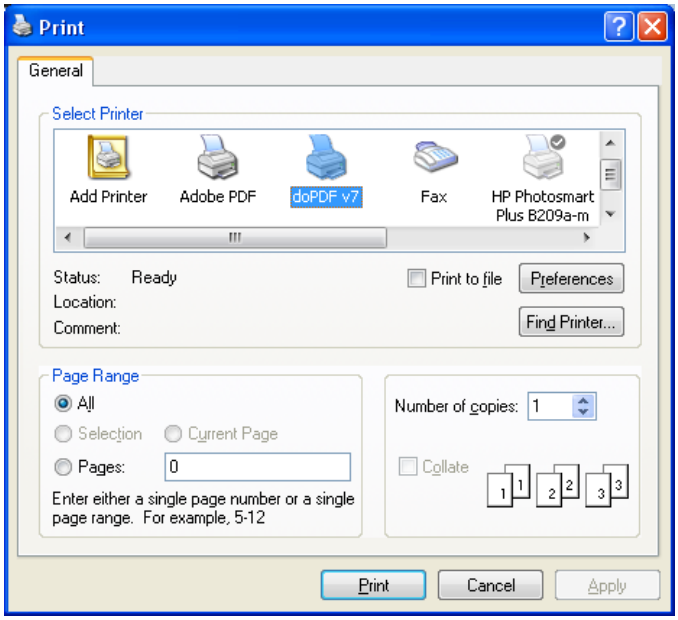
Printing Data

To print a plot:

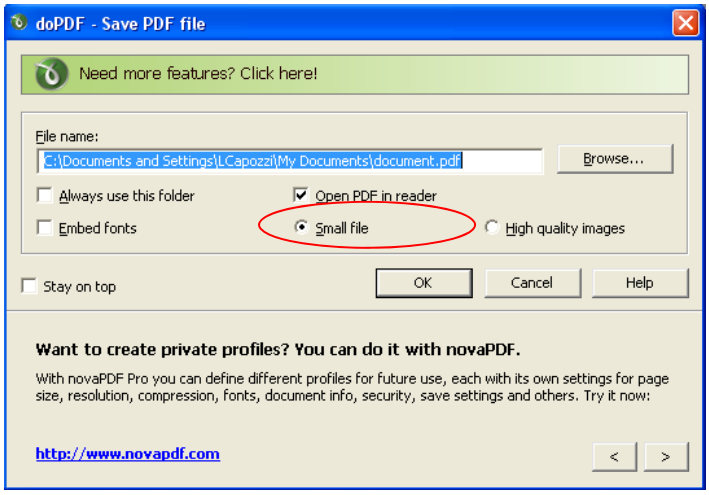
1. Click the **Plot by Node** or **Plot by Measurement** tab.
2. Click the **Print** button.



3. Make sure the doPDF v7 icon is selected as shown below and click Print.



4. Accept the default file name or enter your own to save a PDF file of the plots. Make sure the **Open PDF in Reader** checkbox is selected as circled below to view the plot immediately. Click **OK**.



You can also right-click any plot and select one of three options for printing: to a PDF file, to the clipboard, or to a bitmap file.

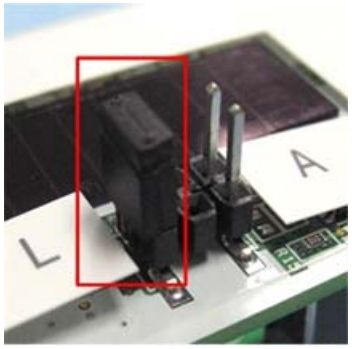
Chapter 4:
Maintenance and Troubleshooting

Replacing Batteries

The receiver is shipped with rechargeable alkaline batteries. Monitors are shipped with non-rechargeable lithium batteries, which are recommended for high-heat environments. **Note:** Make sure the monitor is cool before changing the batteries.

To install batteries:

1. Remove the board from the case (refer to *Task 4: Activate Monitors* on page 9 for instructions on opening and closing the case).
2. Remove the existing batteries from the battery compartment.
3. Install the new batteries.
4. Make sure the battery jumper, which is located on the opposite side of the board from the battery compartment, is in the proper position (A for alkaline or L for lithium). A jumper in the wrong position could result in premature failure or batteries to leak acid.



5. Reassemble the device. Be sure to place the desiccant pack back into the device if it has fallen out while switching the batteries. Also make sure the sensor is securely connected to the board (as shown on page 22), with zip ties tightened and the cable pushed back in.

Reconfiguring a Monitor for Use with a Different Receiver

Follow these steps to reconfigure a monitor for use with a different receiver. **Note:** Make sure the monitor is cool before starting.

1. Remove the board from the case (refer to *Task 4: Activate Monitors* on page 9 for instructions on opening and closing the case).
2. Deactivate a monitor by holding down the **Set/Clear** button for 5 seconds until the red LED flashes quickly and then stops. This places the monitor in **RF Off** mode and it cannot be found by a receiver. It also clears the RF Channel and Network ID that it obtained the last time it was linked to the receiver.
3. Hold down the **Set/Clear** button for 2 seconds again to reactivate the monitor.
4. Reassemble the device. Be sure to place the desiccant pack back into the device if necessary. Also make sure the sensor is securely connected to the board (as shown on page 22), with zip ties tightened and the cable pushed back in.
5. To link the monitor to the new receiver, right-click the Receiver icon in the Viewer Utility and select **Send Command** > **Start Manual Search**. The monitor will appear in the Network Tree.

Moving a Monitor

If you move a monitor to a new location, you may need to re-link it to the receiver if it is moved out of range or Line of Sight. After you move the monitor, check the Network Tree in the Viewer Utility to see if it is still linked.

If it is not linked, there are two options:

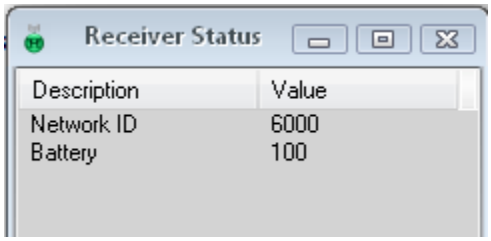
- **AutoSearch for Lost Monitor.** If you have AutoSearch on Lost Monitor enabled, the network will automatically reconnect to the monitor if it is within range of a receiver. The receiver auto searches every hour for lost monitors.
- **Manual Search.** If you moved a monitor and want it to link to a specific receiver, right-click the device icon in the Viewer Utility and select Send Command > Start Manual Search.

Troubleshooting

There are a number of debugging and logging options in the Viewer Utility. If you are working with Technical Support on an issue, you may be asked to enable debugging options and send a log file.

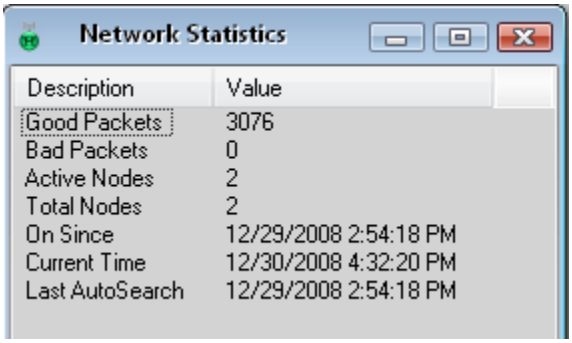
Viewing Receiver Status

To view status information on the receiver, select **Network** > **Receiver Status** from the menu.



Viewing Network Statistics

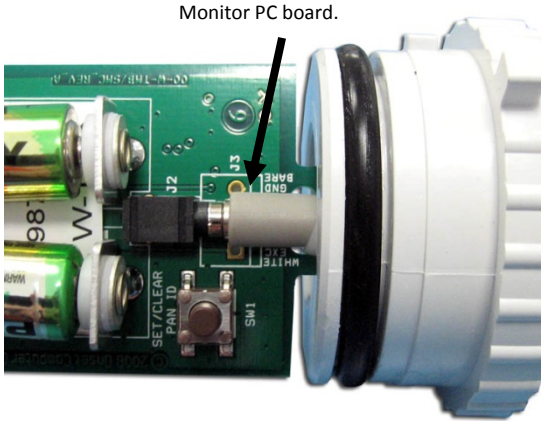
To view statistics on the network, such as packet information and the number of linked monitors, select **Network** > **Network Statistics** from the menu.



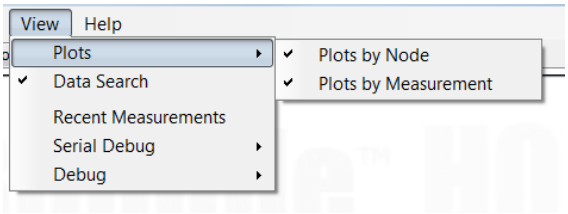
Problems/Resolutions

I am seeing extreme sensor readings. If you are seeing extreme sensor readings, make sure that the sensor cable is properly plugged into the monitor PC board. If this does not solve the problem, contact Quest at 1-800-553-7533.

Sensor cable connected to Monitor PC board.



My plots are not appearing in the Viewer Utility. If you are not seeing the Plot by Node or Plot by Measurement tabs in the Viewer Utility, go to **View** > **Plots** and select the plot type you want to view.



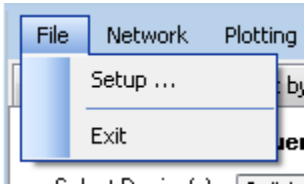
When I restart my computer, all of my monitors are lost and there is no recent data. If you plug the receiver into a USB port on your computer screen, it will lose power if your computer monitor shuts down. The sensors may be lost and no data will be recorded. The receiver will maintain the network for three days before shutting down if the USB port goes away.

Check the power settings for your computer screen and make sure it is not set to turn off at any time, or plug the receiver into a USB port on the computer that is powered at all times.

Chapter 5:
Viewer Utility Reference

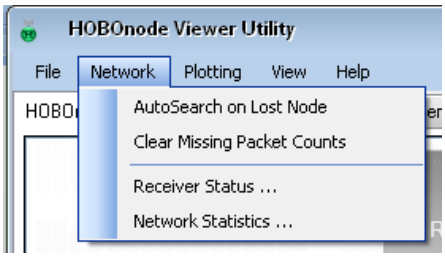
This section describes all of the menu options, windows, and other elements of the Viewer Utility.

File Menu



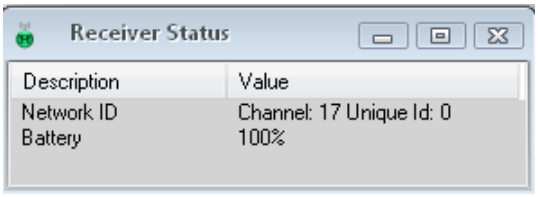
- **Setup.** Select **File** > **Setup** to access the Setup Wizard where you can configure system settings.
- **Exit.** Select **File** > **Exit** to exit the Viewer Utility.

Network Menu

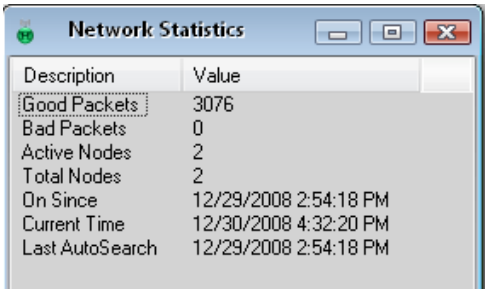


- **AutoSearch on Lost Node.** Select **Network** > **AutoSearch on Lost Node** to perform an auto search when a remote device goes missing. Note that if you have previously performed a Manual Search, Auto Search will override those connections.
- **Clear Missing Packet Counts.** Select **Network** > **Clear Missing Packet Counts** to reset the Current Missed and Total Missed columns in the Device Table. Restarting the Viewer Utility will also reset the counts.

  You may want to reset the counts to start a new round of debugging or troubleshooting, to see how many packets have been missed in a specific period of time, or simply because you do not wish to see the information.
- **Receiver Status.** Select **Network** > **Receiver Status** to view the status of the receiver.

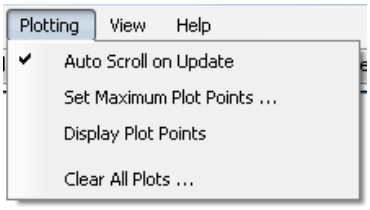


- **Network Statistics.** Select **Network** > **Network Statistics** to view statistics about the system.

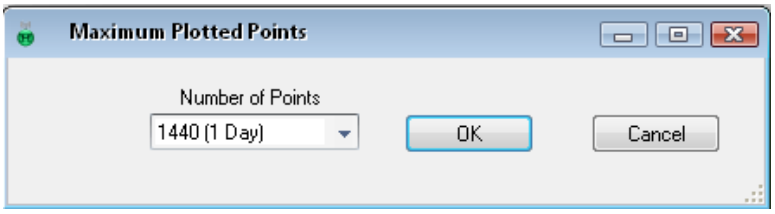


Plotting Menu

Use the **Plotting** Menu options to manage your data plots.

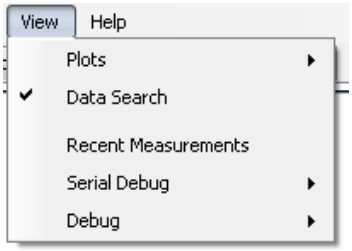


- **Auto Scroll on Update.** If **Auto scroll on Update** is enabled (default), data in logging or debugging views will automatically scroll down as new data is received. Disable this option if you want to hold the view in place to examine specific data.
- **Set Maximum Plot Points.** Use this option to control the number of points per line in a graph before old points are discarded for new points. The default is one days worth of points. You can change this within a range of 2–7 days.

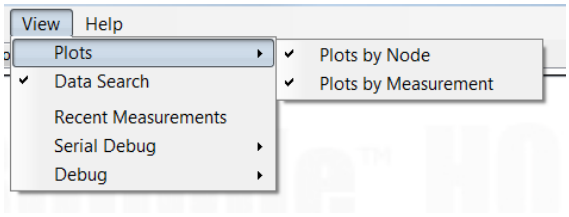


- **Display Plot Points.** By default, the graph will display points up to 50 and then points will no longer be shown. Enable this option to always display points.
- **Clear All Plots.** Select this option to clear all plots from the current view (Plot by Measurement or Plot by Node).

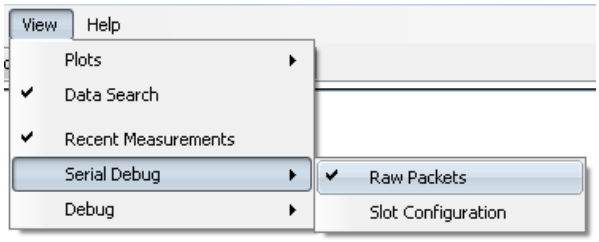
View Menu



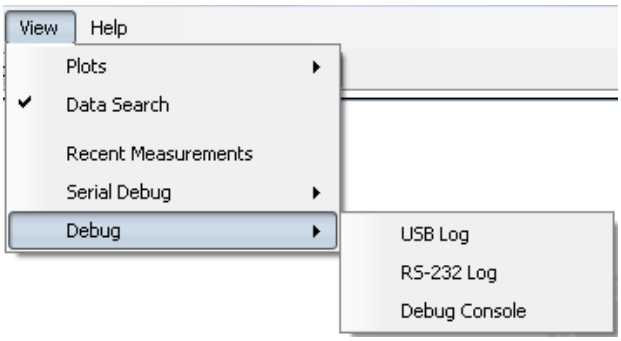
- **Plots.** Use this option to show or hide plots. By default both Node and Measurement plots are shown. Select **View** > **Plots** and then select Plots by Node or Plots by Measurement.



- **Data Search.** Use this option to export measurements data. See *Exporting Data* for details.
- **Recent Measurements.** Select this option to add a Recent Measurements tab to the Viewer window where you can view a list of the most recent measurements observed by the monitor(s).
- **Serial Debug.** Select this option as directed by Technical Support. Selecting Raw Packets or Slot Configuration to display or remove both tabs from the Viewer window. The information on these tabs is used for troubleshooting.



- **Debug.** If you are working on a problem with Technical Support, you may be asked to generate a log file to send. If requested by Technical Support, select a debug option and send the generated file to your support contact. Log files are placed in the directory where you installed the Viewer Utility.

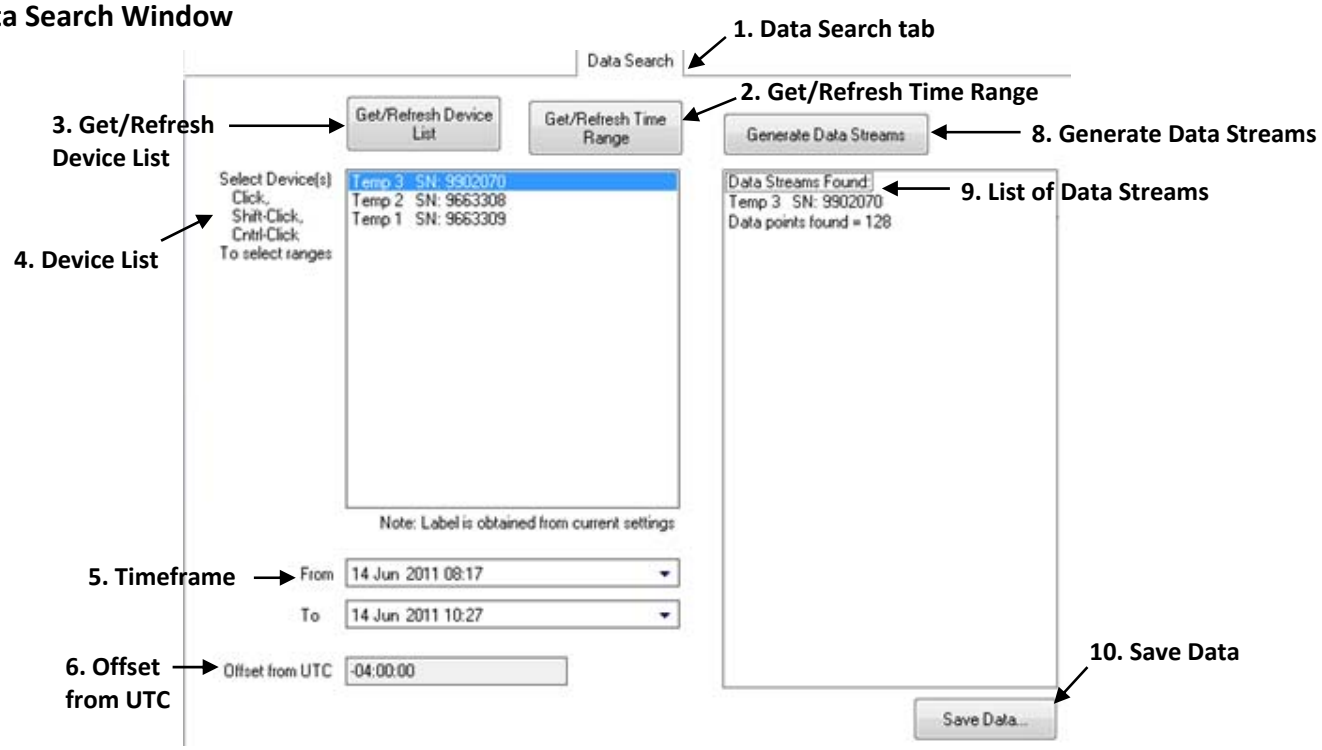


- **Real Log.** Enable Real Log to open a tab at the bottom of the window showing summaries of the packets that have arrived. This view retains a set number of packets and then will dump old packets in favor of new packets when it is full.
- **Serial Debug.** There are two options within the Serial Debug: Raw Packets, and Slot Configuration.

  If you enable **Raw Packets**, a new tab is opened at the bottom of the Network pane that shows the entire contents of data packet as they come in. The view will retain several hundred packets. A text file is also created that includes the contents of every packet with a time stamp. You may need to send this file to technical support for debugging and support purposes.

  If you select **Slot Configuration**, the Slot Configuration table will appear at the bottom of the window. The Slot Configuration table shows the timeslot assigned to each device in the system and its current status.

Data Search Window



1. Data Search tab: Select this tab to view the Data Search window.
2. Get/Refresh Time Range: Click this button to refresh the Time Range shown in the Time Range fields to reflect the actual time range of your data.
3. Get/Refresh Device List: Click this button to refresh the Device List.
4. Device List: Shows all devices in the network.
5. Time Range: Use these drop down lists to change the time range when exporting data, if desired. To refresh to the actual time range of your current data, click the **Get Time Range** button.
6. Offset from UTC: Change the offset from Coordinated Universal Time (Greenwich Mean Time) if required.
7. Generate Data Streams: Click this button to search the database for the selected time range and get all of the data points and prepare them to be exported to a file.
8. List of Data Streams: This is a list of all of the data streams that are ready to be exported. Select one or more streams and click Save Data to export.
9. Save Data: Click this button to export the selected data streams to a text file.

Appendix A: Specifications

System	
Wireless Standard	Based on IEEE 802.15.4, 2.4 GHz ISM band (license-free worldwide)
Transmission Range Monitors to Receiver	1000 ft (300 m) with clear Line of Sight; any obstructions, such as vegetation or walls, will reduce this range significantly
Maximum Number of Monitors	50
Environmental Rating	Monitors and Receiver: NEMA 6P, IP68 Temperature sensor probe is rated for 1-year immersion in fresh water ≤ 122°F (50°C)
Monitor Operating Range	-4° to 140°F (-20° to 60°C); With optional Lithium Batteries: -40° to 158°F (-40° to 70°C)
Receiver Operating Range	-40° to 140°F (-40° to 60°C)
Receiver Communication to PC	6 ft (1.8 m) USB cable (can be extended with optional extension cable up to 80 feet)
Temperature Sensor	
Measurement Range	-40° to 212°F (-40° to +100°C)
Accuracy	0.4°F from 32° to 140°F (0.22°C from 0° to 60°C)
Resolution	0.045°F at 77°F (0.025° at 25°C)
Response Time	3 minutes in air moving 1m/s; 30 seconds in water
Sample Rate	1 reading per minute
Battery Life	1 year typical without solar charging; 3 years typical with solar charging
Size	6.5 in x 2 in; 12 ft cable to sensor (16.5 cm x 5 cm; 3.7 m cable)
Probe Dimensions	0.38 in (1 cm) diameter
Probe Weight	6.3 oz (180 grams)
Sensor Probe Operating Temperature	-40° to 212°F (-40° to 100°C)

Appendix B: Compliance

FCC Part 15 Compliance

The following information applies to the Receiver.

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by Onset Computer Corporation could void the user's authority to operate the equipment.

To comply with FCC and Industry Canada RF radiation exposure limits for general population, the Receiver must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Declaration of Conformity

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Maximum Allowed Antenna Gain

Part	Max Gain
Receiver	5dBi

Canada

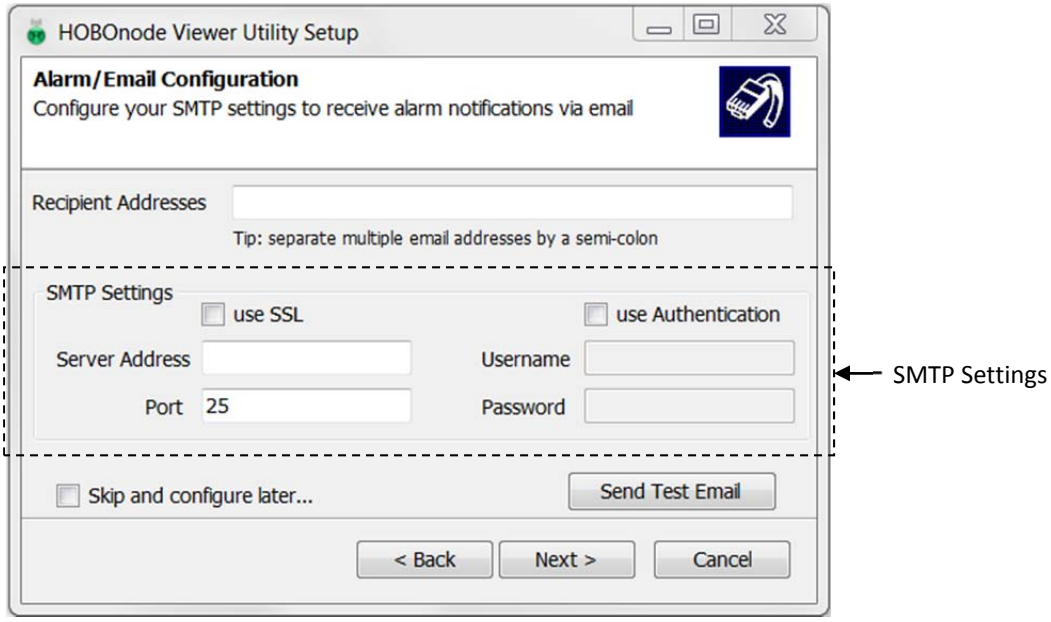
This device has been designed to operate with the antennas listed above, and having a maximum gain of 15 dB. Antennas not included in this list or having a gain greater than 15 dB are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

Appendix C: Email Configuration

SMTP Settings

You must configure the SMTP Settings to allow email from the network to be delivered to your email recipients.



Corporate Environment

If this network is being set up within a corporate network environment, you should contact your Network Administrator (IT/MIS dept.) for this information. Also, the Network Administrator may need to add the receiver to a White List to allow it to relay email through the corporate email server.

Private Email

If you use a private mail account such as Google or Hotmail, or if you do not know your corporate information, you can get the outgoing mail parameters from your mail provider.

The following are links to this information for some providers. For other providers, search online for "SMTP Settings for <provider name>."

- Gmail:

  http://mail.google.com/support/bin/answer.py?hl=en&answer=13287

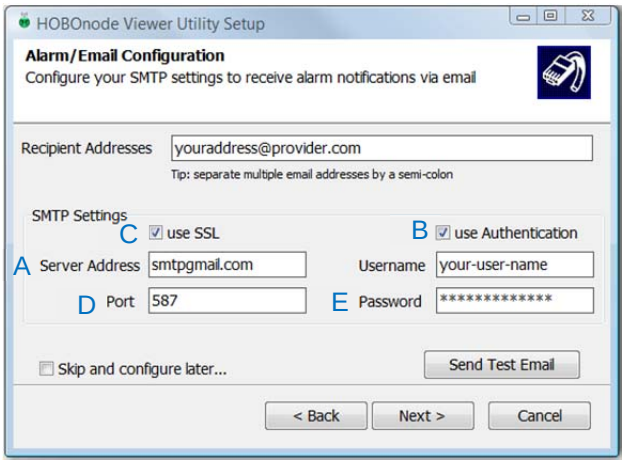
- Hotmail

  http://liveunplugged.spaces.live.com/blog/cns!F92775FC46A390CA!171.entry

Example

The following illustration shows the SMTP information table from Gmail with the information populated in the Alarm/Email Configuration window.

Incoming Mail (POP3) Server - requires SSL:		pop.gmail.com **Use SSL**: Yes **Port**: 995
Outgoing Mail (SMTP) Server - requires TLS:	A B C D	smtp.gmail.com (use authentication) **Use Authentication**: Yes **Use STARTTLS**: Yes (some clients call this SSL) **Port**: 465 or 587
Account Name:		your full email address (including @gmail.com or @your_domain.com)
Email Address:		your email address (username@gmail.com or username@your_domain.com)
Password:	E	your Gmail password



Sending an Alarm to a Cell Phone

To send an email to your cell phone when an alarm occurs, enter the email address for your cell phone, which may be obtained by contacting your provider.