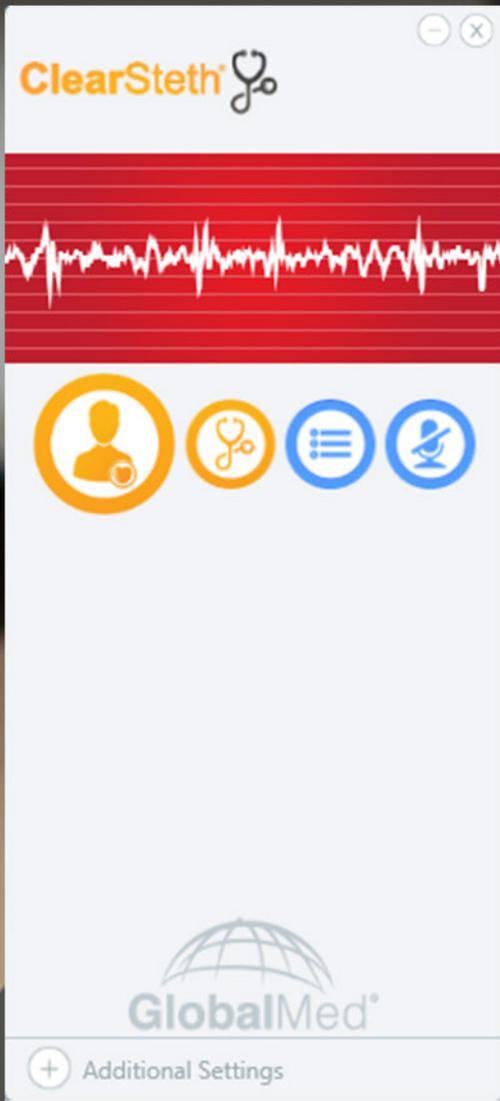


ClearSteth® 

User Manual



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## About GlobalMed®

Scottsdale, Arizona-based GlobalMed designs, manufactures and markets telemedicine solutions and medical image automation systems that provide superior image quality, unmatched versatility, and unsurpassed simplicity for the healthcare industry. GlobalMed's camera, image management, store and forward, video conferencing and video streaming technologies enable multiple specialists and other caregivers to be more effective in providing patient care, and more productive and efficient in managing patient information. Products include the TotalExam® line of cameras, the most versatile and easy-to-use exam cameras on the market, eNcounter Application Suite output, which provides automated workflow capabilities for seamless integration into a provider's network, and fully integrated mobile video cart systems for primary care applications.

## Contact Info

GlobalMed Help Desk: [www.globalmed.com/helpdesk](http://www.globalmed.com/helpdesk)

GlobalMed Help Desk: 1.800.886.3692



ClearSteth® is a digital stethoscope and hosted solution. By connecting your chest piece to the PC, opening the ClearSteth application, and connecting to the clinician, providers can conduct a real-time, remote auscultation exam. ClearSteth was developed with the end-user in mind, combining high quality audio and ease-of-use. The ClearSteth application has the ability to function as either the Sender or Receiver side of the connection, with the functionality determined by the initiator of the call. The application will allow the Sending side of the call to listen to the auscultation locally.

**Specifications**

Stethoscopes Supported:	RNK PCP-USB, Thinklabs One, Littmann 3200
Bandwidth:	128Kbps - RNK and Thinklabs One stethoscopes 64 Kbps - Littmann 3200 stethoscopes
Encryption:	SSL to the eNcounter Server AES 256-bit on UDP, SSL and TCP
RNK Stethoscopes Filters:	Bell, Diaphragm, Extended

**System Requirements**

Windows 7, 8 or 10  
USB 2.0, 3.0  
ClearSteth application: 10.5MB  
Ram: 4GB or greater

**Hardware**

RNK PCP-1 USB Chestpiece  
Headphones (Sennheiser  
HD 280 headphones  
recommended)

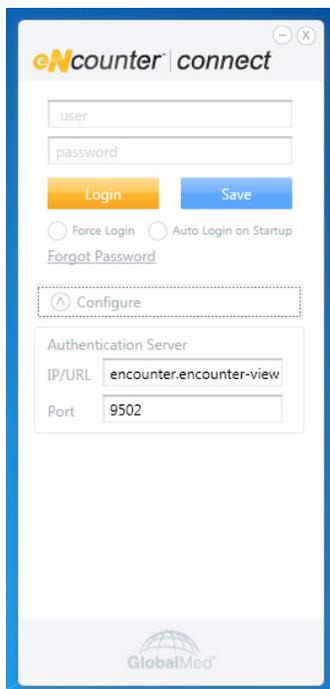
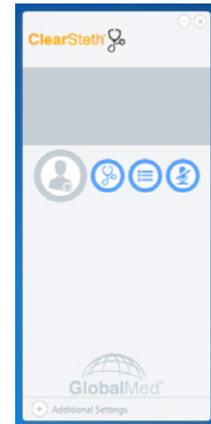
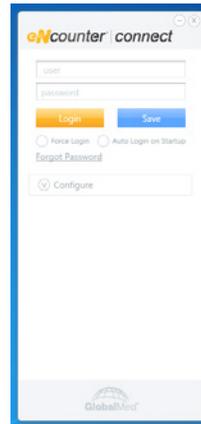
## Installation

1. Navigate to [www.globalmed.com](http://www.globalmed.com)
2. At the top right of the screen, click on the tab labeled, “Support,” and then click on “Downloads”.
3. On the right side of the screen, click on the link labeled “ClearSteth Software v1.x” and allow the installer to download.
4. Once downloaded, select and allow the installation wizard to run.
5. Upon completion, restart the computer.
6. Open the eNcounter Connect and ClearSteth applications to configure.

## Configuration

Both ClearSteth and eNcounter Connect need to be configured before initiating a ClearSteth connection.

Double click on the ClearSteth icon on the Windows Desktop to start ClearSteth. If eNcounter Connect is not running, it will start up when ClearSteth is initiated.



### Configuring eNcounter Connect

1. Enter “[encounter.encounter-view.com](http://encounter.encounter-view.com)” or given IP for IP/URL.
2. Port should be 9502.
3. Enter your GlobalMed-provided Username and Password
4. You can force login; if someone is using your User ID, it will automatically log the other user off.
5. You can use the Auto Login on Startup to automatically log the user in upon application startup.
6. Click the Save button to save all relevant configuration settings.

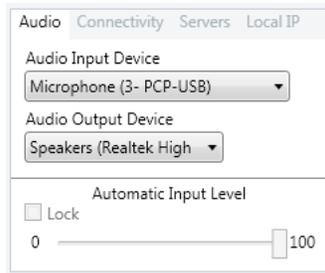


## Configuring ClearSteth Application

Start the ClearSteth application by clicking on the desktop icon. Expand the Additional Settings to view the Configuration tabs.

### 1. Audio Tab

The Audio Input Device drop down list will show the available devices for audio input selection. If ClearSteth is being used as a receiver only, there will be no need to select an audio input device.



Audio Output Device drop down list will show the available devices for audio output selection. Note: GlobalMed recommends Sennheiser HD280 headphones. Caution: Do not use noise cancelling headphones, as they will negatively affect the quality of what you hear.

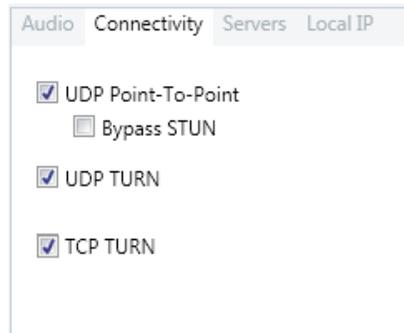
The Automatic Input Level allows for control of the stethoscope input level. When set too high, the stethoscope audio will clip on the high end and sound will be distorted. When set too low, the stethoscope audio will be difficult to hear. When Lock is unchecked, the ClearSteth application will attempt to automatically fine-tune the input level. When the appropriate input level is discovered, check the Lock checkbox, and the system will lock on the audio input level. While the lock check-box is selected, the input level can be manually changed if desired.

### 2. Connectivity Tab

The Connectivity tab configures the audio connection type. If multiple connection types are selected ClearSteth will attempt connections in the following order: (1) UDP Point-To-Point, (2) UDP TURN, (3) TCP TURN. It is recommended to select all 3 connection types to ensure a successful connection is made.

1. UDP Point-to-Point: A point-to-point connection is a direct network connection between two ClearSteth applications. This method utilizes the STUN Server for connecting. The ClearSteth applications can be on the same subnet or on different subnets. This is the preferred method of connectivity. If checked, it is also the first connection method that is attempted.
  - Bypass STUN: Allows a connection between ClearSteth applications without using the STUN or TURN servers. This option is only available if UDP Point-to-Point is selected and will only work if both users are on the same subnet.
2. UDP TURN: Utilizes the UDP TURN Server to route audio messages between the ClearSteth applications. If UDP Point-To-Point is checked, the UDP TURN server will be the second connection method attempted, and will only be utilized if the UDP point-to-point connection was not successful.
3. TCP TURN: Utilizes the TCP TURN Server to route audio messages between the ClearSteth applications. If UDP Point-To-Point or UDP TURN Server is checked, those options will be attempted before the TCP TURN Server connection method is attempted.

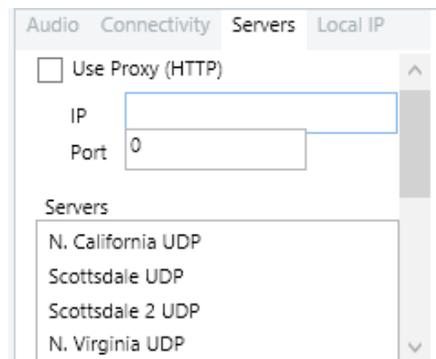
See Image on Next Page



### 3. Server Tab

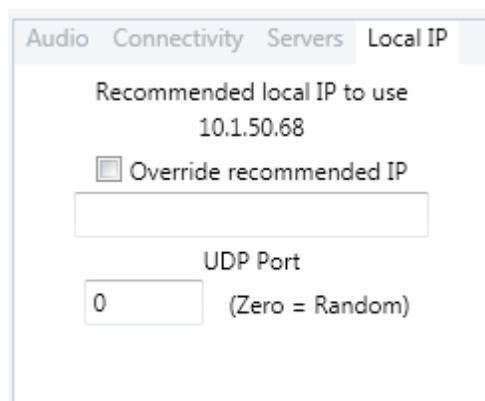
The server tab will show the user all available servers. If the location utilizes a proxy server, check the “Use Proxy” box and enter the appropriate IP and Port information.

*Note: The list of servers will be automatically configured and does not require user action.*



### 4. Local IP Tab

The Local IP tab allows the user to override what ClearSteth determines as the local IP address of the computer and specify a UDP port to use. These two options are only applicable if UDP Point-To-Point and Bypass STUN are selected in the Connectivity tab. Enter “0” for ClearSteth to choose a random port.



## Connected Stethoscopes

### RNK Stethoscope

The RNK stethoscope utilizes a USB connection to transmit auscultation data through the ClearSteth application. To configure:



1. Connect the stethoscope to a USB port on the machine in use.
2. Allow the device drivers to install. Notification of a successful driver install will be provided via the machine's operating system.
3. Start ClearSteth. On the Audio Tab, navigate to the Audio Input Device drop down list. Open the device list and select the device titled Microphone (PCP-USB will appear in parentheses next to this title).
4. Using connected headphones or internal speakers, select an output device from the Audio Output Device drop down list.
5. Upon device selection, click the local stethoscope button  to verify that the RNK stethoscope is working properly. Audio from the stethoscope should be audible through the selected output device (speakers or headphones).

*Note: This icon will only initiate a local auscultation and will not connect to a remote provider.*

## Littmann 3200 Bluetooth Stethoscope

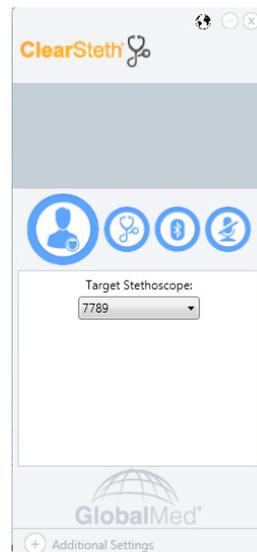
### Pairing and Connecting the Device

To pair and use a Littmann Bluetooth Stethoscope within ClearSteth :

1. Run ClearSteth. Click on the Additional Settings button at the bottom of the window, then click on the Audio tab. Select Littmann on the Audio Input Device list if it is not already selected.



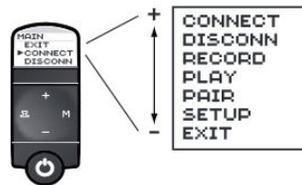
2. In order to connect with ClearSteth, a Littmann 3200 stethoscope must be paired. Paired Littmann stethoscopes will show in the Target Stethoscope dropdown list.



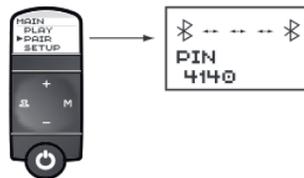
The number shown is the last 4 digits of the serial number printed on the side of the stethoscope. The number selected in the Target Stethoscope dropdown will be the stethoscope to which ClearSteth will attempt to connect. To pair a Littmann stethoscope, select the last item in the ClearSteth Target Stethoscope dropdown, Add New Scope.



3. Put the Littmann stethoscope into Pair mode by selecting Pair on the main menu.

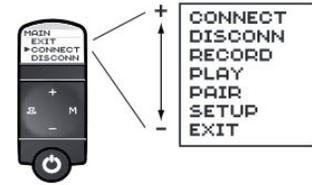


4. Enter the 4-digit number displayed on the Littmann into the New Pin field in ClearSteth and click the Pair button.

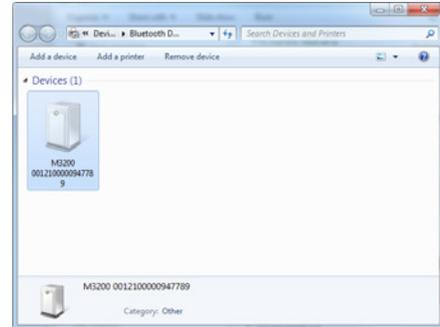


5. Once paired, the stethoscope's PIN number will appear in the Target Stethoscope dropdown list. Select it to successfully pair the stethoscope with the machine.

6. Once the stethoscope has been successfully paired, the user must initiate “Connect” mode using the stethoscope’s directional pad. Press “M” on the directional pad to select Connect. Once in connect Mode, the device is now ready for use with ClearSteth.



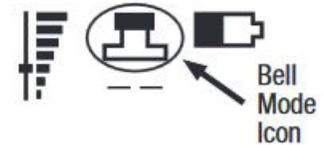
*Note: Occasionally the pairing is lost and a connection cannot be made. If you think this has happened, go to the Windows system Bluetooth Devices screen (in the system tray), and delete the Littmann stethoscope by finding the icon label that contains the Littmann stethoscope serial number, right-clicking on the icon, and selecting Remove Device. Then re-pair the stethoscope as shown above.*



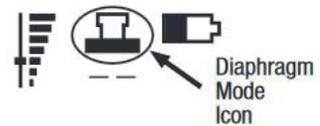
### Littmann Filters

The Littmann 3200 stethoscope offers three distinct frequency filters to emphasize specific sounds of interest.

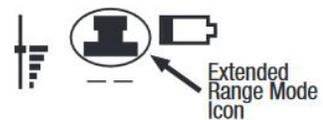
- Bell mode emphasizes lower frequency sounds between 20-200Hz.



- Diaphragm mode emphasizes sounds between 100-500Hz.



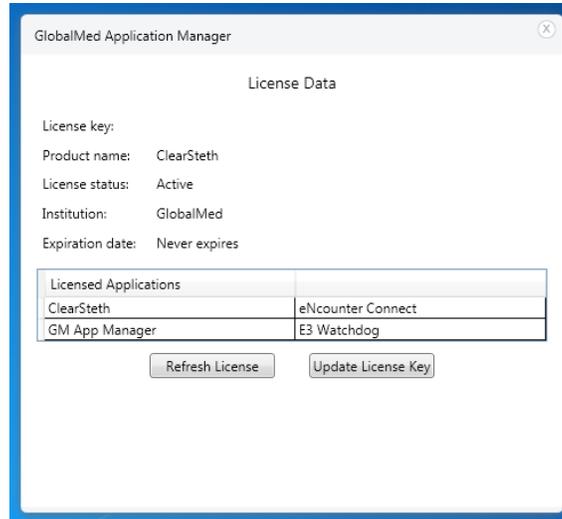
- Extended Range mode provides more low-frequency response between 50-500Hz.



To select a filter, press the filter button located on the device’s directional pad.

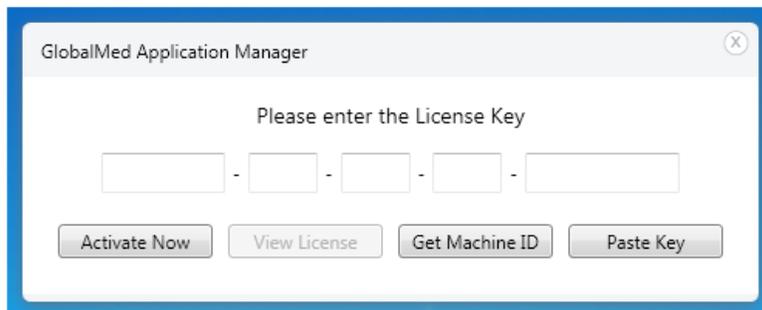


## Licensing



If a ClearSteth License Key has been supplied by GlobalMed, enter the license key to unlock the full send-and-receive capabilities of ClearSteth. Without a license key, ClearSteth will be in receive-only mode.

To enter the license key, click on the eNcounter icon  in the System Tray (lower right corner of the Windows desktop). Upon selection, the GlobalMed Application Manager window will appear. The license key can be entered by selecting the button labeled, Update License Key. Upon entering the license key, click the Activate Now button to activate the license.



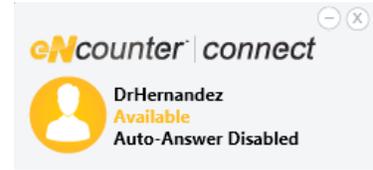
If the license key is successfully verified, the GlobalMed Application Manager window will change to show the license data.

## Using eNcounter Connect

1. Login to eNcounter Connect with your GlobalMed-provided credentials.

2. Select the Institution and the Group of the user to connect with.

User capabilities will show when focus is placed over the username



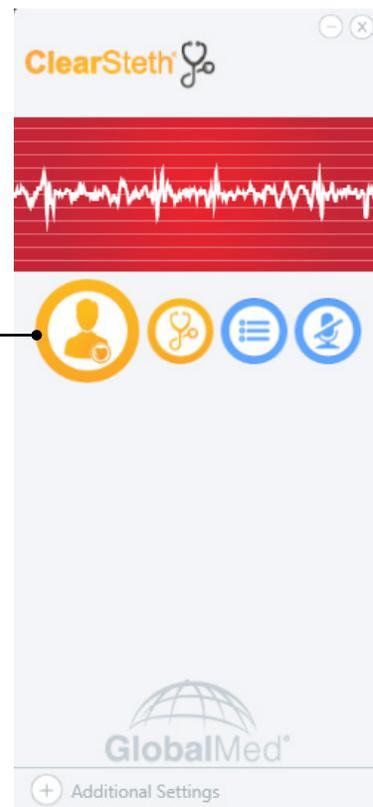
3. Click on the desired user to initiate a call. On the receiving side, a window will appear asking the user to answer or reject the call.



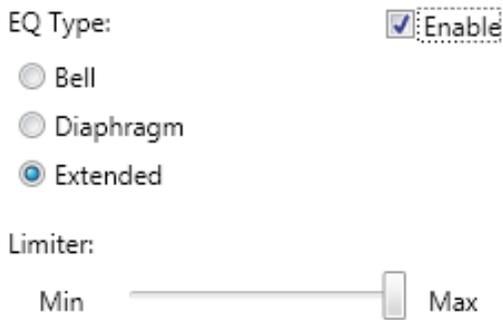
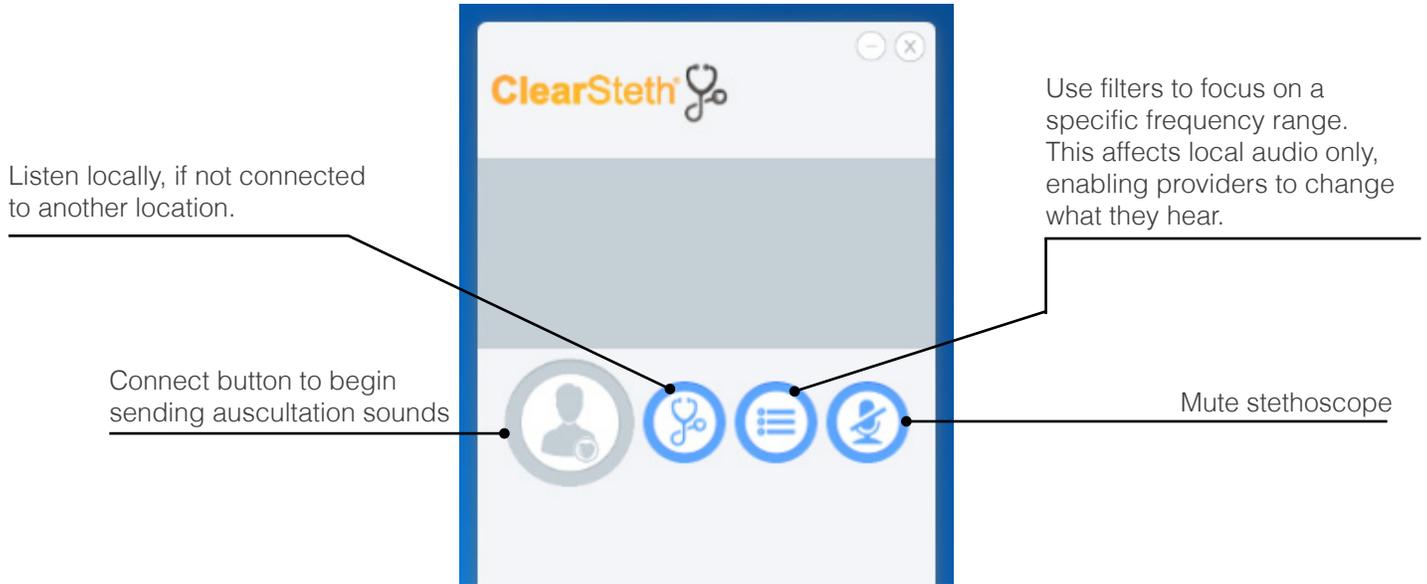
Note: The receiving side can enable the system to auto answer calls. To do this, right click on the avatar next to the username in eNcounter Connect, and check the box for "Auto Answer."

4. On the sending side, open ClearSteth and select the "Connect" button  to begin sending auscultation sounds to the receiving side.

Connect Button



5. Use ClearSteth controls to adjust filters, such as equalizer, etc.



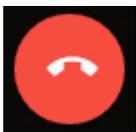
The Equalizer Dialog allows the user to change the way the audio sounds. Changing the equalizer settings affects the local side only, i.e. changing the EQ Type from Bell to Diaphragm on the sending side will not affect what the far end user will hear. “Enable Equalizer” must be selected to apply the changes.

- EQ Type:** Applies selected equalization to enhance audio.
- Bell:** Maintains lower frequency range for heart and bowel sounds.
- Diaphragm:** Maintains higher frequency range for breath sounds.
- Extended:** Maintains full range.

**Amplitude Limiter:** The Amplitude Limiter allows the user to set a maximum audio level. This helps prevent unwanted loud noises (such as those created when the stethoscope is moved) from disturbing the user. When required, this should be set by turning the slider down (to the left) until the heartbeat disappears, then moving it slightly back (to the right) until it reappears.

**Min:** Lowest maximum volume level.  
**Max:** Highest maximum volume level.

6. To discontinue stethoscope sounds, click on the “Disconnect” button  in ClearSteth.



7. To disconnect from the call, click on the “Hang Up” icon in the top right corner of eNcounter Connect.

### Adding an Audio Channel

For users who wish to leverage the video conferencing capabilities of eNcounter Connect while conducting an auscultation exam through ClearSteth, two audio channels must be available. Establishing two separate channels prevents audio mixing.

For instances in which two audio channels are not available, the user can add an audio channel using an external USB soundcard. To do so:

- Connect a GlobalMed verified SIIG USB SoundWave 7.1 Pro to the receiving side machine via USB. Allow the device drivers to install. Once installed, connect headphones to the external sound card device through the 3.5 mm auxiliary headphone output port.
- On the receiving side, open ClearSteth and verify that the device appears in the “Audio Output Device” drop down list as: “Speakers (C-Media USB Headphone Set).” Select this device.



- To determine whether the audio level is set appropriately, wear the headphones and access the volume control bar in the system tray. Audio levels can be controlled either through the operating system or manually on the USB sound card itself by pressing the “+” and “-” buttons.

- Initiate a videoconference call through eNcounter Connect. Verify that the volume from the call is set to an appropriate level.

- Initiate a ClearSteth connection. Using the headphones connected to the USB sound card, verify that the remote stethoscope transmits audio to the local headphones.

**Note:** Please see [Troubleshooting section 5](#) for more information.

## Troubleshooting

**1. My connected stethoscope does not appear in the “Audio Input Device” dropdown menu.**

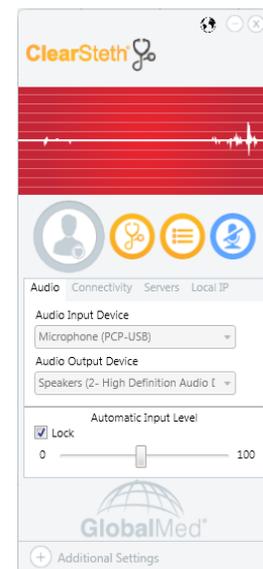
If a stethoscope has been connected to the machine on which ClearSteth is being used and does not appear in the input device dropdown menu, shut down ClearSteth. Ensure that the device drivers are fully installed. The user will be notified by the native operating system when the device drivers have completed installation after connecting the device to the machine. Once installed, reopen ClearSteth. The device should appear in the dropdown menu under “Audio Input Device.”

**2. When attempting to connect to an end user, an error message appears.**

When an error message appears upon selection of the “Connect” button, both users need to configure ClearSteth with an output/input device. Specifically, the receiving side must have an audio output device selected, while the sending side must have an audio input device selected.

**3. The audio on the receiving side is too loud.**

A specific workflow may be followed to avoid elevated audio levels upon initiation of a ClearSteth connection. First, put on the headphones and mute the stethoscope for the local and remote end user. Next, in order to control the receiving side audio level, the sending side can use the “Automatic Input Level” slider in the audio tab to reduce the input level and volume. To do so, check the “Lock” box and position the slider so that it is at an appropriate audio level. Unmute the stethoscope.

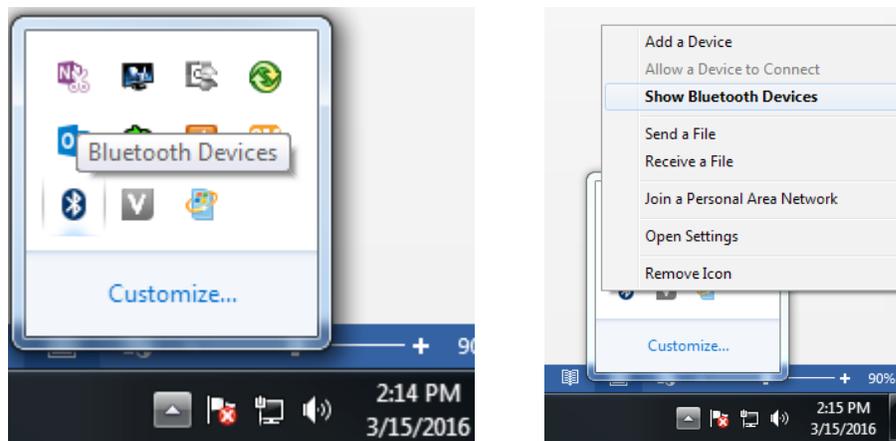


**4. The connected Littmann stethoscope does not appear when connecting the Bluetooth dongle.**

It can be difficult to determine whether the Littmann Bluetooth Stethoscope is paired on the computer. When the Littmann is successfully paired, an icon will appear in both the system Bluetooth Devices window and the ClearSteth Target Stethoscope list. However, even when the pairing is lost there are instances in which the Bluetooth dongle is removed from the machine but the device still appears in the system Bluetooth Devices and ClearSteth lists. As such, it can be difficult to tell when re-pairing is required.

When attempting to connect to an end-user using the Littmann stethoscope and an error dialog indicating that the stethoscope is not in Connect mode appears, the device likely needs to be repaired.

If the Littmann stethoscope has been used on the machine previously, the user must unpair the Bluetooth device before trying to reconnect. The machine will store the dongle specific data, making it appear as if the device has connected - it has not. To ensure a successful Bluetooth connection, connect the dongle. Navigate to the machine specific 'Show Bluetooth Devices' screen.

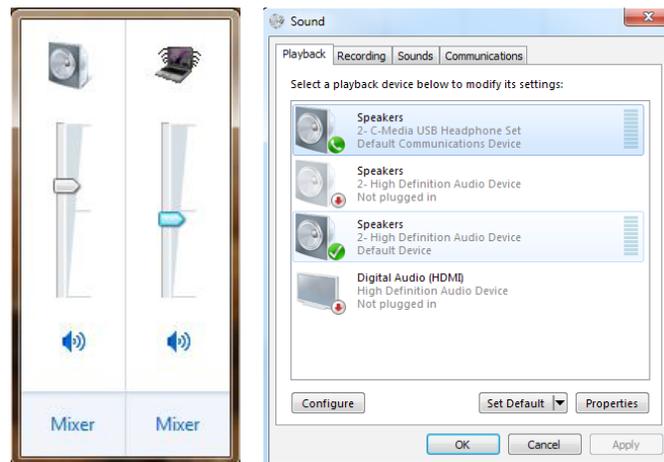


Here, the dongle may appear to be connected by showing a device named “M-x” (x representing 20 numerical digits). Right-click and disconnect this device. Next, start ClearSteth. Bring up the “Audio Input Device” drop down list and select Littmann. This will bring the user to the Bluetooth configuration page. Open the dropdown list under the “Target Stethoscope” field and select “Add a New Scope.” This will bring up the “New Pin” field that will require the user to enter the device specific pin number. Ensure that the device is in “Pair” mode, then select the “Pair” button in ClearSteth. Adherence to this procedure will result in a successful pairing of the Littmann Bluetooth stethoscope.

## Troubleshooting

5. **During a video conferencing session, a loud feedback loop will initiate upon start-up of ClearSteth.**

This can occur when a user is attempting to conduct both a video conference and ClearSteth simultaneously. In order to concurrently stream audio from both the video conference session and ClearSteth, the receiving side machine must have two established audio channels. Many laptops and PCs have sound cards that, by default, cannot support multiple audio channels. For instructions on how to add an audio channel to the machine in use, refer to the “Adding an Audio Channel” section on page 13 of this manual.



## High Frequency Artifacts

Given the marked variability of sound card quality across platforms, it is important to verify whether the machine in use is properly configured to produce clear audio sounds that enable successful remote auscultation exams. Incorrect configurations can manifest in a number of ways, however the most obvious is a high frequency pitch that is noticeable upon each heart-beat. In order to prevent soundcard deficiencies from impacting ClearSteth audio quality, adhere to the following procedure.

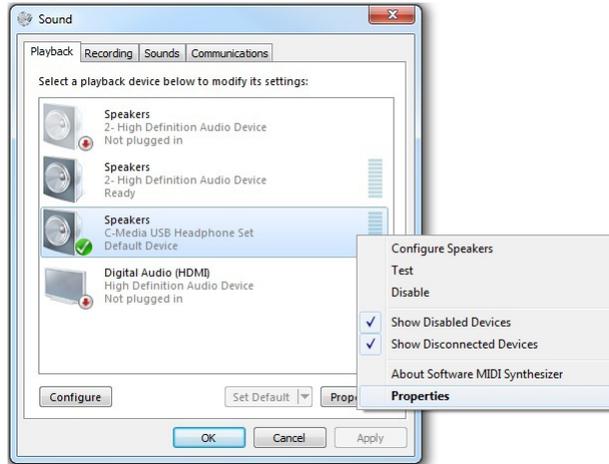
1. Connect a headset to the machine on which ClearSteth is running. Close and reopen ClearSteth. Select the Additional Setting button to view the ClearSteth configuration. Verify that the connected headset is selected in the “Audio Output Device” dropdown menu under the “Audio” tab. Note the Audio Input Device name as this is the device that will be configured.



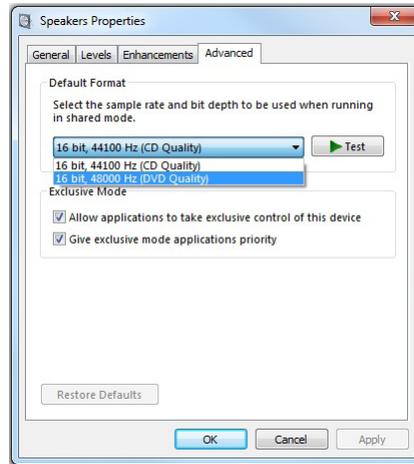
2. To configure the selected audio output device, right-click the Sound icon located adjacent to the Operating System date and time panel and select “Sounds.”



3. Upon selection of “Sounds,” a control panel window will appear. Navigate to the “Playback” tab and locate the selected audio output device (see step 1). Right-click the device and select “Properties.”



4. Navigate to the “Advanced” tab and locate the “Default Format” section. Verify that the currently selected dropdown option reads, “16 bit, 48000 Hz (DVD Quality).” If it does not, open the dropdown and select the 48000 Hz option.



5. Once selected, click Apply. If ClearSteth is in use, it will have to be restarted in order to adjust to the new configuration settings. Close and reopen ClearSteth.

6. The high frequency artifact should no longer be audible when ClearSteth is in use.



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