



# Using AES67 To Connect The Telos VX To WheatNet IP

## Prerequisites

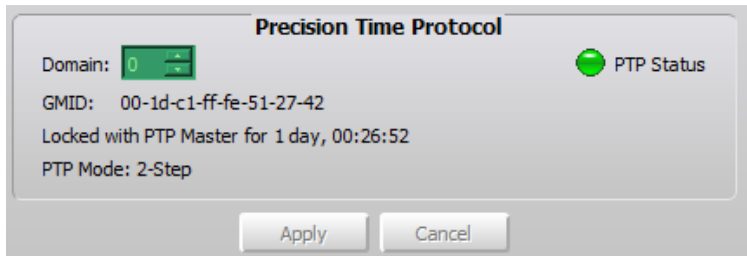
You will need:

- A Precision Timing Protocol (PTP) v2 clock source on your WNIP Local Area Network. Both the blades and the VoIP phone hybrid need to sync to this clock, and they do not generate it. There are numerous PTP clock generators on the market from companies such as Sonifex.
- A license in WheatNet Navigator to enable the PTP clock function. When you go to the **Info** tab in Navigator and set the external timing source to PTP-AES67 in the Clock Master Info section, you will be prompted to obtain the license key. Send the license seed to [activation@wheatstone.com](mailto:activation@wheatstone.com) and the support department will send you a key to paste into the box to activate the feature. There is no charge for this license key.
- The Telos VX and WheatNet-IP systems must both be set to the same sample rate.

Click on the drop down and select AES67 PTP as your clock reference. If this is the first time you've enabled AES67 PTP, you will be prompted to apply for a license; copy the seed key information and forward it to [techsupport@wheatstone.com](mailto:techsupport@wheatstone.com) as mentioned previously.

If you have installed and are running a PTPv2 master clock, Navigator will detect it and show its status here. Note that if you have not installed a PTP master clock or WNIP cannot see it then AES67 devices will not work. This status indicator is also useful when your system is running to alert you; it will turn red and issue an alarm if PTP is lost.

When your WheatNet-IP system has locked to the PTP clock, the PTP Status indicator will turn green:



The Domain setting should be left at zero.

Once your Telos VX is on the WNIP LAN and can lock to the PTP clock, the VX and your Clock Master Blade will be locked to the same clock source and the rest of your Blades will be locked to the Clock Master Blade's metronome, so everything will be time aligned.

### Key Concepts

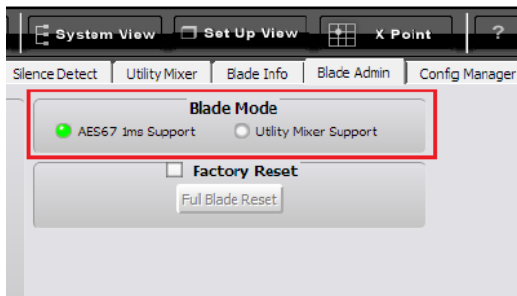
AES67 is at its core a timing protocol – it is a way to ensure that Audio over IP equipment from different manufacturers will send packets at the same rate and in a common format. There is no common discovery protocol, therefore it is necessary to manually enter the following information and enter it on both ends of the wire:

- The multicast address of the audio stream
- The UDP port of the audio stream
- The packet rate
- The payload type

You will enter the information of the Telos VX outputs into Navigator as sources, and you will enter the information from Navigator for the WheatNet sources that will feed the phone system as inputs to the VX.

In WheatNet IP, we refer to the packet rate by its speed. The default rate is .25 ms. In the VX, you are given the choices of either Standard Stereo or AES67 Multicast. The Telos Standard Stereo packet rate is 5 ms and the AES67 Multicast packet rate is 1 ms. Therefore, we should use 1 millisecond packets on each end.

If you have a Blade 3 system, you will need to turn off at least one utility mixer on any blade to turn it into an AES67 translation blade. Go to the Blade Admin tab and choose AES67 1ms support. Each blade set for AES67 1ms Support will create up to 8 1ms streams from any 8 sources on the system.



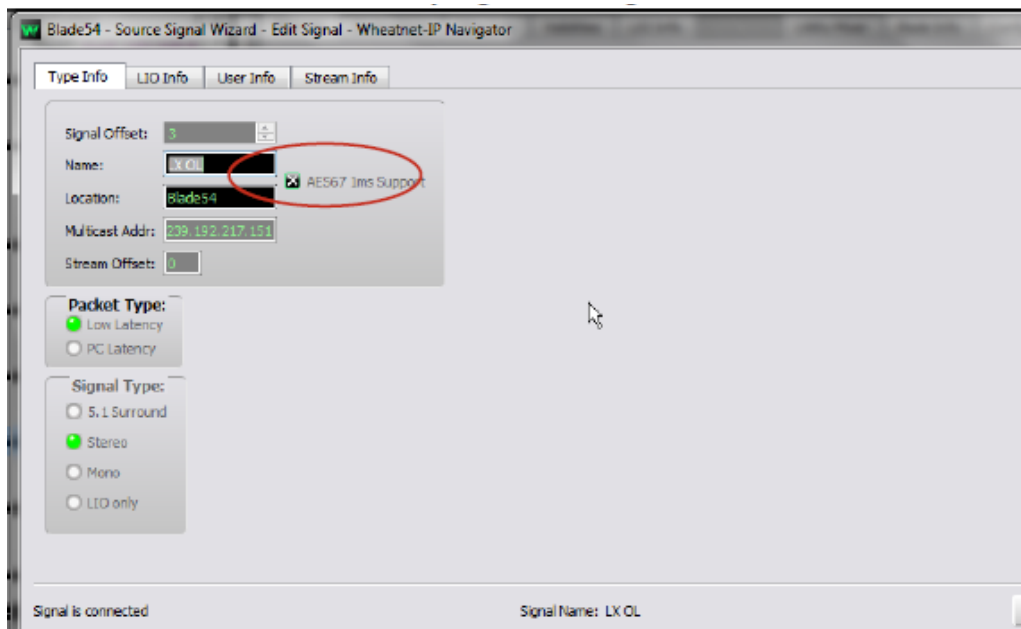
Blade 4 systems are capable of creating 1ms translations without turning off a utility mixer.

### Creating The Outputs To The Phone System

Each studio will need to send a mix minus or bus minus as well as a program on hold feed, which is usually the Program Out of the console or other pre-delay on air feed.

We will need to create 1 ms streams for these WheatNet sources, and we recommend using a utility mixer to assist in this process. This will give you the flexibility to change the routes to the phone system within Navigator either manually or via Salvos, plus it will convert the mono mix minus stream that is created by many consoles to a stereo one, which is required to connect to the VX.

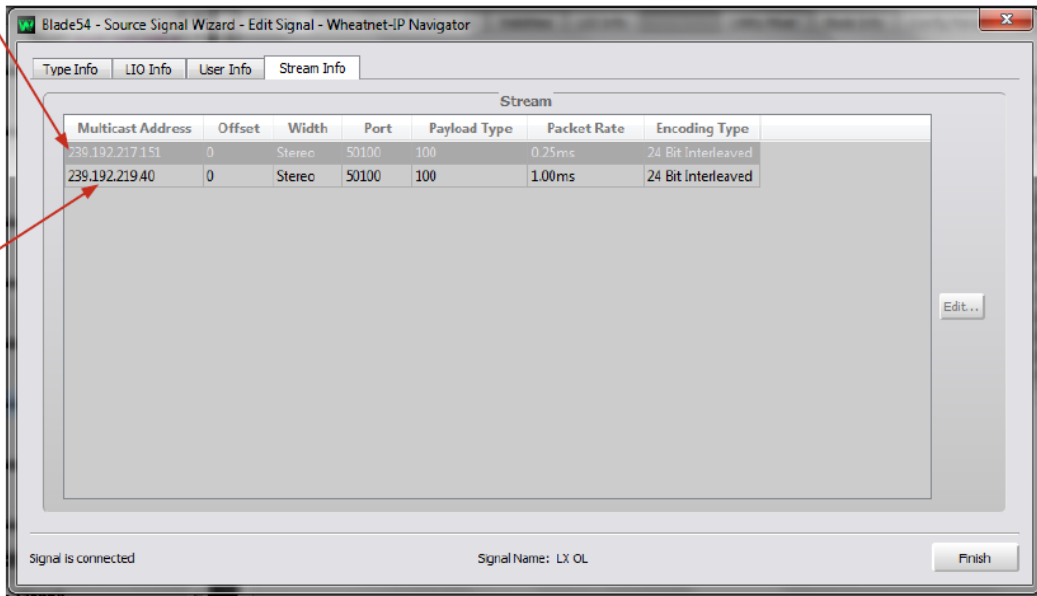
1. Route the mix minus or bus minus you wish to feed to the phone hybrid to utility mixer input 1. Turn its B volume slider down and keep the A volume slider up. Turn the input on.
2. Route the music on hold source (program) to utility mixer input 2. Turn its A volume slider down and keep the B volume slider up. Turn the input on.
3. Turn on the A and B master faders
4. Rename the A and B outputs of the utility mixer as desired on the Sources tab of the blade.
5. While editing each source, turn on 1ms AES 67 support.



While you are here on the Edit window, click on Stream Info. You will see both a .25 ms stream and a 1ms stream.

1/4ms stream

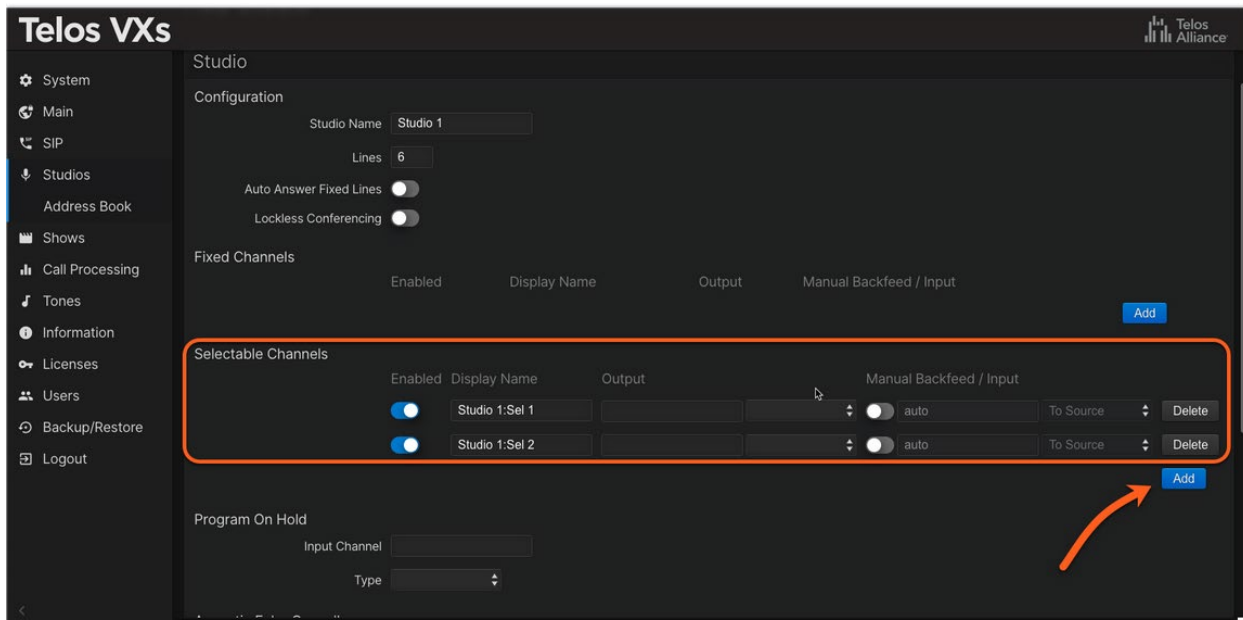
1ms stream



Make a note of the multicast address and port number for each source. You will enter this into the Telos VX.

At this point we can switch over to log into the Telos and start setting that up.

Log into the Telos VX web page.

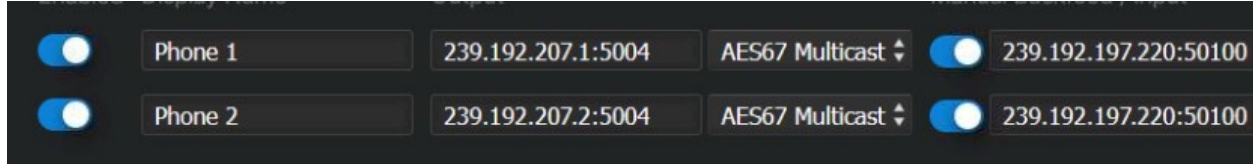


In the Studios page, after adding the Channels (there is one channel per hybrid, so if you will have one phone fader on the console, you will add one; for 2 console faders, add 2.

Under Display name, enter a friendly name for the audio so you can identify it, like Studio A Caller 1.

In the Output field, you will enter the multicast address of the audio coming from the caller. We will discuss setting this address in the next section.

Turn on the switch for Manual Backfeed/Input and enter the Mutlicast IP address and UDP port that you just wrote down from Navigator, separating them with a colon. For example, 239.192.220.40:50100.



Select the AES67 Multicast stream type for both the output stream and the input stream.

Note: If you do not enter the UDP port address, the Telos will assume port 5004. It's okay for the Telos output to be on port 5004, but since WheatNet uses port 50100 by default, the input to the Telos (the backfeed) needs to specify port 50100 as in the screen capture above.

In the Program On Hold field, enter the multicast IP and UDP port number of the audio source you set up in Navigator. For example, 239.192.193.155:50100.

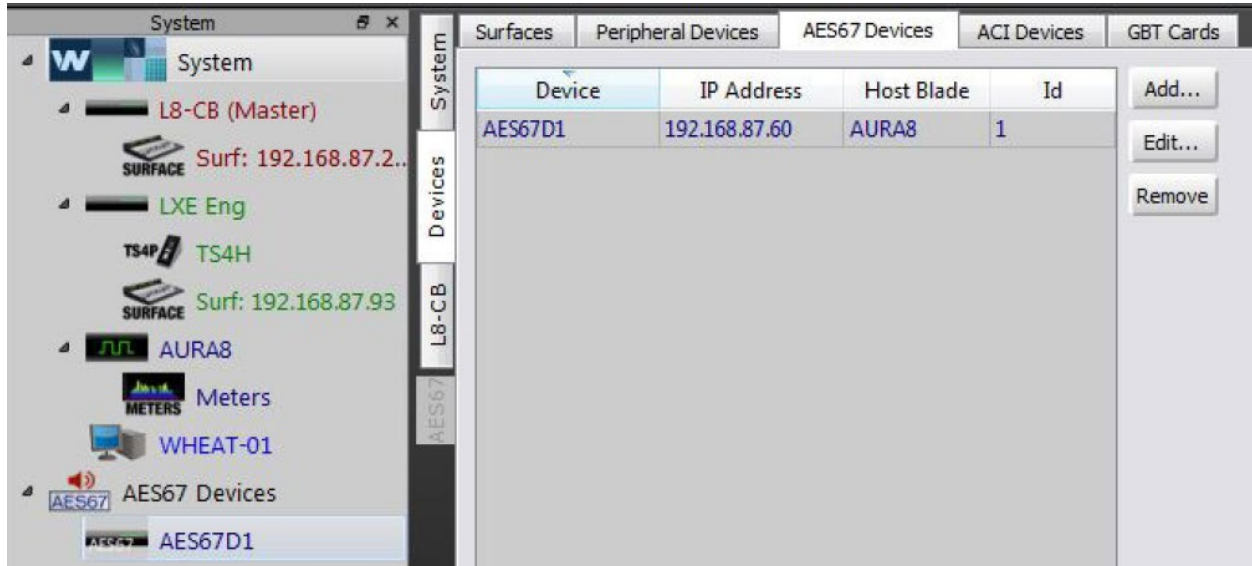
### Creating The Telos Streams

You will need to create a unique multicast IP address for each phone hybrid in the Telos (the output field in the previous section). Any valid multicast IP address will do as long as it does not conflict with the range that Wheatnet IP dynamically assigns. The range of addresses we use is defined on the Info tab of Navigator. The default is 239.192.192.0 and above. The valid range of multicast addresses used for local networks is 239.0.0.0 to 239.255.255.255, so you could choose something between 239.0.0.0 and 239.192.191.254 and not conflict with the WheatNet-IP address pool.

Since different manufacturers will use different portions of that wide range of possible addresses, it is best to plan out your addressing scheme, so as you add more AES67 devices you don't overlap. Keep a spreadsheet that you can refer to as you add new equipment in the future.

If you only enter the multicast IP address into the output field of the VX, Telos will default to UDP port 5004.

## Entering The Telos Stream Information into Navigator



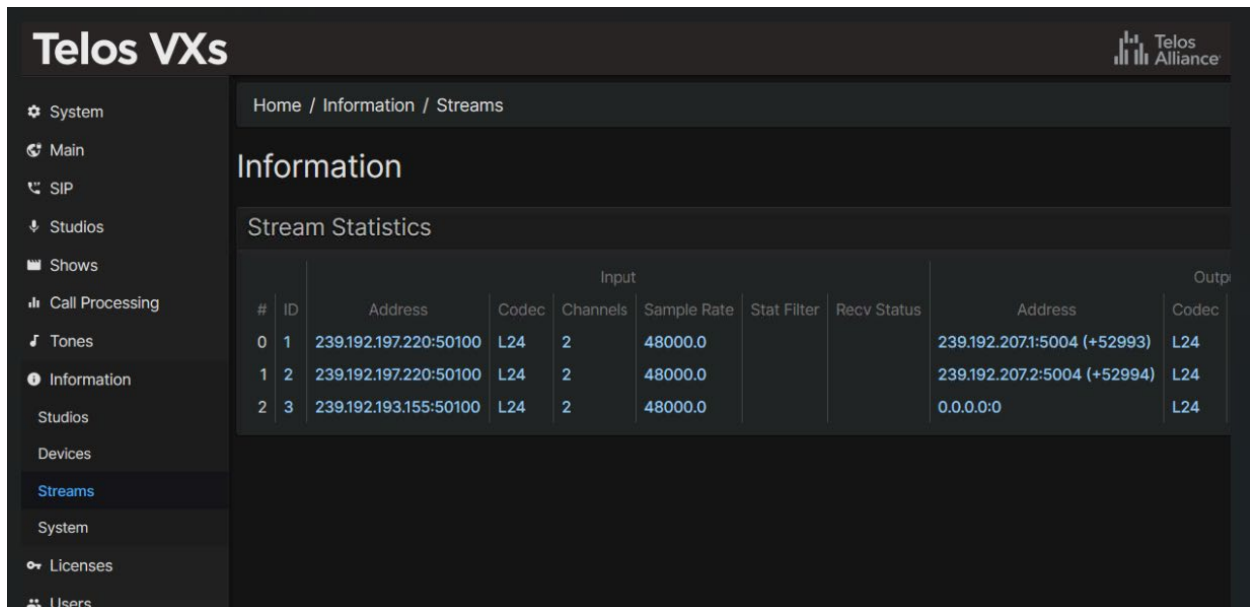
First, create an AES67 Device in the system.



1. In Navigator, click on the Devices tab, then click on the AES-67 Devices Tab.
2. Click Add.
3. Enter the name of the device. (ie "Telos VX")
4. Enter the IP address of the VX (this is the address of the VX, not the multicast address.)
5. Choose a Host Blade. This can be any blade on the system.

This will create an AES67 "Blade" in the system dock.

Now, we can create our sources. For this step we will need to refer to the streams from the Telos VX. The VX will display all the relevant information on its Streams page, under the Information menu:

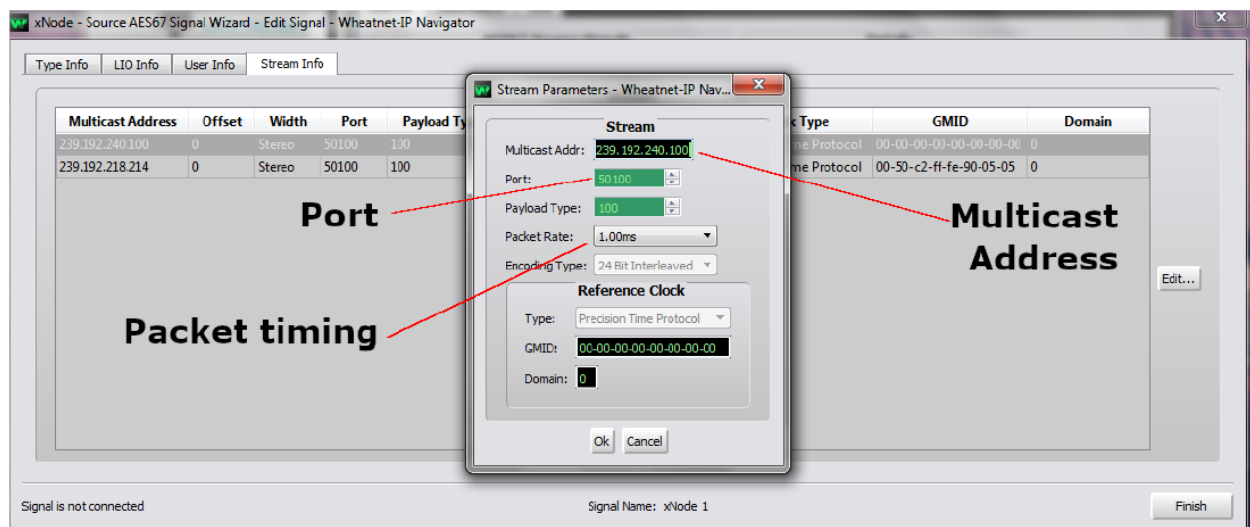


Inputs (which is what is coming from Wheatstone are displayed on the left and Outputs (which is the information we want because it's what's coming from the VX) is displayed on the right.

You will want the Multicast IP Address and the UDP port number (which is displayed following the colon after the IP address. In the screenshot above, Stream 0 is 239.192.207.1 and the port is 5004 (which is the Telos default port).

In Navigator, click on the AES-67 device that you created in the System dock, and then click on the Sources tab. Click Add.

Name the source. This is what will appear on the console. Then click on the Stream Info tab.



Enter the multicast address and port number and set the packet timing to **1ms**. The Payload Type should be set to **96**. Click Ok, then click Finish.

Your source is now created and it can be routed to a console. Test audio in both directions.

## Network Switch Settings

If you can send audio to the VX, but not receive audio from the phone hybrid, you will need to make an adjustment to your Cisco Ethernet switch.

Telos enables QoS tagging on its packets by default, and this is a setting that users cannot easily change in the field.

This tag adds extra bytes to the packet, which breaks compatibility with WheatNet-IP blades. You must add a command to your Cisco switch to filter out the tag.

You will be editing only the access port on the switch that is connected to the Telox VX appliance. Telnet into the switch and log in.

Type **enable** and hit enter to elevate your administration level in the switch. This will put you at a `switchname#` prompt.

Enter the configuration mode by typing **config t**. Hit enter.

Then type the following commands and hit enter when finished with each line:

```
interface GigabitEthernet 0/x (x= the Ethernet port the VX is connected to*)
```

```
switchport voice vlan dot1p
```

```
end
```

```
write memory
```

Once this is enabled, the QoS tags coming from the VX will be filtered out and the WheatNet-IP blades will be able to receive the audio coming from the phone hybrid.

*\*On stacked switches, the port may be identified differently, such as 1/x instead of 0/x. Do a **show running-config** to see how your switch is addressed.*

## Thank You!

More information about setting up AES67 is found in the final appendix of both the Blade 3 and Blade 4 manuals. As always, contact us at Wheatstone support if you need further assistance at (252) 638-7000 or [techsupport@wheatstone.com](mailto:techsupport@wheatstone.com).