

# Streamware™ for Windows Release 2.1

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The logo consists of a solid red square with the word "ECHO" written in white, uppercase, sans-serif font in the center.

ECHO

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## Introduction

The Streamware NIC-1 is both a network adapter, and a sound card for AVB (Audio Video Bridging).

The NIC-1 connects Windows PCs directly to audio streams on AVB networks. Designed expressly for next-generation network streaming standards, the NIC-1 allows Windows audio applications to treat an AVB network just like any other Windows audio device.

The software for the NIC-1 is available in three versions:

	Playback	Record	Talker streams	Listener streams
16 channels	16	16	2	2
64 channels	64	64	4	4
Workbench	64	64	4	4

Workbench provides additional features designed specifically for automotive and/or test and measurement applications:

- Static stream configuration
- 1722a stream formats

Future releases of Workbench will include fault injection, protocol validation and error logging.

## System Requirements

- Microsoft Windows 7 with Service Pack 1 (32-bit or 64-bit)
- Microsoft Windows 8 (32-bit or 64-bit)
- Microsoft Windows 8.1 (32-bit or 64-bit)
- Available PCI Express x1 slot
- ASIO compatible audio software application

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## Installation

To use the NIC-1, first, download and run the installer.

Installing the drivers may take several minutes; please allow this process to run to completion. If prompted to confirm driver installation, simply click the Install button to confirm.

Once the installer has finished, it's time to insert the PCIe card.

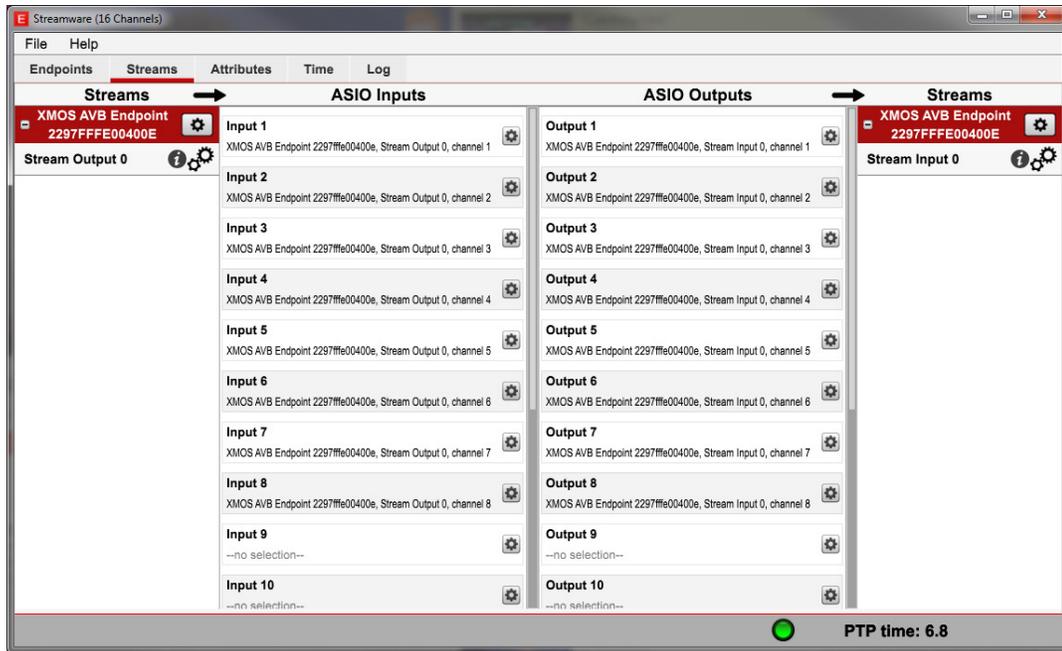
1. Power down the computer
2. Disconnect the computer power supply
3. Insert the NIC-1 into any available PCI Express slot. Be careful not to unseat any of the nearby PCI cards.
4. Reconnect the computer power supply and start the computer

Once Windows has started, it should detect a new network adapter. Windows should find the preinstalled drivers. Again, this may take several minutes. To expedite the process, check the box to tell Windows not to check Windows Update for driver software.

## Connecting to the Network

The next step is to run the controller application. This starts up the AVB protocol stack, enables the audio driver, and prepares the computer to participate in the AVB network. To run the controller, go to the "Echo Streamware" folder in the Start menu, and click on "Streamware Controller".

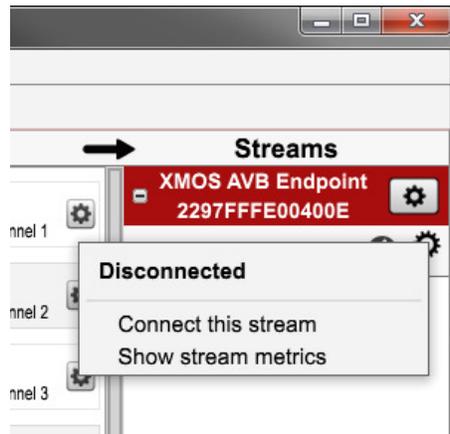
The controller will load, connect to the NIC, and begin looking for AVB devices on the network.



Streams shown on the left-hand side of the window are for audio recording; audio flows from the record streams into the ASIO inputs. For record streams, the external AVB device is the Talker, and the NIC-1 is the Listener.

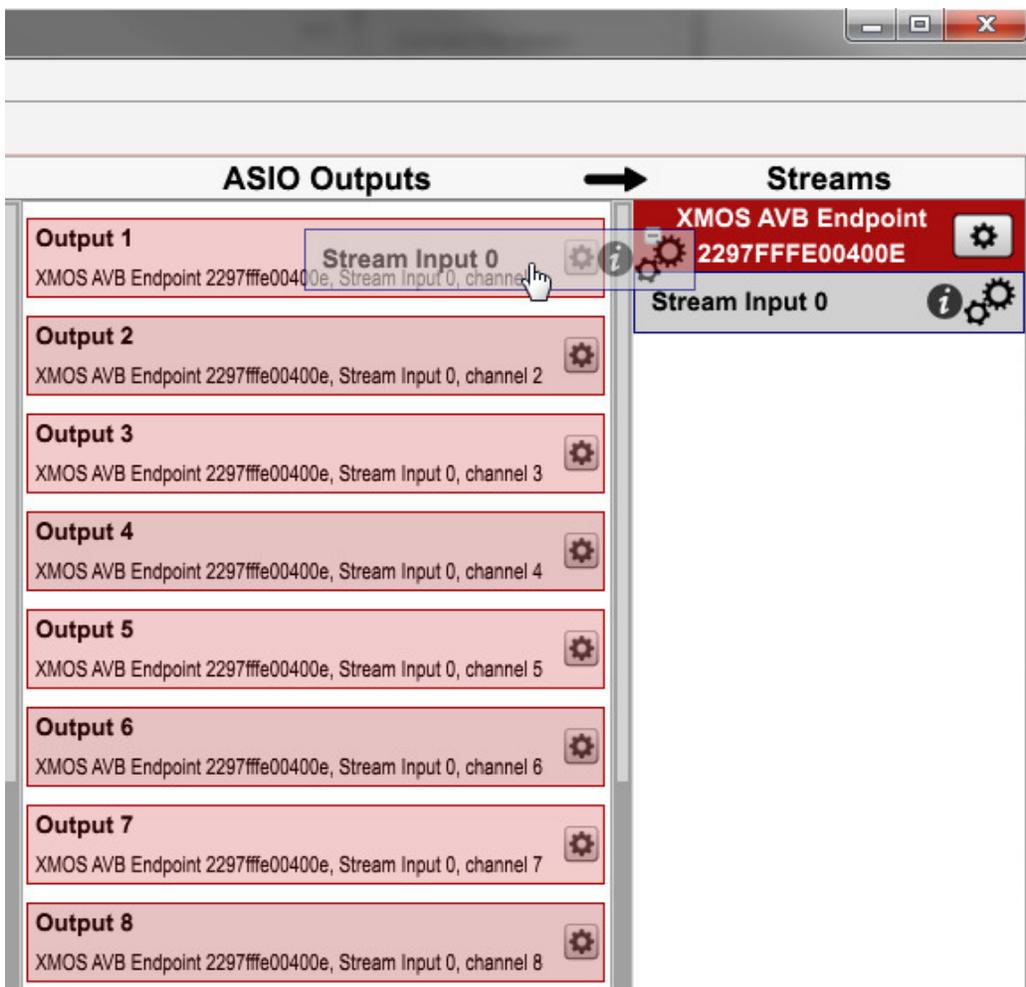
Streams listed on the right-hand side of the window are for audio playback; audio flows from the ASIO outputs to the playback streams. For playback streams, the NIC-1 is a Talker, and the external AVB device is a Listener.

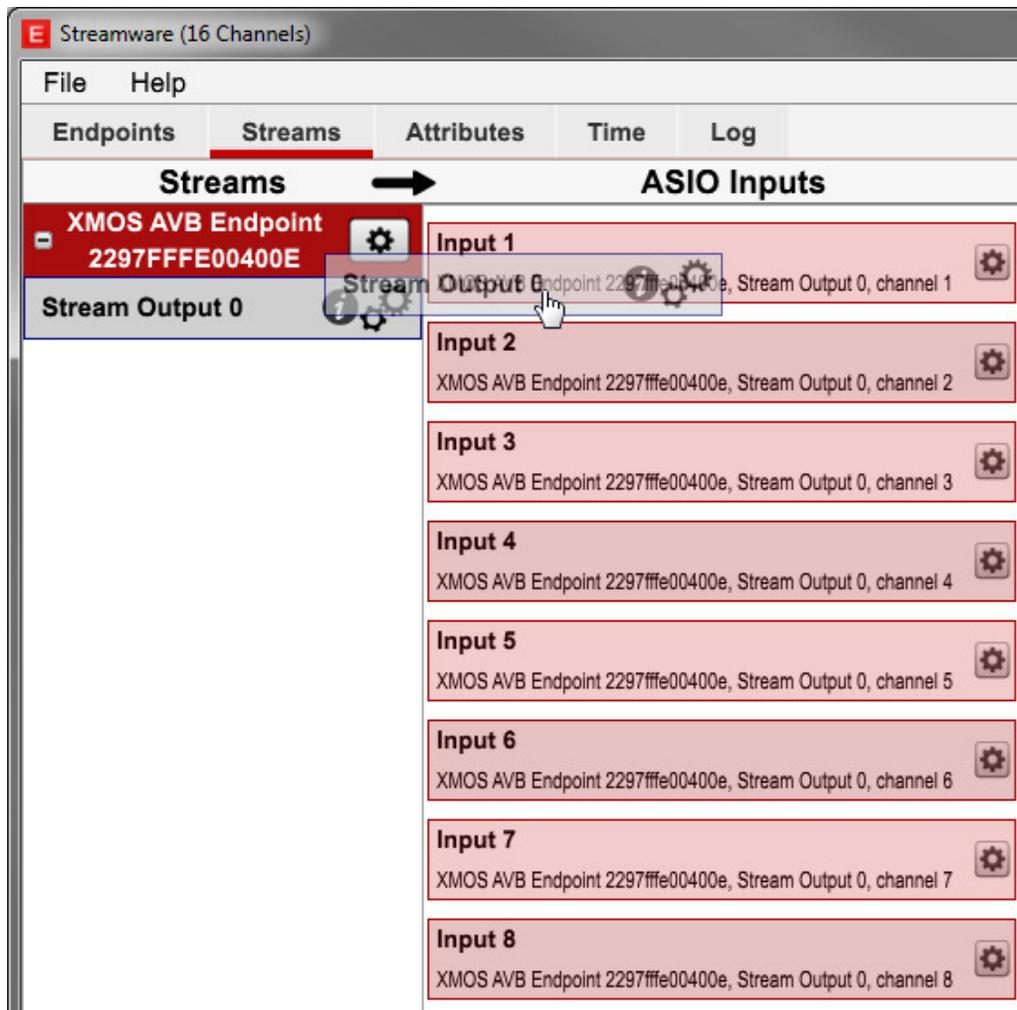
To connect a stream, click the gears next to the name of the stream and select "Connect".



Note that it may take a moment for the stream to be ready.

Once the stream is connected, drag-and-drop the streams into the ASIO inputs or outputs:





Up to four playback streams and four record streams may be connected simultaneously. Drag-and-drop each stream into the ASIO inputs or outputs.

For more information about a stream, click the “i” icon next to the name of the stream. Alternatively, click the button next to the name of the stream and select "Show stream metrics".

The image shows two panels from a software interface. The left panel, titled "ASIO Outputs", displays details for "Stream Input 0" under the "XMOS AVB Endpoint (2297fffe00400e)". The right panel, titled "Streams", shows "Stream Input 0" with a "Show metrics" button and an information icon.

ASIO Outputs	
XMOS AVB Endpoint (2297fffe00400e)	
Stream Input 0	
Reservation:	None
Status:	Disconnected
Stream ID:	14860000ea0001
Destination Address:	91-E0-F0-00-E4-3A
Format:	48000 Hz, 8 channels
Reference Time (ns):	min 0 / max 0
Presentation Time (ns):	min 0 / max 0
DBC Interval:	min 0 / max 0
Sequence Interval:	min 0 / max 0
Callback Interval (µs):	min 0.0 / max 0.0
Sample Rate (Hz):	0.000
Packet Interval (ns):	0.000 average
Run Count:	0
DPC Count:	0
Packet Count:	0
Elapsed Time:	
Packets Scheduled:	0
Scheduled Time (ms):	min 0 / max 0

Streams	
XMOS AVB Endpoint 2297FFFE00400E	
Stream Input 0	
Show metrics	

Once the streams are connected, open an ASIO-compatible software application to play and record audio.

## Static Endpoint Configuration with Workbench

The Workbench software upgrade enables the NIC-1 to connect to audio endpoints that do not support IEEE1722.1.

To manually add a statically configured endpoint, click on the Configuration menu and select "Add endpoint". Click the "Listener Streams" tab to configure the listener streams for the endpoint:

Add remote endpoint: X

Name:

**Listener Streams**    **Talker Streams**   

Index	+ / -	Stream ID	Multicast Address	Number of Channels	Observation Interval	Format
0	+ -	91e0f0ffe00fe00	91-e0-f0-00-fe-00	2 Channels	125 $\mu$ s	1722a 16-bit
1	+ -	91e0f0ffe00fe01	91-e0-f0-00-fe-01	2 Channels	125 $\mu$ s	1722a 16-bit
2	+ -	91e0f0ffe00fe02	91-e0-f0-00-fe-02	2 Channels	125 $\mu$ s	1722a 16-bit
3	+ -	91e0f0ffe00fe03	91-e0-f0-00-fe-03	2 Channels	125 $\mu$ s	1722a 16-bit

Set the stream ID, the multicast destination address, and the number of audio channels for each stream that the endpoint will receive or transmit. The above example shows an endpoint on the network that receives four stereo audio streams. Note that each stream ID and multicast address must be unique.

Future releases will support configurable observation intervals and audio formats. Currently, all statically configured streams are class A and 1722a 16-bit format.

Click the "Talker Streams" tab to configure the talker streams:

**Add remote endpoint:**

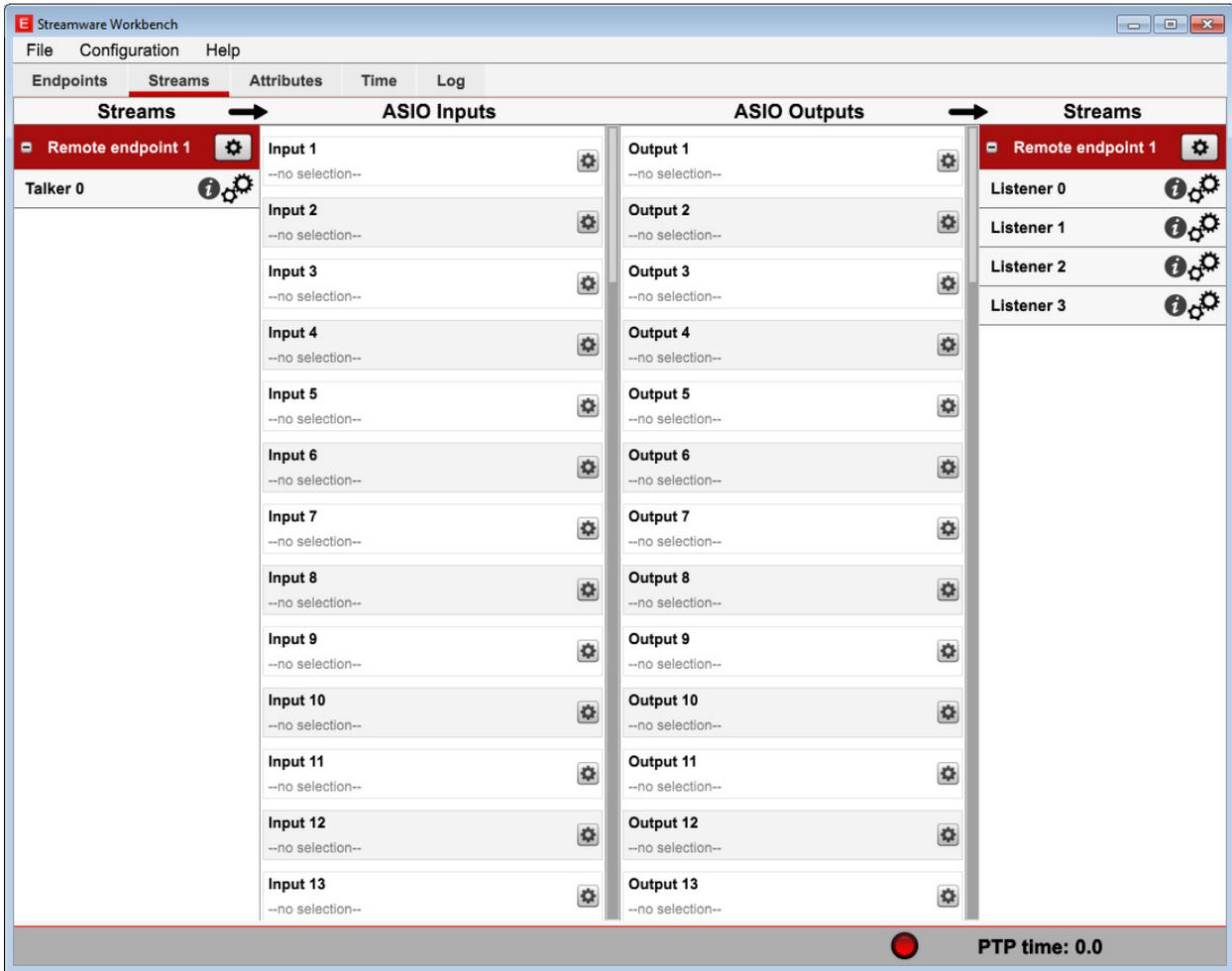
Name:

**Listener Streams** | **Talker Streams** | +

Index	+ / -	Stream ID	Multicast Address	Number of Channels	Observation Interval	Format
0	+ -	91e0f0ffe00ff00	91-e0-f0-00-ff-00	2 Channels	125 $\mu$ s	1722a 16-bit

Once both the talker and listener streams are configured, click the Add button.

The new endpoint will appear on the Streams page:



Once the endpoint is configured, each stream may be started and stopped by clicking on the gears and selecting from the menu:



Since statically configured streams do not rely on IEEE1722.1 ACMP, the stream will begin as soon as the protocol stack receives an appropriate stream reservation from the other end. To add the stream to the ASIO driver, drag the stream to the center of the window as before.

## ASIO Software

To play and record audio, you will need audio software that supports ASIO. Streamware for Windows includes the ASIO Benchmark test application, which can be used to generate test tones and loop audio inputs back to audio outputs.

These audio applications are free to download and are compatible with Streamware for Windows:

Propellerhead Reason sequencing and recording software (demo version)

<http://www.propellerheads.se/download/reason/>

foobar2000 media player with ASIO plugin

[http://www.foobar2000.org/getfile/036458f5a0dc2b74c9aec57bf4a3f584/foobar2000\\_v1.1.18.exe](http://www.foobar2000.org/getfile/036458f5a0dc2b74c9aec57bf4a3f584/foobar2000_v1.1.18.exe)

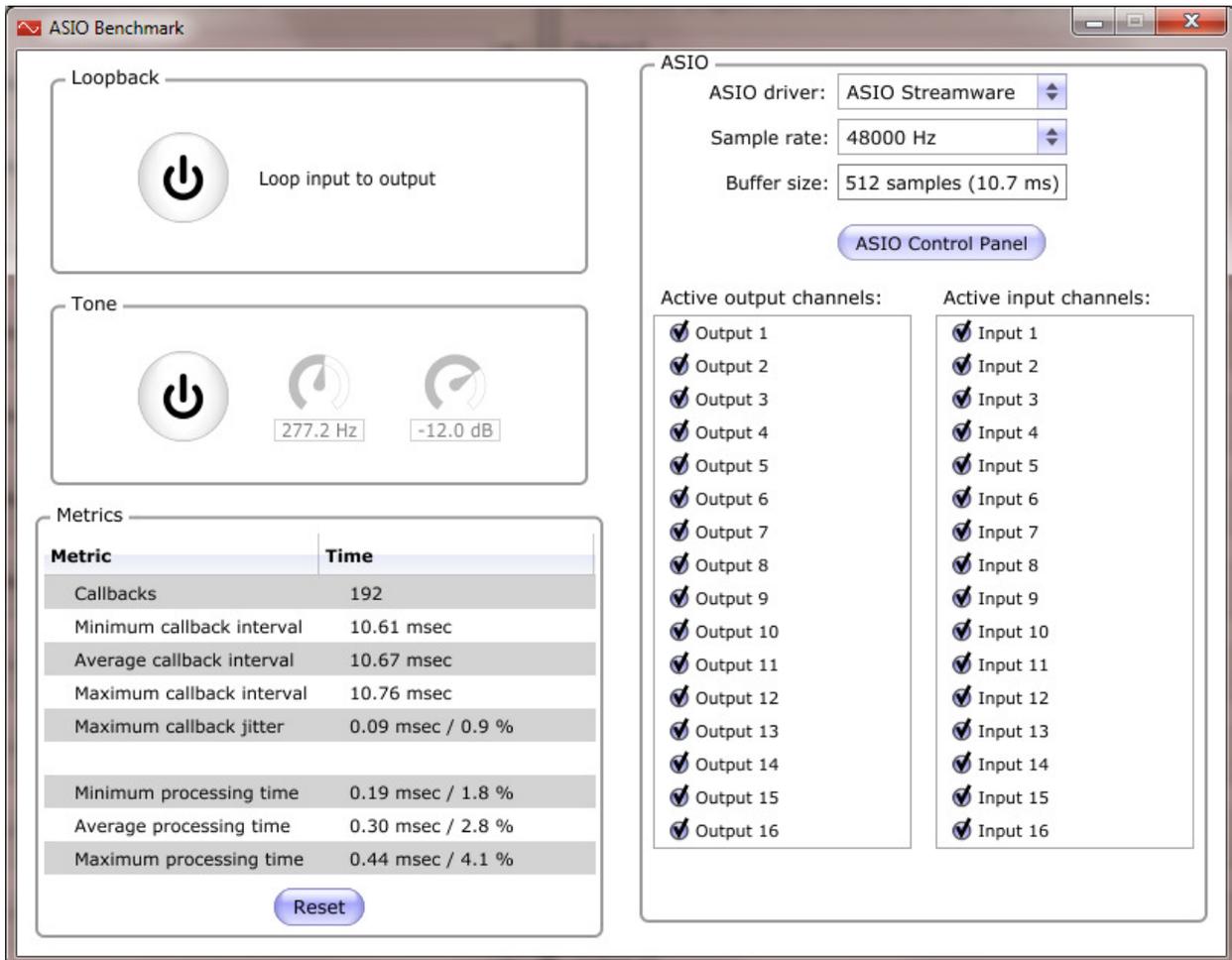
[http://www.foobar2000.org/components/view/foo\\_out\\_asio](http://www.foobar2000.org/components/view/foo_out_asio)

Ableton Live sequencing and recording software (demo version)

<https://www.ableton.com/en/trial/>

## ASIO Benchmark Application

Streamware for Windows includes the ASIO Benchmark application. This application is useful to verify that the audio driver is working. To run it, go to the "Echo Streamware" folder in the Start menu, and click on "ASIO Benchmark".



Select "ASIO Streamware" from the drop box in the upper right corner and select the desired input and output channels.

To loop the incoming stream directly to the outgoing stream, press the loopback button.

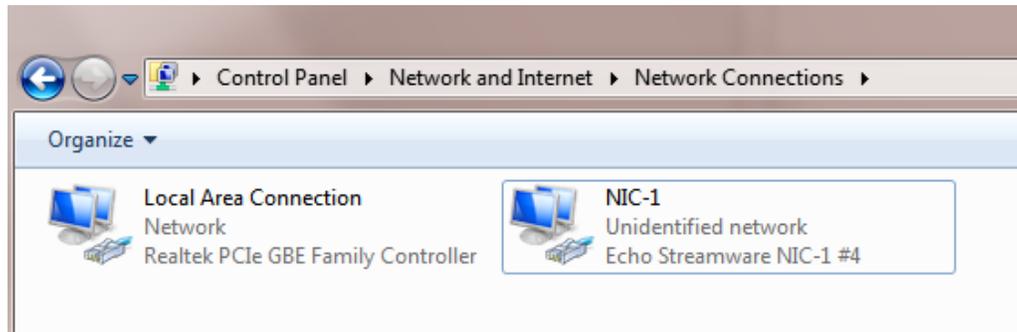
To play a test tone, click the button in the Tone section. The knobs adjust the pitch and volume of the test tone.

For 64-bit systems, the installer will provide both 32-bit and 64-bit versions of this application to test the ASIO driver in both 32-bit and 64-bit mode.

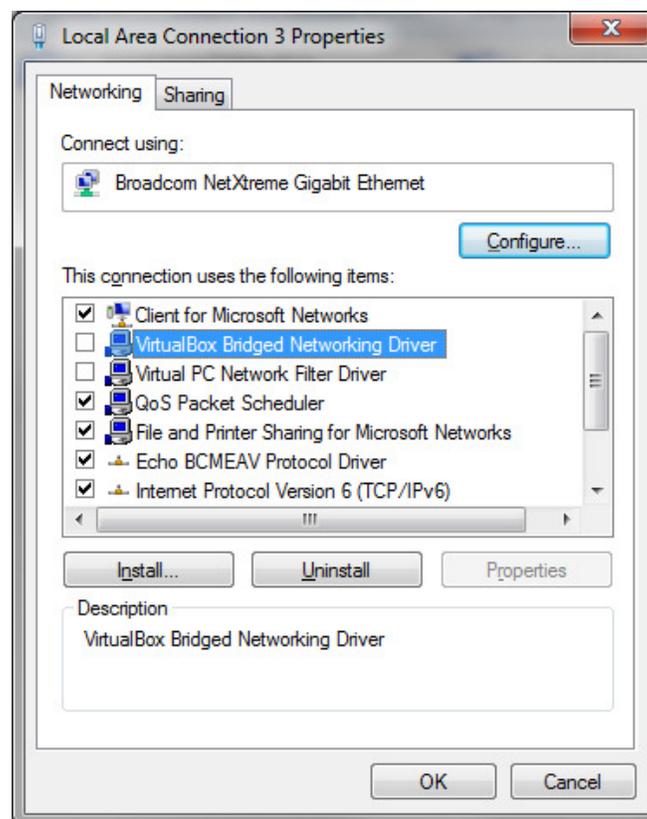
## VirtualBox

VirtualBox is a commonly used virtualization product. VirtualBox bridged networking mode installs a filter driver that interferes with the operation of the Streamware driver. To use Streamware and VirtualBox on the same computer, unbind the VirtualBox filter from the NIC-1.

Open the Network and Sharing Center in the Windows control panel.



Locate the Streamware NIC-1 Ethernet icon. Right-click on the icon, and select Properties.



Uncheck the box next to "VirtualBox Bridged Networking Driver." Click OK. The Streamware driver should now work normally.

## Known Issues

- External controllers are not supported
- The ASIO driver currently supports a single ASIO client
- The ASIO driver currently supports 48 kHz audio

## Version History

### Changes for 2.1.18 and 2.1.66

- Fixed driver PTP bug

### Changes for version 2.1

- New columnar user interface for 1722.1 descriptors
- Better enumeration of complete 1722.1 descriptor hierarchy
- Better support for 1722.1 control descriptors
- Added support for 64 channel ASIO
- PTP rewrite-added support for PTP grandmaster
- Added user interface improvements and animations

### Changes for version 2.0

- Numerous user interface improvements
- Installer and uninstaller improvements
- Internal stream engine improvements for syncing to incoming streams
- More detailed stream metric display

### Changes for 1.9.0

- Initial beta release