Streamware[™] for Windows Release 2.1



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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.

E Streamware (16 Channels)			Station of Street, State		
File Help					
Endpoints Streams A	ttributes Time Log				
Streams 🗕	 ASIO Inputs 		ASIO Outputs	-	Streams
XMOS AVB Endpoint 2297FFFE00400E Stream Output 0	Input 1 XMOS AVB Endpoint 2297fffe00400e, Stream Output 0, channel 1	۵	Output 1 XMOS AVB Endpoint 2297fffe00400e, Stream Input 0, channel 1	۵	XMOS AVB Endpoint 2297FFFE00400E Stream Input 0
	Input 2 XMOS AVB Endpoint 2297fffe00400e, Stream Output 0, channel 2	٥	Output 2 XMOS AVB Endpoint 2297fffe00400e, Stream Input 0, channel 2	۵	00
	Input 3 XMOS AVB Endpoint 2297fffe00400e, Stream Output 0, channel 3	٥	Output 3 XMOS AVB Endpoint 2297fffe00400e, Stream Input 0, channel 3	٥	
	Input 4 XMOS AVB Endpoint 2297fffe00400e, Stream Output 0, channel 4	٥	Output 4 XMOS AVB Endpoint 2297fffe00400e, Stream Input 0, channel 4	٥	
	Input 5 XMOS AVB Endpoint 2297fffe00400e, Stream Output 0, channel 5	٥	Output 5 XMOS AVB Endpoint 2297fffe00400e, Stream Input 0, channel 5	٥	
	Input 6 XMOS AVB Endpoint 2297fffe00400e, Stream Output 0, channel 6	٥	Output 6 XMOS AVB Endpoint 2297fffe00400e, Stream Input 0, channel 6	۵	
	Input 7 XMOS AVB Endpoint 2297fffe00400e, Stream Output 0, channel 7	٥	Output 7 XMOS AVB Endpoint 2297fffe00400e, Stream Input 0, channel 7	۵	
	Input 8 XMOS AVB Endpoint 2297fffe00400e, Stream Output 0, channel 8	٥	Output 8 XMOS AVB Endpoint 2297fffe00400e, Stream Input 0, channel 8	٥	
	Input 9 no selection	٥	Output 9 no selection	۵	
	Input 10	٥	Output 10	۵	
			0	F	PTP time: 6.8

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:

and a second second				- X
ASIO Outputs	→	s	treams	
Output 1 XMOS AVB Endpoint 2297fffe00400e, Stream Input 0, channed by	0,	XMOS AN	/B Endpoin FE00400E	t 🌣
Output 2 XMOS AVB Endpoint 2297fffe00400e, Stream Input 0, channel 2	×	Stream Inp	ut 0	00
Output 3 XMOS AVB Endpoint 2297fffe00400e, Stream Input 0, channel 3	×			
Output 4 XMOS AVB Endpoint 2297fffe00400e, Stream Input 0, channel 4	×			
Output 5 XMOS AVB Endpoint 2297fffe00400e, Stream Input 0, channel 5	×			
Output 6 XMOS AVB Endpoint 2297fffe00400e, Stream Input 0, channel 6	×			
Output 7 XMOS AVB Endpoint 2297fffe00400e, Stream Input 0, channel 7	×			
Output 8 XMOS AVB Endpoint 2297fffe00400e, Stream Input 0, channel 8	×			



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".

XMOS AVB Endpoint (2297fffe00400e)		Streams XMOS AVB Endpoint 2297FFFE00400E
Stre	eam Input 0	Stream Input 0
Reservation:	None	Show metrics
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	

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 re	mote e	endpoint:							Х
Name:	Remote	endpoint 1							
Listen	er Strea	ms Talker St	reams +						
Index	+/-	Stream ID	Multicast Address	Number of Channe	Is	Observation Interv	al	Format	
0	+ -	91e0f0fffe00fe00	91-e0-f0-00-fe-00	2 Channels	•	125 µs	•	1722a 16-bit	•
1 1	+ .	91e0f0fffe00fe01	91-e0-f0-00-fe-01	2 Channels	•	125 µs	•	1722a 16-bit	•
2 (+ -	91e0f0fffe00fe02	91-e0-f0-00-fe-02	2 Channels	•	125 µs	•	1722a 16-bit	*
3	+ -	91e0f0fffe00fe03	91-e0-f0-00-fe-03	2 Channels	•	125 µs	-	1722a 16-bit	•
						Add		Cancel	

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.

Ad	ld rei	note e	endpoint:					Х
N	lame:	Remote	endpoint 1					
L	istene	r Stream	ms Talker Str	eams +				_
Inc	dex	+/-	Stream ID	Multicast Address	Number of Channels	Observation Interval	Format	_
(0	+	91e0f0fffe00ff00	91-e0-f0-00-ff-00	2 Channels 🔹	125 µs	1722a 16-bit	•
						Add	Cancel	

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

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

E Streamware Workbench File Configuration Help			
Endpoints Streams	Attributes Time Log		_
Streams -	ASIO Inputs	ASIO Outputs	Streams
Remote endpoint 1 🔅	-no selection	Output 1 no selection	Remote endpoint 1 🔅
Talker 0	Input 2	Output 2	Listener 1
	Input 3	Output 3	Listener 2
	no selection	no selection	Listener 3
	Input 4 no selection	Output 4 no selection	0
	Input 5 no selection	Output 5 no selection	۵
	Input 6 no selection	Output 6 no selection	۵
	Input 7 no selection	Output 7 no selection	٥
	Input 8 no selection	Output 8 no selection	۵
	Input 9 no selection	Output 9 no selection	٥
	Input 10 no selection	Output 10 no selection	۵
	Input 11 no selection	Output 11 no selection	۵
	Input 12 no selection	Output 12 no selection	•
	Input 13 no selection	Output 13 no selection	•
			PTP time: 0.0

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:

Remote endpoint 1	> Input 1
Talker 0	no selection
	Stopped
	Start this stream
	Clock reference stream
	Show stream metrics

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/

Foobar 2000 media player with ASIO plugin

http://www.foobar2000.org/getfile/036458f5a0dc2b74c9aec57bf4a3f584/foobar2000_v1.1.18. exe

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".

🐼 ASIO Benchmark			
Lessbergh		ASIO	
Соорваск		ASIO driver:	ASIO Streamware
		Sample rate:	48000 Hz 🗢
	out to output	Buffer size:	512 samples (10.7 ms)
			ASIO Control Panel
_ Tone		Active output chan	nels: Active input channels:
		🕑 Output 1	🗭 Input 1
	0	🕑 Output 2	🕑 Input 2
(b) \	0 (0)	🕑 Output 3	🕑 Input 3
277.2	-12.0 dB	🕑 Output 4	🕑 Input 4
		🕑 Output 5	🕑 Input 5
Matulaa		🕑 Output 6	🕑 Input 6
Metrics		🕑 Output 7	🕑 Input 7
Metric	Time	🕑 Output 8	🕑 Input 8
Callbacks	192	🕑 Output 9	🕑 Input 9
Minimum callback interval	10.61 msec	🕑 Output 10	🕑 Input 10
Average callback interval	10.67 msec	🕑 Output 11	🕑 Input 11
Maximum callback interval	10.76 msec	🕑 Output 12	🕑 Input 12
Maximum callback jitter	0.09 msec / 0.9 %	🕑 Output 13	🕑 Input 13
		🕑 Output 14	🕑 Input 14
Minimum processing time	0.19 msec / 1.8 %	🕑 Output 15	🕑 Input 15
Average processing time	0.30 msec / 2.8 %	🕑 Output 16	🕑 Input 16
Maximum processing time	0.44 msec / 4.1 %		
Res	et]

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.

Local Area Connection 3 Properties
Networking Sharing
Connect using:
Proadcom NetXtreme Gigabit Ethemet
Configure
This connection uses the following items:
Client for Microsoft Networks
Virtual PC Network Filter Driver
Brile and Printer Sharing for Microsoft Networks
Internet Protocol Version 6 (TCP/IPV6)
Install Uninstall Properties
Description
VirtualBox Bridged Networking Driver
OK Cancel

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