The WDM ASIO Link Driver v1.3

Contents

What it is for

Utilising a virtual WDM sound card, this driver allows you to listen or record windows audio from your ASIO driver. You can make the windows audio appear as an input into the host application, or monitor windows audio as an ASIO output bypassing the host application.

It's also possible using the Link driver, to grab your total ASIO output and feed it back into the ASIOVAD stereo mix making it recordable by live windows streaming applications (i.e. live broadcast, voice chat programs).

New in 1.3 is also the ability to route your ASIO audio over the network to another running Asio Link to either ASIO inputs or to ASIO outputs. This feature allows for pairs to connect to each other (as both sender and receiver) to allow full duplex sharing of live music ideas!

NOTE: A special Thank you goes out to Aleksey Vaneev for his r8brain sample rate conversion code which is used in the ASIO Link driver for the network re-sampling. See https://code.google.com/p/r8brain-free-src/ for more info on this fast and very high quality SRC code.
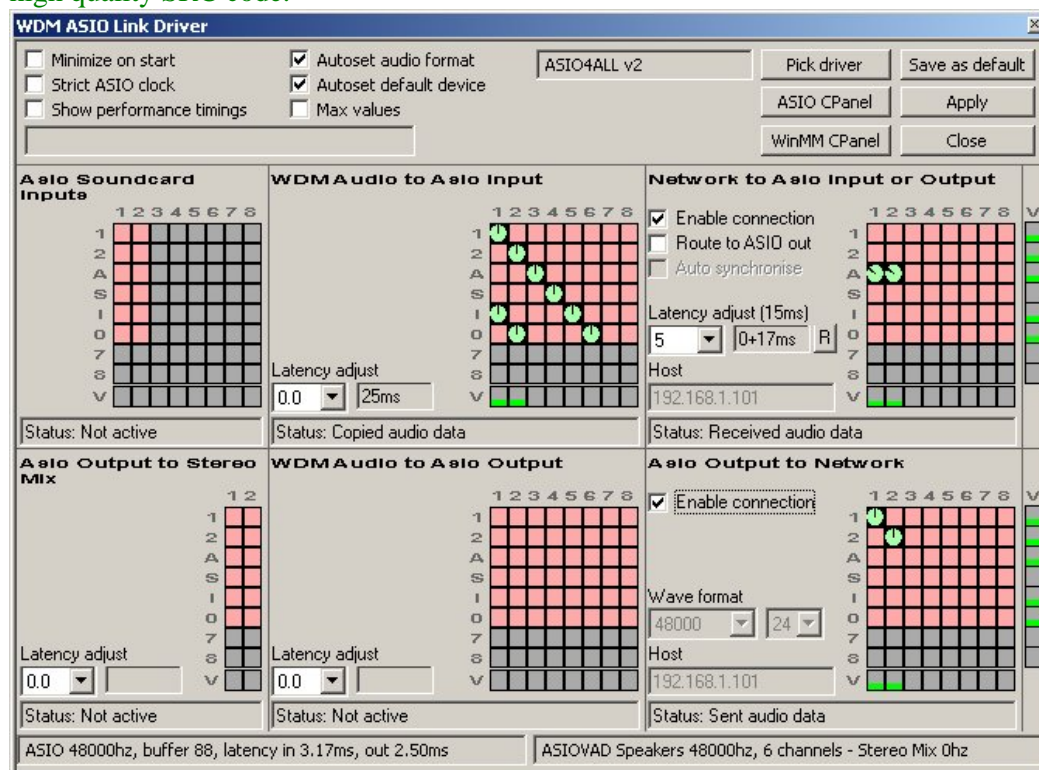

Figure 1 WDM ASIO Link Driver GUI

Why it was developed

One thing I love doing is playing music and videos on my PC, whether it is with my DAW on my keyboard, or via a media player, doesn't matter.

But! There is a problem with the above scenario if I want to do both at the same time. When I want the lowest latency I need to use an ASIO driver but that cuts out all other audio to the card.

My initial solution was to connect my onboard soundcard output as an input on my Xonar card so I could get the windows audio as an input in the DAW and play the whole thing through ASIO and jam along with very low latency.

This presented a further problem, now, I can't use any MIC input on my card (only has stereo inputs).

So I developed the Network WDM ASIO Link Driver which allows me to do a virtual connection from windows audio to ASIO and send it to my friend on the net!

Installation guide

Firstly download the latest installer from http://midithru.net/Home/AsioLink and then run the installer.

You will see the driver is signed by John Shield and just click through the usual install steps and reboot if it prompts you to do so (important).

At the end of install, you can click the "Show details" as I have done below and copy out the text and paste into an email to me if installation fails (it shouldn't fail!).
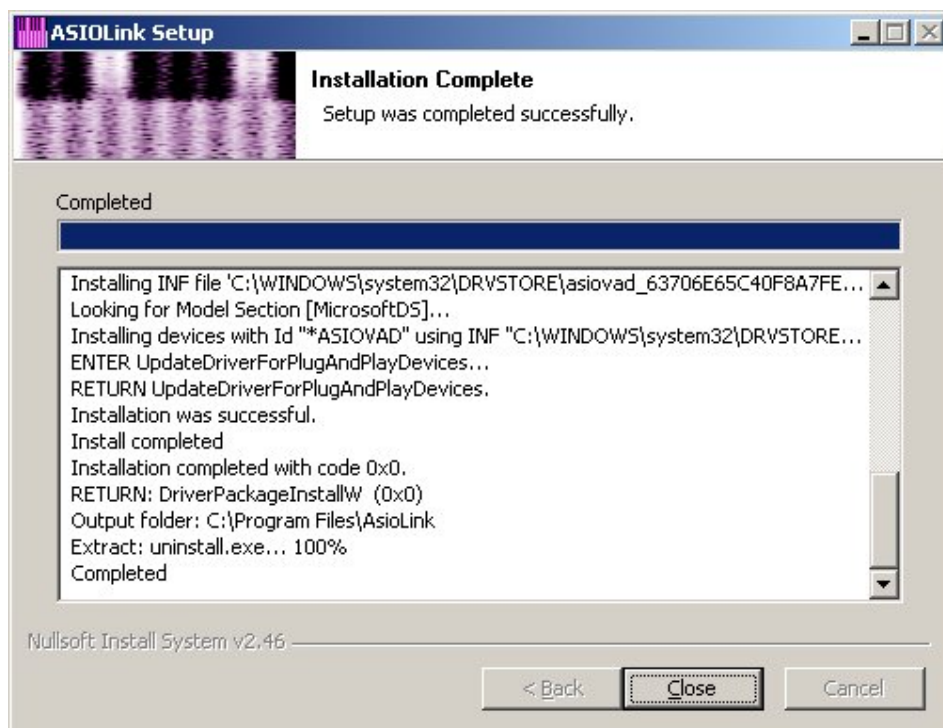

Figure 2 Install has successfully completed

Setup the host application and ASIO Link and ASIOVAD drivers

Hook the Link to your host application

NOTE: It is best to run with minimal ASIO latency, 10ms or less is ideal!

After installing, you can launch your DAW or ASIO host application. I use Ableton live a lot so I'll demonstrate with that. Select "ASIO Link" as the ASIO device.

When the Link first runs for this host program you will see a dialog in which you select the linked ASIO driver as below.
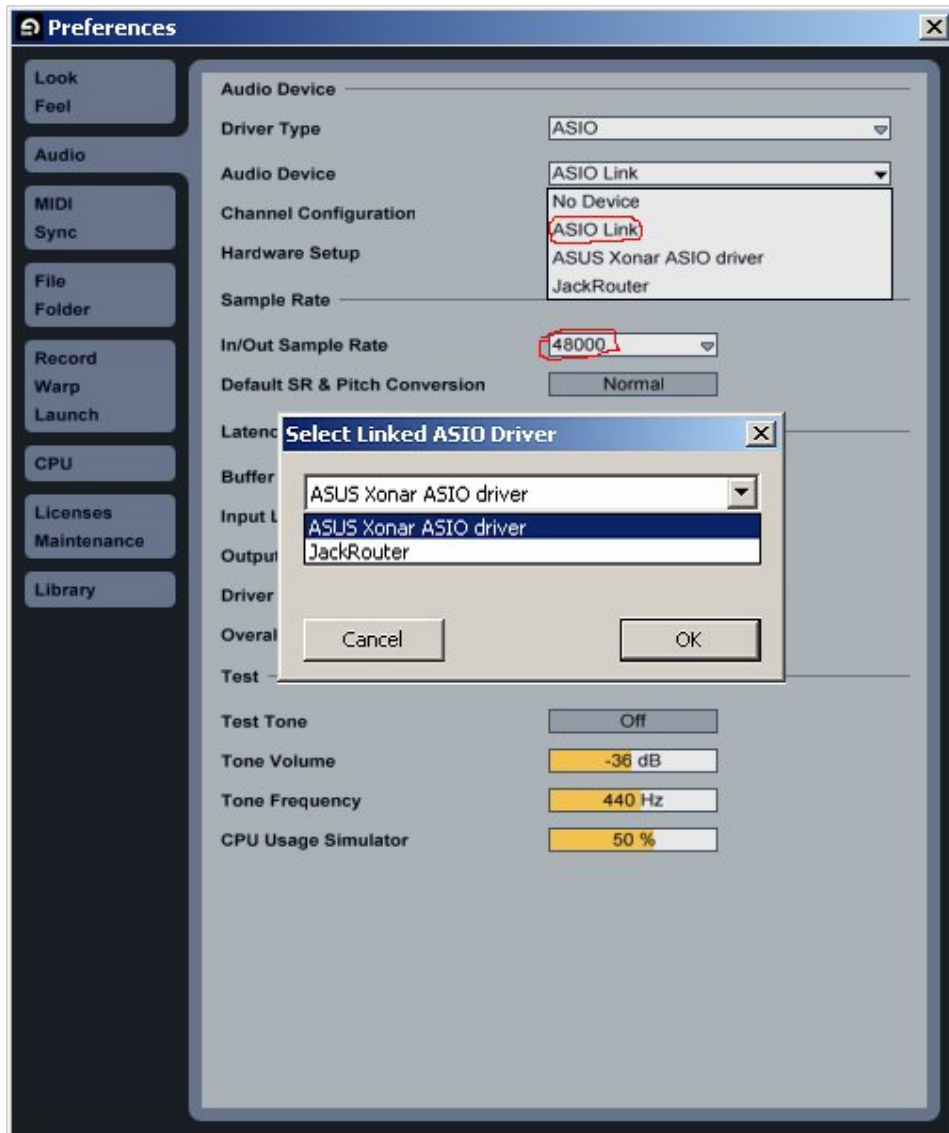

Figure 3 Select the WDM ASIO Link Driver in your host application and select the target ASIO driver.

Next, click the new purple icon in the system tray, if the GUI doesn't automatically pop up.

And the ASIO Link GUI shall appear as below. Look at the sample rate. You need this information in the next step.
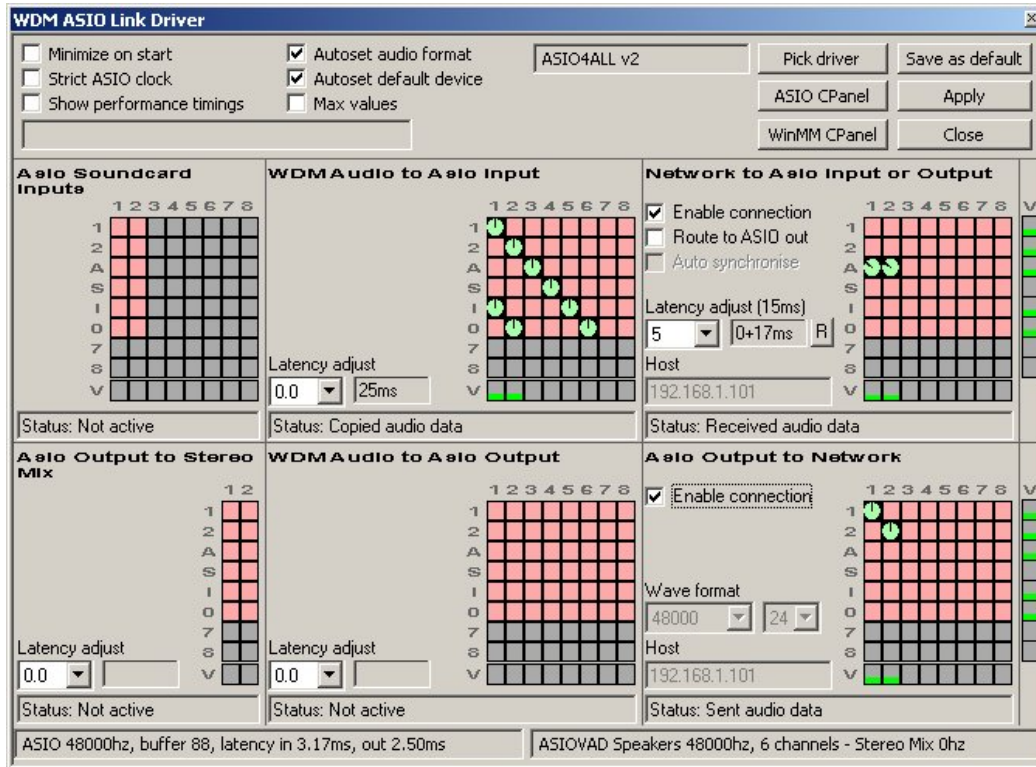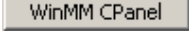
Figure 4 WDM ASIO Link GUI

Setup the ASIOVAD devices

NOTE: Everything except setting the speaker configuration can be done automatically in windows vista and later OS!

Next, right click on the windows speaker tray icon (or the [WinMM CPanel] button) and the ASIOVAD Driver Speakers and Stereo Mix configuration will appear in the playback and recording devices respectively.

To get windows to send all audio through the ASIO Link you need to set the ASIOVAD Speakers (and possibly Stereo Mix) as the default windows devices. It's also wise to use 24 bits if using 24 or 32 bit ASIO and 16 bits if using 16 bit ASIO, it could make it a little bit more efficient.
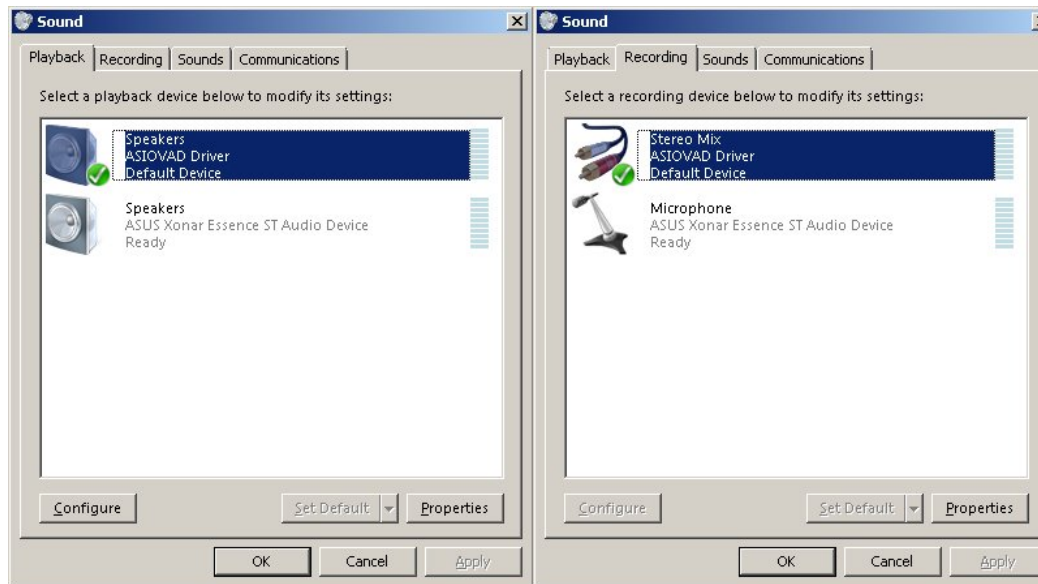
Figure 5 ASIOVAD audio devices

The next step is to right click and go into properties of each device and make sure the sample rate is EXACTLY the same as the ASIO setup.
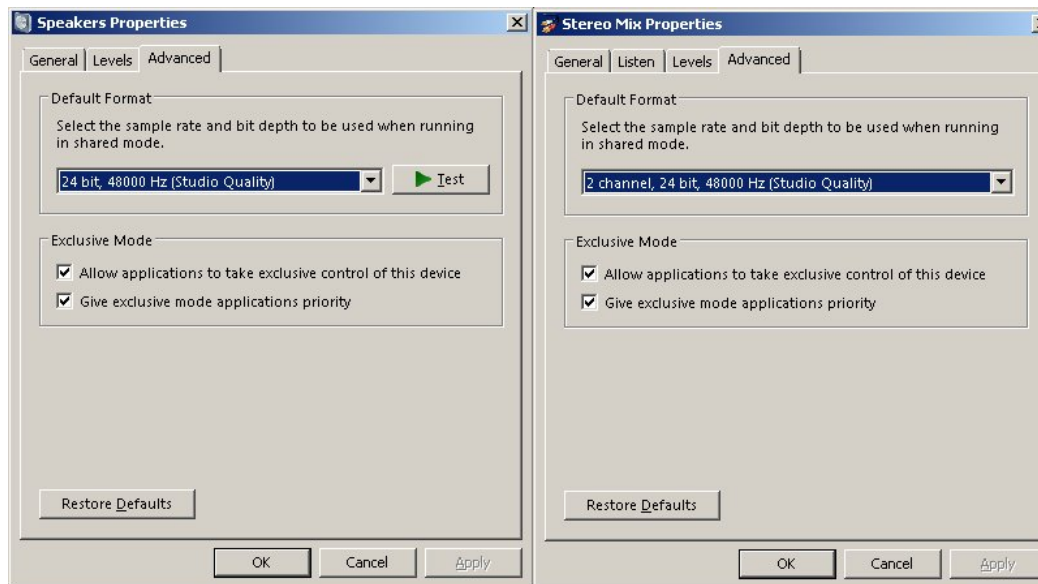
Figure 6 ASIOVAD audio device properties

In the Link GUI below it is 48000 so set the Default Format to 48000 and use 24 bit setting (unless you are running 16bit ASIO, in which case you should pick 16bit).
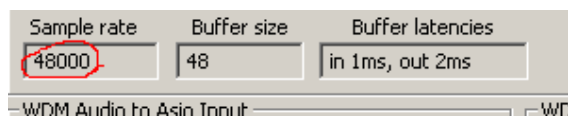
For surround sound support you need to tell windows to use the right speaker configuration. Right click on the device and select "Configure Speakers" and you will see the following screen where you can select 5.1 or just stereo etc.
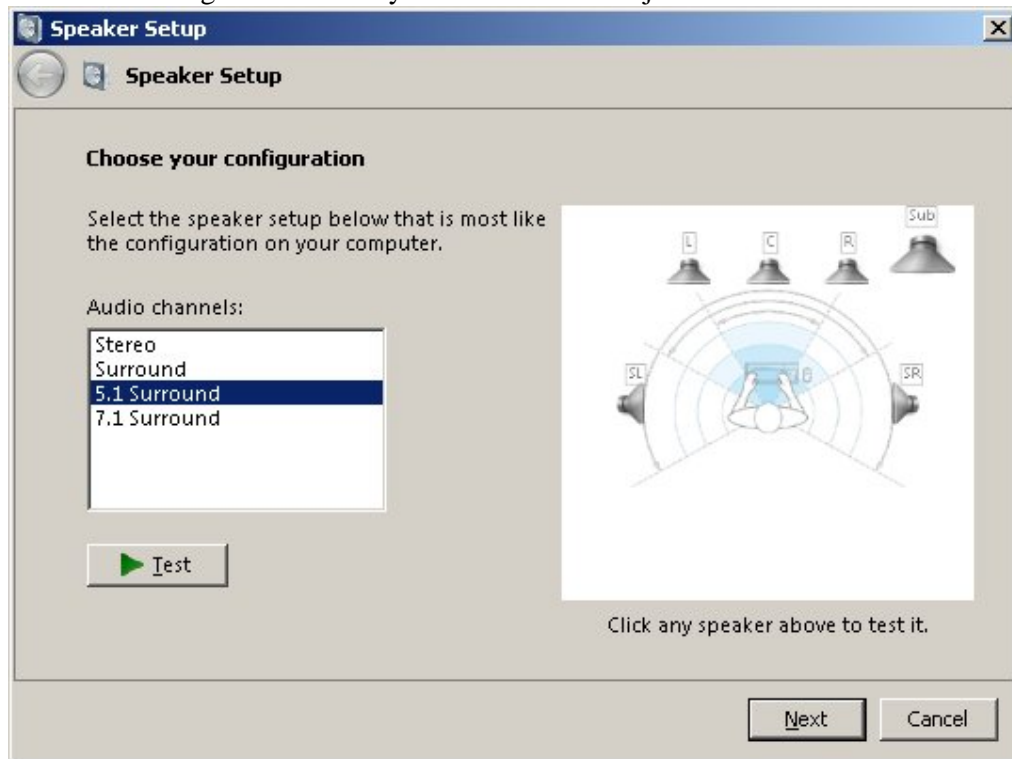
Figure 7 Select the right number of speakers for your setup

Using the ASIO Link

Setup the routing

Figure 8 WDM Asio Link GUI

In the GUI you can see six sections, each containing a matrix of either grey or red squares or a green volume control. If they are grey (as above channels 7 + 8 on the ASIO rows are all greyed) then it means the host has not requested at least 8 channels for inputs. If they are red then it means they are selectable to be mixed into the ASIO stream. If they have the green volume control then they are enabled and sending audio on that ASIO channel (row) and input/output channel (column).
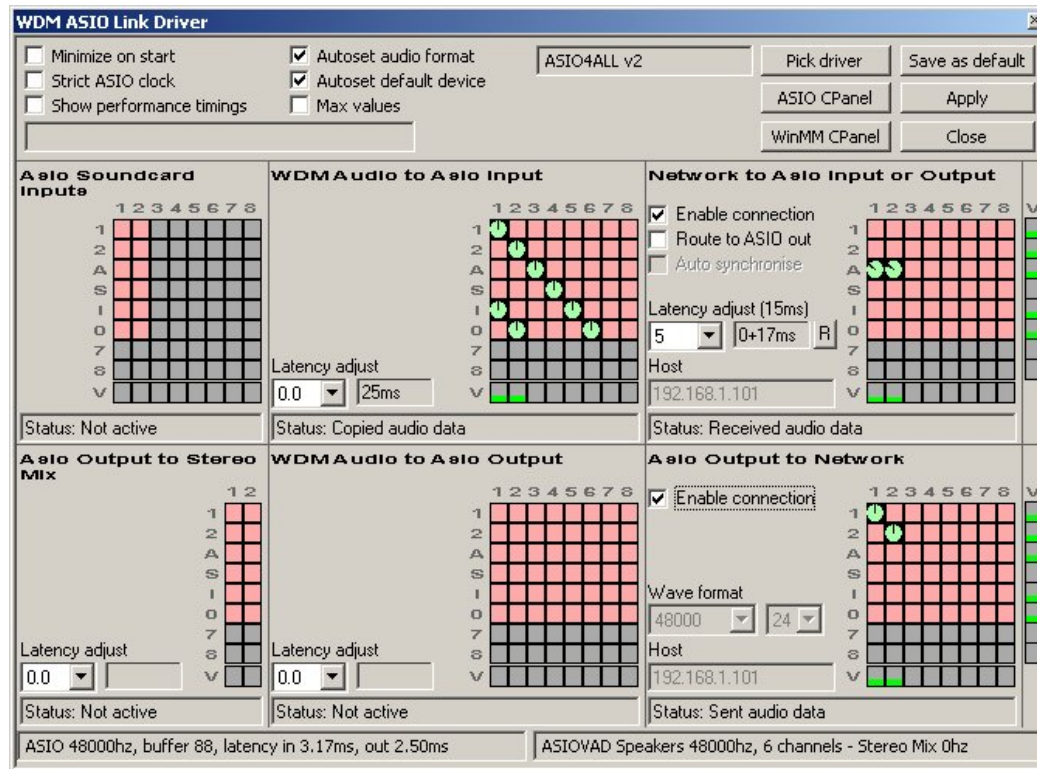
Volume is adjustable between 0 and 2x the input volume. It is now possible to mix multiple input signals into one ASIO channel and vice versa as I have done above, I have mixed the stereo channels 1 + 2 from WDM input into the ASIO channel 3 which is my centre speaker, note, I have turned the volume down on those to make it mix right from two channel sources.

Asio Soundcard Inputs

This is the routing for the actual ASIO driver inputs, i.e. microphone, line in etc. What this means is if you have a microphone plugged into your soundcard, and you want to mix it into the ASIO host input, then click the input channel to make a green volume knob appear!

WDM Audio to Asio Input

This is ASIO input channel assignment. If any of the boxes are enabled (green volume knob!) the sound data that windows outputs to the ASIOVAD Speakers will be written to the host applications ASIO input buffers.

NEW - ASIO Link 1.2 now gives you 8 ASIO inputs to use (one for each channel from the ASIOVAD Speakers) as inputs to any host program. There is also the option to limit the number of "real" driver ASIO inputs since you may wish to only use ASIOVAD speaker inputs, or a combination of both.

WDM Audio to Asio Output

This is ASIO output channel assignment. If any of the boxes are selected (green volume knob) the sound data that windows outputs to the ASIOVAD Speakers will be written to the hosted ASIO driver output buffers (this bypasses the host application completely) so if you just want to monitor the total ASIO output and hear windows then you can enable these channels. By default when you first run the Link for a host, Asio Output will be enabled with channels 1 & 2 enabled.

Asio Output to Stereo Mix

This is a way to make your ASIO output recordable by any normal windows audio application (e.g. sound recorder). If any of the boxes are selected, the mixed ASIO output channels will be sent to the ASIOVAD Stereo Mix device. You can down mix surround sound to stereo by adjusting the green volumes appropriately.

Asio Output to Network

Up to 8 channels can be sent over the network to the specified host IP address running another instance of the ASIO Link driver. In the above screen shot I am actually routing audio back to my own machine so I can demonstrate both send and receive in one shot. You can see the "Wave format" options which allow you to select an appropriate wave format for your internet speed, it is most certainly best to keep the same wave format and bit depth that you are using in your hosted ASIO driver but you can't go wrong always selecting 32 bits.

Network Audio to ASIO Input

Receive up to 8 channels from another instance of the ASIO link with this control. Notice the "Latency adjust" which allows you to move the stream back from the incoming stream to leave just enough latency to avoid drop outs. It is up to the user to set this value right as doing this automatically requires significant latency to be provided. It is best to set this appropriately for your machine(s) and whether you are using a LAN or the internet. The ms value in brackets near the "Latency adjust" label gives you an idea of what latency should be selected, it shows the maximum delay on packets received (network jitter).
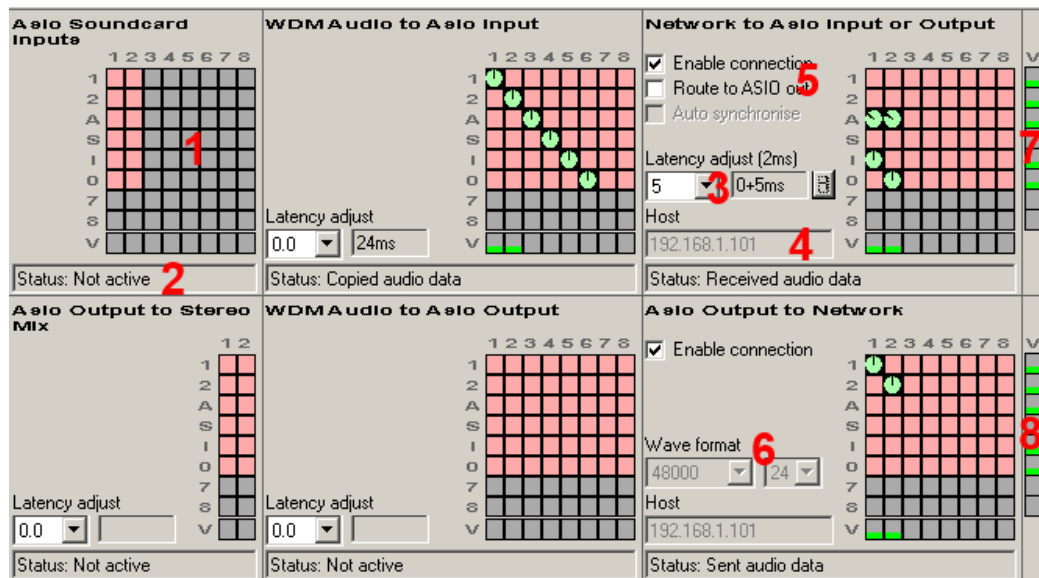
The GUI Sections

Figure 9 Explanation of the section functions

1 Mapping Matrix - All the above sections have a matrix which allows you to choose which input/output channels (columns) are to be output to, or input from which ASIO channels (rows). In the above screenshot, top middle, I have mapped channels 1 – 1, 2 – 2, 3 – 3 etc. This is the standard way to set up for 5.1 surround sound.

CONFUSED? You'll get the hang of it! Remember to select [Apply] when changing settings such as latency, wave format and host to see an immediate effect. When you are happy press the [Save as default] button to make it permanent for the current host/ASIO driver pair combination!

2 Status – Each section has a status display, above it is showing "Copied audio data" for Asio In mix and "Sent audio data" and "Received audio data" for the network boxes. This is what you want to see, if you don't then see FAQ below. This status can give you clues as to errors such as sample rates not being equal or unsupported bit format etc.

3 Latency adjust – This allows adjustment of the time it is taking between the data being written by the driver or network stream and the ASIO Link reading it. You'll note from above I have advanced the WDM KS read pointer by 14 ms bringing it down from 30 ms to 16 ms. The R [R] button resets the network receive latency back to the current setting, use this especially when you have disabled "Auto synchronise".

4 Host – This is the host IP address which, in the case of the "Network audio to ASIO input", is your IP address. If you don't append a port number, i.e. 192.168.1.101:5060 then it will default the port to 5050. The "Asio Output to

Network" host is of course the target machines IP address and port you want to route audio to.

5 Enable connection, Route to ASIO out & Auto synchronise – "Enable connection" when checked, enables the connection if there are any boxes selected in the matrix. "Route to ASIO out" allows outputting the net input audio straight to the ASIO driver bypassing the host application (like WDM to ASIO Output). "Auto synchronise" keeps the incoming stream in sync with the host program by adjusting the incoming sample rate appropriately.

6 Wave format – Sets the format for the PCM to be sent over the network. You set the sample rate and bit depth, It is best to set both networked machines to the same sample rate and ASIO buffer size, and also select the same format in this control. This ensures minimal re sampling needs to take place making the quality optimal.

7 ASIO host input levels– You can see the levels going into the host program, watch out for red clipping markers! If they appear drop the volume on some mappings or the input source.

8 ASIO host output levels – See the levels coming out of the ASIO host program (and therefore going into the hosted ASIO driver), again, watch out for red clipping markers! If they appear drop the volume on some mappings or the input source.

Other options

Autoset audio format – ASIOVAD format auto set when in use (Vista+ only).
Autoset default device – ASIOVAD auto set default device when in use (Vista+ only).
Minimize on start – Once configured for a host application, there is no need to see the GUI. This check box allows you to start the Link in the system tray and do its work ☺
Show performance timings - This allows you to see performance information. It shows the total time, in microseconds, taken for the ASIO buffer switch and the host application and ASIO link times. As you can see, the Link time is quite small compared with host (Ableton Live) time.
Max values – Shows the maximum values over time for each performance display value.
Strict ASIO clock – When this is checked it prevents averaging the ASIOVAD internal DPC timer calculated sample position with the ASIO clock sample position. Generally you don't want to select this but it is there if you have a very accurate ASIO clock on your soundcard driver.

☑ Show performance timings

Total 67us, Host 61us, Link 5us
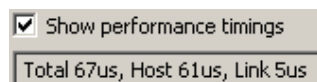
The Buttons

Pick driver – Picks another ASIO driver to host (requires host restart or driver reload).
ASIO CPanel – Opens the hosted drivers ASIO control panel.
WinMM CPanel – Opens the Windows multi media control panel.
Save as default – Saves the current settings as the default for the current host application
Register the Link – Allows entry of a product key to remove trial mode limitations

Apply – You need to click this to get your changes to be verified and applied.
Close – Hides the GUI dialog

Register full version

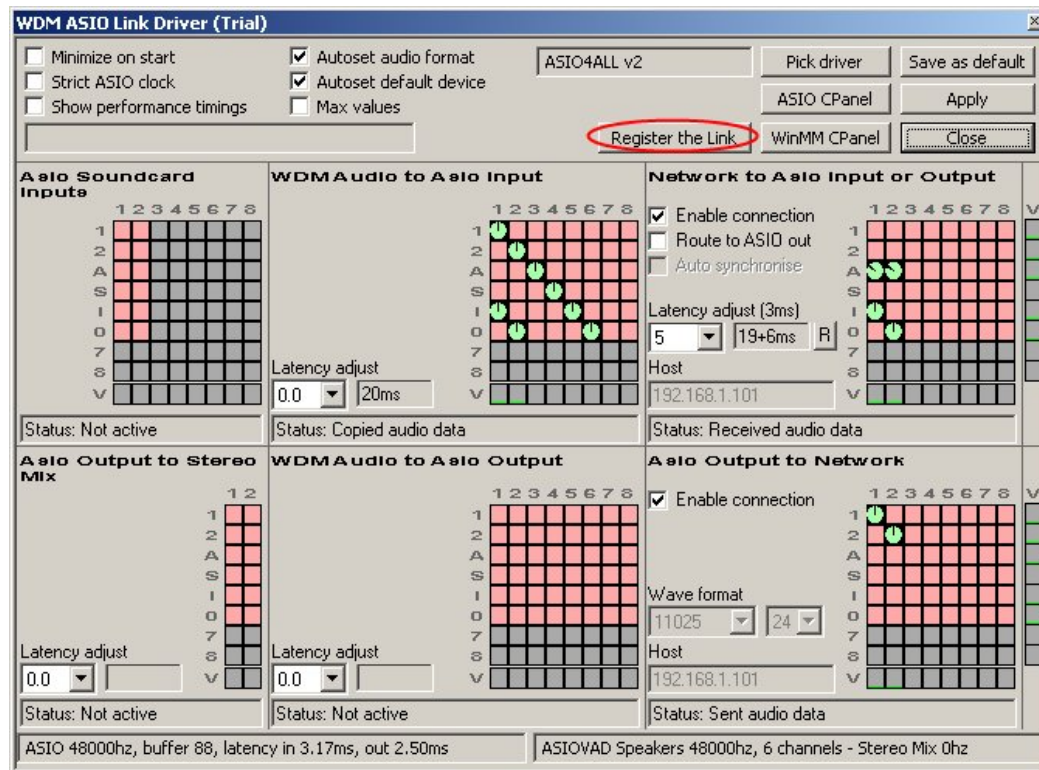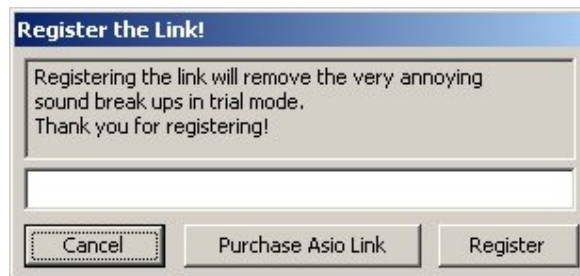**Figure 10 Click the "Register the Link" button**

Figure 11 Click Purchase Asio Link

Then, when you get to the page click the paypal **Buy Now** button and you will receive a product key to enter on this dialog. **You must be connected to the internet to register.**

The ASIO Link Tool

This tool allows testing the ASIO Link without a host application. Most people will not need to use this but it can be very helpful to find and diagnose problems. It can also clear all your default settings for host applications. This is like starting with a fresh install.
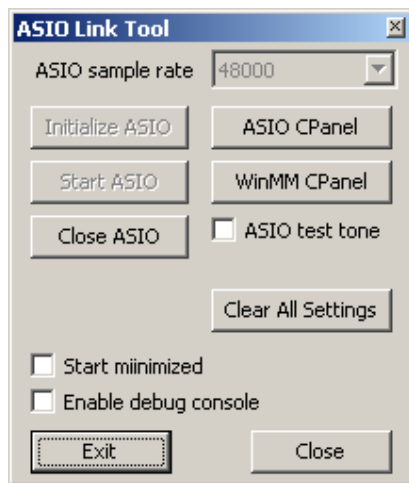
Figure 12 The Asio Link Tool

Asio Link Tool Functions

ASIO sample rate – The rate to set for ASIO which should be the same as ASIOVAD.
Initialize ASIO – Initialises (but does not start) the ASIO Link driver.
Start ASIO – Starts the ASIO Link running and allows you to test the Asio Out and Stereo Mix functionality by playing something through the ASIOVAD audio device. The Asio In can only be tested by an application that uses ASIO inputs.
Close ASIO – This closes and releases the WDM ASIO Link Driver.
ASIO CPanel – Launches the hosted ASIO drivers control panel.
WinMM CPanel – Launches the windows multimedia control panel.
ASIO test tone – Plays a 440Hz test tone to all enabled ASIO output channels
Clear All Settings – Clears all saved settings for each host application. Only use this if absolutely required.
Start minimized – The app will start minimized to sys tray, good if you use this as a host.
Enable Debug Console – Enables a console window to be opened for logging purposes. This is useful to find where initialisation errors may be occurring. Don't use this unless you email me first. ☺
Close – Minimizes the tool application to sys tray.
Exit – Exits the tool application.

Contact John Shield

Go to http://midithru.net and look for my email listed at the bottom of the page to contact me for more information or help.

FAQ

I can't hear anything

Follow the below steps:
1. Firstly, you must ensure that the ASIOVAD device is set up as the default windows audio device to capture all windows sounds (or set it as the output device for your favourite media player if you don't want to capture all windows sounds).

2. Next, you need to start an ASIO host application. I use Ableton Live 8 but there are countless others.
3. Setup the WDM ASIO Link Driver as the hosts ASIO output device and, if it is the first time you have run it, pick the target ASIO driver you wish the Link to output to.
4. Enable the Asio Out mix first then click Apply or Save as default.
5. If the status reads "**Copied Data**" you should hear sound.

I still can't hear anything

Follow the additional steps
1. If the status says "**No Stream**" it means nothing is playing to the ASIOVAD speaker out, play something in your favourite media player with output to the ASIOVAD speakers.
2. If the status says "**Sample Rates Not Equal**" it means you need to set the ASIOVAD windows devices sample rate to the sample rate of the ASIO driver.
3. Make sure you have enabled an Asio channel pair you can actually hear in the appropriate matrix, and also have pressed the "Apply" button.

I want to use this with FL Studio (cool)

Make sure that you don't enable the ASIO option to unload the driver (it is not enabled by default) or the link will be shutdown and restarted breaking its functionality.

I use Reaper (cool too)

Make sure that you don't enable the "Request sample rate" and "Request block size" in the ASIO setup unless you know what you are doing. It is best to setup latency and buffer size in the ASIO driver.

I use Reason (also cool)

Make sure that you enable "Play in background" in Audio preferences or the driver will repeatedly load and unload.

I get a Failed IOCTL error

Make sure you fully uninstall a previous version before installing a new one. Try a complete uninstall and reinstall and it should then be fine.

What is this latency thing?

WDM

In the case of the WDM input or output it is the time between the read pointer and the write pointer of the stream. If it is stereo mix, then windows is one reading as ASIO Link writes. If it is either ASIO input or output, then windows writes and ASIO Link reads. It is safe to reduce this so it never goes to say, below 4ms but there is not a lot to gain.

Network in

This latency adjust allows you to add latency to the network stream to stop drop outs. It is really dependent on the quality of the network connection whether this can be reduced to nearer 0. The range is the same as the stored buffer size which is 250ms of

8 channel audio. In short, if it distorts, add some latency. Note - if you enable "Auto synchronisation" you will not get bit perfect output anymore as the sample rate is adjusted on the fly to keep the incoming audio stream in sync.

Network IP address and port format

When entering the Host IP you can append a port to it with a colon. If you don't it will default to port 5050 so make sure port forwarding is enabled for that (google port forwarding?). I.e. 127.0.0.1:6669

Network port forwarding and obtaining IP address

To obtain your IP address, run a command prompt (search for cmd.exe) and type "ipconfig" and press enter and you will see something like this:

Figure 13 ipconfig.exe

IP address of your machine is not necessarily this on the internet but for routing over the LAN this is the address you want. To connect on the internet, often you have to enable traffic on port 5050 (or whatever port you select) with your ISP and with your firewall. You also have to explicitly set the IP address in the adapter settings (right click the network icon in the system tray to get to this):
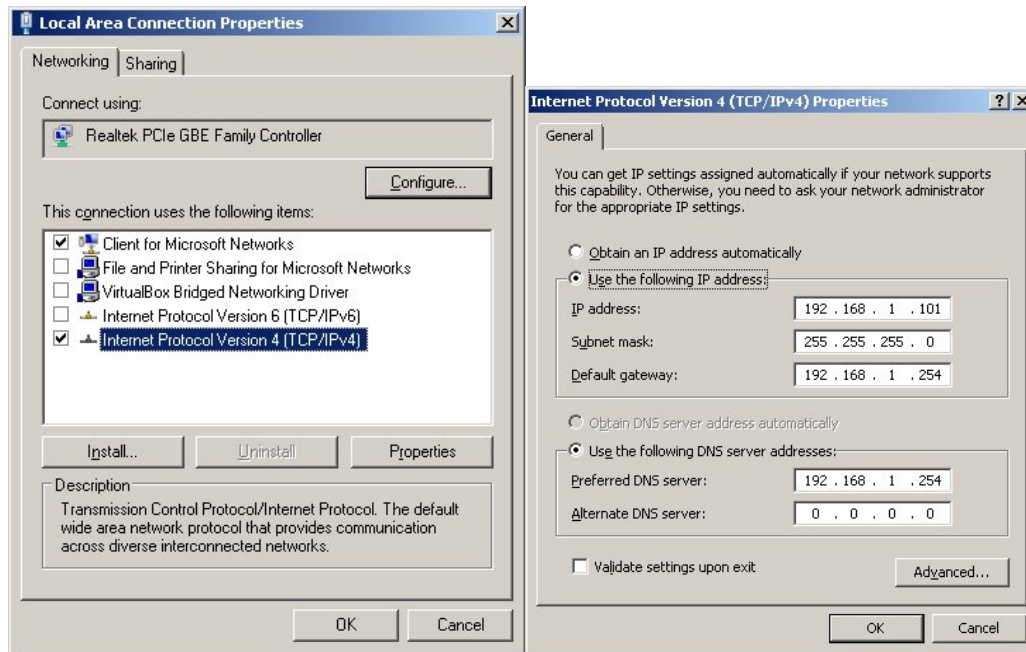
Figure 14 Network adapter settings/IPv4 settings

Now to get your actual real IP address and to check that your port is open, do a google for online port checker and use it to a) Find your "real" internet address and b) to check whether access to port 5050 (or the one you set in the host) is enabled. After this it should allow others to connect to your Link driver. You can see in the above screen shots of the Link I am actually sending audio to my own IP address, you can get some weird feedback if you connect an output back as an input!

I get distortion when mixing multiple channels

Make sure you reduce the volume of multiple channels using the left mouse button (hold it down and move it up or down on the green circle volume control). Make sure no red levels are visible in the level display.

WDM is running but status is "Not Active" with ASIO4ALL

Sometimes ASIO4ALL can have trouble getting the card if it was the default device before ASIO4ALL starts. The best way to work around this is to disable the card in playback devices before using the link. It doesn't always happen so you can just try a few times disabling certain inputs and outputs in ASIO4ALL.