

Computer Audio Best Practices Guide



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High-End Computer Audio

Welcome to a journey to achieve the absolute high-end of computer audio, made in Switzerland. You will experience an analog-like audio quality you've probably never heard before on your computer audio transport system. Our mission is to get you there in a pleasant way, without the hassle of complex adjustments and changes to your operating system. This guide will show you how to get your own high-end computer audio transport using Windows Server 2012 R2, Windows Server 2016 or Windows 10.

Our solution will transform your AudioPC into a true audiophile component. A dedicated AudioPC becomes an ultra-high-end component, ready to use with a simple press of the power button. You don't even need to log in once everything is set up. Press the power button again to shut it down properly. If your system contains a SSD and a modern motherboard, it will be up and running within a couple of seconds and your shutdown times will be even faster.

Please take your time and read this guide **very carefully**, it will cover many more topics aside from AO's usage. It will show you exactly how-to setup and fine tune your computer audio system to get the maximum sound quality possible. Follow these instructions as close as you can.

Please don't employ methods aside from those recommended in this guide. We will not support foreign scripts, optimization scripts, optimization tools, anti-virus software, software firewalls or anything else not listed in these pages. Please don't install, configure or disable anything not mentioned in the guide or not specifically needed to run your audio device. The AudiophileOptimizer will take care of **all** OS related settings.



Computer Setup

Need-to-know

A certain skillset is required to successfully set up a computer audio transport system. You must feel comfortable executing the following tasks:

- Experience with the basic setup of Windows operating systems
- Copying setup.exe into the root directory of a USB-Stick, CD-ROM, etc.
- Selecting drives, changing folders, running commands
- Using basic DOS commands (command prompt)

If you also want to use JPLAY (optional) you have to be very familiar with:

- Setting up and configuring JPLAY Streamer Mode (DualPC setup)
- Basic network configuration and TCP/IP knowledge
- Basic troubleshooting of network problems (ping etc.)
- Starting the registry editor, editing the registry, etc.
- JPLAY registry settings and tweaking

Basic DOS Commands

Commands are followed by pressing enter if not stated otherwise:

- | | |
|------------------------------|--|
| - Core edition configuration | sconfig.vbs |
| - Start PowerShell | powershell.exe |
| - Reboot server | shutdown /r /t 0 |
| - Shutdown server | shutdown /s /t 0 or press the power button |
| - Show files and directories | dir |
| - Change directory | cd |
| - Change drives | enter drive letter colon and press enter |
| - Go back by one directory | cd.. |
| - Go back to root | cd\ |
| - Last command | up arrow |
| - List of last commands | F7 |
| - Stop JPLAY service | net stop JPLAYService |
| - Start JPLAY service | net start JPLAYService |

Do you want to map a network share while in you are in core mode? Use this command to map a share called "music" on your NAS (IP of NAS is 10.10.10.50) as drive m:

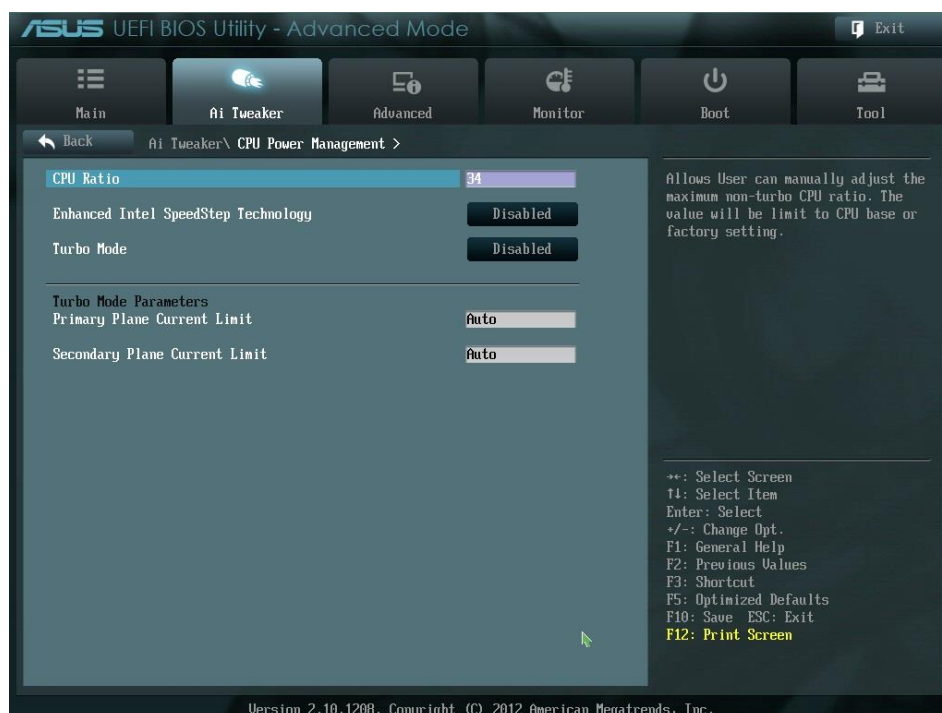
```
net use m: \\10.10.10.50\Music /persistent:yes
```

VIDEO: Watch this video for basic DOS commands in core edition. How to start JPLAYSettings, players etc.:

<https://www.youtube.com/watch?v=4xJwDDL8jpl>

BIOS/EFI Settings (optional)

If this is your first installation, you can skip the following steps as they are optional. If you are more experienced, feel free to employ the following steps. First of all, update your BIOS to the latest version available. Disable every device you don't need including serial ports, onboard soundcard, and anything else you won't need for the purpose of playing high quality audio with your DAC or DDC. The following pictures represent examples; try to match them as close as possible. Depending on your BIOS/EFI you won't be able to set every option but do as much as you can.



It's very important to disable everything related to **Intel SpeedStep**, **Turbo Mode**, **C-States**, **Virtualization Technology** & especially **Hyper-Threading**. You can experiment with different speeds of your CPU and or RAM frequencies, as long as you use a fixed value (do not use "auto"). Listen to whatever sounds best to you.



Enable HPET (High Precision Event Timer); disable Rapid Start and Smart Connect. You can also try HPET disabled. Use whatever sounds better to you.



Driver & Software Installation

Once the GUI Edition is installed, please install all device drivers needed in device manager. Install the latest chipset drivers of your motherboard, the latest drivers for your network card, and install all drivers needed for your DAC or DDC and anything else that shows a missing driver in the device manager. **Do not install the 3rd party driver of your video adapter if not absolutely needed.** Many graphic card drivers set system priority in favor for the graphic card. If you really need the graphic cards driver, try to install only the INF files with PnPUtl and not the whole driver package.

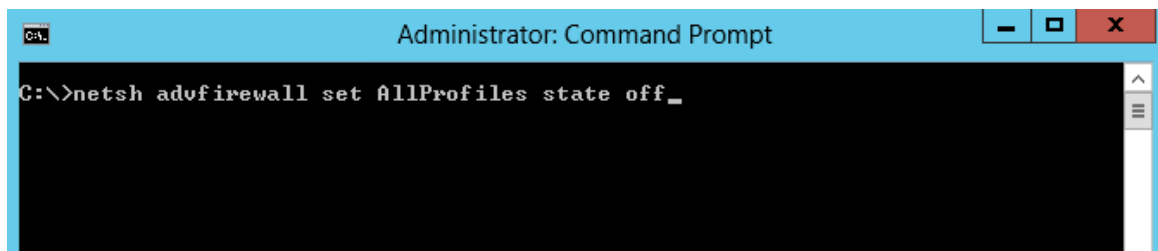
How to use PnPUtl: <https://docs.microsoft.com/de-de/windows-hardware/drivers/devtest/pnputil-examples>

Please see chapter “Device Manager” to see how to enable Device Manager on Windows Server 2016 core.

Disable Firewall (Optional)

Before you start configuring JPLAY you should disable the Firewall. Open a command prompt and enter:

```
netsh advfirewall set AllProfiles state off
```

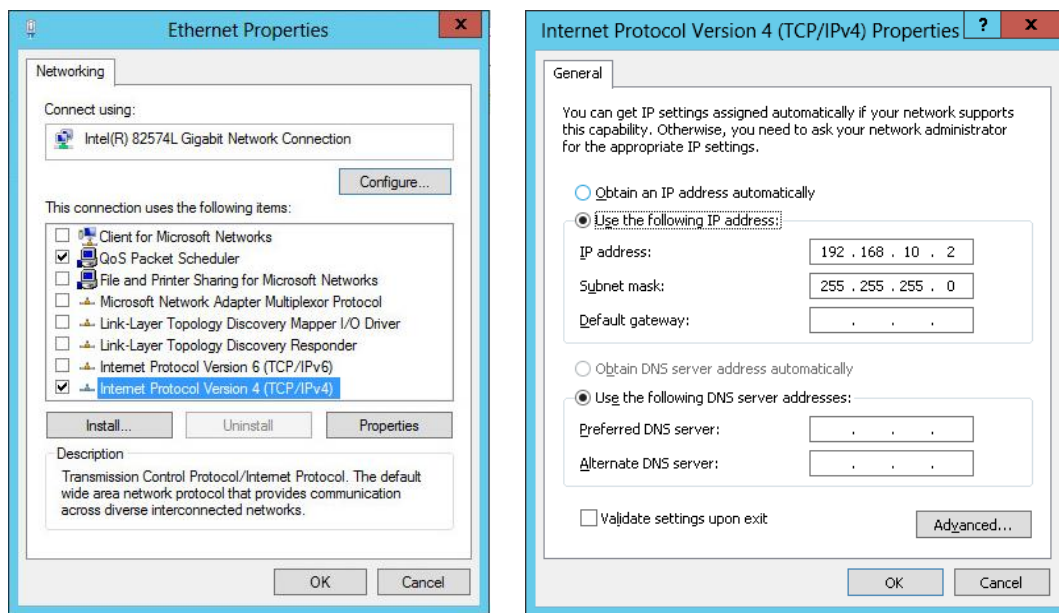


Roon, Hysolid, Bug head Emperor, JPLAYmini, HQPlayer, Foobar2000 & Co.

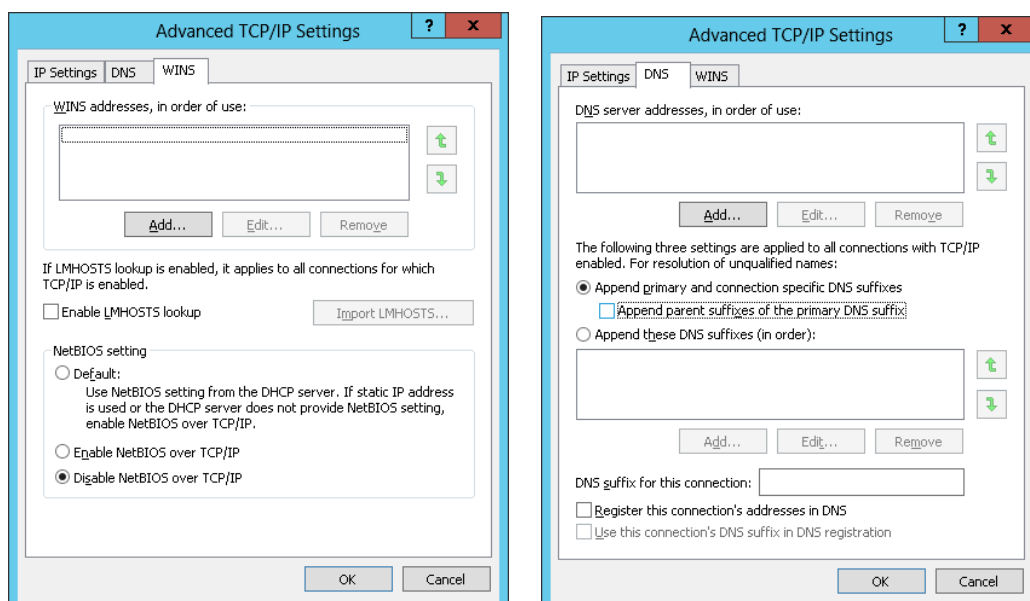
Once all drivers are setup, install JPLAY (if you plan to use JPLAY) and reboot. On a SinglePC or a ControlPC, also install the music player of your choice. For the very best sound quality we recommend Bug head Emperor or Hysolid. JPLAYmini and HQPlayer work in core mode but require a tool like Total Commander to choose files for playback. Roon offers the best overall experience and usability.

Network Tuning

Edit the settings of the network card used for the direct link between ControlPC and AudioPC and uncheck everything besides TCP/IPv4 and QoS. The JPLAY card(s) don't need a gateway or DNS Servers, leave those fields empty. This is only for dedicated "JPLAY" network cards and not for your internal LAN adapter. Apply these changes only on both dedicated network cards for JPLAY StreamerMode. Don't make these changes on your internal LAN card, especially not if you want to use network related services like SMB/CIFS shares (Windows file shares) etc. You have to use fixed IP Addresses under any circumstances; do **not** use dynamic (DHCP) IP's!



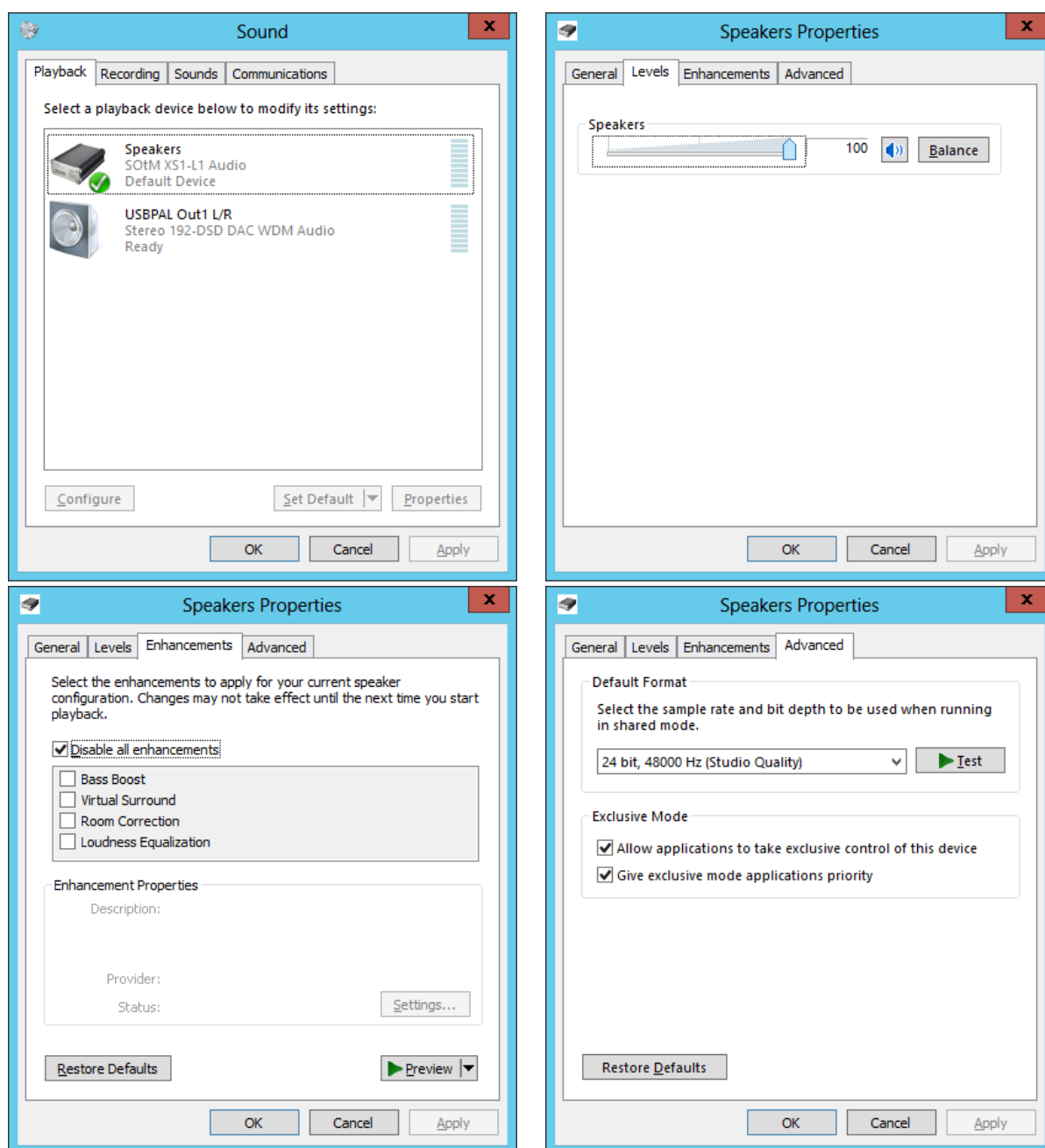
Open properties of the network card used for JPLAY StreamerMode and open TCP/IPv4 properties. Uncheck everything under DNS and WINS, disable NetBIOS over TCP/IP.



WASAPI

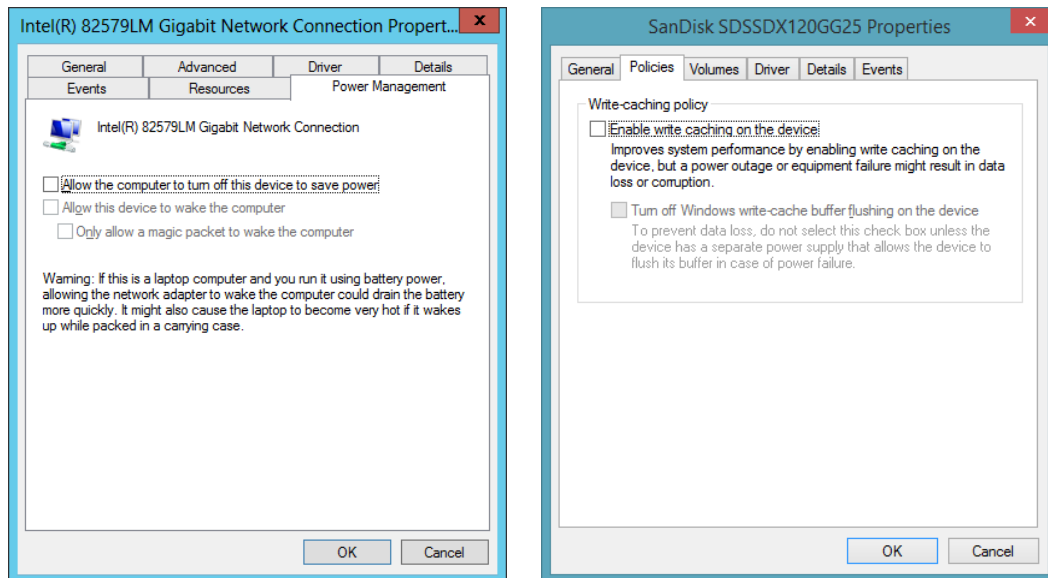
You can skip this section if you don't use WASAPI. WASAPI is supported in minimal-server and GUI mode, but not in core mode (except on Windows Server 2016 & 2019 by using our WASAPI Injector). If you have multiple WASAPI capable devices, choose one as your standard sound device. After the conversion to minimal-server edition, you won't be able to switch between different WASAPI devices inside JPLAY settings anymore. **It is very important to set the volume to 100% if your device supports that option.** Also disable all enhancements in the properties of your device. All these settings do not matter if you use ASIO or Kernel-Streaming.

INFO: Every server OS has all windows audio services disabled by default. If you need WASAPI, or your driver is related to WASAPI architecture in any way, you need to set the windows audio services to automatic start.

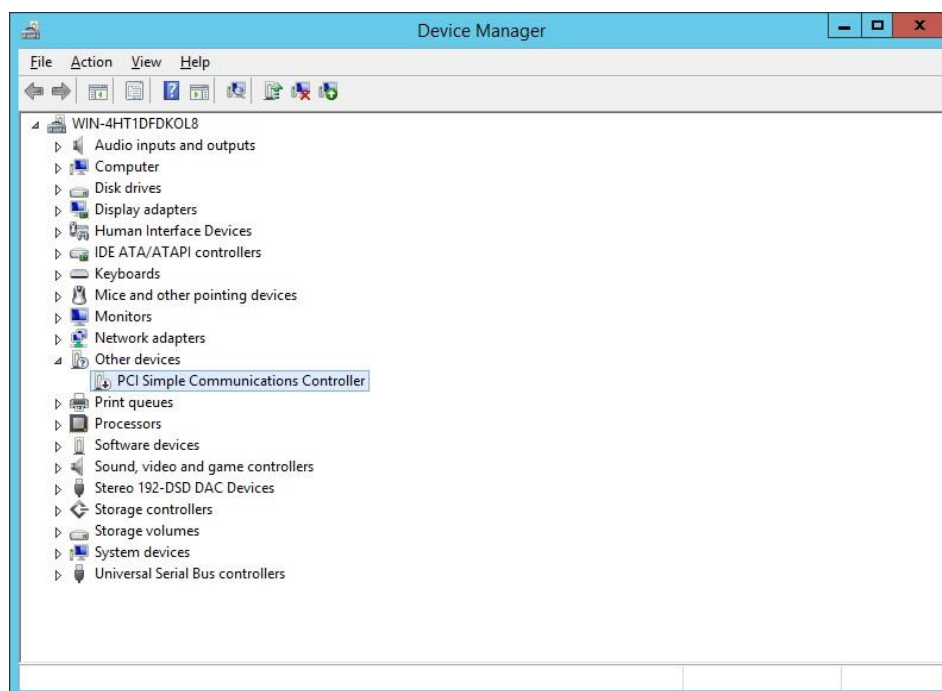


Device Manager

Open the Device manager and select your hard disk drives. In the properties, turn off write-caching of all disks. All power management features (USB, network cards, etc.) get automatically disabled by the AudiophileOptimizer. The AudiophileOptimizer further includes several USB optimizations. The following adjustments are optional:

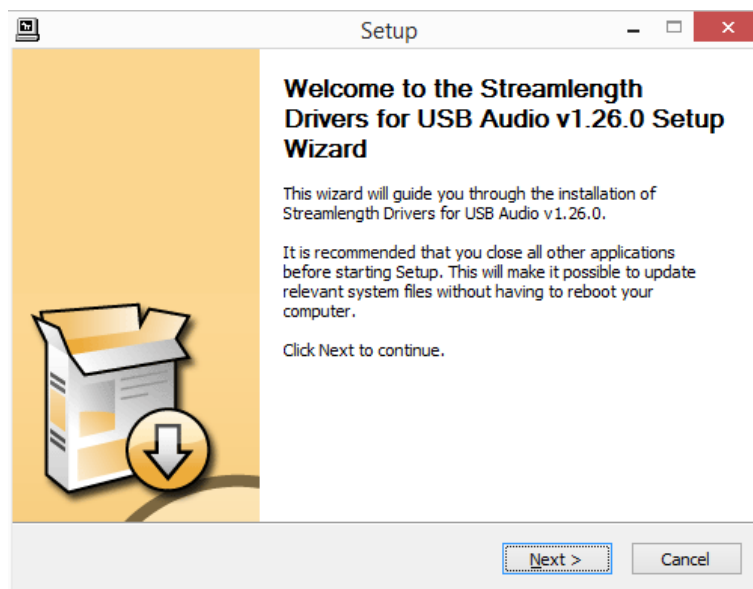
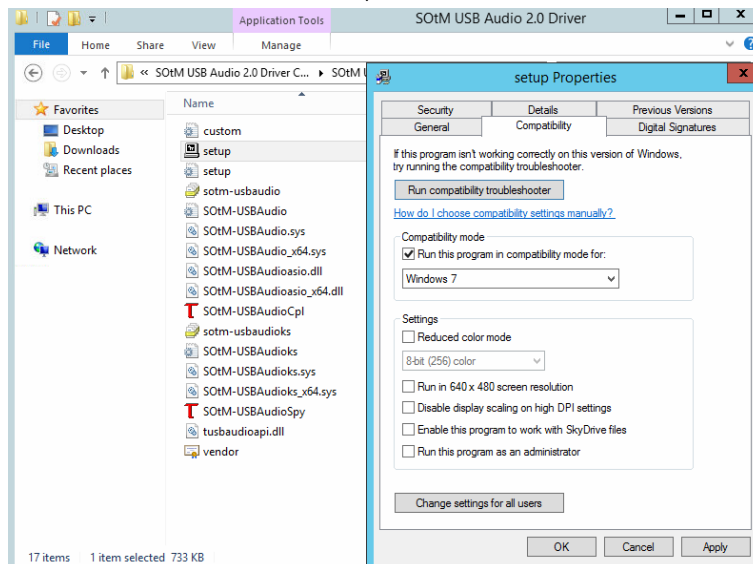


ATTENTION: Often a device called "PCI Simple Communications Controller" shows up. You can safely disable it; you won't need it.



DAC/DDC Drivers

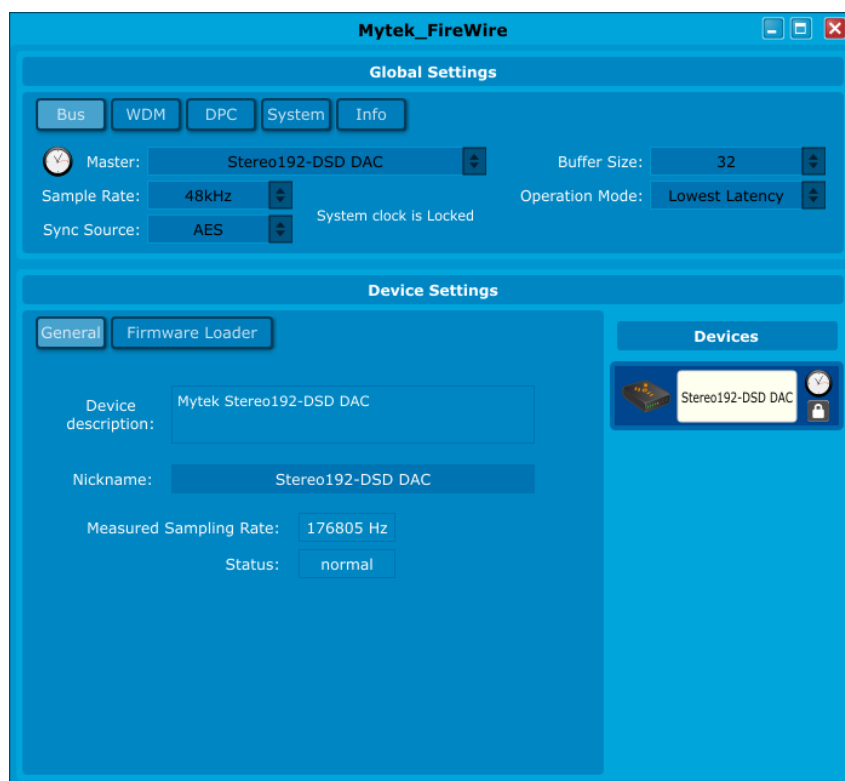
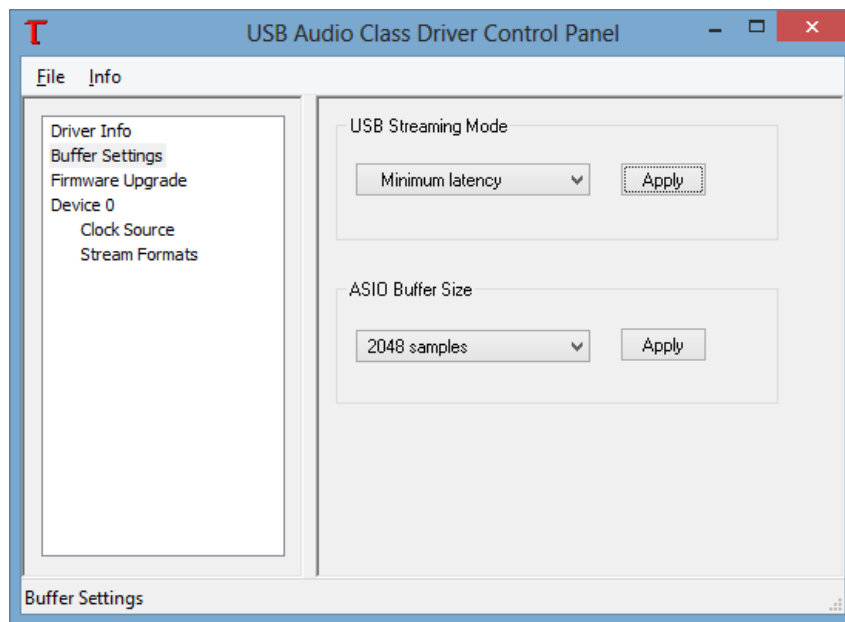
Most driver vendors do not yet offer DAC/DDC drivers made for Windows Server 2012/R2/2016/2019. Drivers made for Windows 8/8.1 or Windows 10 will work without any issues since Server 2012/R2/2016/2019 share the same binaries in wide areas. If no driver for Windows 8/8.1/10 is available, you will have to use the Windows 7 driver. Sometimes the compatibility mode is needed to install a Windows 7 driver on Windows Server 2012/R2/2016/2019. You can use the Driver Helper function of ServiceTool to install such drivers, please see detailed instructions in this manual in chapter "**Error! Reference source not found.**"



ATTENTION: If you still encounter problems during driver installation, start a command prompt and run "install.cmd" found here: <https://www.highend-audiopc.com/Drivers/install.rar>. From the same command prompt window, start the setup.exe of your DAC/DDC driver and install its drivers. Run finish.cmd after you've finished the installation.

Latency Settings

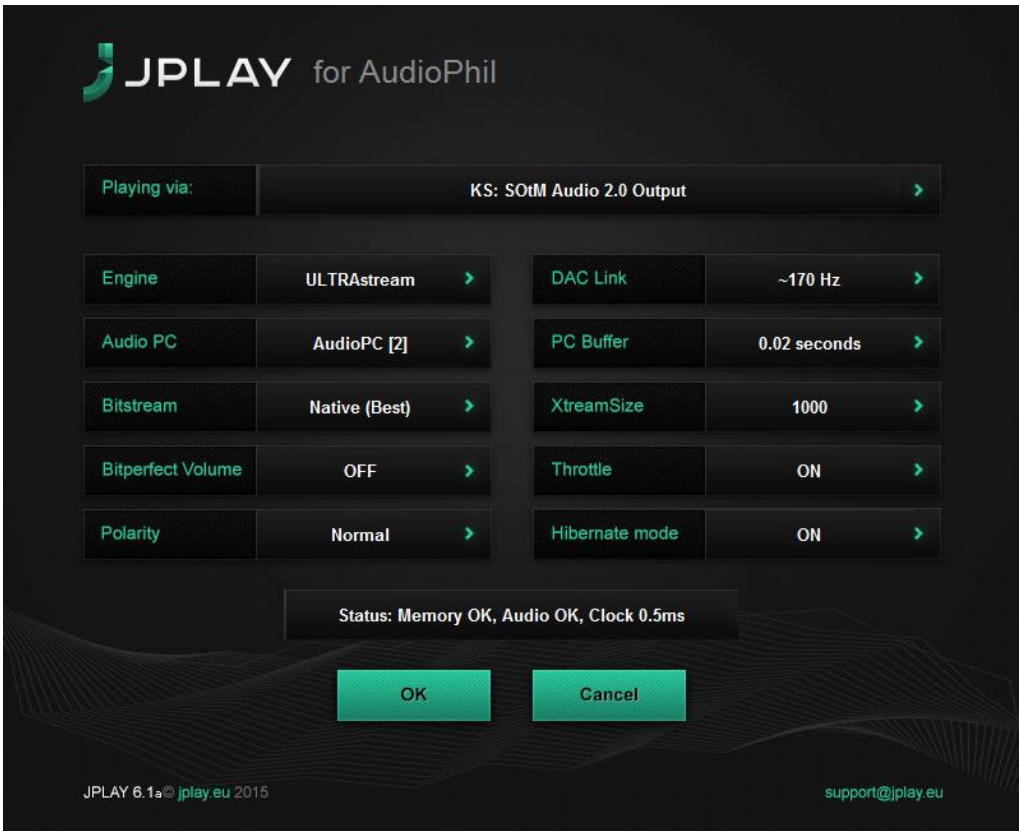
If an adjustment is possible at all, don't forget to adjust the latency settings of your DAC/DDC driver to minimum latency. You may also set the streaming mode to "always on". We use and can highly recommend the [SOTM dx-USB HD](#) USB/AES converter with upgraded [super clock](#) and intelligent dual-battery power supply (SOTM mBPS-d2s). USB Streaming Mode set to minimum latency is crucial for having the most magical sound quality possible. Be aware that minimum latency causes a lot of stress on your hardware and might cause hiccups and dropouts. If your hardware is not up to the task, it will possibly sound better with a less aggressive latency setting. You will have to experiment to find the optimal setting for your setup.



JPLAY

JPLAY Settings

This is an example how a JPLAY configuration might appear. You should start with the default settings and first learn more about what the JPLAY settings do. Then you can experiment with the JPLAY Settings and the registry settings for JPLAY. Once you installed AO, you can start JPLAY Settings by typing "js" in a command prompt, no matter what directory you currently are in.



If you encounter sonic problems, drop outs, distortion, or get no sound at all, please **increase JPLAY buffer sizes**.

JPLAY Registry

Don't forget to optimize your JPLAY settings in the registry of your ControlPC. The settings are located in the following registry key on the ControlPC: [HKEY_CURRENT_USER\Software\JPLAY]. There is no need for adjustments on the AudioPC's registry; JPLAY will handle this for you. If you have everything working, it is a good idea to make a backup of the JPLAY registry of the ControlPC.

Name	Typ	Daten
(Standard)	REG_SZ	(Wert nicht festgelegt)
ASIOChannelOffset	REG_SZ	0
AudioPC	REG_SZ	name<AudioPhil> ip<192.168.10.1>
DriverBuffer	REG_SZ	0
Host	REG_SZ	192.168.10.1
MiniCache	REG_SZ	750
Port	REG_SZ	48168
UltraSize	REG_SZ	100
XstreamSize	REG_SZ	2000

JPLAY StreamerMode

It's important that you get JPLAY Streamer Mode working, and verify that Kernel-Streaming, WASAPI and ASIO are all working (this functionality depends on what your hardware supports and what you want to use in the end) before you switch from GUI to core edition. Your Media Player, JPLAY, etc. has to work before you can continue.

Do not use dynamic (DHCP) IP addresses under any circumstances. You must use manually defined (fixed) IP addresses, especially in a DualPC configuration. How-To: <https://www.highend-audiopc.com/help/static-ip>

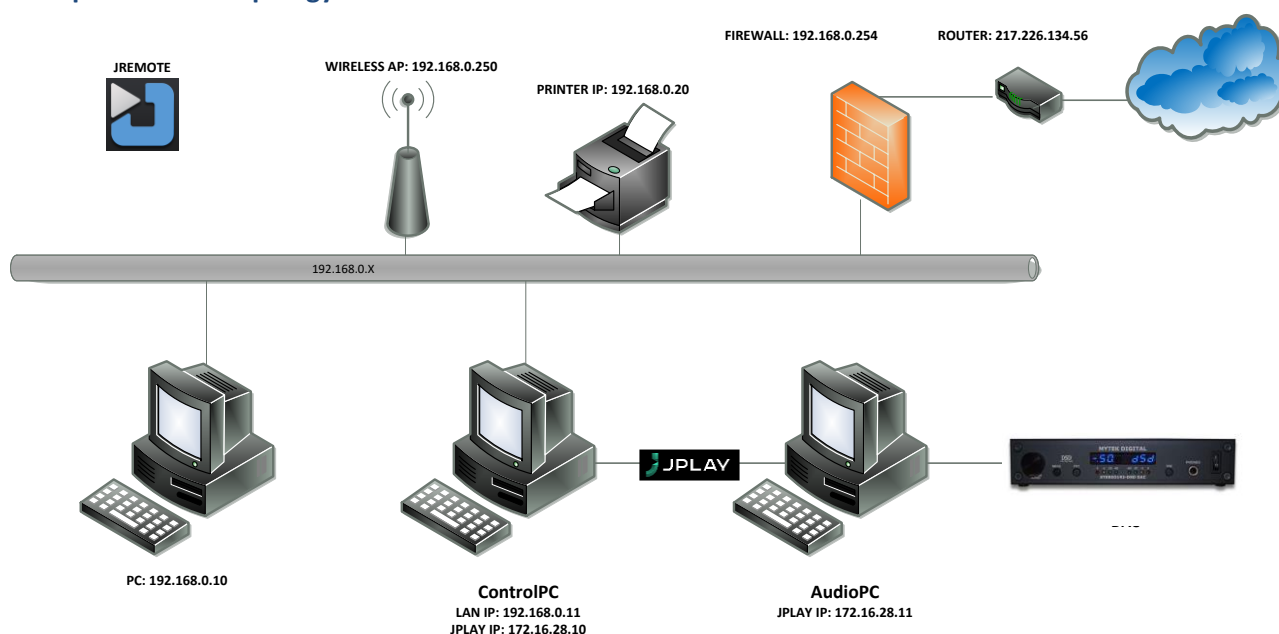
Please refer to the JPLAY manual for detailed instructions on how to install, configure and fine tune JPLAY in a DualPC configuration. <http://jplay.eu/manual>

Properly configured network cards are very important for JPLAY StreamerMode. Your ControlPC should have two network cards, one card for your internal LAN and another dedicated network card for JPLAY StreamerMode. Your AudioPC should have only one network card, and this should be connected directly to the second card of your ControlPC. This will make a remarkable step up in sound quality, so don't miss it.

Enter "ncpa.cpl" at the command prompt and click on advanced settings and check the order of your NIC's. The dedicated LAN Interface must be on top.



Example network topology



Windows Server 2016/2019

Version 3.00 of the AudiophileOptimizer also offers support for Windows Server 2019 aside from Server 2012 R2, Server 2016 & Windows 10. Windows Server 2016/2019 have a few important differences compared to Server 2012 R2, this section of the guide will help to outline those fundamental changes in these new server operating systems.

Switching between Core & GUI mode

Since switching between different modes often not worked as expected, Microsoft decided to entirely remove the ability to switch between Core & GUI mode. With Windows Server 2016/2019 you have to either install GUI or Core mode directly, **you can no longer switch back and forth between them.**

Minimal-Server Mode

Microsoft eliminated Minimal-Server Mode; it does no longer exist in Windows Server 2016/2019. If you want WASAPI aside from Kernel-Streaming in Windows Server 2016/2019 Core mode, then AO's WASAPI Injector will make it possible for you. See Chapter "WASAPI Injector" for detailed instructions.

DAC Driver Installation in Core Mode

You may use the ServiceTool's DriverHelper and HD Audio Drivers feature to install your DAC or DDC driver in Core mode. Depending on your driver **it might be needed to completely uninstall and re-install the driver** after the first installation. If your DAC driver does not work after initial installation, then completely remove it, reboot, and do another installation. (This applies for all supported server grade OS which are directly installed in core mode.) **If you need support to install your DAC or DDC driver, please reach out to online community to get support.**

Features on Demand (FoD)

Get the latest version of the Feature on Demand ISO for Server 2019 by using this link: <https://www.highend-audiopc.com/iso/fod-2019>. Mount the FoD ISO and install the "Server Core App Compatibility" using:

`"DISM /Online /Add-Capability /CapabilityName:"ServerCore.AppCompatibility~~~~0.0.1.0" /Source:drive_letter_of_mounted_ISO: /LimitAccess"`

For more detailed instructions to install FoD please read this article: <https://docs.microsoft.com/en-us/windows-server/get-started-19/install-fod-19>

Supported Editions

These are the **supported** Window Server 2016/2019 editions:

- Standard
- Datacenter
- Essentials

These are **not supported** Window Server 2016/2019 editions:

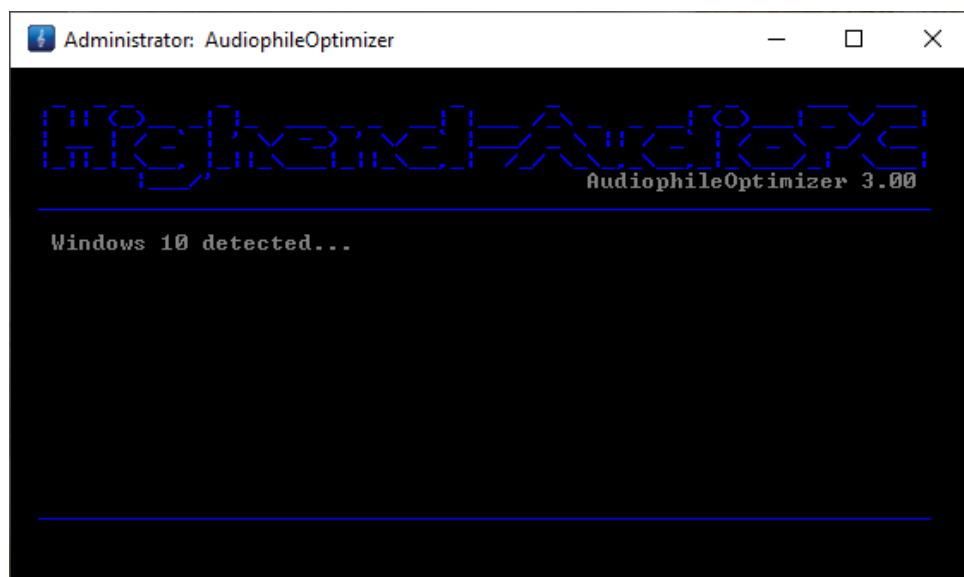
- Hyper-V Server 2016/2019

Windows 10



In addition to supporting server grade operating systems, the AudiophileOptimizer also offers support for Windows 10. AudiophileOptimizer 3.00 now also covers all versions up to the recent 1809 version of Windows 10.

The improved “out of the box” sound quality of Windows 10 (compared to prior client-based versions of Windows) as well as its low price relative to Windows Server are key reasons why audiophiles might choose to pair the AudiophileOptimizer with a client grade OS. AudiophileOptimizer and Windows 10 provide an alternative option for those that don’t want to pay the high price for Windows Server, but still want to get fantastic sound quality out of their computer audio systems.



Supported Editions

These are the **recommended** Window 10 editions:

- Pro, Enterprise, K&N or LTSB Edition

These are the **supported** Window 10 editions:

- Pro, Enterprise, LTSB, Home, K&N, Single Language Edition & Evaluation
(Home Editions is not recommended!)

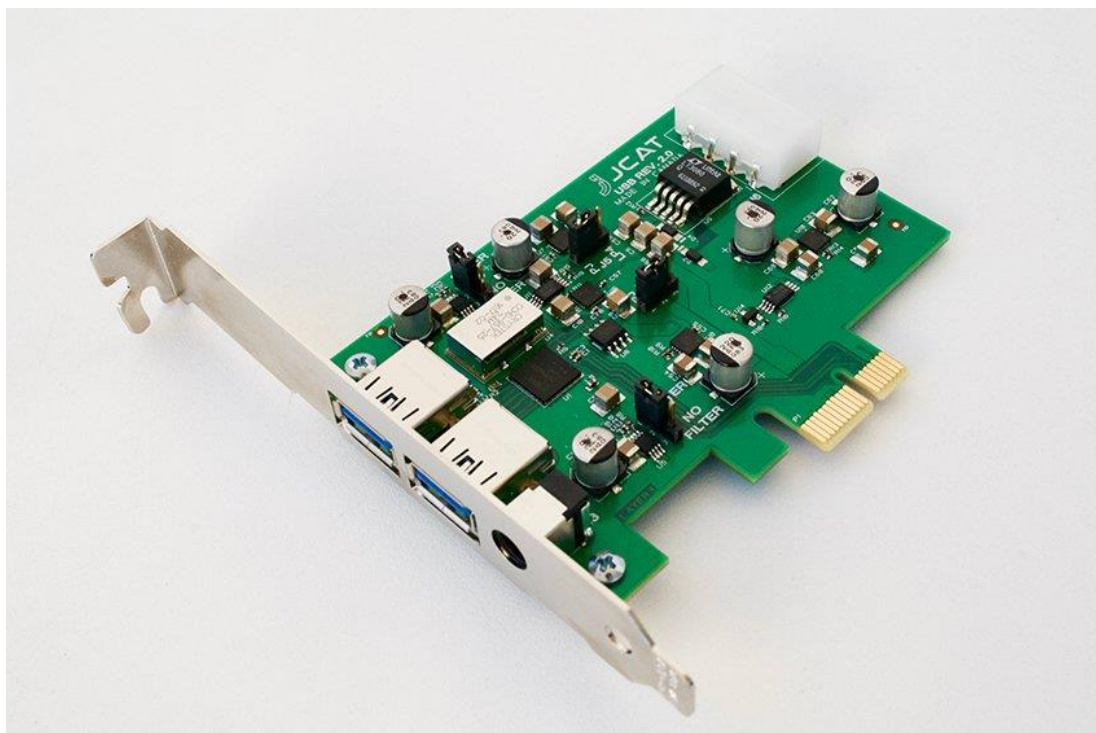
INFO: Since Windows Home edition is not able to process group policies, it does offer less potential for optimization. Therefore, it is supported but not recommended. Windows 10 only offers a Graphical User Interface (GUI). It does not offer Core or Minimal-Server modes like Windows Server 2012 R2 or Server 2016/2019.

Should you want to order a product not listed in our shop, need technical assistance or have any questions, please **don't hesitate to contact us** via e-mail to shop@highend-audiopc.com. We are very confident that we will find the perfect solution for your setup.

www.highend-audiopc.com/shop

Digital Audio Master Clock, 1G Audio Re-Clocker & USB Interface





JCAT USB Card FEMTO



JCAT Reference LAN Cable



JCAT Reference USB Cable



**SOtM dx-USB HD
USB/AES Converter**



SOtM tx-USBhubEx (external)



SOtM ISO-CAT6 LAN Isolator