

Other operating system and computer optimizations and diagnostics

On both Mac OS X and Windows we recommend having as few other programs and background processes running at the same time as Hauptwerk as possible, since all running programs and processes will take processing resources away from Hauptwerk to some extent (and can sometimes interrupt audio by accessing the Internet or storage on some Windows computers).

We also recommend disabling any power saving modes, such as hibernation / sleeping, screen savers or drive sleeping. On notebook computers this needs to be done only for the times when the mains power supply is connected (when conserving power would be less important anyway), and you should always have the mains power supply connected when using Hauptwerk. If the computer hibernates / sleeps, or enters a power-saving mode while Hauptwerk is running, then you might experience extreme performance issues, especially if the operating system needs to re-read all memory back from storage when waking.

No other operating system optimizations are usually needed on Apple Macs running OS X, since they have reliable high-performance professional-grade audio and MIDI support built-in, 'out of the box'.

For Windows/PCs, the following are some things to try (in addition to those mentioned previously) if you have problems with audio glitches:

- Make sure you're using the latest version of Hauptwerk.
- Make sure that all current Windows updates and driver updates are installed, especially the latest drivers for your audio/MIDI interface(s), motherboard and graphics card (if applicable).
- Make sure you have the latest manufacturer-supplied ASIO driver installed and selected in Hauptwerk for your audio interface (*General settings | Audio outputs*).
- Check that none of the real-time meters is going into the red on the *Audio, MIDI and Performance* large control panel (*View | Large floating controls panels (for this organ) ...*). See the '*Summary: quick guidelines for troubleshooting audio or performance problems*' section in the main Hauptwerk user guide for remedial actions if they are.
- Try audio buffer sizes of 1024 and 512 in Hauptwerk on the *General settings | Audio outputs* screen. Note that some audio interface drivers ignore the buffer size that an application (such as Hauptwerk) requests, and instead always use the buffer size set in their ASIO control panel. Hence you might instead need to adjust the buffer size via their ASIO control panel, which can be accessed by clicking the *Show device control panel* button on the *General settings | Audio outputs* screen in Hauptwerk. You can determine which buffer size setting the driver is using by looking for the buffer size shown in the Hauptwerk log (use

Help | View activity log in Hauptwerk, then look at the latest INF:5152 line), or by looking on the *Audio, MIDI and Performance* large control panel.

- See whether the problem occurs with just a very small sample set loaded (or with all-but-one ranks of a larger set disabled), and when just a single pipe is sounding. For example, try the free Ott Orgel sample set, which can be downloaded from our website. If so, then the problem is probably not due to insufficient memory or an incorrect polyphony limit setting.
- Make sure that no other applications are running at the same time as Hauptwerk, especially applications that might try to produce any audio/sounds. In particular, check that nothing unnecessary is running in the Windows System Tray, such as media/MP3/video players or messaging applications.
- If you have previously adjusted Windows virtual memory settings in any way, please make sure that *Automatically manage paging file size for all drives* is now ticked: use *Control Panel | System and Security | System | Advanced system settings* then click on the *Performance | Settings* button on the *Advanced* tab. Select *Adjust for best performance*, then click the *Advanced* tab. Leave *Processor scheduling* set to favor *Programs*. Click *Virtual memory: Change* and ensure that *Automatically manage paging file size for all drives* is ticked, then click *Set*. Finally click *OK* on all of the windows and re-boot the computer if you changed any settings. (Having the paging file disabled or set to an inappropriate size can cause stability problems, performance problems, or other severe problems with Hauptwerk, other applications, or Windows itself, especially if 4 GB or more of memory is installed.)
- If you are using multiple audio interfaces of the same make or model (for example, two Echo Audiofires) then under some circumstances you might need to synchronize their hardware clocks together via Word Clock cables in order to avoid audio glitches or crackling. Check the documentation for your audio interfaces if in doubt.
- Make sure that you have the latest BIOS version installed for your motherboard.
- Disconnect any hardware devices that are not absolutely essential for Hauptwerk and the computer to function, to see if that eliminates the problem. For example, disconnect all USB cameras, printers, scanners, modems, touch-screens, external hard-drives and USB hubs.
- Try running the free DPCLAT utility available from [Thesyscon](#) to see if a hardware device/driver on your computer is introducing an excessive latency that is prevent your audio interface from being able to stream low-latency audio reliably. On a well-performing computer the latency values would normally be in the 50 - 200 microsecond range. Any values in excess of 1000 microseconds indicate a significant hardware/driver performance problem that is likely to cause audio glitches with 'pro audio' (low latency) audio applications such as Hauptwerk. If DPCLCAT shows a problem then you will need to identify the device that's causing the problem and probably either disable it (either in

Windows Device Manager or in your motherboard's BIOS), or find a better-performing driver for it, or adjust its driver/BIOS settings.

- Try your audio interface with each possible connection (for example, in each possible PCI/PCIe slot, or attached to each possible USB or FireWire port, depending upon its connection type).
- Disable any processor speed management capabilities in your motherboard's BIOS (for example, Intel Turbo Boost Technology and Intel SpeedStep Technology), and also in Windows, if applicable. For reliable audio performance it's usually best to have the processor(s) running at their optimum speed constantly. Sudden changes in CPU clock speed might cause audio glitches, or even computer crashes/freezes with some audio interfaces.
- Try disabling your motherboard's onboard audio, either in its BIOS or in Device Manager (in the Windows Control Panel). Motherboard audio devices sometimes conflict with professional audio interfaces/drivers.
- Make sure that all Windows sounds are disabled (*Control Panel | Hardware and Sound | Sound | Sounds* and set the sound scheme to 'No sounds').
- If possible, set Windows to use a device other than your main audio interface as its default device for playback and recording (*Control Panel | Hardware and Sound | Sound | Playback/Recording*) to try to prevent Windows or another application from trying to access the audio interface while Hauptwerk is streaming audio to it.
- Try running another 'pro audio' application that uses ASIO, apart from Hauptwerk, to determine whether the problem is specific to Hauptwerk. For example [Native Instruments](#) make the free Kontakt Player, which uses ASIO in stand-alone mode. Make sure that you select the same ASIO driver that you are using for Hauptwerk, and try the same audio/ASIO buffer size.
- Check that no hardware resources are shown as conflicting in Device Manager (in the Windows Control Panel).
- Also check that no hardware resources, such as interrupts (IRQs), are being shared between your audio interface (or the FireWire/IEEE 1394 controller, if the audio interface is a FireWire unit) and any other key system hardware, such as the graphics card. You can check hardware resource assignments by selecting *View | Resources by type* in Device Manager (in the Windows Control Panel). If your audio interface or FireWire controller are sharing any hardware resources then try moving the audio interface or graphics card (or whichever other device is sharing the resource) to a different PCI/PCIe slot, or see if your motherboard's BIOS allows the resources to be reassigned manually.
- Try temporarily disabling all network adapter devices, Bluetooth devices and wireless networking devices in Device Manager (in the Windows Control Panel). Network/wireless devices/drivers are a common cause of Windows audio performance problems.

- Try keeping any network leads and Internet connections disconnected while using the computer for audio. This prevents other Internet or 'auto updaters' applications (such as Windows Update or virus scanner updaters) from updating while Hauptwerk is running, and potentially causing the network drivers to take processing time away from audio or from the audio interface's drivers.
- If you're connecting your audio interface to a PC motherboard FireWire port, try installing a separate good-quality FireWire controller card (PCI, PCIe, etc.) based on a Texas Instruments FireWire controller chipset and connecting the audio interface to that instead. Some FireWire audio interfaces have performance issues with some FireWire controller chipsets, and Texas Instruments FireWire controller chipsets are often recommended by audio interface manufacturers for maximum compatibility (check with your audio interface manufacturer for recommendations).
- Similarly, if you're connecting your audio interface to a PC motherboard USB port, try installing a separate good-quality USB controller card (PCI, PCIe, etc.). Some motherboard USB controller chipsets might not give reliable performance with all USB audio interfaces.
- If your audio interface driver comes with audio/ASIO performance diagnostic utilities, then try using those in conjunction with their documentation to see if they can show where the problem is occurring. For example, the Echo Audiofire interfaces include a very useful 'ASIO Analyzer' utility that can show quickly whether there is a hardware/driver problem in the computer that's preventing the audio drivers from being able to work robustly for low-latency audio.
- If you have previously manually adjusted Windows processor scheduling (priorities) to favor background processes, which is sometimes seen recommended on websites, then please make sure that the *Adjust for best performance* setting is set specifically back to *Programs (not Background services)* using *Control Panel | System and Security | System | Advanced system settings* and selecting the *Advanced* tab. Finally click *OK* on all of the windows and re-boot the computer if you changed any settings. (Hauptwerk is a program, not a background service, and Hauptwerk already runs at the priorities needed for best performance, whereas forcing other background processes to run at artificially higher priorities may cause audio glitches or other performance problems, depending on the specific combination of hardware, drivers and processes. Background processes, drivers and other applications should already be designed to run at the priorities they need with the default Windows scheduling settings.)
- Similarly, please ensure that you haven't manually changed any Windows priorities for any application, process or thread, since doing so is likely to cause audio, or other, performance problems.
- Disable Windows' drive indexing for all hard-drives (right-click on each drive icon, select *Properties*, then un-tick *Allow files on this drive to have contents indexed in*

addition to file properties, then select the option to apply to all sub-folders/files when prompted).

- Disable Windows' scheduled hard-drive defragmentation (you will then instead need to defragment any hard-disk(s) manually periodically). To do so, right-click on each drive icon, select *Properties*, select the *Tools* tab, click the *Optimize or Defragment Now*, button, click the *Scheduled optimization | Change settings or Schedule | Configure schedule* button, un-tick *Run on a schedule ...* and reboot.
- Some people have reported to us that they needed to disable Windows Superfetch in order to get reliable low-latency audio with their computers, otherwise the background storage accesses it causes gave them occasional audio glitches. There is currently no native way to disable SuperFetch in Windows, although we understand that editing your registry to change the following registry value to 0 (zero) then rebooting should do it:
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Session Manager\Memory Management\PrefetchParameters\EnableSuperfetch . Please be extremely careful if you try to edit your Windows registry, since a mistake could prevent your computer from being able to boot. Any registry edits are at your own risk and should probably only be attempted as a last resort. You might also need to disable the Superfetch Windows service: use *Start | Administrative Tools | Services*, double-click on the *Superfetch* entry, then change its *Startup type* setting to *Disabled*, click *OK* then reboot.
- Similarly, some people have reported to us that they needed to disable Windows System Restore in order to get reliable low-latency audio with their computer, otherwise the background storage accesses it causes (System Restore makes periodic system backups in the background when it believes the computer is idle) gave them occasional audio glitches. Please beware that disabling System Restore might prevent your computer being able to recover if Windows becomes corrupted in the future, and is attempted at your own risk. System Restore can be disabled by using *Control Panel | System and Security | System*, clicking *System protection*, clicking *Protection Settings: Configure ...* then selecting to disable system protection, then clicking *Apply* and *OK*ing all of the screens.
- If you're still having problems after trying all of the above suggestions, try contacting the company that built or supplied your computer for advice. We're sorry that we can't provide formal support for computer hardware/performance issues beyond the suggestions in this section (we don't make or supply computer hardware).