



NATIVE INSTRUMENTS

HARDWARE GUIDE

(Date: 2007-04)

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1. Computer Recommendations

When using a computer for audio processing there are a many things you need to pay attention to, as audio applications demand for fairly more resources than standard office tasks.

Nowadays you find computers suitable for all kinds of audio applications. Computers for smaller projects are available, as well as multi-processor platforms for high end professional studio productions or laptop setups that can be taken along on the road. The question to ask oneself is: What are the aims I want to archive with my DAW (digital audio workstation)?

Commercial computer retailers communicate their offers by specifying mainly the processor, that is built inside and common office and internet applications that come along. There is much more to it, if you contemplating using your computer for audio processing.

In the following paragraphs we discuss components of a computer regarding their suitability for audio processing especially with regards to the Native Instruments product line:

1.1 Processor

- PC

Generally modern high performance processors like Pentium 4 or Athlon work excellent with Native Instruments hard- and software. However, we want to give you some recommendations regarding special components of the processors. To increase the speed of computing tasks a processor is generally equipped with a cache, to minimize the access time to data. The size and the speed of the cache are the crucial parameters defining its effectiveness. Some of the current Core 2 Duo processors come along with a 4MB cache, which does give a raise to the overall performance of the system.

Please make sure that the processor is equipped with SSE2 (Streaming SIMD Extensions 2) or higher. As well look out for a powerful FPU (Floating Point Unit) engine that will accelerate the use of software applications.

- MAC

With at Macintosh, the processor alternatives to choose from are not as manifold as you find it in the PC market. Regarding the use of Native Instruments soft- and hardware, please check on the minimum requirements for the product you want to use. You will find this information

on the particular product page on our website. Recommended are Mac computers that come along with USB 2.0 (which is a minimum requirement for all Native Instruments hardware), which is integrated in G4's and higher. Furthermore, please check back on our product pages in the internet, if a product already supports Intel Mac technology.

1.2 Hard Drive

The hard drives suitability for the audio field can be judged on its access time (in rotations per minute; RPM), its cache and size.

- Access Time

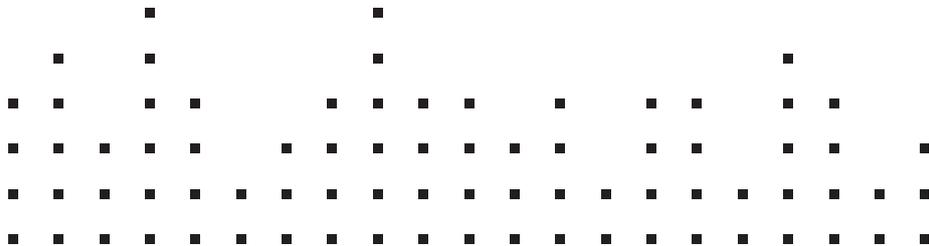
On a desktops system it is recommended to use hard drives that have a RPM of 7200. In Notebooks mostly the hard drives RPM are slightly lower around 4200 RPM up to 5700 RPM. The access time sets the limit to how many audio tracks or samples can be recorded and played back simultaneously. Native Instruments software supports the DFD (direct from disk) technology, where a beginning of a sample is loaded into the RAM while the rest is streamed from the hard drive. A faster access time will generally smooth out the performance.

If you use Kontakt 2, please have a look in the DFD-demystified pdf. doc which might be helpful.

Note! Not only the access time is crucial. Sometimes a partitioned hard drive with a slower RPM generates faster data access. This is due to the fact, that not only the average seek time (the time it takes the read/write head to move from one track to another on the hard drive) is crucial, but as well the rotational latency (the average time the hard drive need to turn once) that adds up to the seek time. So in the end, a bigger, but slightly slower hard drive might result in a faster access time by partition the hard drive and keep the system data and the programs on one partition. The space that needs to be bridged by the read/write head is smaller due to the partition and so it will decrease the average seek time. In the end the addition of the seek time and the rotational latency might be lower than the one of a drive with higher RPM. This will give you more storage capacity in the end as well, as you still have the other partition to store your audio data.

- Cache

A cache is a temporary storage area where frequently accessed data can be stored for rapid access. Means, audio data can be loaded (actually copied) into the hard drives cache to be accessed more rapidly than form the hard drive itself. A bigger cache can handle overall data transfer more rapidly. A cache size of 8MB and higher turns out to be very efficient for applications in the audio field.



• Size, Partition & more

Looking at the size the numbers are changing rapidly in the market. If you work with big sample libraries, a large drive space will be rendered useful. Generally it is recommended to either partition your hard drive or to use more than one hard drive. For several reasons it makes sense to place your audio data on another drive or partition than the system drive.

If you partition your hard drive (the most economical way to have separate directions for system and audio data) you might assign a space of around 10GB to the system partition, where you install the operation system and the software programs. In either way, partitioned or multiple drives, it is not recommended to install the audio programs on another hard drive than the system. If you are new to computing, a partitioned hard drive will make your life easier when it comes to errors in the operating system. Even though the repair functions nowadays work fairly well, it is not the easiest way when you lack experience. A partition of the hard drives gives you the easy option of reinstalling the operating system, without erasing all your audio data on the other partition.

The main advantage of a second hard drive is that the access time to audio content is not interrupted by system related operations - for the use of software samplers like Kontakt2 or sample based Vst-plugins like Akoustik Piano this is an optimal setup.

1.3 RAM (Random Access Memory)

Generally admitted, RAM is a component where the relation the more the better makes widely sense. Native Instruments software like Kontakt 2 load audio samples into the RAM (at least parts of it, as DFD technology is supported by Native Instruments Products) and reads it from there. The access is quicker than reading it from the hard drive. Theoretically, the more RAM is installed the more audio samples can be buffered there. However, Native Instruments Software supports DFD (direct from disk) technology. That means, only the beginning of a sample is loaded into the RAM and the rest is streamed from the hard drive. This procedure leaves more RAM accessible for other applications. Means, you do not need plenty of RAM to run sample based VST Plug-ins or software samplers properly, but higher RAM amount will smoothen your computers overall performance.

Applications under Windows XP and Vista 32bit can use up to 2GByte of RAM.

The 64bit support of Mac OS X Tiger (and following Leopard) can run

64bit programs that can address an amount of memory that goes far beyond the one seen in 32bit programs. For now Native Instruments Software is compiled in 32bit and practically can address an amount of RAM allotted to sample buffering of 2.5GB. Adding the RAM used for applications running and the OS itself, an installation of 4GB RAM makes sense.

If you have one application running at a time (e.g. Logic; a Plug-in does not count as a unique application here) it would be sufficient to have an amount of 4.5GB RAM installed (4GB for the application, 0.5 GB for Mac OS X). Only if you have further applications running at the same time a higher amount of RAM than 4.5 GB would make sense.

Since 32-bit floating point audio processing already provides substantial internal headroom for professional audio applications, 64-bit technology does currently not promise a general leap in quality or in performance from the perspective of Native Instruments. The main advantage of 64-bit applications for music production is that they can utilize more memory than 32-bit applications, which makes this technology potentially useful for software samplers. Native Instruments will investigate 64-bit technology for future developments.

1.4 Graphic Card (PC only)

1.4.1 Shared Memory, TurboCaching or Hypermemory

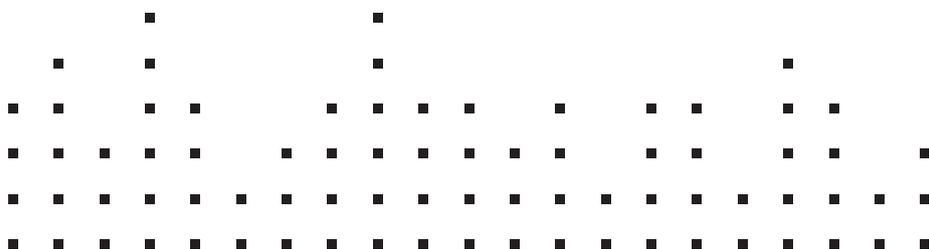
Concerning the graphics card, there are a couple of things you need to take into account.

First, built-in graphics cards in notebooks (sometimes in desktop computers as well) are often shared-memory cards. A Shared-memory graphics card accesses to the same memory as the CPU. Other Graphics Cards have their own memory, so that the main memory is reserved to the processing of audio data. Other names for the same issue are TurboCaching or Hypermemory. You want memory and processing power available for your audio project. It is not recommended to buy a notebook with a shared memory graphic card, as dropouts or malfunctions of the audio software and hardware might be the outcome.

1.4.2 Graphic cards for multiple monitors

Not all graphic cards can provide a signal to more than one monitor, so in case you want to use more than one monitor for comfortable editing and arranging, you should watch out if it is supported by the graphics card.

Assuming that the computer shall be solely for audio production (that is not meant for film scores etc.), the graphic card might be a component



Furthermore high standard graphics cards often come with a ventilator cooling system, because they really heat up challenged by animated games. These ventilators come up quiet noisy sometimes, so a graphics card that is cooled passively (e.g. over cooling chips) might be the better choice for audio purposes.

1.5 USB 2.0 requirement

Every Native Instruments Hardware is a USB 2.0 interface and will not work at all on a USB 1.0/1.1 port. Make sure your computer is equipped with USB 2.0 ports. If your computer is not equipped with USB 2.0 the solution is to get an USB 2.0 PCI card in case of a desktop or a USB 2.0 PCICIA card in case of a notebook.

- PC

To determine if your PC has USB 2.0 ports, go to Start>Run and type 'devmgmt.msc' to go to the Device Manager, then look down to the section labelled 'USB' to see the list of all USB ports on your machine.

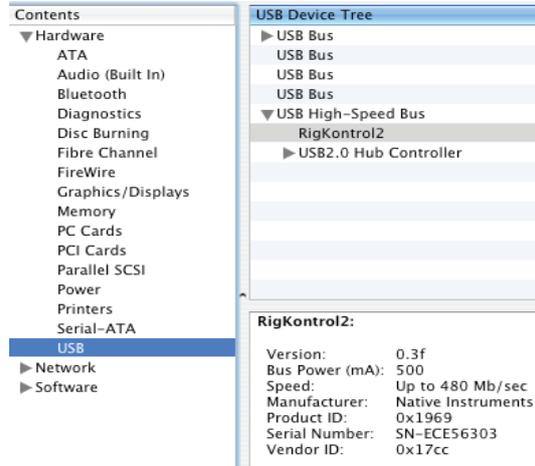
If your computer has one or more USB 2.0 ports, you will see 'USB Enhanced Host Controller' listed here. If you do not see at least one ENHANCED Host Controller listed here, then your PC does not have USB 2.0.



- MAC

On a Macintosh you can find the same information by using the System Profiler utility, which can be found in Applications>Utilities. Open the System Profiler and go to Hardware>USB. Here you will see the list of USB hubs. If your computer has one or more USB 2.0 ports, you will see 'USB High-Speed Bus' here.

If your computer does not have a USB 2.0 port available, you may be able to get a USB 2.0 expansion card that will enable you to use the Native Instruments Hardware on your system. For a desktop computer, any USB 2.0 card should work. For a laptop, you will need to get a Cardbus USB 2.0 card that has its own external power supply in order to supply sufficient power to the device.



have seen a few cases where the USB 2.0 ports on a particular computer do not fulfil the minimum requirements and therefore do not meet the official USB 2.0 specification. In this case you may see a message saying that there is not enough power available to operate your device.

In this case the Native Instruments Device might produce crackles or might not even work at all.

1.6 Operating System

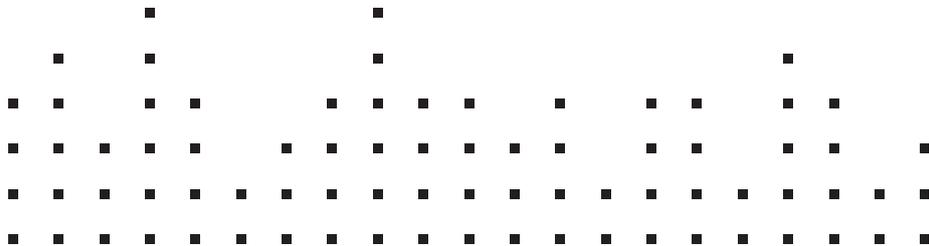
- PC

We recommend you running Native Instruments products under Windows XP (Home Edition and Pro Edition) in connection with the latest Service Pack.

All current Native Instruments products generally operate without any specific limitations or problems under the 32-bit version of Vista. At the moment, the installation process may require a few more clicks than under Windows XP. Updates that streamline the installation process under Windows Vista are planned for release within the second quarter of 2007. The current Windows drivers for NI hardware products work fine under Vista 32-bit.

Installation under Windows Vista 64-bit is not recommended for now (29th of March 07). You will find more detailed information on Windows Vista compatibility on the Native Instruments website under Support>Compatibility.

The differences between the available Windows Vista versions do not affect the operation of Native Instruments products in any way.



- MAC

We generally recommend you running Native Instruments Hard- and Software under the current version of Apple's operating system unless noted otherwise in the particular system requirements of the product.

1.7 Noise Reduction

- Desktops

For a comfortable working atmosphere it is crucial to have a suitable cooling system for your components. Especially the ventilator of the power supply might produce a high level of noise. This noise becomes fatigable to your ears rapidly. Be aware that there are different ways how to cool down your components, as already mentioned in the graphics card section. The power supply should be cooled with a ventilator though, as it serves the purpose of changing the warm air inside the computer as well. There are quiet ventilators available on the market that might be the right choice.

- Notebook

The noise of a Notebook produced by the cooling system depends on the processor architecture. Processor types come along with different cooling systems, so a general recommendation can not be given here.

1.8 Minimum Requirements for the NI Hardware

Please make sure that your system fulfils the following minimum requirements for our hardware devices, since otherwise the Native Instruments Hardware might not be able to run at all. As stated above, all Native Instruments devices need a USB 2.0 port.

1.8.1 Audio Kontrol 1

- Windows

Win XP, Pentium / Athlon 1.4 GHz, 512 MB RAM
 Windows systems must have Service Pack 2 installed.
 USB 2.0 Interface

- Mac

Mac OSX 10.4.8,
 G4 1.4 GHz or Intel® Core™ Duo 1.66 GHz,
 512 MB RAM

1.8.2 KORE

- Windows

Win XP, Pentium 1GHz,
 512 MB RAM
 Win XP must have Service Pack 2 installed USB 2.0

- Mac

Mac OS 10.4.x,
 G4 1GHz or Intel® Core™ Duo 1.66 GHz,
 512 MB RAM
 USB 2.0

1.8.3 Rig Kontrol 2

- Windows

Windows XP SP2 or higher.

Note: If you do not have Service Pack 2 installed, you will most likely get an error message when trying to install or use the Rig Kontrol 2 driver.

Intel Pentium 700 Mhz, Athlon 1.33 Ghz
 256 MB RAM
 USB 2.0

- MAC

Mac OS X 10.3.x,
 G4 733 MHz or Intel® Core™ Duo 1.66 GHz,
 512 MB RAM
 USB 2.0

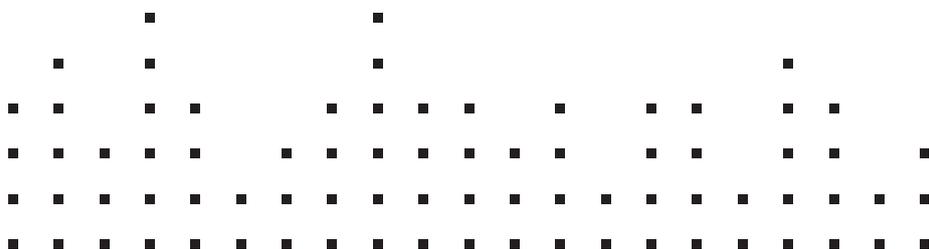
1.8.4 Audio 8 DJ

- Windows

Windows XP Service Pack 2,
 Pentium / Athlon 1.4 GHz,
 512 MB RAM
 USB 2.0 interface

- MAC

Mac OSX 10.4.8,
 G4 1.4 GHz or Intel® Core™ Duo family,
 512 MB RAM
 USB 2.0 interface



2. Adjustments and Optimization

2.1 USB Setup

2.1.1 Disable USB energy saving mode (PC only)

It is recommended to disable power management to the USB hubs if you are on a Windows machine, to assure that the Native Instruments devices receive enough power to work properly. XP turns this on by default. Go to device manager (Control Panel/system/hardware) and right click a USB hub to bring up properties. On the power management page, uncheck all boxes. Repeat for each hub and reboot.



2.1.2 Using a powered USB 2.0 hub

It is best to connect the Native Instruments device directly to a USB 2.0 port on your computer. However, in certain situations a powered USB hub can also be a solution if you are having problems connecting your device to an onboard USB port, especially if your USB 2 port does not meet the official USB 2.0 requirements as explained in paragraph 1.6. Furthermore you should avoid connecting other devices to the hub if you can as they will take away from the total amount of power available.

2.1.3 Tryout all USB ports

Even though your computer is equipped with USB 2.0, some ports might still be USB 1.0, so if you have problems connecting your Hardware to the computer, please tryout different ports on your computer as not all might supply sufficient power to the device.

Furthermore, some ports might work better than others, due to differences in the internal connection. Some ports are placed on the mainboard, while others are connected to the mainboard via a cable. This internal connection might be a problem source as incorrect wiring or power loss might occur. Ports on the rear of the computer might work better than ports that are placed on the front side, as the ones on the front mostly are connected via an internal cable.

2.1.4 Try another USB cable

A bad USB cable can be responsible for audio dropouts and other connectivity problems. It is highly recommended that you try using a different cable if you are experiencing difficulties; make sure to use a cable bearing the official USB logo.



Cable with USB icon

Make sure your cable does not exceed the length of five meters; the maximum recommended size is three meters and it is not recommended to use an extension cable.

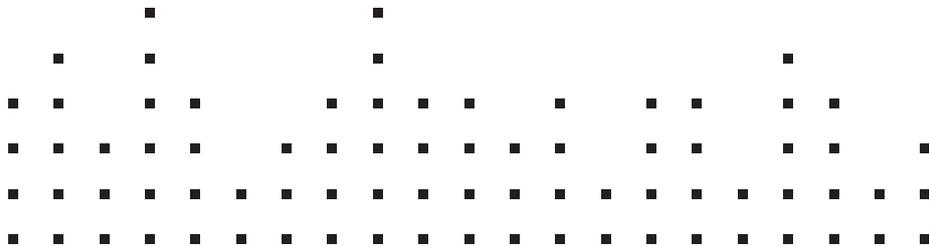
2.1.5 USB Drivers (PC only)

General support of USB 2.0 under Windows XP was brought on by the Service Pack 2. In case your USB device does not work properly with the windows drivers, it might be useful to try out the drivers of the manufacturer. If you had these drivers installed from the beginning, the installation of Service Pack 2 might have overwritten them, so a re-installation might be useful (this is recommended especially for VIA chips)

a shared memory graphic card, as dropouts or malfunctions of the audio software and hardware might be the outcome.

2.3 Defragmenting the Hard Drive

The hard drive becomes fragmented after a while as data is erased and generated. Generally we recommend you to defragment your hard drive every now and then as the fragmentation slows down the computers performance and especially if you work with sample libraries the defragmenting will lower the data access time.



- PC

On a PC the defragmentation of the hard drive has a significant impact on the computers performance if you work with big data files, which is generally given in the audio field.

You find the application if you right click on the hard drive, choose properties and select the extra tab. The computer handles the defragmentation fairly alone and you do not need to backup data first, as the defragmentation will not erase any of your data.

- MAC

In general, there is not significant degradation of performance from normal use of your computer due to fragmentation on Macintosh systems. If you create and delete a large number of files though, your hard disk may become fragmented to the point that you may see a slight slow-down of file system performance. In this case you might use third-party software to fragment your drive.

2.4 Notebook Check (PC only)

It is not recommended to run a notebook on battery, as the clock rate of the CPU might be slowed down by the computer.

It is worthwhile to check if your notebook is suited to handle real-time audio processing without occurrence of drop-outs. Drop-outs might be brought on by certain components of your computer. Please download a tool that scans your computer regarding suitability for audio processing here: www.thesycon.de/deu/latency_check.shtml

There is no software installation required, just launch the tool after downloading. With all external devices disconnected the tool will report if your notebook can handle real-time audio-streaming without drop-outs or if there might be components that disturb a smooth processing.



DPC

In case your Computer might not be able to handle glitch free audio processing, the tool will show you red latency bars and report you so in the box on the bottom. Run it with both settings – external devices like audio interfaces connected and disconnected - to find out about your computers capacities.

In case you get red bars, there are workarounds that might help you adjusting your computer for audio purposes.

2.4.1 Disable Devices (PC only)

Notebooks often are equipped with built-in devices that disturb audio processing. An example is a WLAN card. In case you experience serious drop-outs, you might need to disable these devices.

To do so, please go to the device manager (Start>Run and type 'devmgmt.msc'). You can disable a device, let's say the network adapter, by clicking on network-adapter, then double click on the device to bring up the properties dialog. On the bottom of this pane you can disable the device via the Scroll-Down menu. Please deactivate it and hit "OK". You should see a red cross over the device, which means that it is deactivated.



Common built-in devices are: network adapter, WLAN cards, blue-tooth ports, infrared ports, printer ports etc. Try to disable the network adapter and WLAN card first, as they are the most common devices causing problems in audio processing. Make sure that you don not disable devices that are indispensable for your notebook to work properly. Here is a list of devices that you should not deactivate: System timer, Keyboard ,System CMOS/real time clock, Microsoft ACPI-Compliant System, Numeric data processor, Primary IDE Channel, Secondary IDE Channel, Graphics Controller, Ultra ATA Storage Controllers.

2.5 Adjustments on MAC

2.5.1 Energy Saver

Under the Options tab you'll find a section called processor performance. Select Highest from the list. Under the Sleep tab set all sliders to never. Uncheck put hard disk to sleep when possible. For PowerBook/iBook owners: Set Processor usage to maximum.

Set the processor power to maximum for AC and Battery usage. (System preferences/ Energy saving). This option is available only on PowerBooks and iBooks.

2.5.2 Turn off devices

If you have a wireless card ("Airport") installed and Bluetooth running, turn them off while you are using the Native Instruments Hardware (you can turn this off in the top OSX menu bar). Disconnect additional hardware (printers, scanners etc.). Please turn off "Apple Talk" (OS X System Prefs>Network).

3. Audio Interfaces

By enabling you to connect the computer's outputs to a stereo, mixing desk or PA, the sound card lets you hear the digital sounds produced by your music software. The sound card also converts microphone or line signals (guitar outputs, hardware synthesizers/samplers, CD players etc.) into digital signals for recording and editing purposes.

The choice of an audio interface is one of the most important when considering putting up a DAW. Especially on a PC it is not recommended to use built-in sound cards that come along with low quality converters and that run with high latencies.

A correct choice depends on the aims you have your sights on - means if you want to record audio signals or if you just want to monitor audio, if you want split signals for DJing or if you need multiple inputs for simultaneous audio hard disk recording.

3.1 Latency

Latency in audio processing marks the time delay between a sound is triggered (e.g. strumming the guitar) and it actually can be heard on your speakers.

The latency value displayed in the setups of audio cards is the round trip (in and out) audio latency experienced when, for example, you play a guitar through Guitar Rig. The latency displayed in the settings represents the "real" round trip latency. If you play a software instrument via MIDI, you will experience half of this round trip latency plus a tiny amount of MIDI latency.

Generally, for PCs as well as for Mac's there are drivers available that provide low latency. In any recording or playback/monitoring situation low latency is crucial, as latencies above a few milliseconds are noticeable and become quiet annoying. The latency of consumer products comes from two sources, the quality of the converters and the drivers.

- PC

Common audio cards can operate under ASIO, DirectSound or MME drivers. If your application supports ASIO, we highly recommend using the ASIO driver as it will give the best performance. You can find ASIO drivers that work with many devices here: www.asio4all.com

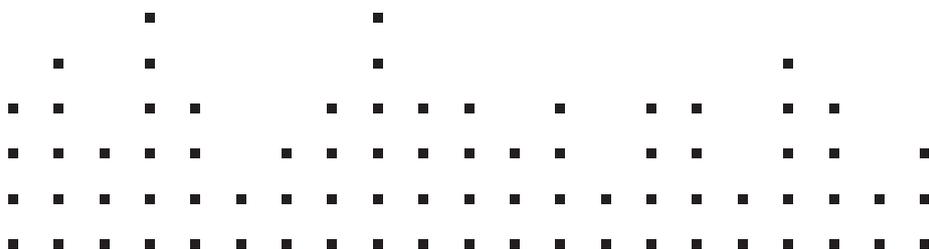
Built-in soundcards of consumer PCs normally need about 20 milliseconds to turn the trigger sound into an audible signal. This is far too long if you want to play a software instrument like a real instrument. To reduce that latency you may run the built in soundcard with the asio4all driver, better would be to use a high quality audio card (see also paragraph 3.2).

- MAC

Apple computers nowadays come along with a usable good sounding audio card with low latency.

Note

Latencies can be adjusted within the software you are using, but the lowest value depends strongly on the quality of your audio card and the drivers. If you experience clicks and dropouts the latency might be set too low.



3.2 Native Instruments Audio Interfaces

Native Instruments currently offers one audio interface that provides all classical aspects of a soundcard and offers features beyond the standards - the Audio Kontrol 1.

Then again, there are two more devices that have integrated audio interfaces and furthermore function as controllers to certain Native Instruments Software – KORE & Rig Kontrol 2.

All of them come with an integrated Midi Interface (Midi In/Out).

3.2.1 Audio Kontrol 1

The Audio Kontrol 1 is a USB 2.0 soundcard that not only fits perfectly the requirements of Native Instruments software, but also supports any needs of common audio recording, virtual instrument or DJ-ing software on the market.



It is compact in size, easy to transport, but very powerful. Here are some features of the Audio Kontrol 1:

- Intel Pentium III 1 Ghz, Athlon 1 Ghz
- 512 MB RAM
- USB 2.0

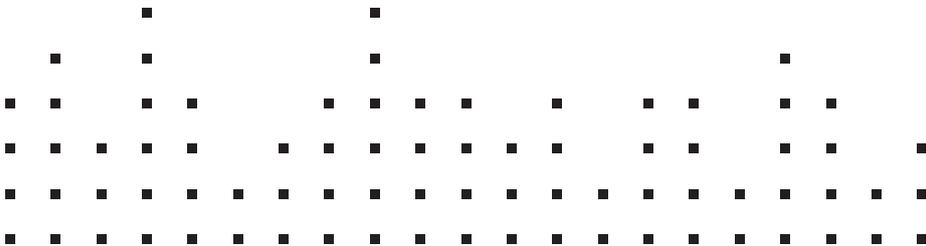
- A built in preamp – for recording microphone signals or any instruments via Line-in/Instrument input
- A built in headphone amp – for monitoring recordings or DJ purposes with pre-listening option for each of the 2 stereo/mono outputs
- Three buttons and a control knob to control any parameter within your software

These highlighted aspects make the Audio Kontrol 1 card highly suitable for multiple audio applications, such as:

- professional recording and monitoring (Studio Situation)
- Playing instruments with software applications like Guitar Rig (Studio and Live Situation)
- DJing with applications like Traktor (notice that the Audio Kontrol 1 does not support Final Scratch)
- Arranging, editing and mastering purposes
- Hi-fi playback of your digital music collection on your computer

3.2.2 KORE

KORE is a powerful connection of software and hardware. It is not solely an audio interface in the first place, as the software works as a host that in connection with the hardware controller aims at easy controlling and layering sounds from vst-plugins. It comes along with two in- and two outputs.



3.2.3 Rig Kontrol 2

The Rig Kontrol 2 is a Controller with integrated preamp and soundcard that is mainly designed for use in connection with Native Instruments software Guitar Rig 2. The inputs are equipped with a preamp and are designed for guitar and bass signals that need amplification before it can be edited within the software.



More Information about each Native Instruments hardware can be found on the Native Instruments website.

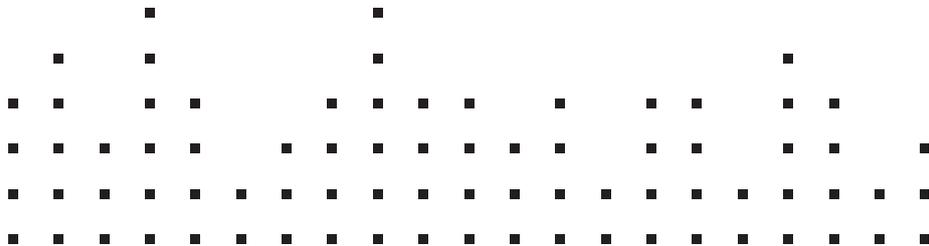
3.2.4 Audio 8 DJ

AUDIO 8 DJ is the ultimate audio interface for DJs, and the pulsing heart of TRAKTOR SCRATCH. This pro quality 24bit/96 kHz interface with ultra high-end Cirrus Logic™ AD-DA converters is unique in the field- a dedicated DJ soundcard that surpasses every audio expectation.



More Information about each Native Instruments hardware device can be found on the Native Instruments website.

www.native-instruments.com



4. Connection of the Unit to equipment

Regardless how you connect your hardware to the mixers, amplifiers or active speakers, make sure that you turn on these devices at last. When you boot your computer and you turn on/connect your audio device there might be glitches transmitted via the outputs of the card. If you turn on the amplifier at last, these glitches will not be transmitted, which conserves your speakers. It is the other way around, when turning off your equipment. First turn off the amplifier, mixer or speakers.

Use balanced cables

Always use balanced audio cables if possible to connect the Native Instruments Device with your mixer/speakers. If your mixer provides both unbalanced and balanced inputs, avoid using the unbalanced inputs if you can. This might prevent ground loops from occurring.

4.1 Ground Loops

Ground loops are a common problem within any environment where multiple electrical devices are connected to the same power circuit. In complex setups the cause of the noise can be difficult to find. Ground loops are perceived usually as a hum or buzz in your audio signal, but this can also transmit and amplify other sounds from the devices connected to the circuit. For example, one very common problem is that you hear internal clicking sounds created by your computer.

The cause of the noise is usually the computer and its internal devices, or devices connected to the computer like external hard drives. (Note that even if the power supply of your laptop computer is not connected, your setup may still be vulnerable to ground noise from an external device with its own power supply.) The cause can also be any other device (such as a television) connected to the same mixer.

The reason why this noise is present at the monitor speakers input has to do with a loop in the setup of electrical and audio cable connections in your studio. Most likely this loop occurs through the ground of one or more of these cables. With this in mind, the following points should help to eliminate the ground loop:

Try to eliminate the loop

Assuming that you have connected the Native Instruments Device to a mixer, a first troubleshooting step is to disconnect all devices from your mixer which you are not currently using. This applies also to other peripheral devices you may have connected to your computer (external data storage, CD burners).

Break the loop (if necessary) with a DI box

If you cannot fix the ground noise problem by disconnecting equipment and using balanced cables, you still have the possibility of using a DI (direct input) box between the Native Instruments Device outputs and the mixer inputs. (This is the same kind of box that is used to connect a line-level instrument like a guitar). Most of these boxes have a ground lift switch on them, this can be used to break the ground loop and eliminate the noise.

A DI box is especially recommended if your mixer has unbalanced inputs only.

For further information, please contact us under info@native-instruments.de

