SoundSystem

AUREON *7.1 Universe*

Digital Audio Solution

Manual (English)

CE Declaration

We:

TerraTec Electronic GmbH, Herrenpfad 38, D-41334 Nettetal, Germany

hereby declare that the product:

SoundSystem Aureon 7.1 Universe

to which this declaration refers is in compliance with the following standards or standardizing documents:

EN 55022 Class B
EN 55024

The following are the stipulated operating and environmental conditions for said compliance:

residential, business and commercial environments and small-company environments.

This declaration is based on:

Test report(s) of the EMC testing laboratory

Contents

Welcome!

We're pleased that you have chosen a TerraTec SoundSystem and would like to congratulate you on this decision. You've purchased a sophisticated product representing the state of the art of audio technology, and we're convinced that our product will prove extremely useful to you in the coming years and provide you with a great deal of entertainment.

This manual provides a complete description of the SoundSystem Aureon 7.1 Universe.

But first, here's a quick overview:

Aureon 7.1 Universe – PCI card with front module and accessories

A broad range of connections. The SoundSystem Aureon 7.1 Universe is the result of our many years of experience in the PC audio sector and reflects the continuous evolution of time-tested TerraTec products. The SoundSystem Aureon 7.1 Universe offers you a wide range of interconnection options with other audio devices such as a hi-fi surround system, a turntable MiniDisc or CD players with analog or digital outputs, headphones and microphones. For convenient access—and a visual highlight, of course—install the front module in your PC.

High-quality audio characteristics. The SoundSystem Aureon 7.1 Universe provides extremely high quality for analog recording and playback of analog material. The card features modern 24-bit converter components with a sampling frequency of up to 192 kHz. As a result, the Aureon 7.1 Universe achieves a S/N ratio of well over -100 dB(A) on its analog inputs and outputs!

Recording and playback of audio material at the purely digital level. The SoundSystem Aureon 7.1 Universe features an optical input and output, as well as a stereo input and output, in 24-bit S/PDIF format. You can therefore transfer already digitized recordings from a CD, DAT or MiniDisc player (or recorder) to the PC without losses. You can also choose between all common sampling frequencies, and have access to settings such as copy protection. The interface even supports the transfer of raw data such as Dolby AC3 signals.

From near and far. As one would expect of an all-around talent, the Aureon 7.1 Universe includes a remote control (and batteries), which you can use to manage and control not only the functions of the soundbox itself, but also of any applications you want. It is up to you, however, to bring the chips and dip.

Software à la carte. You will quickly learn to treasure the ControlPanel—the central controller for your Aureon 7.1 Universe. Its carefully thought-out user interface and intuitive control of all card settings will make your day-to-day work with the SoundSystem a breeze.

The selection of drivers leaves nothing to be desired. A highly-developed driver architecture, based on Microsoft's WDM technology, guarantees problem-free use with all modern Microsoft Windows operating systems. Musicians will also be glad that, through the support of the Steinberg ASIO 2.0 interface and WDM kernel streaming (e.g. Sonar‹Trademark›), extremely low latencies can be achieved with suitably equipped programs. This is useful, for example, for playing software instruments "live".

Last but not least, we have included helpful software titles, which allow you to take complete advantage of the capabilities of the SoundSystem—and to have fun!

We hope you enjoy your SoundSystem Aureon 7.1 Universe and would like to suggest that you browse this hopefully entertaining manual when you get the chance. In addition to the important information about its technology, we have outlined a number of typical applications wherever appropriate. We're convinced that even experienced users will profit from this guide. Don't miss the remarks in the margins marked with an exclamation point! They contain information such as summaries of the following sections, notes on important settings or tricks that can make your day-to-day audio work significantly easier.

Thanks for your attention—enjoy!

...your TerraTec Team

From opening the package to installation.

Before installing the sound card in your computer, please note the details of your computer's configuration. Also refer to the manual of your computer and other expansion cards for their settings.

Please observe the following instructions to ensure a trouble-free installation.

If difficulties arise nevertheless, please reread the relevant chapter in this manual carefully.

If you are still having problems, please call our service hotline. The telephone number and operating hours of the hotline are on the included customer service card.

Start by making sure that nothing is missing.

The scope of delivery of the SoundSystem Aureon 7.1 Universe includes at least the following:

- 1 PCI sound card TerraTec SoundSystem Aureon 7.1 Universe
- 1 Aureon 7.1 Universe front module
- 1 flat conductor cable to connect the PCI card and the front module
- 1 MIDI I/O slot plate adapter
- 1 CD-ROM digital audio connector cable
- 1 TOS-Link cable (1.0 m)
- 2 adapter plugs, 6.3 mm stereo jack to 3.5 mm socket
- 1 infrared remote control including batteries
- 1 installation and driver CD
- 1 manual
- 1 customer service card
- 1 TerraTec registration card with the serial number
- 1 Algorithmix registration and update card

Please return the registration card to us at the earliest possible opportunity or register online at **http://www.terratec.net/register.htm**. This is important for support and hotline services.

Short and to the point for busy pros.

The SoundSystem Aureon 7.1 Universe is a PCI card that supports Busmastering. Please choose a slot that is as far away from the graphics card(s) and SCSI/RAID controllers as possible—usually as close to the "bottom" as possible in most installations. Also be sure to leave room for up to six audio cables that can be connected to the card.

The front module is connected to the card using the included flat conductor cable. This cable also supplies the front module with power. If possible, please install the module in a bay below the CD, ZIP drive or other devices due to the dangling cables.

The driver installation under Windows (2000 and XP) follows the Microsoft guidelines. The drivers can be found on the included CD-ROM.

It is necessary to install the ControlPanel after installing the driver. The full functionality of the SoundSystem cannot be controlled using the Windows Mixer.

The WDM audio drivers can be selected in the applications as usual. ASIO drivers are available in compatible programs; WDM kernel streaming is "not visible" (i.e. it is always available for applications and cannot be selected explicitly). The respective buffer sizes can be configured in the Aureon ControlPanel (not to be confused with the Windows Control Panel).

So much for the summary. The following is a detailed, illustrated description of the installation.

The connections of the Aureon 7.1 Universe PCI card.

CN22

CN20
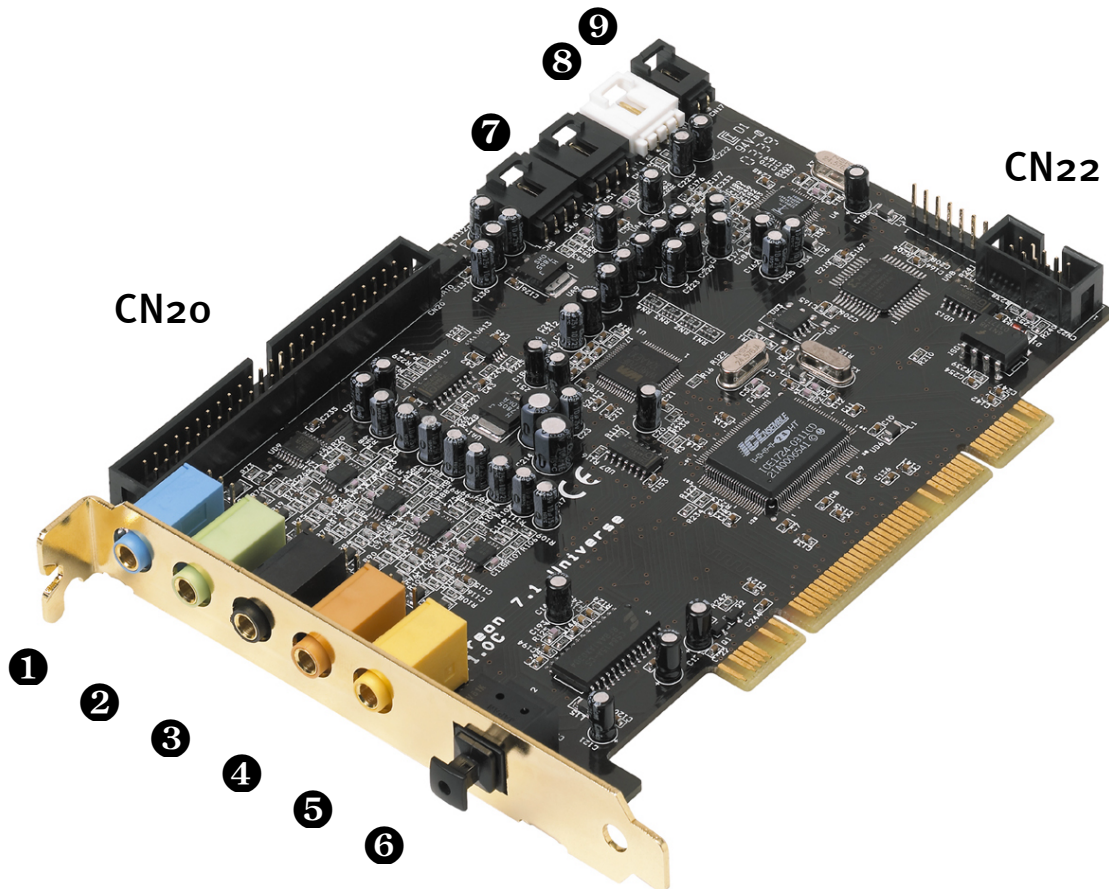
❶ Analog stereo input (3.5 mm mini-jack)

❷ Analog stereo output 1 "Front" (3.5 mm mini-jack)

❸ Analog stereo output 2 "Rear" (3.5 mm mini-jack)

❹ Analog stereo output 3 "Center/Subwoofer (LFE)" (3.5mm mini-jack)

❺ Analog stereo output 4 "Back Surround (BS)" (3.5mm mini-jack)

❻ Digital audio output (optical, S/PDIF / AC3 / DTS)

❼ Onboard CD audio input 1 / 2 (stereo)

❽ Onboard audio input (AUX, stereo)

❾ Onboard CD-ROM digital audio input (TTL)

CN20 Connection for included front module

CN22 Connection for included MIDI I/O adapter

The connections of the Aureon 7.1 Universe front module

❶ Stereo audio input (cinch/RCA with signal LED) for line-level devices such as a tape deck

❷ Stereo audio input (cinch/RCA) for connecting a turntable with moving magnet (MM, MD) pickup system

❸ Stereo audio input (cinch/RCA) for line-level devices such as a tape deck

❹ Digital audio input (coaxial, S/PDIF / AC3 / DTS)

❺ Digital audio output (coaxial, S/PDIF / AC3 / DTS)

❻ Digital audio input (optical, S/PDIF / AC3 / DTS)

❼ Digital audio output (optical, S/PDIF / AC3 / DTS)

❽ Mono microphone input (for 6.3mm plug, adjustable gain; with peak LED)

❾ Stereo headphone output (adjustable level)

On the rear: Connection for flat conductor cable to PCI card

Installation—step by step.

- Switch off your PC and all connected peripheral devices such as your printer and monitor. Leave the AC power cable connected for the time being, so that your computer is still grounded.

- Touch the metal chassis at the rear of the PC to ground and to discharge static. Now unplug the cord from the AC socket.

- Remove the cover from the case of your PC.

Installing the PCI card.

- Find a free PCI slot, remove the screw securing the metal cover over the slot and remove the cover itself. Should it be necessary to break a cover out of the case, do so with care to avoid injury.

- To ensure the optimal function of your SoundSystem, look for an expansion slot that is not immediately next to an already-installed card. Some cards, such as video or SCSI/RAID adapters, can send out signals which can interfere with the sound card.

- We also recommend a slot as close to the bottom of the computer as possible, as you can connect up to 6 audio cables directly to the card itself. Due to certain physical properties of our planet, it is very likely that these cables will dangle downward. ;-)

- First remove the flat conductor cable, then the PCI card from its packaging. Pick it up by the edges with one hand while your other hand is resting on the metal of the PC case.

- This will ensure that your body is completely discharged (no joke) via your computer without affecting the card. Please do not touch the components of the board.

- Connect the flat conductor cable to the only suitable connector on the card. Next, connect the internal cables (e.g. from the CD drive). For further information on the various connections, please see page 8 (The connections of the Aureon 7.1 Universe PCI card.).

- Align the audio card so that the strip with the golden connector pins is located exactly over the PCI slot.

- Insert the card into the slot. You might have to press the card firmly into the slot to make good contact. Take care to ensure that the contacts are exactly in line. If they are not, you could do damage to the audio card or your computer's motherboard.

- Secure the card with the screw from the slot blanking plate (these screws are generally included with PC cases).

Installing the front module.

- Find a free 5¼" bay on the front of your PC. If possible, please install the module in a bay below the CD, ZIP drive or other devices due to the dangling cables. It may be necessary to break out the cover plate. Do this with great care to avoid injury.

- Take the loose end of the flat conductor cable that you connected to the PCI card earlier and thread it from the inside of the PC through the open bay so that it extends out of the PC case. Connect the plug to the connectors on the rear of the module.

- Slide the module into the bay and secure it with the included screws. Make sure that it is installed solidly, as the frequent plugging and unplugging of cables places higher mechanical loads on the module than those that act on a CD drive.

Finishing up.

- Reinstall the cover of your PC case.

- Connect your audio peripherals (hifi amp, active speakers, mixer, etc.) to the Aureon 7.1 Universe. (See also chapter "

The connections and their uses." starting on page 21.)

- Reconnect the AC power cable as well as all other cables and turn your PC on. Make sure that your speakers or hifi system is set to low volume.

- Start your computer. The installation of the driver software is the next step.

Installing the driver software.

The SoundSystem Aureon 7.1 Universe currently comes with drivers for Windows 2000 and Windows XP. The card cannot be used under Windows 95, 98, ME and Windows NT 4. You should therefore determine which operating system you are using before installing the card.

For information on your operating system and its version number, please check the System dialog in the Windows Control Panel.
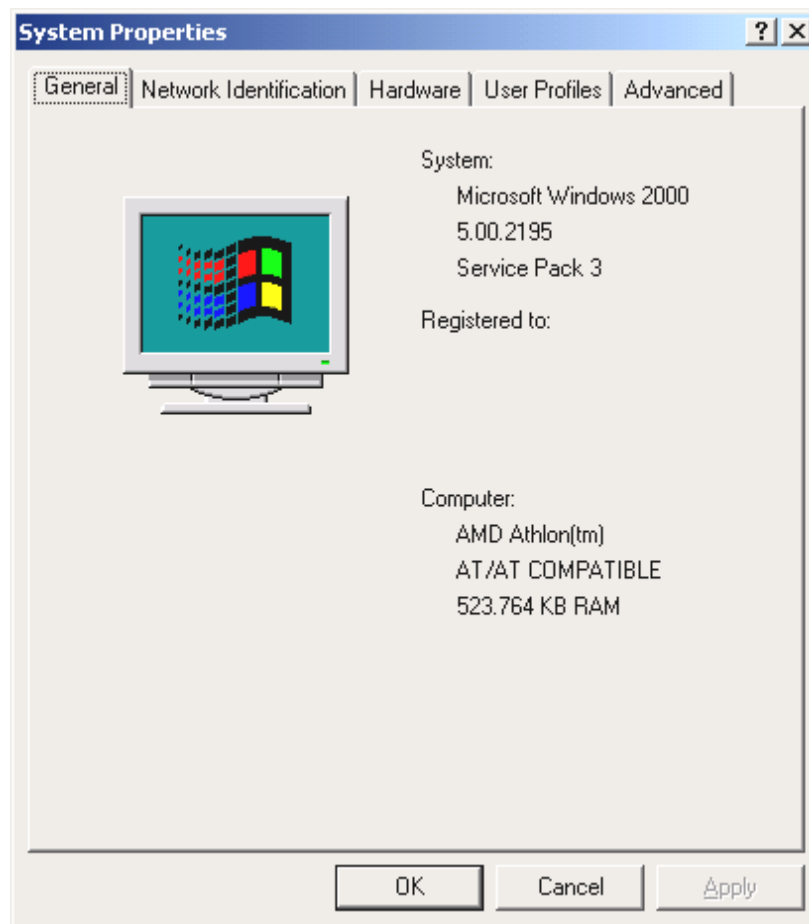

Here you can see for example the Windows 2000 Service Pack version 3.

In the following driver installation descriptions, ‹CD› stands for the drive letter of the CD-ROM drive containing the driver CD of the SoundSystem Aureon 7.1 Universe.
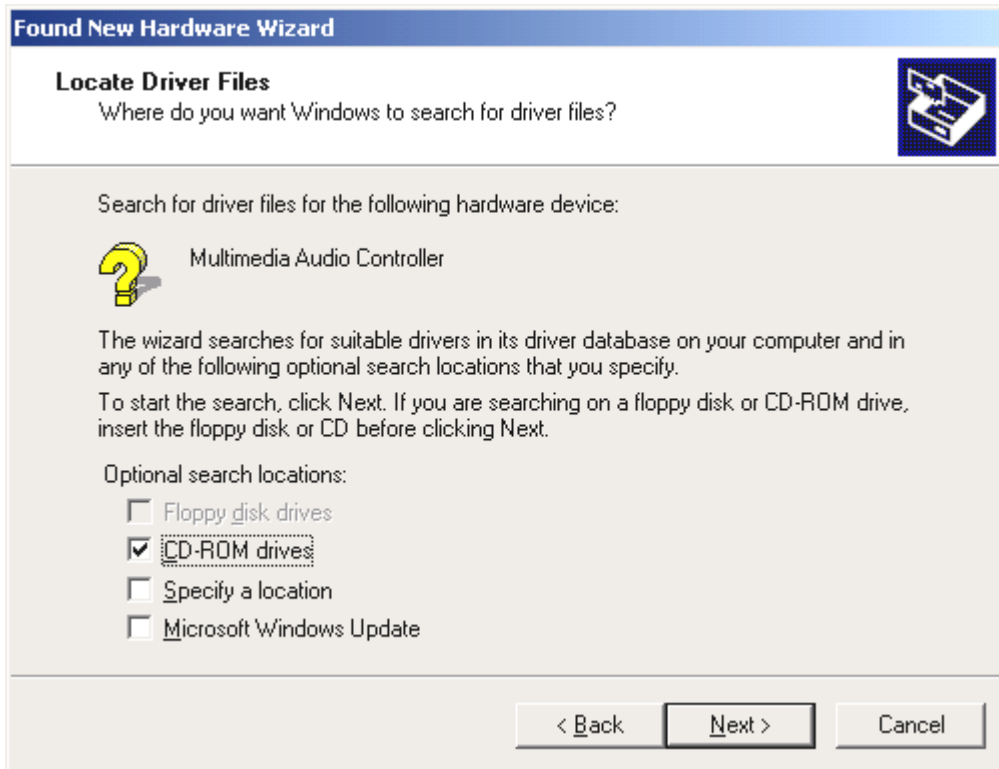
Installation under Windows 2000.

After the computer restarts and Windows detects the new hardware using the Add New Hardware Wizard, the following window displays.
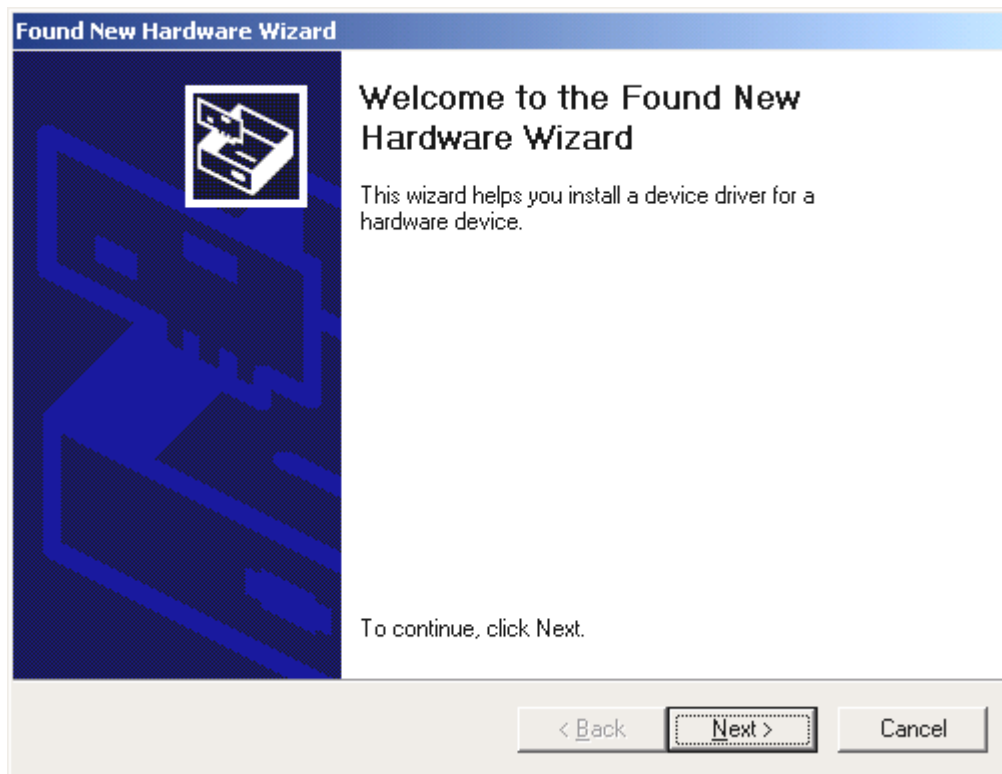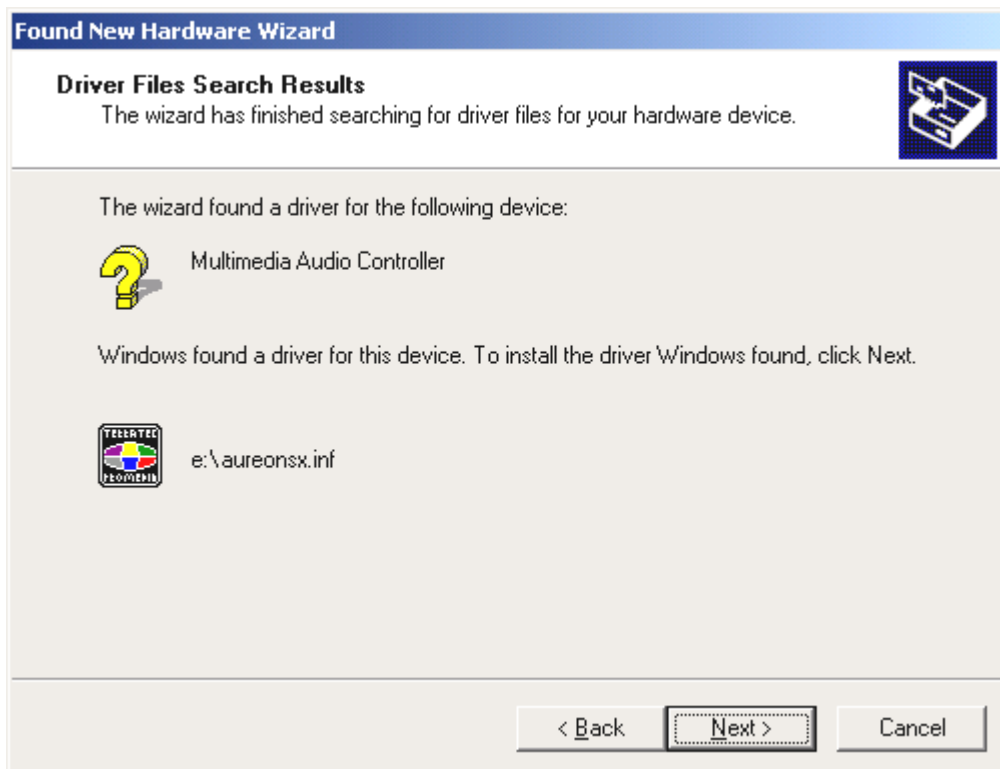

Click "Next".

Select the "Search for a suitable driver for my device (Recommended)" item and click "Next".

Activate the checkbox "CD-ROM drives" and click "Next".

Acknowledge this screen by clicking "Next".
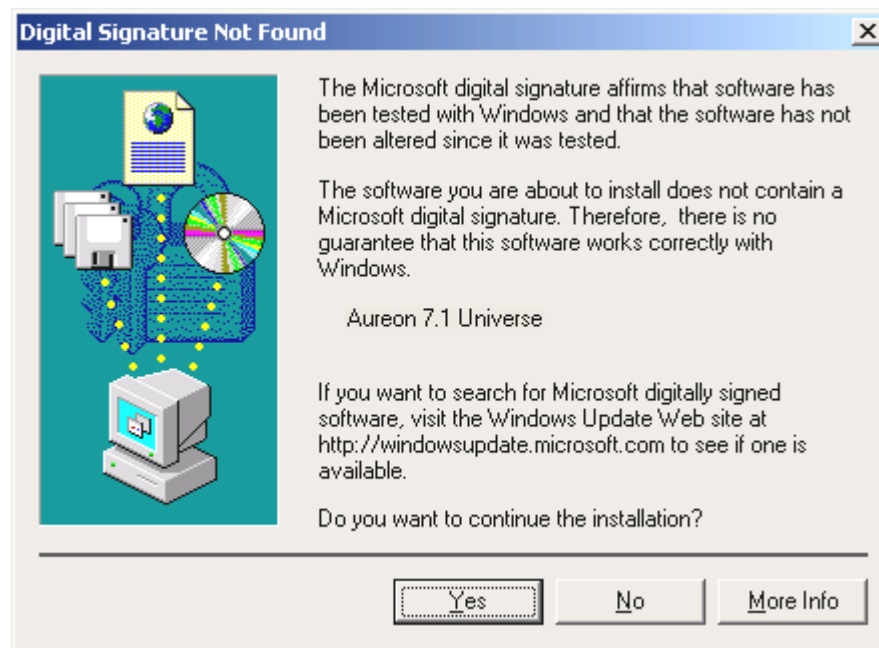
Continue the installation by clicking "Yes".

It is possible that such a dialog window appears again in the course of the installation. If this is the case, simply click "Yes".

Windows now performs the driver installation and acknowledges the process with several windows that can be viewed. Nothing else should be required at this time. If contrary to all expectations a request should appear for you to perform some action and you are not sure about it, then pressing the Enter key is generally a safe action.

If Windows requests a second driver file, please refer to the aforementioned directory on the Aureon 7.1 Universe CD-ROM.

After successful driver installation, the additional bundled software can be added easily using the autorun option.

`<CD>:\autorun.exe`

Follow the instructions on the screen to install the various bundled software programs. A particular bundled software can also easily be removed from your system. For this purpose, call up "Control Panel -› Software" and locate the programs to be removed. Select the various programs and click "Add/Remove Programs...".

Installation under Windows XP.

After the computer restarts and Windows detects the new hardware using the Add New Hardware Wizard, the following window displays.


Click "Next".

Select "Search for the best driver in these locations" and click "Next".

Select "Continue Anyway".

It is possible that such a dialog window appears again in the course of the installation. If this is the case, simply click "Continue Anyway".
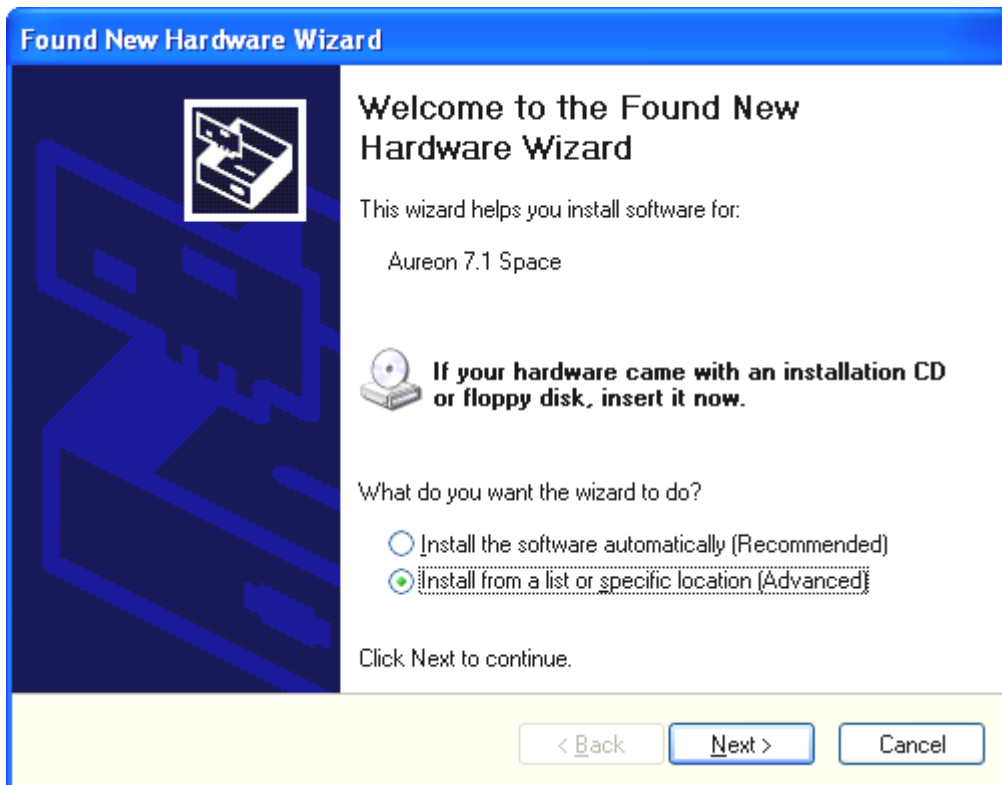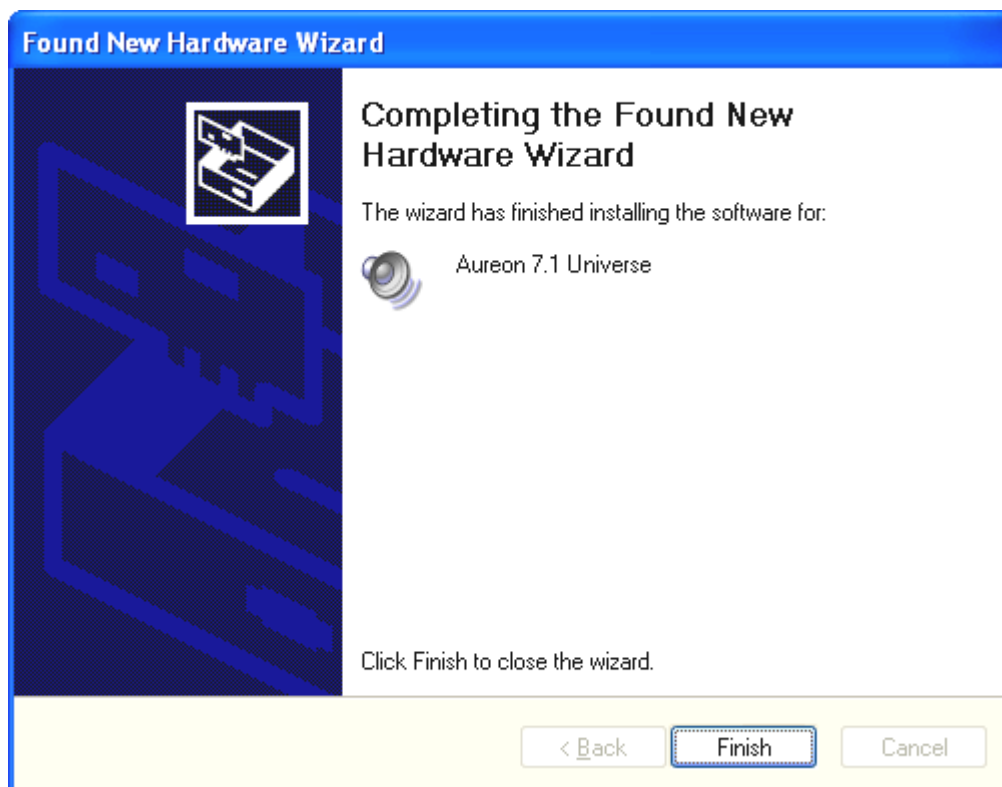

After successful driver installation, the additional bundled software can be added easily using the autorun option.
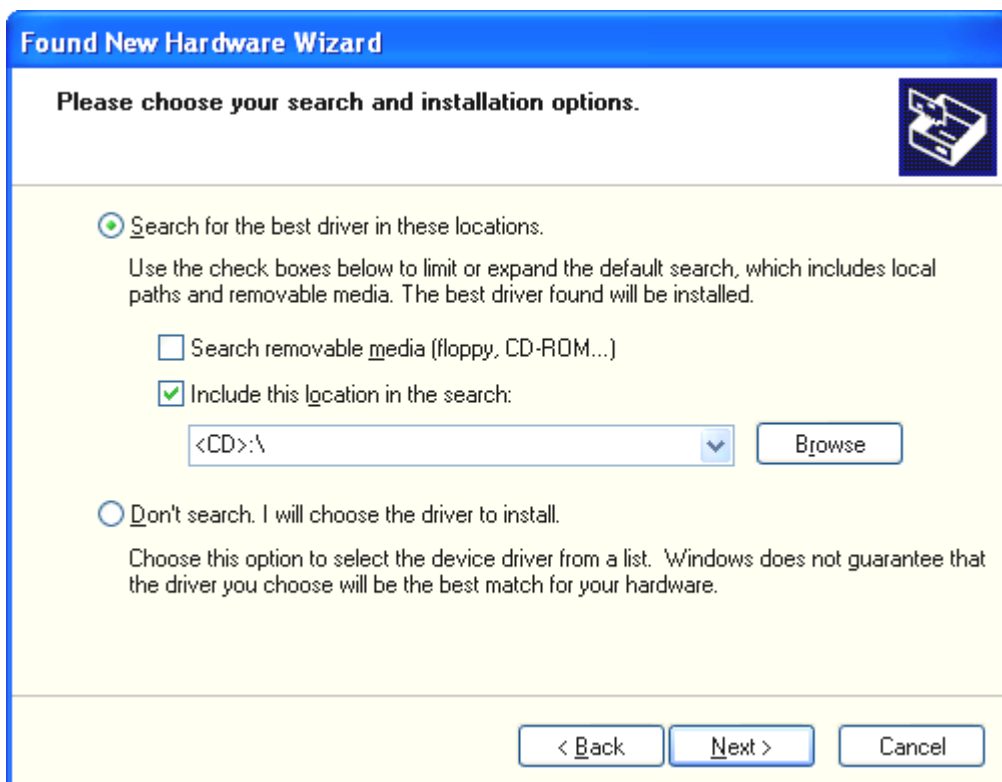
`<CD>:\autorun.exe`

Follow the instructions on the screen to install the various bundled software programs. A particular bundled software can also easily be removed from your system. For this purpose,

call up "Control Panel -› Software" and locate the programs to be removed. Select the various programs and click "Add/Remove Programs...".

Installed drivers should look like this.

After a successful driver installation, you should verify the correct condition of your Windows system. The Device Manager presents an overview of installed and recognized hardware components of your computer. The Device Manager can be found on the Control Panel under "System" › "Hardware". Then click the "Device Manager" button.
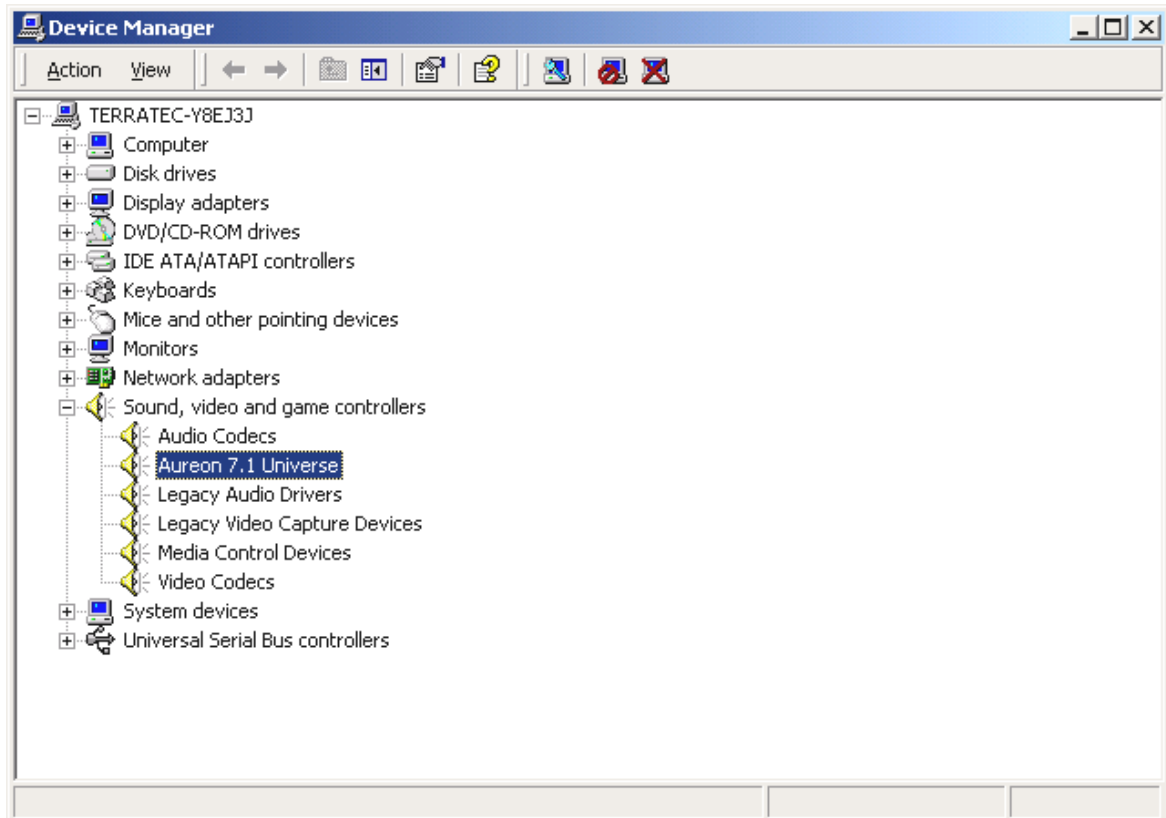
If everything is correctly set up, the window should look like this. The figure shows the expanded view of the "Sound, video and game controllers" branch. To obtain this view, simply click the "+" symbol on the left side.

Multimedia settings.
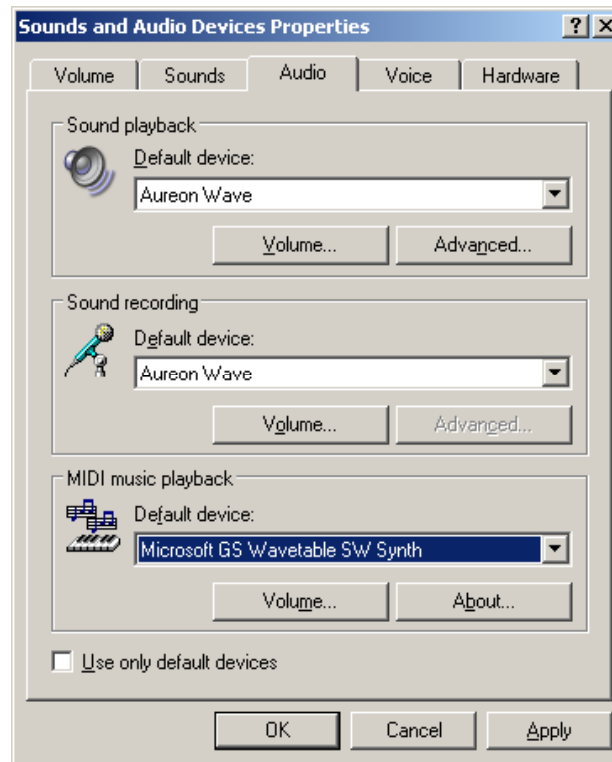
Finally, check your system's "Multimedia" settings and ensure that the playback of audio data via the Windows Wave Mapper is correctly set up.

Open the "Multimedia Properties" ("Control Panel" › "Multimedia") and select "AUDIO".

The output via the Wave Mapper is preferable for many programs and for the output of Windows system sounds.

A device may also be selected for the playback of MIDI music files. The Microsoft Wavetable Synthesizer is selected for this by default. If you have installed a different DirectX software synthesizer or a MIDI interface, select it here. If you want to output a MIDI signal via the MIDI interfaces of the Aureon 7.1 Universe, select the "Aureon MIDI" driver.

The settings in the dialog above apply to many games, the Windows system sounds, the Microsoft MediaPlayer, applications in the Internet Explorer (Flash, etc.), and so on. Please note that the driver settings must be configured separately in a number of programs. These settings will then override the ones made above.

The connections and their uses.

Now that you have successfully installed your new sound card, we come to the most important part—connecting external devices and configuring the software.

Safety note.
When connecting analog devices, ensure that the power is off to protect your speakers and your hearing from sudden peaks. For digital devices, be sure to at least lower the volume on your playback equipment.

Overview.

In and on the PCI card, and of course on the expansion modules, the SoundSystem Aureon 7.1 Universe features a wide variety of connection options. We would like to introduce them to you briefly below:

Internally—CD Audio, AUX and TTL.

The PC board of the Aureon 7.1 Universe features three plug connectors for analog connections to CD-ROM drives (CD1 and CD2), or other cards such as TV or video expansion modules (AUX). The required cables and plugs are standardized and are generally included with branded products.

An internal digital input is also available. The plug labeled "CD Digital" can be used to accommodate an external S/PDIF signal with TTL level (+5 Volt), which is how the signal is sent by most CD-ROM drives.

The analog CD-ROM connections are electrically independent (decoupled) and can be used simultaneously. The Aureon ControlPanel represents both CD signals as a single source, however.

From the rear—8 out, 2 in.

Five sockets reside on the golden slot plate of your SoundSystem, each waiting for a 3.5 mm stereo mini-jack.

First, the blue jack (IN) on the slot plate—one of the equally numerous audio inputs of the card. A signal applied to this input can later be selected for recording in the Aureon ControlPanel.

The four jacks (green, black, orange and yellow) carry eight discrete audio channels from the card, and are intended for connection to a correspondingly equipped (surround) amplifier or active speaker system. Naturally, a mixer can also be connected to these outputs for studio applications.

The outputs are laid out in the format that you probably already know from 5.1 / 7.1 hifi applications:

F   for the two front speakers (Front, Left and Right)

R   for the two rear speakers (Rear, Left and Right)

C/W   for the center speaker (mono) and the subwoofer signal, the so-called LFE channel (also mono). The left channel hereof is the Center signal (usually a white or black plug on the cable).

BS   for the rear effects speakers of your 7.1 speaker system.

Another note: the output for the front speakers (F) is switched in parallel to the analog and (usually) digital stereo output pairs, as well as the headphone output on the front module. More about that later.

The optical digital output (Toslink) is switched parallel to the digital output on the front module, and accepts a cable that is permanently connected to the rear of the computer.

From the front: the Aureon 7.1 Universe front module—complete flexibility.

The front module shows you the flexibility of the SoundSystem, with which you will be equipped for all recording and playback requirements for music and other kinds of audio. One at a time, from left to right:

The front module and its many connections.

Line In/Tape

The left (top) and right input is designed for recording from sources with a normal, so-called line level. The sensitivity corresponds to that of the input on the slot plate of the PCI card. This is the input for connecting devices such as tape decks, mixers, dictaphones, studio effects devices, the record output of your hifi system, etc. The small LED indicates whether this input has been activated in the Aureon ControlPanel.

Phono

The left (top) and right inputs are designed for recordings from turntables without an intermediate preamp—without a doubt one of the highlights of the SoundSystem. You can plug your vinyl player directly into the front module thanks to its integrated phono preamp, and the system also handles the necessary filtering. The included software also has many features for processing and restoring old audio material. Please ensure that your turntable uses a so-called "moving magnet" (MM, MD) pickup system. The hardware of the Aureon 7.1 Universe is not optimized for a "moving coil" (MC) system, which is a rarer variety of pickup. If you would like to use an MC system nevertheless, please ensure that it generates a minimum output voltage of 2-3 mV (please refer to the documentation of the pickup system).

Tip: to eliminate AC hum, connect the ground wire of the turntable to the case of your PC. Simply connect it to one of the retaining screws of the case's cover.

Line Out

This is the direct route out of the card in two channels (stereo; top = left). A normal line level is also available here, which also corresponds to the signal available at socket F (front) on the slot plate.

Mic In with gain

This is the microphone input of the SoundSystem Aureon 7.1 Universe. You can use this to connect a condenser microphone with 6.3 mm jack. The gain control above the socket controls the sensitivity of the integrated microphone preamplifier. Use one of the included adapters if you would like to connect a microphone with a small 3.5 mm jack, for example a headset, to this input.

Headphone with level

This is the system's headphone output. It provides a stereo signal which is also available at the Line Out described above, as well as at the front socket. You can adjust the volume to suit your individual preferences with the control marked Level.

Digital coaxial

The pair of RCA sockets are the digital inputs and outputs (Digital In and Digital Out) of the system. The output complies with the S/PDIF standard; an AC3 or DTS signal can also be transferred. A variety of additional information can be added to the signal or filtered out during recording (or when looping a signal through the system). Copper coaxial cables with double shielding (similar to antenna or network cables) should be used on this interface.

Digital optical

Another digital interface is available in addition to the electrical (coaxial) type. The functions of the TOS-Link socket pair correspond to those of the coaxial sockets. An optical fiber cable

(optical waveguide) is used here to connect digital equipment (many MiniDisc players use this connection type).

The wavetable connection.

The front module also contains an expansion socket: the connector with 26 small pins is designed for the wavetable modules that you may remember from "way back when". TerraTec had a number of these supplementary modules in its product range under the "WaveSystem" name back in the mid-90s. Obligated as we are to tradition, you can insert and use these modules, as well as modules from other manufacturers such as Roland, Korg, Yamaha or CreativeLabs.

Naturally, a MIDI driver is available for the external wavetable—as always. The driver can be selected under the name "WaveTable" and can be used with a full 16 MIDI channels. Page 30 (The "Input" window)

The Aureon 7.1 Universe MIDI adapter.
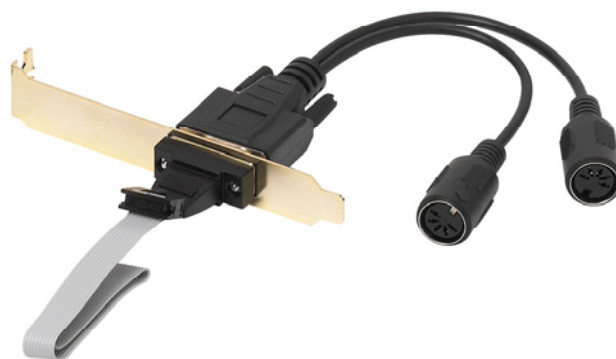
The Aureon 7.1 Universe MIDI cable whip with slot plate adapter

MIDI In and Out.

Last but not least: MIDI devices can also be connected directly to the 5-pin DIN connectors without the need for adapter cables. A tip for beginners: MIDI cables are always "crossed"— Out to In, and In to Out.

The software.

The drivers.

The SoundSystem Aureon 7.1 Universe features a range of drivers for a variety of applications. The drivers support all bit rates between 8 and 32 bits with all common sample rates between 8 and 192 kHz. As a rule, the sample rates are not "interpolated". In other words, the Aureon 7.1 Universe always automatically sets itself to the sample rate with which an application is recording or playing back. This prevents quality losses due to internal sample rate conversions. There are exceptions, however, which we will be covering below. And now to the individual drivers.

The Aureon Wave driver.

In most Windows programs, you will encounter drivers with the designation "Aureon Wave" for recording and playback. Signals which are output via this driver can generally be heard via the analog outputs of the system, and analog signals (from the line, microphone, tape or phono inputs, as well as the internal analog connections) can be recorded.

The ASIO driver.

Programs that support Steinberg's ASIO (or ASIO 2.0) interface will display the ASIO driver of the SoundSystem Aureon 7.1 Universe in the relevant dialogs. With ASIO, programs achieve extremely short delays (latency) during audio recording and playback. With Cubase VST, for example, a latency averaging 7 to 20 ms should be achievable. On fast, cleanly set up systems, latency can be reduced to 1.5 ms at a sample rate of 96 kHz!

The MIDI driver.

A separate driver is available for transferring MIDI information via the MIDI IN and MIDI OUT jacks of the MIDI cable whip of the Aureon 7.1 Universe. The driver, which is designated as "Aureon MIDI" in the system, can be selected in any situation in which its use is appropriate.

If MIDI files being played using the Windows Media Player are also to be forwarded to external devices, open the "Sounds and Multimedia Properties" dialog in the Windows Control Panel and set the MIDI output to the driver specified above (see also the "Multimedia settings." chapter, page 20).

**In detail—special properties of the Aureon driver.**

The following contains in-depth information for those with the need to know. Less experienced users won't encounter any problems if they skip over this section.

32-bit data transfer.

The drivers support a special data transfer format known as "32-bit unpacked". Audio data streams are transferred to the computer's main memory via the PCI bus. The PCI bus features 32 "lines" (32-bit). A PC generally takes care to ensure that its data lines are well-utilized. For this reason, 8-bit audio data is always sent on its way in groups of four packets (4 x 8 = 32), and 16-bit data (2 x 16 = 32) in groups of two (diagram above).

The situation is a bit more complicated from the processing standpoint with 24-bit audio data: suddenly there's "only" 24 sweet-sounding bits available, i.e. 8 bits are "missing". The "24-bit packed" process solves this problem in the following manner: the computer CPU (your Pentium, for example) divides the 24-bit data into multiples of 32 (middle of diagram). That costs computing power and isn't really necessary.

The "32-bit unpacked" process fills the remaining bits with zeroes and the driver sends suitable 32-bit packets on their merry way. Most commonly-used applications currently support this process, which is particularly easy on the computer's resources (bottom of diagram).
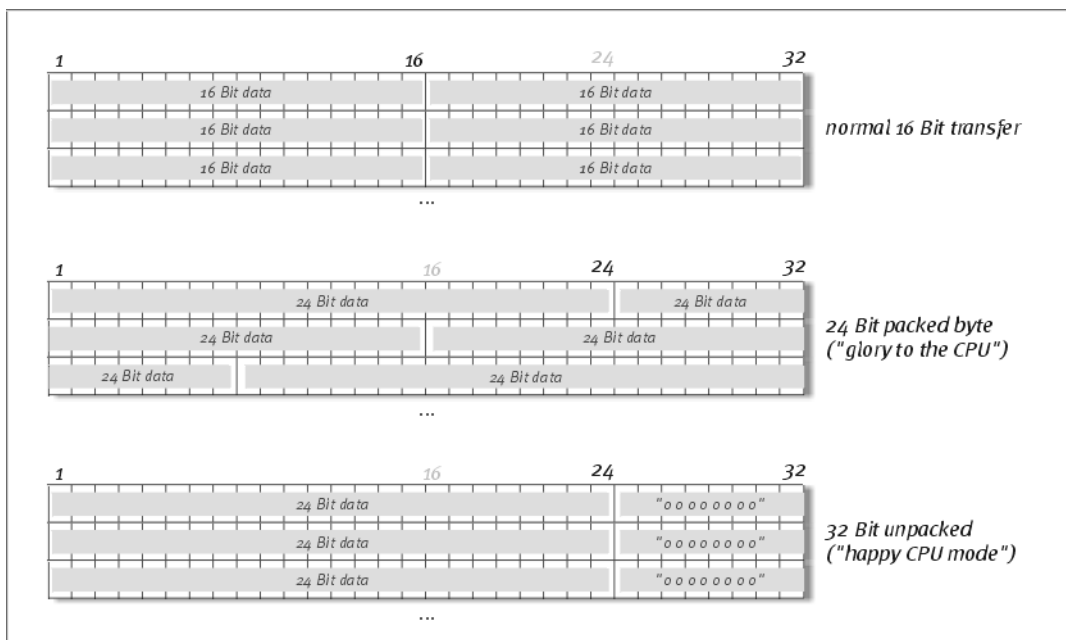
DirectSound & WDM.

It goes without saying that the drivers of the Aureon 7.1 Universe also support Microsoft's DirectSound or DirectSound 3D interface. What's more, the software complies strictly with Microsoft's WDM specification. WDM (Windows Driver Model) is a recent driver concept from that popular Redmond-based software manufacturer which also involves a number of innovations in the audio sector. For example, the drivers are able to play back audio data streams

from multiple applications (MME and/or DirectSound) in parallel (multi-client, a "luxury" that faithful TerraTec customers have enjoyed since 1997).

WDM sample rate (SR) interpolation.

The multi-client capability of the WDM architecture also permits the simultaneous playback of multiple audio data streams with differing sample rates. The sample frequency used for all data streams is oriented towards the file with the highest sample frequency. All additional data streams played back—still during the runtime of the first file—are interpolated accordingly and their tone pitch remains unaffected.

An SR conversion/interpolation does always result in a certain loss of quality, however. You should therefore ensure that you do not use several programs simultaneously with differing sample rates for applications in which the highest possible audio quality is vital. For example, it's best to only have the playback software running when transferring a piece of music at 44.1 kHz to a DAT recorder. In the Aureon ControlPanel you can also bypass possible level adjustments (= changes to the data stream!) by enabling the "Wave Playback" option on the Settings page. This setting is especially important if you want to transfer AC3 or DTS signals via the digital interface, for example to an external Dolby digital decoder.

WDM kernel streaming.

WDM kernel streaming also represents a new technology for Microsoft. Like established models such as Steinberg's ASIO interface, kernel streaming permits extremely fast access to the audio hardware. The deployed software (such as audio/MIDI sequencers or software synthesizers) must support the WDM function directly, however. One program we have tested and are familiar with is the "Sonar™" recording software from Cakewalk.

The Aureon ControlPanel.

The Aureon ControlPanel is— next to the drivers— by far the most important piece of software in the package. Here you can configure your Aureon 7.1 Universe to suit any given situation, adjust sensitivities, reduce volume levels, and much more.

In the mixer window, you can control the volume of each source. The rightmost section of the Aureon ControlPanel, which controls the master volume of the system, always remains the same.

How does the ControlPanel work?

Despite its wide range of capabilities, the ControlPanel and the routing (signal flow within the card) of your Aureon 7.1 Universe is very easy to understand. The Aureon ControlPanel is provided on several pages, which you can select by clicking their respective tabs, on which you can configure settings and view previously configured settings. The tabs are Mixer, Surround, Inputs, Settings and Info. For starters:

The "Mixer" window.

Let's take a closer look at the six signal paths. From left to right, you see them labeled as CD, Line In Front, Analog In, Mic, Phono and Wave—which may or may not mean anything to you. The Master area, which is identical on each page, is on the right. More about it later.

Each of the five "analog" signal paths (CD, Line In Front, Analog, Mic and Phono) and the "digital" wave signal (e.g. your system sounds, or music playback from your media player software) has a separate fader for controlling the volume.

The Mute button completely mutes the signal at that particular input.

The stereo link function (enabled by default) permits the left and right signals to be adjusted simultaneously.

The settings on the mixer page should not be confused with the gain control settings on the "Input" page—more information on this subject will follow later. These settings allow you to control only the volume proportion of the signal, which you hear over your speakers.

In the Master area on the right, a master volume controller for the system appears on all pages of the Aureon ControlPanel. This always allows you to have direct access in case you need to make a quick adjustment.

The "Surround" window.

The Surround controls the volume of up to 8 audio channels for multichannel playback, as used in DVD audio, for example.
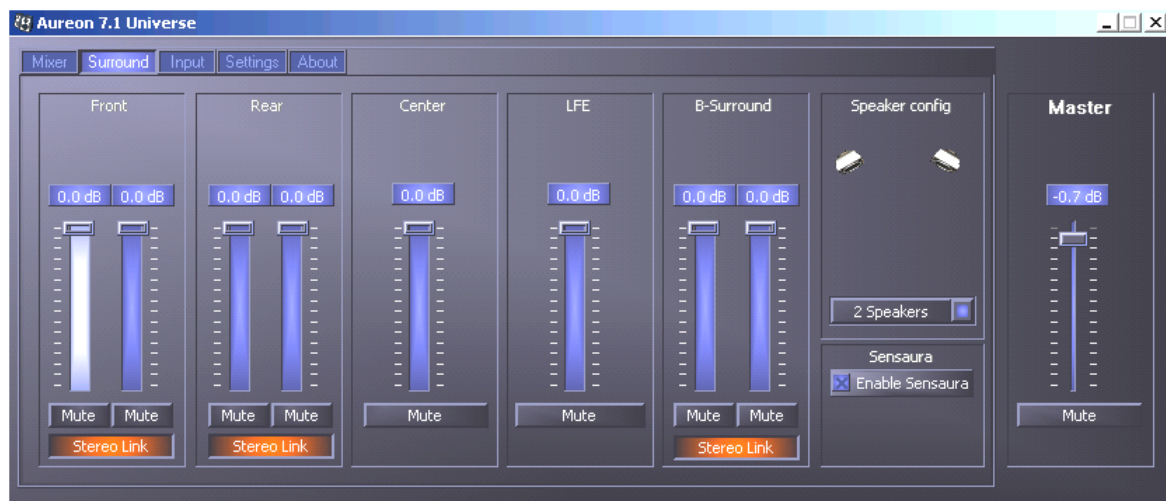
The surround configuration of the Aureon 7.1 Universe—here, you control the proportionate levels of the surround channels between each other.

In the section towards the right—under Speaker config—you first set the listening configuration which corresponds to your setup, or the one you want to use. You can choose between 2, 4, 6 or 8 speakers. If you click on a speaker icon, it changes color, and you should hear a test signal from the corresponding channel.

Selecting "Enable Sensaura" adds an algorithm which provides a more spacious, three-dimensional sonic image, even when using only two speakers.

The volume controls control the relative levels of the channels. As the signals can only be attenuated, you must reduce the levels of the other channels to hear the center channel louder, for example.

The "Input" window

The control center of your Aureon 7.1 Universe—in this window, you can set the sensitivity for each input, and select the input from which you want to record.

Click the button above a fader to select the corresponding input for recording. If you can't decide on just one input, you can always use the "Stereomix" function, which combines the signals from all inputs into a single signal.

For the Aureon 7.1 Universe, each input has a separate sensitivity or gain controller. On the PCI card, there are several preamps which can be used to increase or decrease the strength of an input signal. They are controlled by the software faders. Experienced users will be glad to hear that this increase (maximum +19db) is performed before the actual A/D conversion, just as in professional equipment. This ensures that the high-quality A/D converters always deliver their best possible performance.

The colorful lights in the panel aren't just intended to brighten your day, they're primarily designed to help you set the signal levels cleanly. The display above shows the amount by which the signal is increased or decreased within a range from −13dB to +19dB.

Setting it to -13dB activates a hardware-based gate function, which is equivalent to muting.

Hover over one of the colorful VU meters briefly with the mouse cursor and the current peak signal level in dB will be displayed.

The stereo link function (enabled by default) permits the left and right signals to be adjusted simultaneously.

The "S/PDIF" bar remains grayed out and cannot be selected as long as there is no usable signal present at the digital input. If a signal is present, or the synchronization source is set to "External" (in the "Settings" window), you can switch between the two digital inputs here.

You cannot adjust the sensitivity (gain), because it is a digital signal.

The "Monitor" button activates direct monitoring of the digital input, allowing you to hear the digital signal directly, and unadulterated, at Line Out 1 (front) or the headphone output.

The "Settings" window.

Here's where we come to the real nuts and bolts. To be more precise, to a number of sophisticated technical details—which aren't very difficult to understand, however. Specifically, these are:
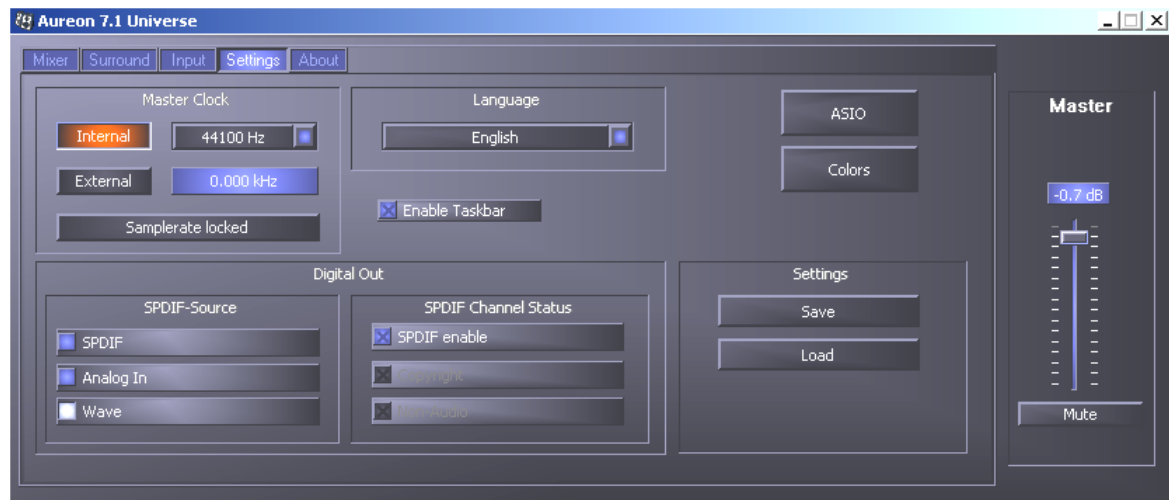
The Settings page for the configuration of drivers, digital interfaces/filters and the color settings of the ControlPanel.

The Master Clock.

Here we're dealing with the sample rate used by your SoundSystem Aureon 7.1 Universe. This is—depending on the application—a very important point, as the card can be (and in some cases, must be) controlled by an external signal (from a MiniDisc recorder, for example), or it can specify a rate for itself internally and can share this signal via the digital interfaces with other devices being used for recording.

If a valid S/PDIF signal is being applied to a digital input, its sample rate will be displayed in the Aureon ControlPanel, and the SoundSystem can and should be set to this external sample rate (External). If you forget this step, audible errors such as dropouts and clicks may occur during recording—and already when monitoring the signal.

Naturally, you should also pay attention to the settings of your periphery in the reverse situation (synchronizing an external device with the Aureon 7.1 Universe). In that case, set the Aureon ControlPanel to "Internal", as it also would be when you are not using external digital devices. If the devices are to be permanently connected to one another in both directions, you must decide which device will provide the clock signal.

The digital interfaces of the Aureon 7.1 Universe support all bit resolutions between 8 and 24 bits, as well as all sample rates between 8 and 96 kHz. Please note that not all devices can process sample rates higher than 48 kHz. To transfer a signal recorded at 96 kHz to a minidisk recorder, it's probably necessary to convert the file(s) to 44.1 kHz or 48 kHz first.

The "Sample rate locked" function locks the sampling rate at a defined value. This function is used mainly in conjunction with games or programs which use voice over IP, to ensure that the speech is reproduced correctly and without distortion.

The language.

Here, you can set the Aureon 7.1 Universe ControlPanel to the language of your choice.

Enable Taskbar

This button adds an icon for the ControlPanel to your Windows taskbar, and starts the Aureon ControlPanel automatically each time the computer is restarted.

Digital Out.

The "Settings" window of the Aureon ControlPanel lets you choose from a variety of sources for digital audio output. The following source settings are available in the "Digital Out" field:

At the click of the mouse: signal sources and S/PDIF filters.

SPDIF sends the signal applied to the digital input directly to the digital output without losses. Be sure that the synchronization is correct, however!

Analog In takes the signal from the input selected on the "Input" page and outputs it directly at the digital output. This function thus allows you to "monitor" an analog recording directly and digitally.

Wave delivers the signal output of an audio application directly to the digital output. You will need this setting to send control information as used in AC3 and DTS signals in addition to the audio data. The audio signal is "bit-true".

In addition, the following parameters can be selected in all three positions:

Copyright adds a copy-protection ID to the signal or filters it out when deactivating copy protection. This function sets the so-called "copy protection bit" which ensures that no digital copies can be made of the signal.

Non-Audio adds information to the data stream that indicates that control information (such as channel assignments) is being transferred in addition to the audio information. Activate the Non-Audio mode when transferring AC3 or DTS audio signals from a software DVD player to an external decoder.

S/PDIF enable, as you may have gathered from the name, switches the digital outputs of the Aureon 7.1 Universe on or off.

ASIO.

The ASIO button will take you to the settings for the so-called ASIO buffer size. These are responsible for the "speed" of the ASIO driver. A lower number of samples per buffer will reduce the time that elapses before an application issues audio signals with ASIO support.

This setting is system-dependent. In the best case, the software will have a latency of around 1.5 ms. On average systems with processor loads typical for a music PC, you can expect values around 7-30 ms. Note that you may have to restart the ASIO application before your new settings take effect.
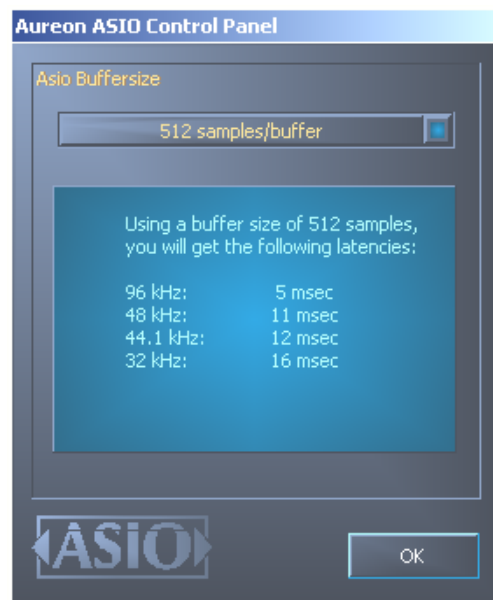
The ASIO settings:

Colors Settings.

Here you can configure perhaps the most vital system settings within the ControlPanel. No matter where you look, our days are filled with color.

The "Reflections off" option disables the attractive reflections of the elements. This can be helpful for slower systems.

What's more, you can use the pop-ups to choose from among a number of preconfigured designs. "Default" restores the original display settings.

By the way, users who hate colorful UIs or who are obsessed with performance don't need to worry: with the reflections disabled, the system load is no greater than when displaying "normal" (gray) Windows elements.

The Information window

…will display information on the audio drivers and system settings. These details can be useful when contacting TerraTec support.

The remote control.

The Remote Control Editor.

To install the application required to use the remote control, run the software setup using AutoStart or by directly accessing the "Setup.exe" file from the directory
`<CD>:\Software\TerraTec\Remote Control\Setup.exe`. Select the appropriate language, then follow the instructions on the screen.

Once the setup routine has been completed successfully, you should see a small remote control icon in your taskbar. Your remote control is now ready to control a few basic functions. You can raise and lower the playback volume of your system by pressing Vol Up and Vol Down. So that operation via remote control will be as effective as possible, the TerraTec Remote Control Editor control software has the capability to forward commands to all Windows applications. For greater convenience, set up the most frequently used applications for remote control.

The menu

If you have not made any changes, the window displayed to the right appears, with similar contents. This overview shows the currently loaded settings for various applications. Of course, some of the applications which appear in the screenshot may not be set up on your system. In order to select other sets of commands than these, or to switch these off, simply click the corresponding field and a dialog window opens with all command sets and the entry "---". Select the entry to disable this menu input. In the default settings, you can reach this menu via the *APP* button of the remote control as an OSD (On Screen Display) menu.
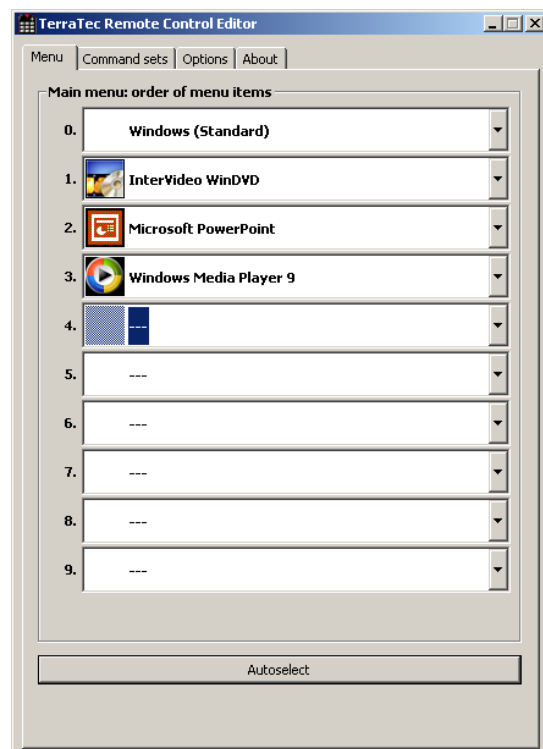
Automatic selection. You can use the "Automatic selection" button to clean up your menu at the touch of a button. Clicking it performs a check of whether the program file associated with the instruction set is actually located on your hard drive and/or removes entries between two command sets which have been disabled, and the menu items move more closely together.
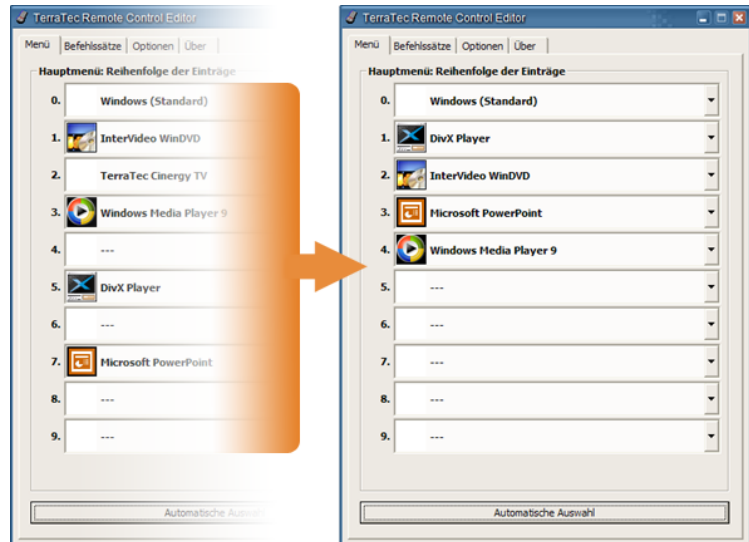
In the row of tabs to the right of the "Menu" item, you can switch to the "Command sets" tab to create your own command sets, edit existing ones or delete existing ones.

The command sets

While developing the software interface between the operating system on the one side and the TerraTec hardware on the other, our first priority was to provide the user with as much flexibility as possible, and thus not to restrict the remote control options to TerraTec applications. The convenient user interface allows you to create your own command sets, adjust existing ones to your requirements and remove command sets. If you go to the "Command sets" window, a list of all currently available sets is displayed first.
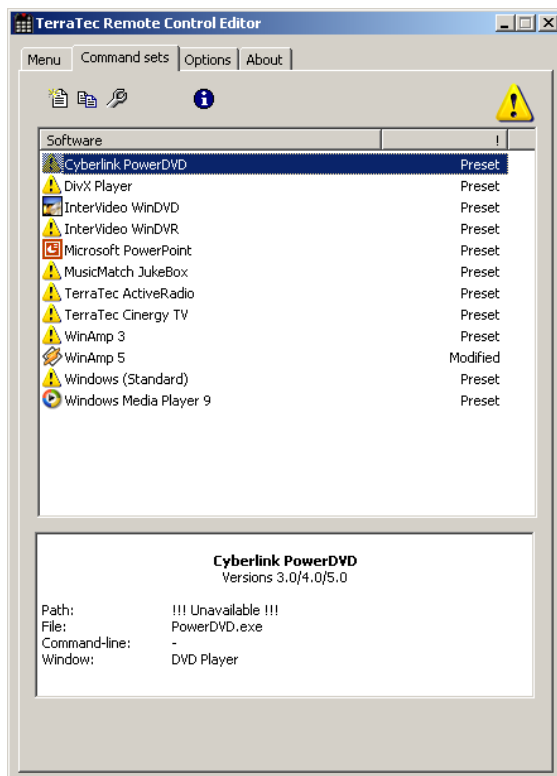
Where's the program? When the warning symbol appears as the icon, it indicates that this command set cannot be used at this time. This can happen if you have uninstalled an application, or a preinstalled command set cannot find the executable file in the application's default directory. If, on the other hand, the settings are correct, the correct program icon is displayed.

Information. An information window is displayed in the lower area and provides the most significant key date relevant to the selected command sets. In the example here, the path to the program (program folder) appears unavailable.
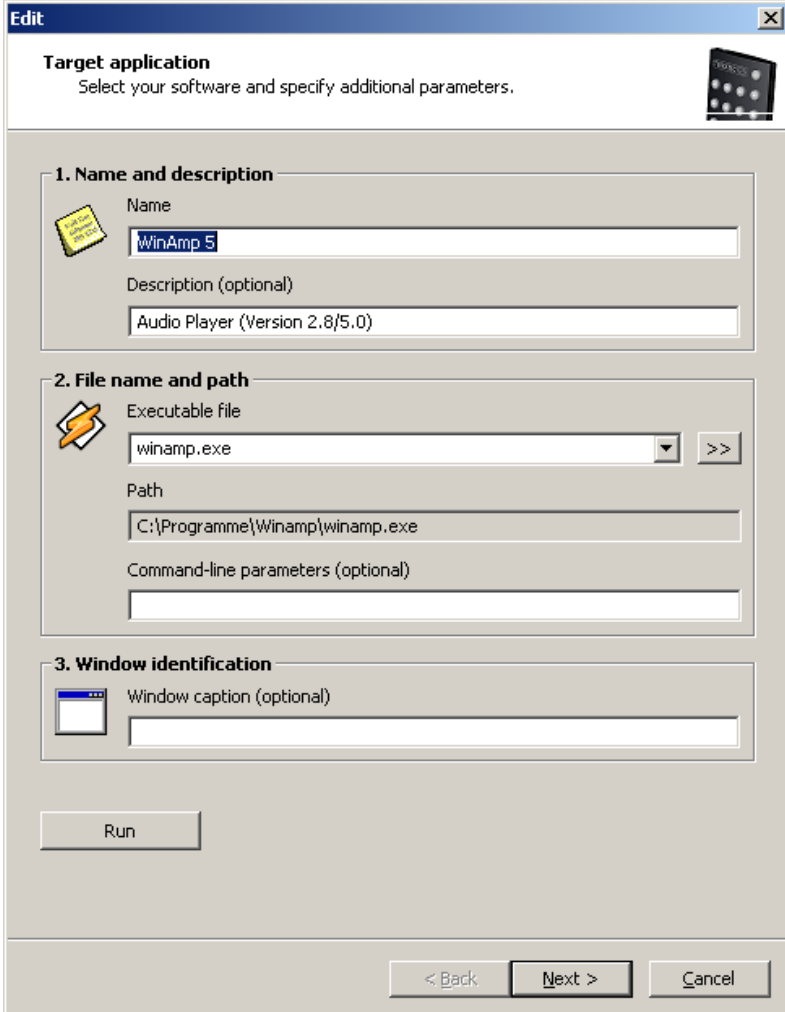
Using the example of the Windows Calculator—an often underrated, cool little app—we want to provide you with an example of how you can create your own presets for a desired application. To do so, click the icon we mentioned above in your taskbar.

1. Select the application

In order to allow the Windows Calculator to be operated via remote control, we must first create a new command set. To do this, click the 📑 icon in the upper area, or right-click an existing list entry to open the context menu and select "New".

Context menu	Icon	Meaning
- New	📑	New command set
- Copy	📋	Copy command set
- Edit	🔧	Copy command set (or double-click a command set)
- Delete	✗	Delete command set
- Reset	↓	Reset command set to original settings
- Information	ⓘ	Show assignment as an HTML file.

In the window that appears, you can enter detailed information about the application that you want to operate by remote control. After entering a name and description of your choice, you can enter the path to the executable file by clicking [»]. In all probability, the file name will vary depending on the program description in the start menu or the name of the icon. This goes back to old MS-DOS restrictions on file names. At that time, the name of the executable files could have no more than eight characters.

To make it easier for you to navigate using the program icons, you can change the view so that the icons are displayed larger, if this is not already configured by default. From the "Open" dialog, it is best to select "Thumbnails" as the menu view. Now, select an application to be controlled.

Using the optional input for command-line parameters, you can, for example, send the parameter `C:\My Music\Hits.m3u` to WinAmp (as the selected application), which calls up a playlist when WinAmp starts. If you enter a window caption under "Window identification", this may help to identify the application more quickly, allowing you to control it more efficiently. However, please note that many applications change this title, and integrate, for example, the document name of the last file loaded into the title. Now click "Next ›".

2. Program the remote control

This takes you to the most important window for assigning functions to buttons. Because this software is also included with the delivery of other products, you can use the "Remote control" pulldown menu to select the TerraTec product you want to use right now. Below it, you see the name of the button you have just pressed, in this case Channel + . This is also indicated by a red outline around the image of the remote control. The various outline colors have the following additional meanings:

Green – default assignment;

Orange – user-defined, i.e. created or changed by you; and

Blue – preset.

Unfortunately, things now become a little more complicated. Because of the wide range of options provided for command assignments, we won't try to provide a thorough description of every parameter here, but just an overview of them in table form. The possible commands can be subdivided into five areas using the "Command type" and "Parameters" pulldown menus:

- **On-screen display menu (OSD)**
  ... "On Screen Display" functions such as the clock etc.

- **System command**
  ... Execute or assign basic functions of the operating system.

- **Key combination**
  ... Anything you can do from the keyboard can also be programmed here.

- **Window**
  ... Functions that are familiar from usual window menus, such as maximize etc.

- **Control element**
  ... For hardcore users only: In Windows, all program buttons and menus are identified using unique designations, which can be used in commands to jump to them. Thus, it is also possible to use them via the remote control. As a rule, though, the functional areas listed above are sufficient for household use.

Here is a detailed overview of the individual functions, listed according to command type parameter…

On-screen display menu (OSD)	
Display parameter	Function
Main menu	Use this button to call up the main menu; in the default assignment, the menu is called up using the **APP** button. (For more details, see the chapter on *The menu*)
Software info	Shows the currently loaded command set
Time	Displays the current system time

System command		
Parameter type	Parameter command	Function
On/off	SCREEN SAVER	Enables and disables the screensaver.
	Standby	Switches the computer to "Standby" energy-saving mode.
	Sleep	Puts the computer in sleep mode.
	Shut down	Closes Windows—don't forget to save!
Volume	Change the volume by XX%	Changes the volume by XX % each time this is selected
Mute	Switch on/off – mute on/off	Switches the sound on and off
Mouse click	Left / Middle / Right	Clicking once with the specified mouse button
	Double click	Triggers a double click with the left mouse button
Move mouse	To the left/right	Move the mouse cursor in the specified direction. Start the movement with the first press of the button and stop it with the second, or change the direction using another button.
	To the top/bottom	
	To the top left/top right	
	To the bottom left/bottom right	
Cursor	Hide / show / show/hide	Display or hide the cursor—useful when watching movies and the like.

Button combination
Click the **Next entry** button and perform the desired keyboard input, e.g. **Ctrl + A** for "Select all". Then, an "A" appears as confirmation under the key combination and a check appears in front of *Ctrl*. This confirms that you have assigned this combination to the selected key.

Window	
Parameter command	Function
Close / maximize / minimize / restore	Executes each window command listed.
Open/Close	Opens and closes a window
Maximized on/off	Switches the window between maximized and restored sizes.
Minimized on/off	Switches the window between minimized and restored sizes.

Control element

Anyone familiar with the term *Resource Workshop* will be at home here. Using this, you can jump directly to certain program functions which would otherwise be impossible to reach via keyboard input, and very difficult to reach using mouse movements. The best way to find out is to ask someone who knows.

This concludes our discussion of the essential part of assigning functions. For the calculator in our example, this basically means assigning key combinations with the digit block from 0 to 9; the AV button of the remote control could be assigned the plus key, the "-/--" button assigned the minus key, the Mute button assigned the key code of the Enter key, and so on. Now you can perform a simple calculation using the remote control. OK, it doesn't make a whole lot of sense to do it that way. However, we hope that it clearly illustrates how the process itself works.

In the description field, you can then insert a description of your own creation (for example, "ultimate number cruncher") and test the assignment you have chosen by pressing "Test", which starts the calculator. Then, continue by selecting "Next ›".

3. Check the assignments

The following window now gives you the opportunity to check all the settings you have configured. To do so, click [››]. Now, the browser of your choice should open and provide you with an overview of the assignment of all buttons of the remote control for this application. For the first time, the browser also allows you to print out the whole thing if you like.

4. Done!

Once you have decided on a command set using the possible function assignments and have checked and saved it, you can select this application for the menu, making it conveniently accessible using the remote control via the application menu.

The options

Now, about the options: There, you can switch the on-screen display menu (OSD) on and off completely, and modify its display options.

If you have installed more than one TerraTec product with infrared receivers, here you can choose which one you want enabled. You can select the "Start with Windows" option to ensure that the Remote Control Editor loads automatically to manage the command sets each time the system is started.

Standalone mode.

The Aureon 7.1 FireWire can provide enjoyment even without a PC. Even without an active FireWire connection, the high-quality converters live up to their reputation.

This means that you can use the remote control to switch between sources, and thus output digital signals as analog signals and vice versa. If none of the LEDs that indicate the selected source is lit up, the digital input is selected.

Selecting an input using the remote control in standalone mode:

1 – Phono IN

2 – LINE IN

3 – Mic IN

0 – Digital In

This means that a signal received via the digital input can be output via the analog output and vice versa. However, the Aureon module is, of course, not a standalone DolbyDigital® Decoder. This means that the incoming digital signal should be a standard PCM signal, and not a data signal such as those used for AC3 or DTS. The converted signal is output at the first line output. As in regular operating mode, the master volume controller controls the volume. Of course, if no FireWire connection has been established, it is understood that you must supply the module with the power it requires by plugging in the power adapter.

Sound Rescue TerraTec Edition 2.0

1. Overview

Sound Rescue *TerraTec Edition 2.0* is a powerful tool that lets you clean up problematic material such as older recordings, directly on your PC. It lets you remove or significantly reduce unwanted noise while maintaining the authentic sound and quality of the original recording.

Sound Rescue *TerraTec Edition 2.0* is an ideal compliment to recording and CD programs, especially if you want to eternalize all of your tape cassettes and vinyl treasures – even your shellac phonograph records on CD. **Sound Rescue** *TerraTec Edition 2.0* offers a vast variety of functions and is specially developed for the multimedia user who does not want to spend hours learning complicated editing processes or use the multitude of parameter settings necessary for other professional software. For the two editing modules, *Descratcher* and *Denoiser*, only two parameters need to be set to achieve optimal sound, which normally takes only a few seconds to do. You can adjust these settings with no trouble during realtime playback. Likewise, you can adjust the volume and tone (bass and treble) of the "cleaned" output signal to remaster "dusty" recordings.

Features:

- Realtime operation with 233 MHz or better MMX Pentium and Windows® 95/98/Me/NT/2000/XP

- High stability using its own, separate drivers

- Recording at 44.1-kHz/16-bit "Red Book" WAV format

- Worldwide, the fastest off-line processing

- Fast, intuitive menu prompts

- Removes noises such as popping, crackling, static, scratches and surface noises

- Reduces constant background noises such as tape static, line hum and thyristor hum

- Softens digital distortions and covers signal drops

- Realtime operation during the fine tuning of parameters

- Unique *Difference* function for listening to the noises that are removed

- All measurements are precise to up to 80-bit decimal accuracy

Typical Applications:

- Archives and restores old audio media

- Remasters old recordings on CD: from shellac, vinyl and tape

- Removes interference noises on cassette tape recordings

- Filters out and removes distortion in noisy dialogs and in recorded telephone clips

- Reduces distortion in radio broadcasts from medium wave, short wave and FM

2. First steps

Sound Rescue *TerraTec Edition 2.0* is located on the product CD, which is configured for automatic installation. If the autorun application on the CD does not launch automatically, start the application manually by double-clicking the "autorun.exe" file in the root directory of the CD. Then start the setup of **Sound Rescue** *TerraTec Edition 2.0* and follow the instructions as they appear on the monitor.

When **Sound Rescue** *TerraTec Edition 2.0* is started for the first time, it checks whether a CD burner and burner software are installed on your system. **Sound Rescue** *TerraTec Edition 2.0* has been tested with WinOnCD™ 3.6 to 5.0, EasyCDCreator™ 5.0, Nero 4.0 to 5.0 and Feurio 1.63. A dialog window asks which CD burning program you can start directly from **Sound Rescue** *TerraTec Edition 2.0*.
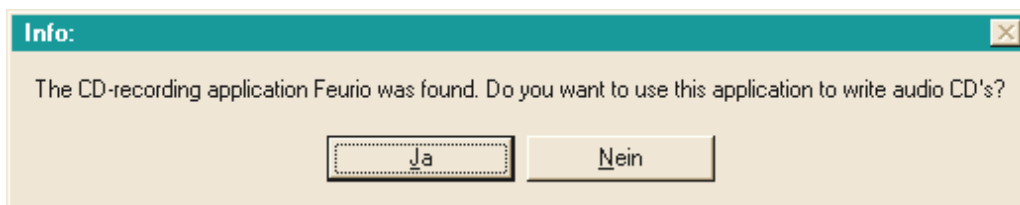
The dialog window for selecting burner software

Select the program that you prefer most for burning your audio CDs. Also refer to Chapter "**8. Burning CDs**".

To quickly verify that **Sound Rescue** *TerraTec Edition 2.0* was installed successfully, simply click the [Load] button and select the *democlic.wav* file for editing. **Sound Rescue** *TerraTec Edition 2.0* supports WAV files based on the Red Book standard: 16-bit/44.1 kHz.

User Interface

Sound Rescue *TerraTec Edition 2.0* has an intuitive interface. Its features are clearly arranged and truly easy to use and, at the same time, it offers powerful functionality. The upper half of the window contains the areas for the **DeScratcher, Analyzer** and **DeNoiser** features, and below these is a strip with other adjustment options for sound optimization. Below this is the **Playback area,** which displays the actual audio material in the **Waveform window** as well as control buttons for other program functions.

Quick Instructions

Follow the steps listed below to achieve – in very little time – a high-quality, remastered, recording of, for example, and old, scratched LP record. More detailed features are described in the chapters that follow.

1. Click the [●] button, enter a file name and start recording your new audio material.

2. Click the ![Load] button to open the "*Select Input File*" menu. Select the WAV file that you want to process. The file you selected is loaded and its waveform is displayed in the *Waveform window*.

3. Start playback with the ![play] button. You should now hear the audio material and be able to view the *level-control indicator*. In the **Analyzer** window, the frequency profiles of the input and output signals are dynamically displayed as is the *noise print*. You can pause playback with the ![pause] button and "rewind" back to the beginning of the clip by clicking ![rewind]. During playback, you can restart playback at any position you like simply by clicking the position in the *Waveform window*.

4. If your recording contains sudden popping noises, use the *Declick* adjuster to try to filter them out.

5. If your recording has humming or buzzing noises or, in the case of a recording from an LP record, a constant background crackling, use the *Decrackle* adjuster to filter it out.

6. To reduce or remove noises such as tape static or constant LP surface noises, use the **Denoiser** feature by adjusting the *threshold* and *reduction* adjusters.

7. To compare the original sound with the filtered signal, click the ![bypass] button.

8. Use the ![difference] function to listen to the noise that has been filtered out.

9. Adjust the volume slide so that the volume level never quite reaches the red range.

10. Use the ![Split] button to clip off the extra audio material to the left of the current marker position.

11. Click ![Save] to save the remastered audio material to a new file. Saved files are in 16-bit/44.1-kHz format.

12. Click ![Norm] to optimize the loudness level of the audio material.

13. If you click the ![Cd] button, the current audio material is sent to the associated burning software as a new track. Simply repeat this step to instantly put together an audio CD, which you can then burn.

14. The functions of the parameters for the Descratcher and Denoiser features are described in the chapters entitled, **Descratcher**, **Denoiser** and **Application Notes**.

3. User Interface

Editing Area

The editing area of **Sound Rescue *TerraTec Edition 2.0*** consists of four main components: **Descratcher** (on the left), **Denoiser** (on the right), **Analyzer** (in the center) and the adjustment sliders for *bass/treble/volume* (on the bottom). Two sound-level meters let you control the output level while, at the same time, you can adjust the volume and the bass and treble levels using the sliders mentioned above.

Because the processor requirements of **Sound Rescue *TerraTec Edition 2.0*** are quite low (about 30 % for a 300 MHz Pentium II for a WAV file with 16-bit, stereo and 44.1 kHz), you can optimize all of the parameters and simultaneously hear the results in realtime while editing your tracks.
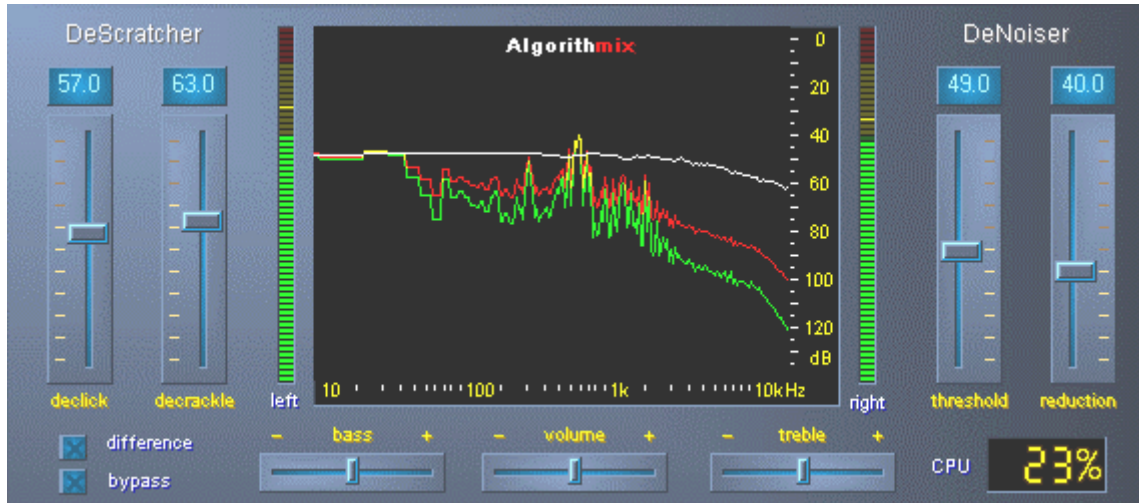
The editing area of Sound Rescue TerraTec Edition 2.0

difference	lets you listen separately to the noises that are being filtered out during processing in realtime.
bypass	lets you listen to the input signal by bypassing the DeScratcher and DeNoiser filters.
CPU 5%	indicates the CPU usage of the computer, i.e. the percentage of CPU time being used by **Sound Rescue *TerraTec Edition 2.0***.
Analyzer	graphically displays the volume and frequency curves, which is useful for visually verifying the filter levels.
DeScratcher	effectively removes pops and crackling from the audio material.
DeNoiser	removes noise and static from the audio material.

Playback Area

The **Playback area** is located in the lower section of the **Sound Rescue *TerraTec Edition 2.0*** interface. Using its features, you can record a WAV file, load a file for editing, start and stop playback, and jump to any position in the WAV file by moving the cursor within the *Waveform display*.

After loading a WAV file, its name and format are displayed in the *status window* below the **Analyzer** and its waveform is displayed in yellow in a normal view, meaning it is adapted to fit within the width of the Waveform window.

*The playback area of Sound Rescue* TerraTec Edition 2.0

You can save the processed audio material by opening the file dialog box using the ⬚Save button. The sampling frequency of the saved file is identical to the frequency of the output file (44.1 kHz). If the format of the output file is not 16-bit/44.1-kHz, it should be converted using any correspondingly high-quality tool in your editing or sound card software.

The Buttons and Controls in the Playback Area

File Functions

|	
Load	opens the "load" file dialog box
Save	opens the "save" file dialog box

Audio Functions

|	
Norm	normalizes the audio material to maximum loudness
Split	splits the audio material at the current marker position
Track	sets the marker at a position in the audio material at which a new track most likely begins
Peak	sets the marker at the position where the loudness is at its maximum
Cd	starts the associated CD burning software
Help	opens the help file

Control Functions

●	asks for a file name and opens the recording window
▶	starts playback
■	interrupts playback
⏮	returns the playback cursor to the beginning of the clip

View Functions

Zoom-	shows the entire audio material of the file
Zoom+	zooms in on a length of about 20 seconds of the audio material

4. Recording

With **Sound Rescue *TerraTec Edition 2.0*,** you can, of course, also make recordings. To do so, click the ▣ button and specify a location and name for the resulting WAV file in the dialog box that opens. You will now see the **AlgoRec** window, which shows you the input level for the standard recording device as configured in Windows. The recording is still paused ▣.
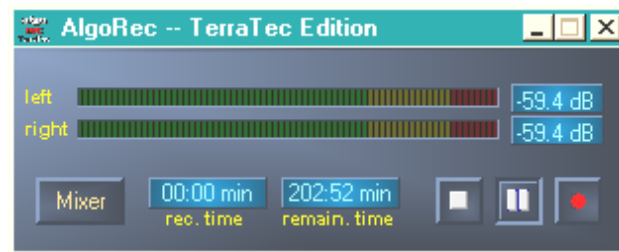
The AlgoRec recording window of Sound Rescue TerraTec Edition 2.0

Adjust the level so that it never quite reaches 0dB, i.e. the red range. Going into the red range can cause digital crackling noises, which cannot be completely filtered out by the editing tools. Clicking the ▣ Mixer button opens the Windows recording controls.

When you are ready to start recording, simply click the ▣ button. You can also use ▣ to pause and again continue recording.

Recording for the file you previously selected is stopped when you click ▣. If you like, you can now press ▣ again to specify a new file and create a new recording.

5. Rescuing Audio Material

This section provides greater detail on how you can edit your recordings.

Restoration

After you have recorded the entire side of an LP, for example, you may want to rescue and restore the recorded audio material using **Sound Rescue *TerraTec Edition 2.0*.** Start playback with the ▣ button. If you enable the ▣ bypass button, the **DeScratcher** and **DeNoiser** filters are bypassed so that you can listen to the original recording. Disable the bypass option to listen to the effects of the restoration filters in realtime. You can adjust the settings of the **DeScratcher** and **DeNoiser** filters during playback and see the difference in the **Analyzer** while hearing it at the same time. To hear only the noises and crackling sounds that are being filtered out of the audio material, click ▣ difference. Adjust the control slider to your liking and refer to the chapters on the **DeScratcher** and **DeNoiser** functions for more information. Adjust the volume slide so that the peak level never quite reaches the red range. Once you are satisfied with the results, stop playback by pressing ▣ and save the results by clicking the ▣ Save button. The new audio material is loaded and displayed automatically. To avoid mistakenly filtering a file that has already been filtered, the bypass option is enabled automatically.

Optimization

Use [Peak] to find the positions having the highest peaks and check whether they are the result of pops or the normal audio material. When you are completely convinced that the quality of the material is good, you can raise its recorded volume without your recording being overamplified by clicking the [Norm] button. Now save your results again.

Creating Tracks

After successfully restoring your digital recording, you will probably want to pull out certain tracks from the length recording. If you click [Track], **Sound Rescue *TerraTec Edition 2.0*** automatically finds for you a position that is likely a pause between two tracks. You can of course search for such pauses manually simply by listing to the audio material with [▶], stopping the marker with [□]. Then you can zoom in on the section of the recording using the [Zoom+] button and reposition the marker more accurately.

Use [Split] to write the audio material to the left of the marker to a new file or to delete it altogether.
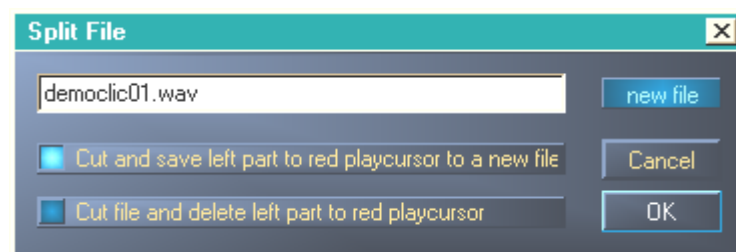
The Split window of Sound Rescue TerraTec Edition 2.0

Select the option you want to execute, provide a name for a new file if necessary and then click OK. Save your individual tracks here and burn them onto a CD.

6. Descratcher

The **Descratcher** function effectively removes pops and crackling noises from old vinyl and shellac records as well as from audio files in which the tone quality has been decreased during recording because of switch noise, digital crosstalk or thyristor humming.

The *Descratching algorithm* consists of two components: the *Declicking filter* and the *Decrackling filter*. While the *Declicking filter* is running, usually to remove relatively loud clicks and pops from old vinyl records or switch noise from digital or analog audio devices, the *Decrackling filter* removes any remaining, usually quiet but dense crackling.

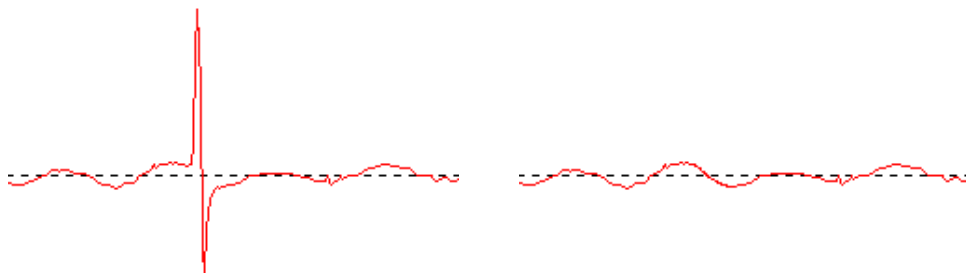The higher you set the *Declick* parameter, the more cracking noise is removed. When it is set to 0, the filter lets through nearly all cracking noises. To remove cracking noises from soiled vinyl records, a *Declick* value of about 50 is good in most cases.

A typical popping noise in a signal from a vinyl record (left) and the reconstructed signal (right).

The higher you set the *Decrackle* parameter, the more crackling noise is removed from the original. The highest setting, nearly 100, dampens the actual input signal. In general, this parameter can be set to 80 without resulting in any audible depletion of the original sound. In some cases, an extremely high setting, even up to 100, can be used to improve the quality of the audio material.

To minimize the depletion of the original sound in the *Descratching* procedure, you should listen very carefully to the effects of the *Declick* and *Decrackle* parameters at various points of the recording before deciding on their final values. In doing so, the *Difference* function in the **Playback area** will certainly be a great aid. It allows you to set the parameters in a very intuitive manner. With it, you can switch between the original input signal and the input/output signal difference, i.e. the part that has been removed by the *Descratching* algorithm. Normally, you do not want the signal difference to contain any part of the original signal that you want to keep. For more notes on optimizing the settings of the *Declick* and *Decrackle* parameters, see to the Application Notes.

Note also that the *Difference* functions can be applied to the **Descratcher** and **Denoiser** functions simultaneously. If you want to run the **Descratcher** only, leave the sliders (*threshold* and *reduction*) for the **Denoiser** set to 0.

7. Denoiser

The **Denoiser** belongs to the noise reduction systems. It does not require any special coding method prior to recording, such as that required by the familiar tape noise reduction system by DOLBY™ Lab. The Denoiser efficiently removes all types of wideband noises from recorded audio tracks. The **Algorithmix® Denoiser** is used to remove tape hiss, static noise in telephone clips and residual noise on old records after they have been edited using the **Descratcher.**

This version of the **Denoiser** uses a typical wideband noise print that has been optimized for reducing surface noise on vinyl records and tape hiss.

The noise reduction process of the **Denoiser** is controlled by only two parameters, making it easy to optimize the results for various output material.

The frequency band of the input signal (red), the noise print used for processing the audio material (white) and the frequency band of the output signal after processing (green) can be viewed in the **Analyzer** window.

The noise print (white) indicates the threshold value beyond which no more noise reduction takes place. You can move this noise print up and down using the *threshold* parameter. You can also use this parameter to adjust the noise print so that it is just above the background-noise level. At a specific *threshold*, the *reduction* parameter then determines the range of removed noise within the selected noise print.

A good starting point for the *threshold* is to set the noise print just above the background-noise level (at about 10 dB). Increasing the *reduction* parameter would then reduce the background noise significantly. If distortions such as whistling sounds or robot-like noises (caused by the phenomenon called *time aliasing*) are clearly audible, decreasing the *reduction* parameter and increasing the *threshold* (to about 30 dB above the background-noise level) usually helps.

8. Burning CDs

When **Sound Rescue** *TerraTec Edition 2.0* is started for the first time, it checks whether a CD burner and burner software are installed on your system. **Sound Rescue** *TerraTec Edition 2.0* has been tested with WinOnCD‹Trademark› 3.6 to 5.0, EasyCDCreator‹Trademark› 5.0, Nero 4.0 to 5.0 and Feurio 1.63. A dialog window asks which CD burning program you can start directly from **Sound Rescue** *TerraTec Edition 2.0*.
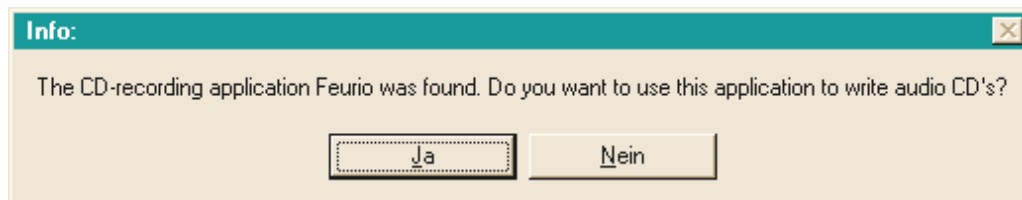
The dialog window for selecting burner software

Select the program that you prefer most for burning your audio CDs. If you want to change this program at a later time, simply click the small icon in the upper-left corner of the **Sound Rescue** *TerraTec Edition 2.0* window and select the *CD-Recording* item.

The selected burner software is now linked to the ⬚ button. You can now send the current, restored track from **Sound Rescue** *TerraTec Edition 2.0* on the burner software with a single click. When you do so, you are asked whether you want to add the audio file to the burner program's CD list.
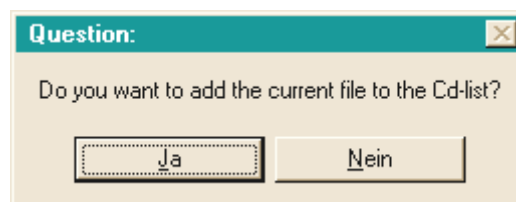
*Adding an audio track from **Sound Rescue** TerraTec Edition 2.0*

Simply add individual audio tracks to the burner program's CD list after you have restored them to your liking. When you are finished, simply start the burning process.

Congratulations on your remastered, digital "record"!

9. Application Notes

The **Descratcher** and the **Denoiser** are user-friendly audio-restoration tools based on an extremely effective signal-processing algorithm. In most cases, they automatically produce good results. To get the most out of these tools, especially when working with badly damaged audio material, use the following, practical guidelines:

- Create your recordings using the WAV file format and do not use any editing devices, such as limiters or compressors, before applying the *Descratching* filter.

- If the audio material you are restoring contains loud crackling noises, you can limit them during the digital recording process. We recommend recording various versions with different input amplification levels and comparing the results after carrying out the *Descratching* process.

- To avoid digital distortion, do not set the *Declick* and *Decrackle* parameters too high. When working with badly damaged material, we recommend finding a good acoustic compromise between the remaining level of noise and the digital distortions that result within the signal. Make allowances when trying to improve hopelessly damaged audio sources, because not even the best tools can bring back the original sound where none is left.

- If the sound level and/or sound characteristic changes several times within a recording, you may want to split the original into separate segments, edit these individually using various *Denoising* settings and then normalize them.

- To avoid digital distortions such as whistling sounds and robot-like noises (*time aliasing*), do not set the *threshold* and *reduction* parameters too high. Start by using a moderate setting by adjusting the *noise print* to just above the background-noise level (about 10 dB), and then increase the *reduction* parameter gradually. Finally, try determine the optimal correlation between these two parameters.

- The **Analyzer** can be a great help when optimizing the setting of the **Denoiser** parameter. During the *Denoising* process, it makes visible the influence that the noise print and the parameter setting have on the audio signal.

- If you find the output signal too quiet, increase the *volume* while watching the left and right sound-level bars. If the red range lights up at all, the volume is set too high and you have reached the so-called *threshold range*, which can lead to audible distortions.

- Use the *bass* and *treble* sliders to increase (+) or decrease (-) the values of the bass and treble frequencies to achieve the tone that sounds best. Be aware, however, that setting the *bass* and *treble* levels too high increases the output signal volume level and in some cases can put it into the *threshold range*. In this case, lower the *volume* slider until the level no longer reaches the threshold range (so that the red LEDs at the top of the level bars no longer light up).

- If you save your audio files with a sampling frequency other than 44.1kHz (for example, 48 kHz), you will have to convert them to a sampling frequency of 44.1kHz. Here, too, be sure to use a high-quality software application for converting the frequency.

- Best results are achieved by evaluating the sound with your own ears using the *Difference* function during playback. This function plays only the sounds that have been filtered out by the *Descratching* and *Denoising algorithms*. In the best circumstances, you should only be able to hear noise with this function. If you can detect the presence of the original signal in the *Difference* signal, the amount of filtering should be decreased.

Important note:

Sound Rescue *TerraTec Edition 2.0* is a fast and effective tool. You will be amazed by how much you can improve the sound quality of old records and distorted audio files. However, please do not expect any miracles when trying to restore material that contains gaps or jumps. Once the signal has been lost to the point where there is insufficient redundancy in the remaining material, it becomes impossible to recover the original material. In cases as hopeless as these, experienced professional sound editors apply highly complex audio editors to try to copy similar sounding, already existing passages into the gaps. Likewise problematic is the attempt to rescue material that is so full of noise that the original signal can no longer be distinguished. If, for all practical purposes, the information consists almost entirely of noise (an extremely bad signal-to-noise ratio) and there is insufficient information available on the characteristics of the original signal, or even worse, if nonlinear distortions occur too, the quality of the *Denoising* results will be limited.

10. Contacting Us

For more information on extensions, updates and new products from Algorithmix® visit us on the Internet at:

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or send an e-mail:

to **support@algorithmix.com**

if you want information on the installation and features of this product,

or to **info@algorithmix.com**

if you have general comments or questions regarding the Algorithmix® product range.

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Intervideo WinDVD 5.0 – 8-channel

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If these options do not provide the necessary help, please contact our phone hotline. You can also reach us online. To do so, visit us at **http://supporten.terratec.net/**. In either case, please have the following information handy:

- your registration number,
- this documentation,
- a printout of your configuration files,
- the manual of your motherboard, and
- a screen shot of your BIOS configuration.

In addition, it would be helpful to our technicians if you are at your computer during the phone call so that you can carry out our tips and tricks directly. Please do not forget to write down the name of the respective support technician if you contact our Support Team. You will need this name if a defect is present and your card needs to be mailed to us.

Broken?!

Before you send the product back, be sure to contact us! Make a note of the name of your support contact and follow these simple instructions:

- Please fill out the service request form provided with your card clearly and completely. The more clearly and detailed you describe the problem, the faster we will be able to help. Cards sent in without a description of the problem cannot be processed and will be returned to you at your expense.

- Be sure to include a copy of your purchase receipt (not the original) with the package. If we do not receive a copy of a receipt, we will assume that the warranty for the product has expired and will bill you for the repair.

- Please use a sufficiently strong and padded mailing package. We recommend using the original package. Remember that the card is a sensitive electronic component.

- Be sure to include enough postage—we will cover for the postage for the return to you.

;-)

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   You will require a copy of the purchase receipt or delivery slip as proof of warranty. If you do not supply proof of warranty, we will charge for repairing the goods.

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   Shipments that do not include a description of the fault or an insufficient description ('defective' or 'for repair' is insufficient) will be returned for a processing fee, because this makes repair more difficult and could have been avoided.

4. Invalid returns
   In the event of an unfounded complaint (no fault could be detected, probable operating error), we will return the goods and a processing fee will be charged.

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   If possible, please use the original packaging for return shipment. Any warranty claim will be jeopardized by improper packaging. The warranty will not apply to damage caused by improper packaging.

6. Foreign manufactured products
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7. Repairs liable to your expense
   Repairs out of the warranty period are liable to your expense.

8. Transportation costs
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