AudioSystem

EWS MIC8

Enhanced 24 Bit /96 kHz Recording System

AudioSystem

EWS MIC2

Enhanced 24 Bit /96 kHz Recording System

English Manual

TERRATEC ®

Version: 11.11.02

CE Declaration

We:

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

hereby declare that the products:

AudioSystem EWS MIC 2 and AudioSystem EWS MIC 8

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

1. EN 55022 Class B

2. 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

Safety note.

Please ensure that all analog devices are turned off before plugging them in. This will protect you from any possible - albeit weak - electrical shocks, as well as protecting your speakers and your hearing from sudden peaks. For digital devices, be sure to at least reduce the volume of your playback equipment.

Welcome!

We're pleased that you have chosen a TerraTec AudioSystem and would like to congratulate you on this decision. You've purchased a sophisticated product representing the state of the art of studio 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 describes the EWS MIC2 and MIC8 AudioSystems, as well as their "Plus" versions (+) including PCI cards. It covers the correct use of the systems in complete detail, and provides practical tips so that you can get started as soon as possible. But first, here's a quick overview:

Connection versatility - with a system.

The EWS MIC2 and MIC8 19" modules feature a range of professional connector options that predestine them to become the audiophile hub of your home or project studio.

If you have purchased the Plus version of the MIC2 or MIC8, even more options are available on the included PCI card: additional S/PDIF connections (coaxial), as well as a range of connectors for internal PC peripherals. The killer feature: a dedicated analog output that lets you play the system sounds of the operating system - without disturbing your musical work!

➤ For everything you need to know about audio connections, see page 19.

Choice preamps - made by SPL.

When it came to selecting microphone preamps, years of experience and our desire for the best possible audio quality made our choice an easy one: SPL. Important parts of the sophisticated analog circuitry were developed in cooperation with SPL's engineers for a sound as clear as glass and which doesn't stop dead at the XLR connector, as is often the case.

➤ For everything you need to know about audio quality, please turn to page 50.

Nerve center - the software.

As you know, a professional AudioSystem is no sound card for wild-eyed gamers, but the heart of your day-to-day studio work with your PC. And despite its extensive routing options, the EWS software gives you a clear overview at all times and - depending on the complexity of your switching needs - stays transparent and intuitive.

➤ For everything you need to know about the EWS ControlPanel, see page 29.

Pure performance - the drivers.

The selection of drivers for the EWS MIC series leaves nothing to be desired. Our sophisticated software architecture based on Microsoft's WDM technology guarantees the trouble-free deployment of the card in all modern Microsoft Windows operating systems.

The thoroughly proven ASIO drivers have often been used as a reference and guarantee the lowest possible latency between the software-based sound generation and audio output. And support for the GSIF model provides performance levels in TASCAM's GigaStudio that makes many hardware synths look pale.

➤ For the details on driver use, please turn to page 25.

We hope you enjoy your work with the EWS MIC system 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 as well as tips and tricks wherever appropriate. We're convinced that even experienced users will profit from this guide.

Thanks for your attention and here's to your creativity.

...your TerraTec Team

From opening the package to installation.

Before installing the AudioSystem or the PCI card of the Plus version, please take note of any special points pertaining to the configuration of your computer. Also refer to the manual of your computer and other studio peripheral devices 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 phone numbers and hours of the hotline can be found in the Appendix of this documentation.

Scope of delivery.

Start by making sure that the contents of the package are complete.

The scope of delivery of the **EWS MIC2** and **EWS MIC8** AudioSystems includes at least the following:

- 1 19" MIC2 or MIC8 rack module
- 1 splitter cable with MIDI and WordClock sockets
- WordClock T adapter
- WordClock terminator
- 1 customer service card
- 1 registration card with the serial number
- This manual

The scope of delivery of the **EWS MIC2+** and **EWS MIC8+** AudioSystems also includes:

- 1 PCI card, type EWS88 MT 2.0 or higher
- 1 connector cable, rack module to EWS88 PCI card (4 m)
- 1 thin sync cable to internally connect multiple EWS88 boards
- 1 installation and driver CD with software for EWS88 MT 2.0 or higher.

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

Setups - Short and to the point for busy pros.

Stand-alone mode. The EWS MIC2 and MIC8 AudioSystems can be used stand-alone, i.e. without a connection to a computer:

1. For use as a simple but high-quality microphone preamp (in conjunction with a mixer, for example) simply connect your microphones to the inputs on the rear of the module. Enable phantom power if needed (see page 21) and connect the MIC outputs to the LINE inputs of your mixer or tape deck.

2. The modules can also be connected directly to an ADAT device such as an ADAT multitrack recorder. In this case, connect line devices or microphones to the inputs of the MIC module and transfer the signals to the recorder (EWS MIC2/8 ADAT optical OUT to ADAT unit IN) using optical waveguides (not included). Ensure that the optical output of the MIC module is not set to S/PDIF (see page 19). You must also select the desired sampler rate (44.1 or 48 kHz). A switch is also available for this function (see page 19).

3. Conversely, digital signals from an ADAT can also be converted and output as a high-quality analog signal. Connect the optical output of the ADAT (OUT, lit when a signal is present) to the appropriate input of the module. The sampler rate is determined by the ADAT player. No further settings are required; the format will be identified automatically.

In conjunction with Macs or PCs, or with studio devices with ADAT interfaces. The EWS MIC2 and MIC8 AudioSystems can also be used as pure AD/DA converters on any ADAT interface. These can be found (in some cases as optional extras) on devices such as

- digital mixers
- hardware multitrack recorders
- synthesizers and samplers
- computers with suitable PCI cards.

The EWS MIC modules do not need to be configured for playback, as the configuration essentially corresponds to the scenarios 2 and 3 above (MIC module as an alternative converter for ADATs). The installation of TerraTec software is also not required when using the modules with a Mac or PC (this also applies in conjunction with an already-installed AudioSystem EWS88 D, the TerraTec ADAT interface). However, please note the instructions on synchronization and switching of the optical output on page 46.

EWS MIC2+ and EWS MIC8+: with PC using the included PCI card. The AudioSystems EWS MIC2+ and MIC8+ are supplied with an EWS88 MT Version 2.0 (or higher) PCI card. The system-specific PCI card supports a wide range of routings that would not be possible in stand-alone use or in combination with ADAT interfaces from other manufacturers. Before you install the EWS88 MT PCI card, check the CN1 and JP1 jumpers on the card. If you would like to use the digital input (coax) on the PCI card, set JP1 and CN1 to **1 and 2** respectively. To use the

digital interfaces of the MIC module (ADAT, S/PDIF or WordClock), set the JP1 and CN1 jumpers to **2 and 3** respectively.

Jumper CN1   Jumper JP1

5 4 3 2 1   Clock   3 2 1   Signal

COAX IN on PCI board active
NO MIC-Module digital IN - ADAT or S/PDIF -

Jumper CN1   Jumper JP1

5 4 3 2 1   Clock   3 2 1   Signal

MIC-Module digital IN active
NO COAX IN on PCI board

Operation with additional EWS systems. An EWS88 MT PCI card can be used with up to three further EWS88 MT/D systems in the same computer. A maximum of one EWS88 MT can be used together with a maximum of one EWX 24/96 or a maximum of one DMX 6fire. For information on synchronizing multiple PCI systems, please refer to Chapter "Multiple audio cards in a single system." starting on page 46.

The following is a brief description of the PCI card installation for experienced users.

- The AudioSystem EWS88 MT is a PCI card with busmastering support. Please choose a slot which is far away from the graphics card(s) or SCSI/RAID controllers i.e. as far close to the "bottom" as possible in most installations. Also keep in mind that the heavy connector cable and various audio cables (S/PDIF, System-OUT) will be dangling from the back of the card.

- A special cable (4 m) is included to connect the 19" EWS MIC2 or MIC8 module. The power supply is not realized via this cable. Please ensure that all screws are securely tightened. Ensure that the computer and the EWS MIC module are switched off before plugging or unplugging the 4 Meter connector cable.

- You will need one (1) IRQ. Installing multiple audio systems of the TerraTec EWS family is no problem - the cards will run in IRQ-sharing mode.

- You will also need a number of free address ranges (generally no problem).

- The driver installation under Windows (98SE to XP) follows the Microsoft guidelines. The drivers can be found on the included CD-ROM. **Important note:** The drivers have not yet been certified by Microsoft. You will receive a warning to this effect in Windows 2000 and XP which you can ignore. **Continue the installation.**

- After installing the drivers, open the Device Manager and check for yellow exclamation marks. If you find any, you can usually solve the problem by repeating the installation according to the instructions. Please also read the FAQ (frequently asked questions) on the product CD for other suggested solutions.

- After the drivers have been installed, install the software. You can start the installation using the autostart function of the CD, for example. **You must install the EWS Control-Panel.** The full functionality cannot be controlled using the Windows Standard Mixer.

- The WDM audio drivers can be selected in the applications as usual. ASIO or GSIF (GigaStudio) 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 **EWS ControlPanel** (not to be confused with the Windows Control Panel).

Important notes for EWS88 MT owners.

If you are already using an AudioSystem EWS88 MT and are now the proud owner of an EWS MIC2 or MIC8 module, please observe the following points:

- It is not possible to use the 5¼" module of the EWS88 MT and the new 19" module at the same time on only one PCI card. Parallel connection of the modules can damage them. DAMAGE OF THIS KIND IS NOT COVERED BY THE WARRANTY!

- Please also note that cards with a board version 2.0 or later must be used to ensure trouble-free operation with an EWS MIC module. In the event that you have an older board version (this information can be found on the component side of the board, near the edge) please contact TerraTec technical support BEFORE INSTALLING (see page 55). A board version 2.0 or later is required when using 4 meter cables.

- EWS Control Panel. Be sure to install the latest version of the EWS ControlPanel software (1.03.35.12X or later) as earlier versions do not support the enhanced routing options of the MIC module.

- The EWS ControlPanel will automatically recognize the replacement of the 5¼" front module with a 19" MIC module. As the input gains can be adjusted directly using pots on the module itself, the mixer-side analog input levels are superfluous.

Installation of the EWS PCI card - step by step.

- Switch off your PC and all connected peripheral devices such as your printer and monitor. Leave the AC 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.

- Look for a free PCI expansion slot, remove the screw holding the slot blanking plate (if present) and remove the plate. Should it be necessary to break a plate out of the case, do so with great care to avoid injury.

- Check the jumpers of the card as described on page 8.

- To ensure the optimal function of your AudioSystem, 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 / must connect several cables directly to the card itself. Due to certain physical properties of our planet, it is very likely that these cables will dangle downward. ;-)

- Carefully remove 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.

- First, connect the internal cables (e.g. from the CD drive or other EWS cards). For further information on the various connections, please see page 23.

- 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 precisely in line in order to avoid damaging the audio card or the motherboard in your PC.

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

- Switch on and boot the computer to continue with the driver installation.

Installing the driver software.

The AudioSystem EWS MIC8(2)+ (including PCI card) currently comes with drivers for Windows 98 SE, Windows ME, Windows 2000 and Windows XP. Windows 95/98 and Windows NT 4 are not supported. 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.

Driver support for Apple Macintosh computers (OS9 and OSX) was in development as this manual went to print. Please check the TerraTec website from time to time for drivers as they become available.

In the following driver installation descriptions, ‹CD› stands for the drive letter of the CD-ROM drive containing the driver CD of the AudioSystem EWS MIC8(2) +.

Driver installation under Windows 98 SE.

1.   Boot your computer after installing the EWS88 MT PCI card.

2.   During the boot, the Windows hardware wizard will identify the new hardware as a "PCI Multimedia Audio Device". Confirm by clicking "Next".

3.   The hardware wizard will ask you how you would like to continue. Select the "Search for the best driver for my device (Recommended)" item and confirm with "Next".

4.   Select the checkbox "Specify a location" and enter the path to the driver on the CD. **`<CD>:\Driver\`**. Alternatively, you can also select the path to the best driver of your EWS88 MT PCI card using the mouse by clicking "Browse...". Confirm by clicking "Next".

5.   In the final window, the hardware wizard will report that the driver software has been installed successfully. Close the wizard by clicking "Finish".

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 EWS MIC8 (2)+ CD-ROM. It is also possible (e.g. if this is the first sound card installation in your system) that some additional Windows extensions have to be installed. Please have your Windows CD ready for this purpose.

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 these 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 98SE 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."

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.

Driver installation under Windows Me.

1. Boot your computer after installing the EWS88 MT PCI card.

2. During the boot, the Windows hardware wizard will identify the new hardware as a "PCI Multimedia Audio Device". Select here "Specify the location of the driver" and confirm with "Next".

3. Activate now the checkbox "Specify a location:", and enter the path **<CD>:\Driver**. Confirm by clicking "Next". Alternatively, you can change to the respective directory by clicking on "Browse...".

4. The hardware wizard will now search for the AudioSystem EWS88 MT driver and will display the location of the driver. Confirm by clicking "Next".

5. In the final window, the hardware wizard will report that the driver software has been installed successfully. Close the wizard by clicking "Finish".

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 ME 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.
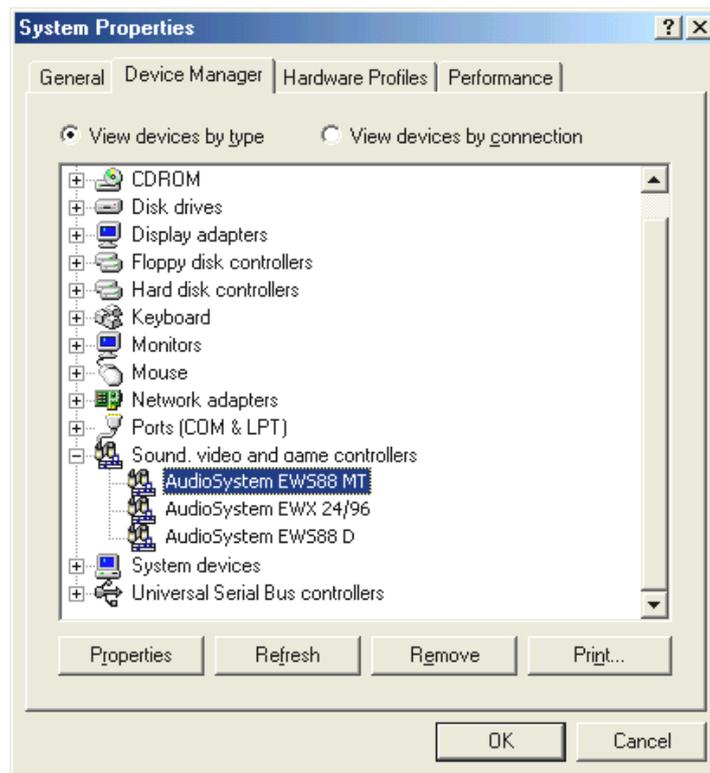
Installation under Windows 2000.

1. Boot your computer after installing the EWS88 MT PCI card.

2. During the boot, the Windows hardware wizard will identify the new hardware as a "Multimedia Audio Controller". Confirm by clicking "Next".

3. Mark the "Search for a suitable driver for my device (recommended)" checkbox and insert the EWS product CD if you have not done so already. Click "Next".

4. The hardware wizard will now inform you that it will search for drivers for a "Multimedia Audio Controller". Activate the checkbox "CD-ROM drives" and confirm with "Next".

5. The hardware wizard will now indicate that it has found a suitable driver for the "Multimedia Audio Controller" on the CD-ROM **(<CD>:\driver\)**. Click "Next" to start the installation.

6. The following dialog box may appear at this point or later in the installation:

This is no cause for alarm. Click "Yes" to continue. The installation will now be executed.

If contrary to all expectations an additional 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 EWS MIC8 (2)+ CD-ROM. It is also possible (e.g. if this is the first sound card installation in your system) that some additional Windows extensions have to be installed. Please have your Windows CD ready for this purpose.

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...".

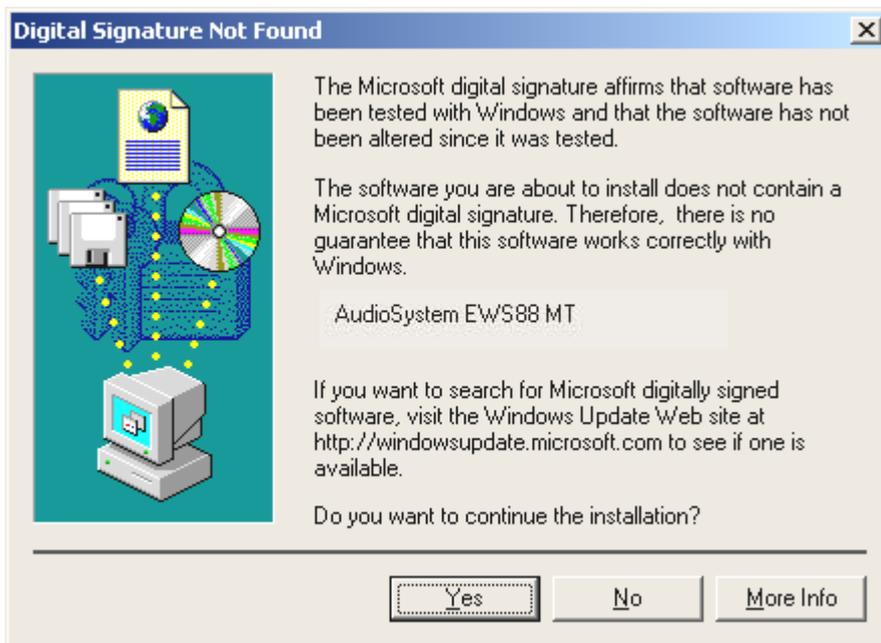***Installed drivers should look like this.***

After a successful driver installation, you should verify the correct condition of your Windows 2000 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.

Installation under Windows XP.

1.   Boot your computer after installing the EWS88 MT PCI card.

2.   During the boot, the Windows hardware wizard will identify the new hardware as a "Multimedia Audio Controller". If you have not done so already, insert the EWS MIC8(2)+ product CD-ROM now. Next, mark the "Install the software automatically [Recommended]" checkbox and click "Next".

3.   The hardware wizard will now inform you that it will search for drivers for a "Multimedia Audio Controller".

4.   The following dialog box may appear at this point or later in the installation:

This is no cause for alarm. Click "Yes" to continue. The installation will now be executed.

5.   In the final window, the hardware wizard will report that the driver software has been installed successfully. Close the wizard by clicking "Finish".

If contrary to all expectations an additional 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 EWS MIC8(2)+ CD-ROM. It is also possible (e.g. if this is the first sound card installation in your system) that some additional Windows extensions have to be installed. Please have your Windows CD ready for this purpose.
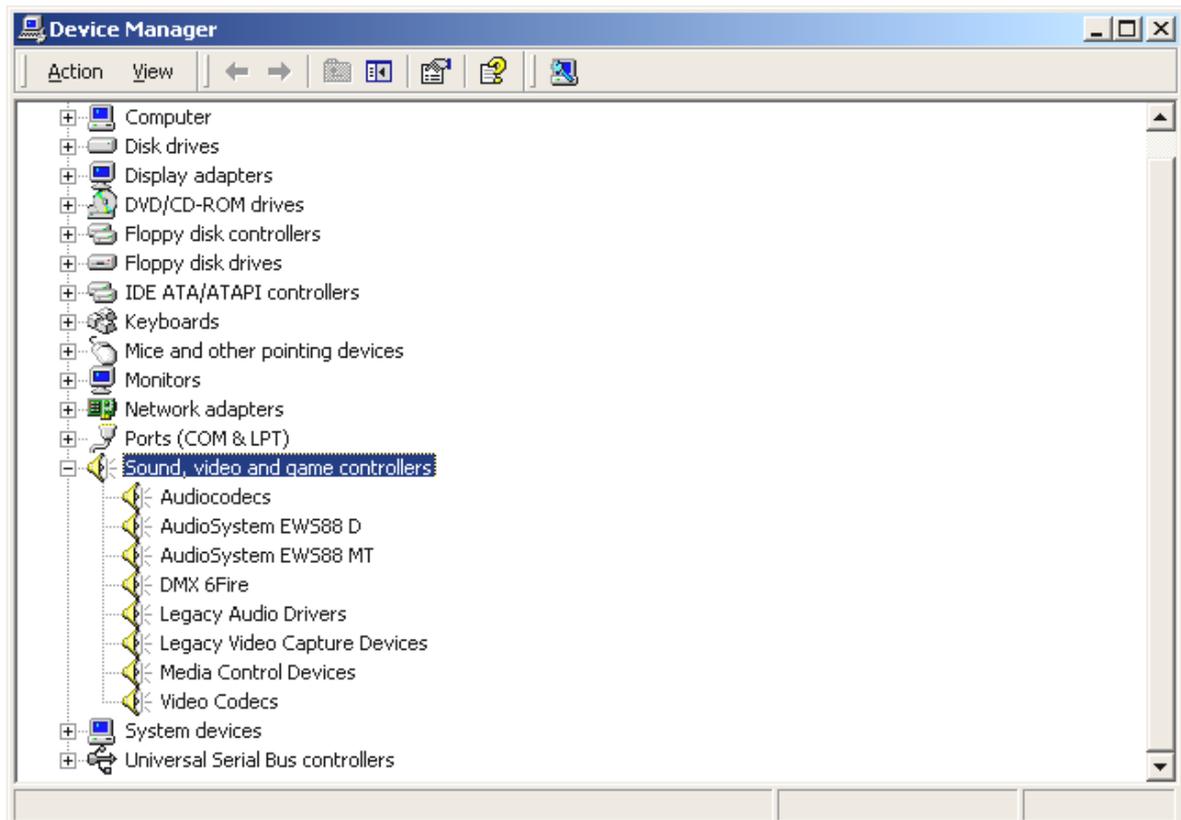
After successful driver installation, the additional bundled software can be added easily using the autorun option (**`<CD>:\autorun.exe`**).

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...".
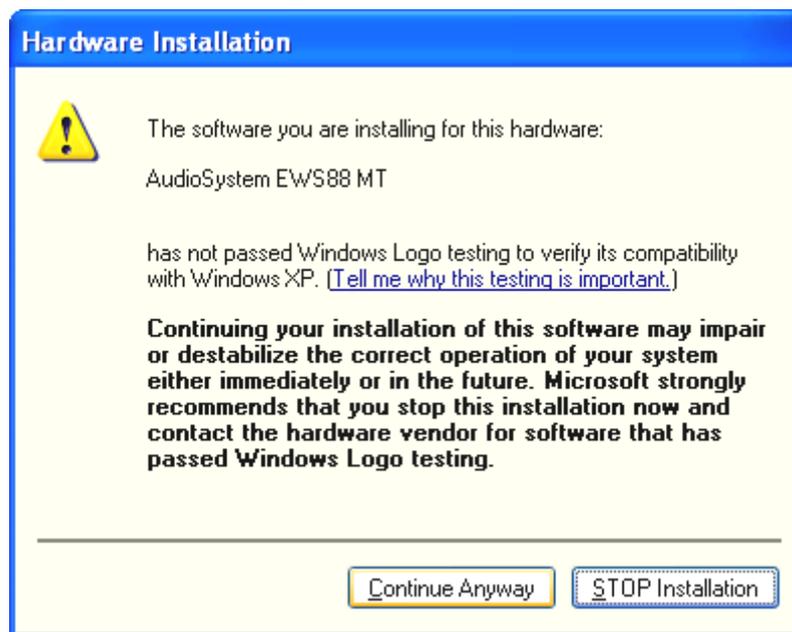
Installed drivers should look like this.

After a successful driver installation, you should verify the correct condition of your Windows XP 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.

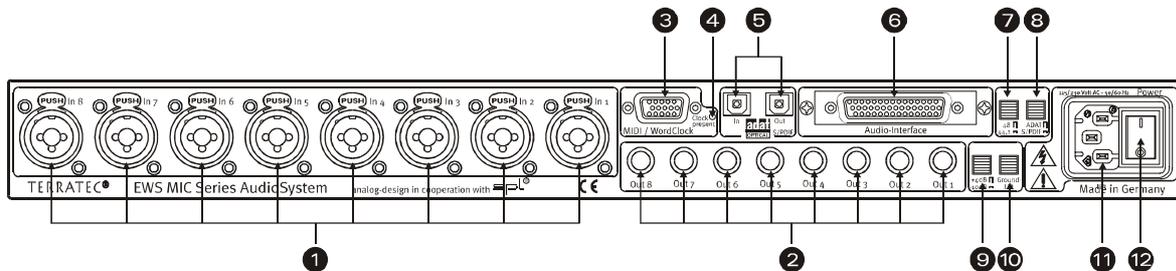*If everything is correctly set up, the window should look like this. The figure shows the expanded view of the "Sound, video and game controllers" branch. To obtain this view, simply click the "+" symbol on the left side.*

The EWS 19" module.

A full range of connections in only one 19" rack height unit (1U) - that's the heart of the EWS MIC system. On the following pages we will be covering the purpose of the individual connectors and controls in detail. For typical sample applications, please turn to page 43.

The rear panel.

A full range of connections in only one 19" rack height unit.

1) **Analog inputs.** Eight balanced inputs can used with XLR or jack connectors. If one channel includes a microphone pre-amp the XLR connector is hard-wired to the microphon section while the TRS connector is hard-wired to the line/instrument input. The sockets on the front panel of the module can be used as an alternative to the inputs 7 and 8. This disables the signal path of the rear sockets.

   Tip: it is not necessary to remove cables plugged into connectors 7 and 8 on the rear panel when using the sockets on the front panel.

2) **Analog outputs.** The eight balanced outputs are suitable for jack connectors. Activating the direct routing on the front panel will send any input signals directly to the appropriate output (see below).

3) **MIDI / WordClock interface.** Connect the included adapter cable with two MIDI inputs (IN) and outputs (OUT) here. Two BNC sockets are also available here for WordClock input and output.

4) **WordClock LED.** If a signal is present at the WordClock input, the LED lights and the EWS MIC module switches completely to WordClock operation if it is being run in stand-alone mode (without a computer). It does not matter in this case whether the clock signal is valid. The LED therefore is not a status indicator (in the sense of "synchronization OK").

5) **ADAT & S/PDIF.** Both interfaces (IN and OUT) can be equipped with optical waveguides (not included) as needed. Devices can also be combined - for example ADAT and DAT recorders. A signal conversion, if needed, can be selected in the EWS ControlPanel software (see page 29) if the module is connected to a computer. When cabling digital equipment, always verify the synchronization (master/slave). For further information, please see page 39.

   In stand-alone operation, incoming ADAT signals (IN) are converted digital-analog (D/A) and can be picked up at the analog outputs of the module - depending on their channel assignment (1 to 8).
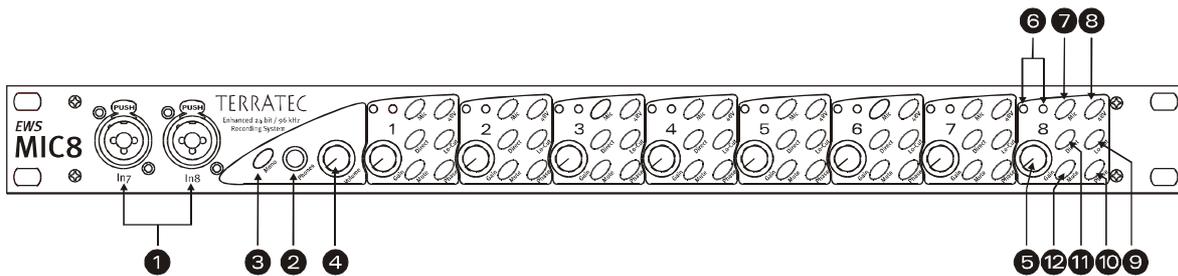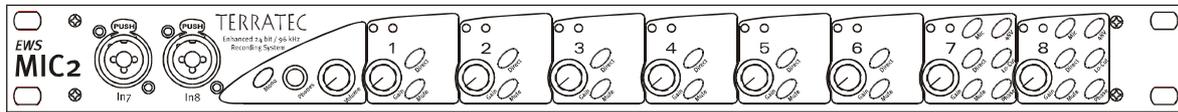
Conversely, all analog input signals are present at the ADAT-OUT when the unit is in stand-alone mode. Gain controllers, phase setting and filters are upstream to ensure an optimal signal prior to the analog-digital conversion.

If you are using your EWS MIC module with a computer, please note the wide range of routing options which are described in detail in the chapter covering the EWS Control-Panel starting on page 29.

6) **To-Host interface.** To take full advantage of an EWS MIC module with a PC, it must be connected to a type EWS88 MT PCI card (version 2.0 or higher) with the included special cable (only part of the EWS MIC2/8 + version). This card is included with the EWS MIC2+ and EWS MIC8+ products. Please ensure that the connector strips are firmly screwed onto the 19" module and PCI card, as the weight of the cable can otherwise cause it to come unplugged.

7) **Switch: digital clock 44.1 or 48 kHz. If** you are using a stand-alone EWS MIC module, i.e. without a computer (as a microphone preamp or ADAT converter, for example) use this switch to set the sampler rate for all digital interfaces working in master mode. For detailed information on digital synchronization, please turn to page 39.

8) **Switch: ADAT or S/PDIF.** This switch refers to the signal format to be present at the optical output when in stand-alone mode. When set to S/PDIF, both channels (7 and 8) are converted and output digitally (in other words: the eight channels are not mixed).

9) **Switch: +4 / -10 dB.** Globally adjusts the level of the analog outputs to your existing studio equipment.

10) **Switch: Ground Lift.** Activate "Ground Lift", to separate the signal ground from the unit ground. This can be used to avoid undesirable hum pickup. It is better to eliminate the source of the hum, however, as activating the ground lift can reduce the signal-to-noise ratio.

11) **AC power.** Connect the included AC power cable. Please note: external power is required even if the device is connected to a computer (PCI card), as the device is not supplied with power via the data cable in the same way as some USB devices or the AudioSystem EWS88 MT. The integrated power unit automatically detects the power applied (110 volt/60 Hz or 230 volt/50 Hz).

12) **AC power switch.** Turns the power on and off.

The front panel.

As the name suggests, the only difference between the EWS MIC2 and MIC8 modules is the number of available microphone channels. On the EWS MIC2 module, only channels 7 and 8 are available for microphone signals. As a result, there are fewer buttons on the front panel for channels 1 to 6.

Three sockets, nine pots and 25 (48) switches for greater convenience in the studio.

1) **Inputs 7 and 8.** As an alternative to the inputs 7 and 8 on the back, these can be used for two sources that you may want to change from time to time. Inserting a jack or XLR plug into either of the sockets disables its counterpart on the rear panel.

2) **Headphone output.** Connect stereo headphones here. You will hear the mixed signal of all (!) channels input to the device including audio signals being output by the computer. By the way: thanks to the choice components used, the headphone amp will satisfy professional demands and should be used - if possible - in preference to monitoring via a mixer or even an ADAT recorder.

3) **Mono switch.** Do you need to quickly check the microphone phase position or the sound of the mono mix? Just press the button and find out how nice it is to have two ears.

4) **Headphone volume.** Even this can be adjusted as needed.

5) **GAIN pots.** Here you can set the gain of the analog inputs over a range of 20 dB, or 60 dB with the microphone preamp activated, BEFORE the A/D conversion.

6) **Signal and clip LEDs.** If an input signal is present, the signal LED for that channel will light up blue. At around -1 dB (the "0 dB mark" is at a solid +20 dBu or +60 dBu), the red LED lights to warn of impending distortion.

7) **Line/Mic switch.** Here you can set whether a signal with line level (e.g. synthesizers, effects) or a microphone signal is being applied to the input.

8) **Phantom power.** If your microphone needs its own 48 V power supply, it can be activated per channel as required.

9) **Subsonic filter.** Unpleasant impact sounds and associated signal peaks - such as those caused by an over-athletic singer - can be filtered out for the most part prior to the conversion. Just press the button and enjoy.

10) **Phase switch.** Reverse the phase position of a microphone signal with this switch. This can be helpful to prevent signals from canceling one another out (interference).

11) **Direct.** Activate this switch to transfer an audio signal applied to the analog inputs directly to the corresponding output. This function is useful in a number of different respects:

    In stand-alone mode, you can use the 19" module as a simple microphone mixer and preamp (in conjunction with the mute buttons). If you already have a small mixer which you are using for live recording purposes, we would like to recommend using the preamps of the MIC2/8 module - the SPL sound will convince you.

    When recording with the PC, use the direct mode to monitor input signals directly, without a trace of latency. This is also possible using the ASIO 2.0 interface. Sometimes quickly pressing a hardware button is simply faster and more intuitive than three mouse clicks, however.

    Sometimes the Direct button is useful simply to check whether an analog signal is actually present at the MIC module and hasn't gone astray in the depths of the computer.

12) **Mute button.** As seen on your mixer, TV remote and clock radio.

The connectors of the PCI card.

If you've purchased the Plus version of the AudioSystem MIC2 or MIC8, you can look forward to a flexible system for routing a variety of signal sources. In addition to the connections on the 19" module, the following connections are available on the included PCI card:

EWS88 MT PCI Card Version 2.0

EWS88 MT PCI Card Version › 2.0

1) **Digital input, coaxial.** The input of the PCI card can accept signals in S/PDIF format (up to 24-bit). When recording, ensure that the card is correctly synchronized (slave mode, see page 39 "Cascading of multiple EWS systems and synchronization.").

2) **Digital output, coaxial.** Signals in S/PDIF format (up to 24-bit) are available at the output of the PCI card. The output can also be used to send raw digital data (e.g. AC3 or DTS signals to an external Dolby Digital decoder).

3) **System OUT / separate analog output.** There's more to this inconspicuous little mini-jack socket on the PCI card than meets the eye - a complete "sound card" which can be fully isolated from the "musical properties" of the EWS system. For example, you can have all sounds from the operating system sent to this output to prevent spoiled recordings whenever a Windows system sound comes between you and your sequencer. Tip: TerraTec's product range also includes economical and visually pleasing speaker solutions for entertainment applications. Maybe a reason to have a closer look at our consumer solutions as well. ;-)

4) **Connector for EWS MIC module.** Connect the 19" module here. Please ensure that the connector strips are firmly screwed onto the 19" module and PCI card, as the weight of the cable can otherwise cause it to come unplugged.

5) **Internal connection (only!) for EWS88 MT front module.** This connection is not designed for use with EWS MIC modules. Both modules cannot be used simultaneously. Former EWS88 MT users must read the information on page 10 with care!

6) **Internal CD audio input 1 and 2.** The analog connections are electrically independent (decoupled) and can be used simultaneously. Their volume controls are not in the EWS ControlPanel, but in the standard Windows mixer. CD audio playback via these internal connections is realized using the System-OUT described above, not the "musical" part of the EWS system.

   Suitable cables are normally included with your CD drive or can be purchased separately.

7) **EWS® Connect Sync-IN connection.** For the internal synchronization of up to 4 EWS PCI cards (5 contacts, the plug must remain on the master card). For more information, please read Chapter "Cascading of multiple EWS systems and synchronization." starting on page 39.

8) **EWS® Connect Sync-OUT connection.** For the internal synchronization of up to 4 EWS PCI cards (3 contacts).

9) **Jumper 1.** Sets the digital input:

   1-2 -> Coaxial S/PDIF on the PCI card active.

   2-3 -> Digital input on the MIC module active (ADAT or S/PDIF).

The drivers.

Note: The driver designations are based on the PCI card of the complete system and are thus called "EWS88 MT". This does not have any effect on the interaction of the modules, however.

The AudioSystem EWS MIC2+/MIC8+ 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 96 kHz*. As a rule, the sample rates are not "interpolated". In other words, the audio system 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 Wave driver.

In most Windows programs, you will encounter drivers with the designation "EWS88 MT Wave" for recording and playback. In order to address the inputs and outputs of the EWS MIC system, you will also find a numbering that corresponds to five input/output pairs: 1/2, 3/4, 5/6 and 7/8, as well as S/PDIF Left/Right. Please note that they define the physical input or output in the EWS ControlPanel. The "EWS88 MT Wave ½" playback driver is thus not automatically considered to be identical to the analog outputs 1 and 2 of the MIC module.

If you are using multiple cascaded EWS MIC systems, the operating system generally numbers the driver names from 1 to 4. "Generally" in this case means that there may be exceptions which are unfortunately beyond our control.

Depending on the software, the driver names are displayed with supplements that refer to the audio architecture of the operating system: MME, WDM or DirectSound (see below for more information).

Last but not least, there's the "EWS88 MT Digital Mixer" driver (for recording only). If required, it records the sum of all of the audio signals coming together in the system. It can thus also be used for a digital resampling of all driver sources.

The System-OUT driver.

We have a special treat for you in the form of the lowly "EWS88 MT System Wave" driver for the System-OUT output on the slot plate of the EWS88 PCI card (see page 23). An 18-bit converter delivers punchy sound - we suggest using it for the playback of Windows system sounds (pearls before swine, one could say...) or as an independent output for audio editors or software synthesizers. The latter benefit from the extremely fast DirectSound part of the driver - you should easily reach latency values of less than 10 ms with a software synthesizer.

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* With the exception of the "EWS88 MT System Wave" system sound driver; this part of the card works with an 18-bit / 48 kHz AD/DA converter.

Its counterpart, "EWS88 MT System WaveRec" lets you record signals from your connected CD drives. However, we recommend reading the CD audio data out digitally for quality reasons.

The ASIO driver.

Programs that support Steinberg's ASIO (or ASIO 2.0) interface will display the ASIO driver of the AudioSystem EWS MIC2+/8+ in the relevant dialogs. With ASIO, programs achieve extremely short delays (latency) during audio recording and playback. That way, 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 ASIO driver is listed in compatible programs under "ASIO for EWS88 MT/D". The inputs and outputs (generally "busses") available in the programs are called "EWS88 MT (n) Out", wherein "n" is used to distinguish multiple EWS MIC systems (1 to 4). In many cases only the left channel of the output pair (1/2, 3/4, 5/6, 7/8 and S/PDIF Left/Right) is stated, it applies for both channels however.

If you have cascaded multiple EWS systems in a PC, you can explicitly enable or disable each card for ASIO in the ASIO window of the EWS ControlPanel. For example, this permits two synchronized EWS systems to be addressed together under one ASIO driver (e.g. under Cubase SX) while a third system is available to another application (e.g. CoolEdit) under the MME driver.

The GSIF driver.

The GSIF driver by AudioSystems is also visible only in certain programs. The GigaStudio sampler application and other Nemesys products can also access the hardware in a very fast and direct manner. The outputs available in the individual programs are also called "EWS88 MT/D GSIF (n)" in this case and are routed - as described in detail below in Chapter "The ControlPanel." starting on page 29 - to the digital mixer of the card or the outputs on the MIC module.

The MIDI driver.

A driver is also available for the playback of MIDI information via the MIC module's MIDI IN and OUT sockets on the splitter cable. The driver designated as "EWS88 MT MIDI 1" (or MIDI 2) in this system, and it can be selected in any situation in which its use would be appropriate.

Tip: 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 chapter

Installing the driver software., page 12).

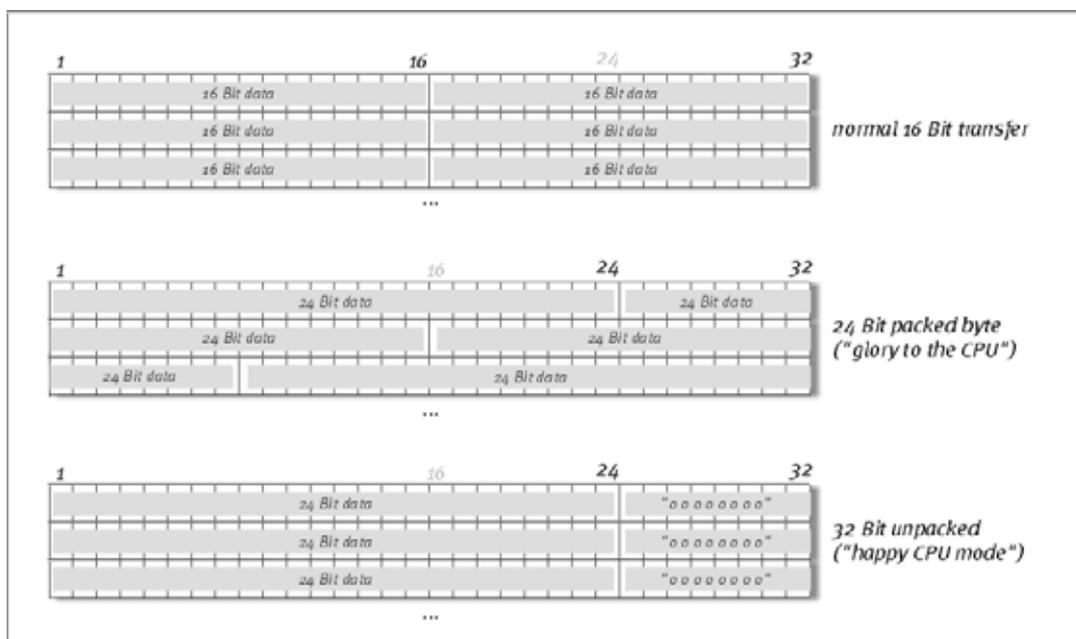**In detail - special properties of the drivers.**

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 (top of diagram).

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 EWS system also support Microsoft's Direct-Sound 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 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 sampler frequency used for all streams is based on the file called up first. All further data streams - those called up during the run time of the first file - are interpolated as required and their pitch is not affected.

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.

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. At the time of printing, a program that we know and have tested is Cakewalk's "Sonar" recording software.
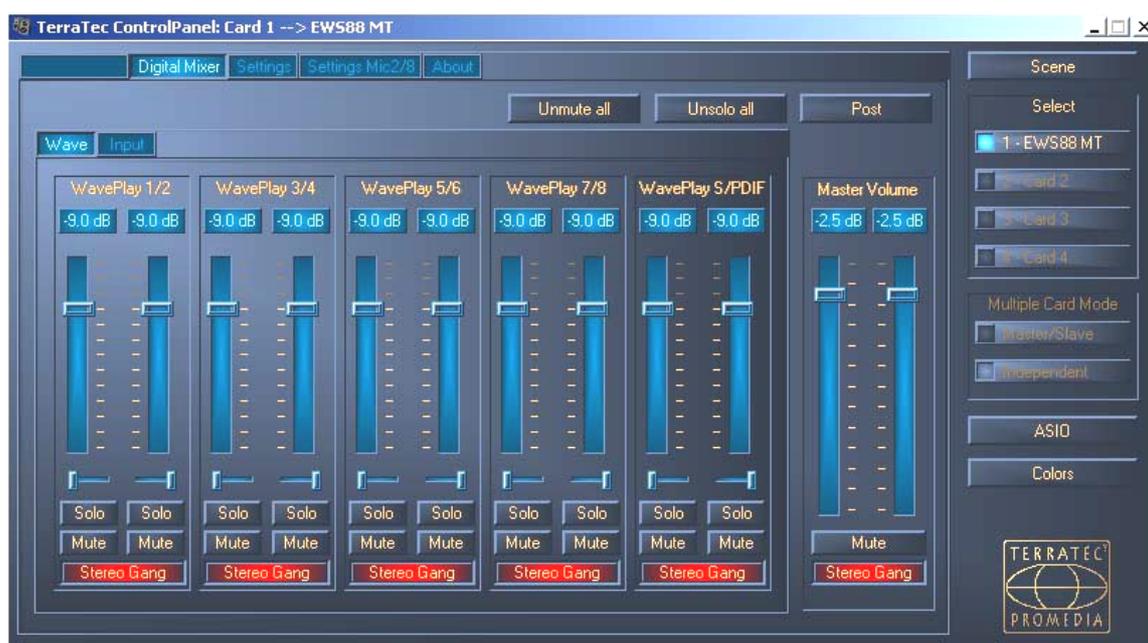
The ControlPanel.

The ControlPanel is - next to the drivers - by far the most important piece of software in the package. Here you can configure your AudioSystem to suit any given situation, reduce volumes, load, save, and much more.

Unlike other "mixers" for PC audio or sound cards, the EWS ControlPanel is a tool in which certain settings are configured once for a given task and then rarely or never changed. The chip technology on which the AudioSystem is based provides possibilities that our software lets you use to their fullest. Depending on the complexity of your setup, the extensive routing options may require a bit of concentration. Just one request: please take 5 minutes to read at least the sections on routing and the digital mixer in one sitting - it simplifies quite a bit. Go for it!

A note for EWS88 MT owners: Be sure to install the latest version of the EWS ControlPanel software (1.03.35.12X or later) as earlier versions do not support the enhanced routing options of the MIC module.

The EWS ControlPanel will automatically recognize the replacement of the 5¼" front module with a 19" MIC module. As the input gains can be adjusted directly using pots on the module itself, the mixer-side analog input levels are superfluous.

The "Digital Mixer" page.

The AudioSystem EWS features an internal digital mixer which you can bypass if you don't need it.

The digital mixer mixes all of the signals output by the drivers as well as those present at the physical inputs. Switch between the "Wave" and "Input" pages to view and control the levels.

The sum of all signals mixed here can be adjusted with the master volume and finally sent to the PCI card outputs 1+2 and/or S/PDIF via the "Digital Mixer" entry in the routing dialog.

Tips for operation.

You can change names in the digital mixer display to improve the overview. Simply double-click WavePlay 1/2 ... 3/4 ... or Input 1/2 ... 3/4 ... and enter a new name (for example that of the connected device).

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

The VU displays can be disabled with a right-click to conserve system resources.

A mute switch silences the relevant signal completely, whereas it can still be heard faintly when the fader has been pulled all the way down.

Solo mutes all channels except for the currently selected one.

Unmute all restores the muted channels.

Unsolo all restores the channels set to solo to their normal state.
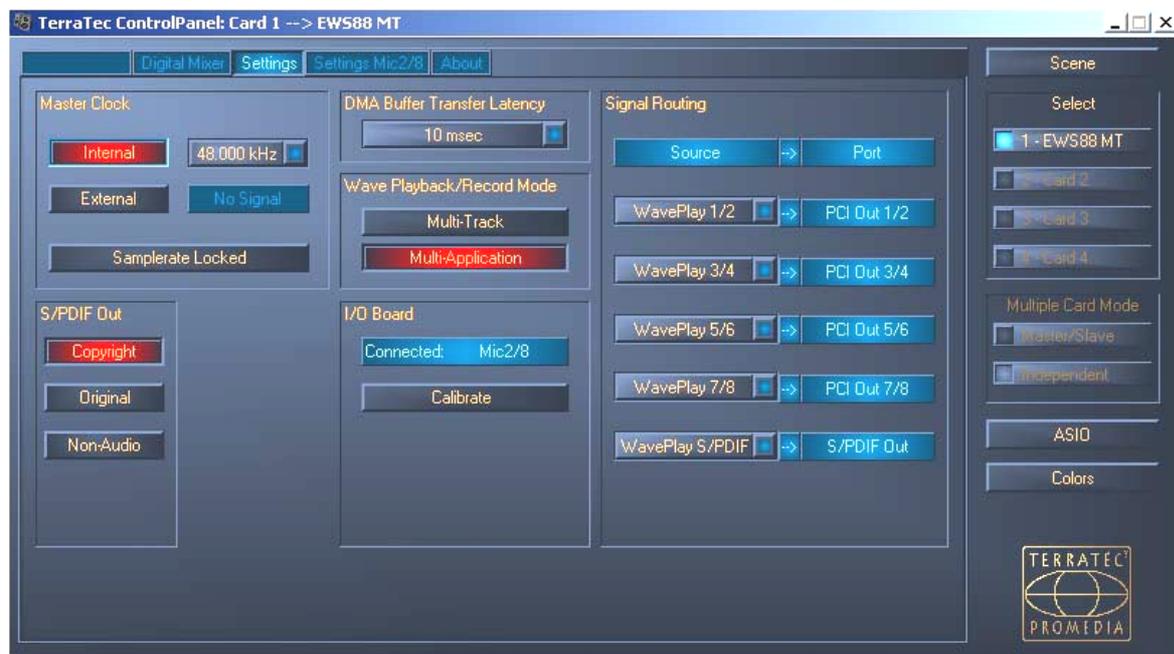
Post shows the post-fader levels of the signals leaving the mixer.

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

Internal resampling.

As described above, the mixed signal can also be recorded again! The recording driver provided particularly for this purpose ("Dig. Mix Record") can be selected in all commonly-used Windows audio applications.

The "Settings" page.

The Master Clock.

Here we're dealing with the sample rate used by the AudioSystem EWS MIC 2/8. This is a very important point, as the card can be clocked by an external signal (External, e.g. from a DAT recorder) or it can set a sampler rate itself and provide this signal to other devices.

You can choose from all commonly used sampler rates from 8 to 96 kHz - the actual bit rate is not important at this point. In the case of external synchronization (i.e. via a signal applied to the digital interfaces or the internal connection to cascade multiple cards), the external sampler rate will be displayed. If no signal is available or the connection has been interrupted, the message "No Signal" will be returned.

The audio controller of the PCI card does not feature a sample rate converter (exception: the System-Out driver). This module - which is common on sound cards - normally lets you play back signals with a variety of sampler rates by "interpolating" the sampler rates in real time to a specific frequency as needed.

An example: Your system is being clocked externally by a DAT recorder at 48 kHz. In your audio editor, you are currently working on a file with a frequency of 44.1 kHz. While you're monitoring this file, an action prompts Windows to play a systems sound (22.05 kHz). All of these signals can be heard at the same time at 48 kHz - the externally-specified frequency. Everything sounds normal, even though the audio files are not being played at their actual frequency. You can detect a difference when listening closely, however, as the audio data has

been modified in real time by the sample rate converter. The quality thus suffers under this converter - which is otherwise quite practical. As the AudioSystem EWS is not a sound card in the conventional sense, and you would probably hit the ceiling if it came to light that half of your tracks were accidentally recorded with an interpolated sampler rate, we have chosen not to provide a sampler rate converter.

Instead, the sampler rate is dynamically adjusted to suit the current audio data stream. This is realized without the slightest loss in quality - as you would expect from a professional system. Please note, however, that you will get an error message if you try to simultaneously play back multiple files with different sampler rates. While it is possible to play back audio data from several programs at the same time, they must all use the same sampler rate. (You should also ensure that the "Wave Playback/Record Mode" is set to "Multi-Application". More on this below.)

The "Sampler Rate Locked" switch also permits the sampler frequency to be set to a fixed (or externally specified) value. This will prevent the accidental use of sampler rates other than the intended one.

Example: You would like to "run" a complete production at 96 kHz. Lock the sampler rate at 96 kHz to prevent audio material with a lower rate from "sneaking in" - you'll receive an error message if this happens.

The I/O board.

An extremely simple section of the EWS ControlPanel. If the MIC2/8 19" module should ever get separated from the card (pretty unlikely if the screws are tightened), you will need to re-calibrate the converter. This process takes exactly 250 ms and doesn't hurt a bit. However, you should always be sure not to dock or separate the rack from the PCI card during operation. This could damage them.
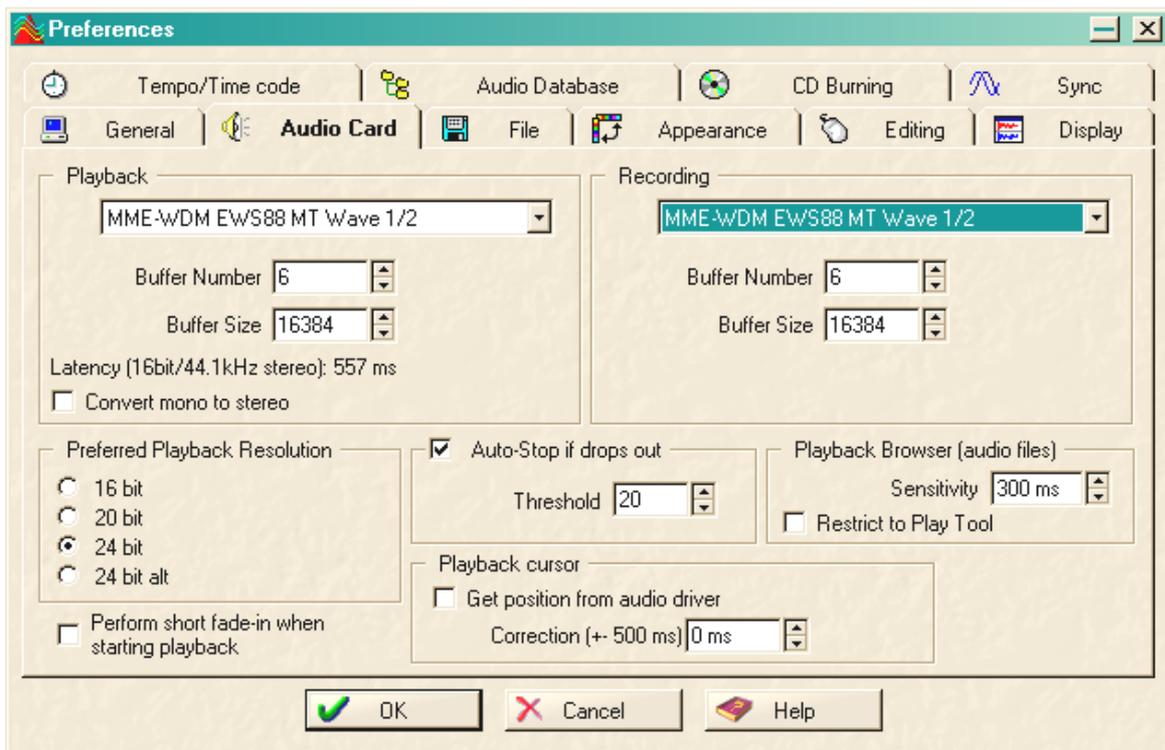
S/PDIF Out.

Here you can specify the inclusion of protective information in a signal that you are sending across a digital interface. It is possible to add copy-protection information (original) to your recording when transferring it to another device. This can be useful when recording a composition to DAT or a MiniDisk as a demo to prevent (digital) copies from being made.

- **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.

- **Original** activates the so-called "generation bit", permitting exactly one digital copy to be made. Disabling this function sets the bit to 0 - you can then copy to your heart's content.

- **Non-Audio** adds information to the data stream that defines it as "anything, but not audio" so that it can be reproduced in RAW format (e.g. for AC-3 / DVD Audio, see below).

The DMA buffer transfer latency.

A long term, but a very useful one. Here you can determine the speed with which an application such as a software synthesizer can access the Windows drivers (with the exception of the SystemOut driver, see page 25). You might think faster is better, but there's a catch. The setting is system-dependent and - if the system is too slow - an excessively low value will result in audible dropouts during recording and playback. If you detect dropouts when playing back audio tracks with your hard disk recording program, increase the DMA buffer transfer latency. The "tuning" of your application is also important in this regard, however. Many programs let you configure the audio buffer (in this example: WaveLab) and ignore the settings made within the EWS ControlPanel..

Audio setup in Steinberg WaveLab.

A tip for balancing: If speed is important - i.e. a low delay during playback - try to keep the number of buffers and their size as low as possible. Next, lower the DMA buffer transfer latency in the EWS ControlPanel step by step. The drivers are cleanly programmed and have been designed for speed. With a decent system, you should also achieve decent values that are a joy to work with.

Note: The DMA buffer transfer latency settings have no effect on the performance of the ASIO or GSIF drivers (see page 26). The DMA buffer transfer latency is of great importance for the optimization of kernel-streaming applications such as Sonar, however.

Wave playback/record mode.
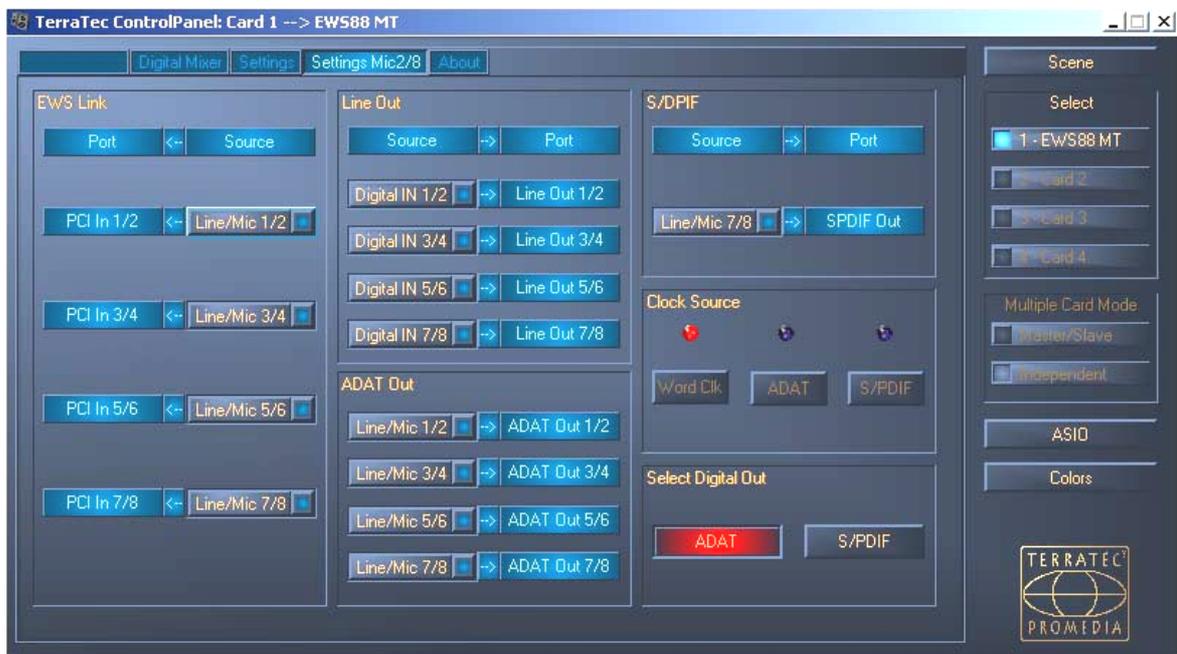
- **Multi Track**

  If this function is enabled, the driver optimizes all input and output devices (WavePlay (Rec) 1/2, 3/4, etc.) for use under a single software application. Multi track mode thus ensures that all channels are absolutely synchronized during recording and/or playback. Be sure to use this function during multitrack recording and playback.

- **Multi Application**

  If this function is enabled, the driver optimizes all input and output devices (WavePlay (Rec) 1/2, 3/4, etc.) for use with multiple software applications simultaneously.

Please note: The "Multi Track" and "Multi Application" settings only affect kernel-streaming applications (Sonar), not ASIO or GSIF applications.

The "Settings Mic2/8" page.

Which input should be routed to which output? Directly from analog to digital? Or run it through the computer first? You can answer all of these questions in this window by adjusting the settings in the pop-up menus to suit your needs.

All of the settings of the 19" MIC module are thus configured on the "Settings Mic2/8" page.

But first the relevant terms:

- **Line/Mic** refers to the numbered analog input pair.

- **Digital In** either stands for the numbered channels of an 8-channel ADAT or a ("stereo") S/PDIF signal which can be applied to the optical input alternatively to the ADAT. If an S/PDIF signal is present, no signal will be available at the "Digital In" channels 3-8.

- **PCI In** goes directly to an application via the connector cable - i.e. a WaveRec driver corresponding to the number pair. In addition, the signal is also present at the routing input of the EWS88 MT PCI card (see page 31)

… with which the routing options have essentially introduced themselves. You should simply bear in mind that not all combinations are possible at random, and that the channel number pairs of an input are always routed to the corresponding outputs (i.e. 1/2 to 1/2, 3/4 to 3/4, etc.).

Clock Source.

A word in advance: If you have multiple EWS88 PCI cards (MT or D) connected via the EWS Connect synchronization, you should set the EWS88 MT PCI card connected to the 19" module as the master card. If you are using multiple EWS MIC2/8+ systems, we recommend synchronizing these systems via the WordClock interface of the MIC module. The digital inputs of all MIC modules can thus be used in independent mode (see page 38).

The ClockSource LEDs indicate the input that has the sync signal that you can use to synchronize the EWS Mic system (as a slave). These can be the WordClock interface and/or the optical digital input (ADAT or S/PDIF, depending on what is connected) on the 19" module.

If more than one connected device provides a suitable sync signal, use the switches to select a source.

Select Digital Out.

When using the EWS MIC2/8 module in stand-alone mode, the optical digital output can be toggled between ADAT and S/PDIF format at the press of a button. If you have connected the module to the PCI card, click the output format here with your mouse. When used with the PCI card, the switch on the 19" module is disabled.

When set to S/PDIF, both channels (7 and 8) are converted and output digitally (in other words: all eight channels are not mixed for output via S/PDIF). This ensures that the microphone inputs can also always be converted to S/PDIF format (remember: the MIC2 microphone pre-amps are assigned to channel 7 and 8).

Signal routing of the EWS MIC8(2)+ systems

The "About" page.

The **"About"** page contains - in addition to a silkscreen-like impression of our headquarters in Nettetal, Germany - important system information that may prove useful when contacting our hotline or prior to driver updates. Hover over the info area with the mouse cursor for additional information.

The mixer icon on the Windows taskbar.

The mixer icon appears in the Windows system tray (in the lower right corner, next to the clock) whenever the EWS ControlPanel has been loaded. Right-clicking the icon offers direct access to a number of functions that are also available from the Panel itself - please see the sections above for further information.

- **Show / Hide.** Displays the panel or hides it.

- **Select Card.** In cascaded audio systems, select the card you want to control here. You can also do this using the keyboard. Press the keys 1 to 4 on the numerical keypad.

- **Select Page.** Directly selects a page of the panel. The dialogs for scene management, colors and ASIO/GSIF settings can also be selected via the keyboard.

- **Advanced.** "Reset System Out": It may occasionally become necessary to reset the System output (see page 23). You should do so whenever the signal on this output is distorted. "Rescan master/slave configuration" seeks the master card (that you have set via the type of EWS Connect and/or WordClock connections). "DirectMonitoring" transfers the control of the digital mixer to an ASIO application. External signals can thus be output via the digital mixer without latency.

- **Exit. ... or Alt+F4.** Done. Finished. Basta. Outtahere. That's all, folks.

Managing scenes.

In modern digital mixers it's known as "total recall" - PC users would call it "load" and "save". The "Scene" button at the right-hand edge of the EWS ControlPanel lets you save all of the card's settings as a scene, or to load or delete previously-saved scenes. Use "Cancel" to exit the dialog without saving.

Multiple card mode and managing cascaded cards.

The card selector (Select) is also always accessible at the right-hand side. Here you can select the display mode for multiple cards of the EWS family, if installed. The master card will be recognized automatically and marked with an (M). Please note that the scene memory function always saves all settings for all of the cards.

You will still have the option of using the individual cards independently at different sampler rates, even if the synchronized cards are linked via the EWS® Connect or WordClock connections. At the right-hand side of the ControlPanel you can choose whether you would like to use the EWS systems independently or in synchronized mode (Master/Slave).

If you select Master/Slave mode, all slave cards are automatically set to external synchronization, as the cards are now digitally synchronized among one another. The clock of the first (master) card is now set to "Internal" (you can choose the cards at the right-hand side of the ControlPanel in the "Select" field).

All AudioSystems will now run using the sampler frequency set on the master. If you would like to use an external clock for the master card as well (using a DAT recorder, for example), set its master clock to "External" as well. The sync information will be forwarded to all EWS88 systems.

Colors.

Here you can configure perhaps the most vital system settings within the EWS ControlPanel. No matter where you look, our days are filled with color. After all, life is beautiful, and there's nothing like pink buttons and delicate green reflections to breathe life and good cheer into your boring Windows desktop. Have fun...! ;-)

But seriously, folks - this section contains a number of truly useful settings that not only beautify your EWS ControlPanel, but which improve the overview of its display:

A click on the Background, Text, Static Controls and Peakmeter buttons opens the Windows dialog to change the colors.

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

Test the settings made above in the right-hand part of the window and save them when you're satisfied.

Once saved, you can find your personal color settings in the dropdown menu, which already contains a number of examples. The "Windows System" color set uses only colors that display correctly at an 8-bit color depth.

ASIO & GSIF

Programs that support Steinberg's ASIO or Tascam's GSIF (GigaStudio) feature dialogs containing special settings for these drivers. The properties of the EWS hardware can be set up in the ASIO ControlPanel. For further information on the various drivers, please see page 25.

The ASIO buffer size has a direct effect on the latency ("speed") of the ASIO driver; if the value is too low it may impair the overall performance of your system, however. On fast systems (1 GHZ or higher), you should be able to set values of less than 512 samples/buffer (this corresponds to a latency of less than 5 ms at 96 kHz) without problems.

"Without problems" means that you will not detect any dropouts during audio recording or playback. If such dropouts occur, increase the number of buffers.

Tip: The "conversion" into time values is displayed just below the menu.

GSIF/ASIO multi-client.

Activate GSIF/ASIO multi-client mode in order to simultaneously use applications based on the different driver models, such as GigaStudio with Cubase SX. Two programs can thus share access to the hardware while you decide which output will be used by which application.

- GSIF resolution. Choose whether you prefer playback with 16- or 20/24-bit dynamics here. The bit depth you select here applies to ASIO as well as GSIF applications.

- Buffer size. Depending on the performance of your system, you can choose between small, standard and large buffers here. Select the buffer sizes "by ear" as described above - do dropouts occur, or do all of your applications work correctly?

- Output selection. Allocate the outputs to their respective drivers here.

Cascading of multiple EWS systems and synchronization.

Up to 4 AudioSystems of the types EWS MIC2+, MIC8+, EWS88 MT and EWS88 D can be installed in a single computer and operated together. You can therefore conveniently increase
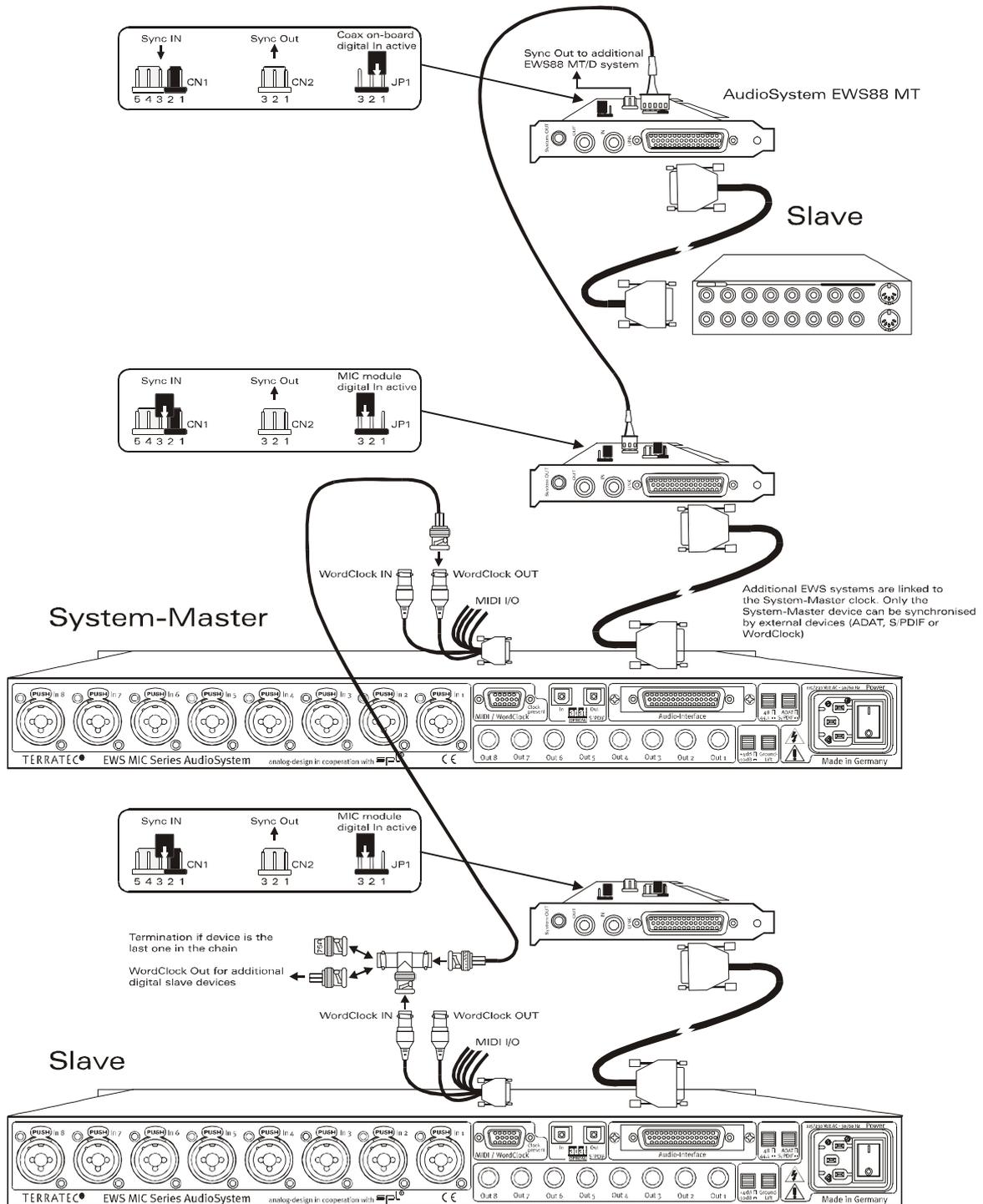
the number of input and output channels which can also access directly from most Windows applications. A fully loaded system containing four EWS models thus features a total of 40 inputs and outputs - and all of that with virtually the same low latency!

Before installing the individual PCI systems, you should give some thought to their future use. If you intend to use multiple systems together within a single application, for example under an ASIO and/or GSIF driver, these systems must be synchronized with one another. Synchronization means that the system clock of one card (master) controls all of the other cards (slaves). Please note that the sync input of an EWS88 MT/D system used as a slave has a fixed cable connection (EWS-Connect) to the master card or a further slave card. The onboard digital input of the EWS88 MT/D can no longer be used in this configuration (nor in independent mode). When deploying multiple EWS MIC2/8+ systems, synchronize them via the Word-Clock port. The Sync-In on the associated EWS88 PCI card is therefore not connected. The advantage of this is that the digital inputs of all MIC modules are available separately in independent mode. Additional EWS88 MT/D systems must be internally connected to the master card via the EWS-Connect (see the illustration "Master/slave operation - synchronizing multiple EWS systems").

As only the master card can be synchronized externally in a master/slave configuration, it is preferable in most cases to select the EWS PCI card of a MIC module as the system master.

If you would like to use the systems in a variety of applications (such as an EWS MIC2/8 system under ASIO in Cubase SX, and an EWS88 MT system under an MME application such as CoolEdit) we recommend not synchronizing the systems via hardware connections. Master/slave operation would not be suitable in this case. As mentioned earlier however, all of the digital inputs of the individual systems are once again available in independent mode.

Master/slave operation - synchronizing multiple EWS systems

The ControlPanel.

The EWS ControlPanel now automatically handles the settings of the master clock on the Settings page, as the cards are now digitally synchronized with one another. The clock of the first (master) card is now set to "Internal". All additional cards (you can select the models on the right-hand side of the ControlPanel with "Select Card#") are now set to external synchronization.

All AudioSystems will now run using the sampler frequency set on the master. If you would like to use an external clock for the first (system master) card as well (using a DAT recorder, for example), also set its master clock to "External". The sync information will be forwarded to all connected slaves.

Synchronization via WordClock.

The 19" MIC2 and MIC8 modules can communicate with one another (and of course with other compatible devices) via WordClock. Only connect the WordClock-Out to control external devices as slaves. When using the MIC system as a slave, please use the included T adapter as shown in Fig. "Master/slave operation - synchronizing multiple EWS systems". To synchronize further devices on the WordClock chain, connect them to the T adapter of the slave system as well. If no further devices are to be connected, attach the included 75 Ohm terminator to the free connection of the T adapter.

Synchronization in stand-alone mode.

When using the AudioSystem EWS MIC8(2) without an EWS88 PCI card, three external synchronization sources may be used - WordClock, ADAT or S/PDIF. ADAT and S/PDIF signals use the same optical interface and are therefore mutually exclusive. If an ADAT or S/PDIF is available, the MIC module will synchronize itself with it. If a WordClock signal is applied to the input of the EWS MIC8(2) system by an external device, the system will synchronize itself with it. If both WordClock and ADAT (or S/PDIF) clock information is available, the WordClock signal will be given priority. As a rule, if an external clock is available, the MIC module will automatically be the slave.
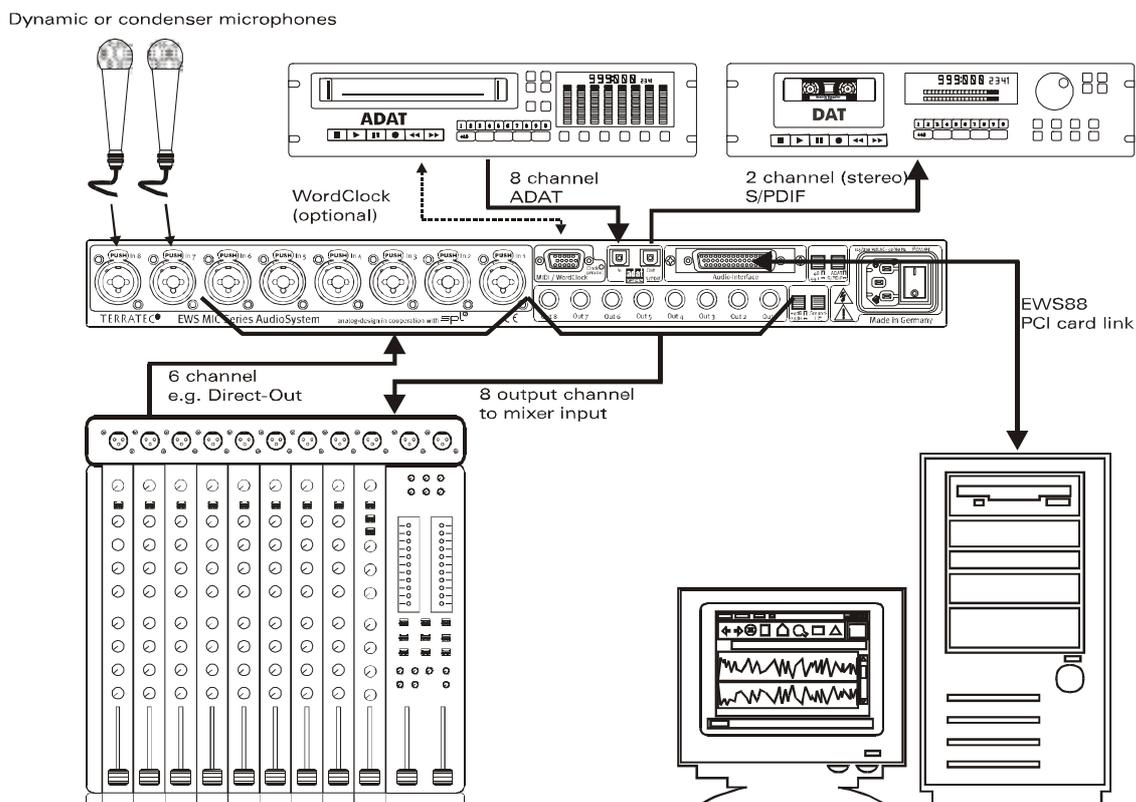
Practical section.

Sample applications.

In the following section we would like to describe a number of sample applications that may help you in planning your recording setup, or which might present you with new application perspectives.

Set A - Studio recording.

Our first example is based on the use of a mid-sized mixing desk as can be found in most home recording studios. 16 to 24 channels with connected instruments ranging from synthesizers to guitar effects, and the mixer features eight external busses to send signals to a multitrack recorder. The microphone preamps of the mixer are, as is often the case, of barely adequate quality.

While the Alesis ADAT was once the multitrack recorder of choice, it has been supplanted by the PC, which also can serve as a convenient audio editor and as an additional audio source (sampler, synth, etc.). That doesn't mean that tape decks are obsolete, however, they're simply integrated into the current setup - to transfer old recording to the PC or for additional audio tracks.

In our example, the "final" mix is recorded either on a DAT or 24-bit master recorder (e.g. Alesis ML-9600), or on good, "fat" audio tape. Depending on your computer's performance it's also possible to make the final recording on the PC. Just be sure to avoid feedback loops.

Setup A - Mixer and PC are at the center of attention, on "equal terms".

[1] In our example, six of the (as a rule) eight output signal paths of the mixer to the computer, i.e.: to inputs 1 – 6 of the EWS MIC system. Normally these outputs are labeled on the mixer as TAPE-OUT, REC-OUT, DIRECT-OUT or AUX-Send (not to be confused with effect sends).

[2] Two microphones are connected directly to the EWS MIC rack (inputs 7+8), and can be supplied with phantom power as needed. The quality of the analog preamps is very high, so as a rule you should choose them over the preamps integrated in a mid-class mixer. However, if you would like to use analog outboard equipment (compressor, de-esser, EQ) BEFORE recording, then there's no alternative to a "traditional" setup via the insert points of the mixer.
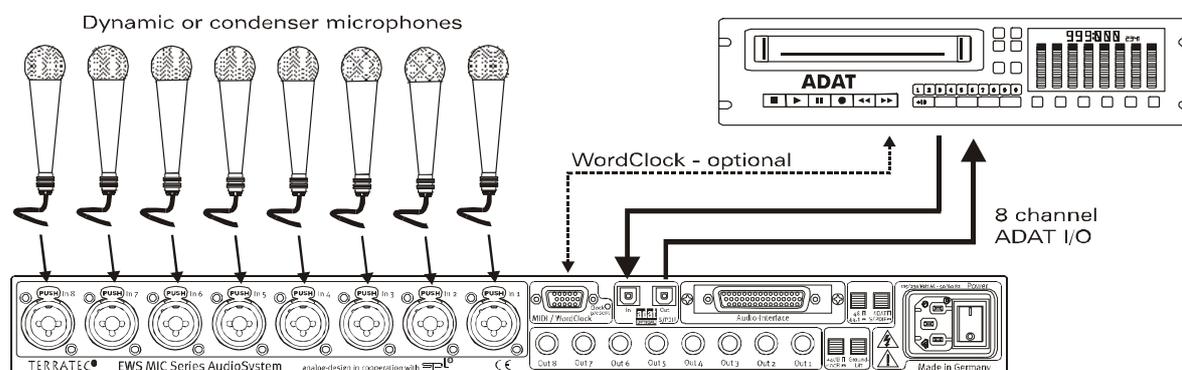
[3] Connect the eight outputs of the EWS MIC rack with the inputs of the mixer. The mix is run via the console, with the PC handling all tasks related to recording and editing. Depending on the application, eight fully-featured mixer channels - or TAPE returns, if present - can be used, although the latter generally have very restricted sound control options or none at all. This isn't really a problem, however, as these channels can also be edited in the computer.

[4] The digital recorder (an ADAT machine in this example) is integrated via the ADAT interfaces of the EWS MIC system. In this example only the ADAT output of the digital recorder is used. The optical output of the EWS MIC rack is thus available as a digital S/PDIF output for mastering to a DAT recorder. If the external digital devices have WordClock interfaces, connect them to the appropriate interface of the EWS MIC module. If the ADAT machine does not have a WordClock I/O, use it as the master for the MIC module and all other digital devices. In this case, ensure that the EWS MIC system (in the case of cascaded systems, the system master) is set to external synchronization in the ControlPanel and the clock source is set to "ADAT".

[5] To put your audiophile masterpiece on tape, our example uses any 2-track recorder - in this case, a DAT recorder. Naturally you can also reconnect the ADAT machine (or any other ADAT or S/PDIF device) to the optical digital output.

Setup B - Live recording without a PC.

The EWS MIC 8 rack is also very suitable for live recordings without a PC or mixer(!). In this case, the high-quality microphone preamps of the EWS rack module are used in conjunction with a stand-alone multitrack system (ADAT).
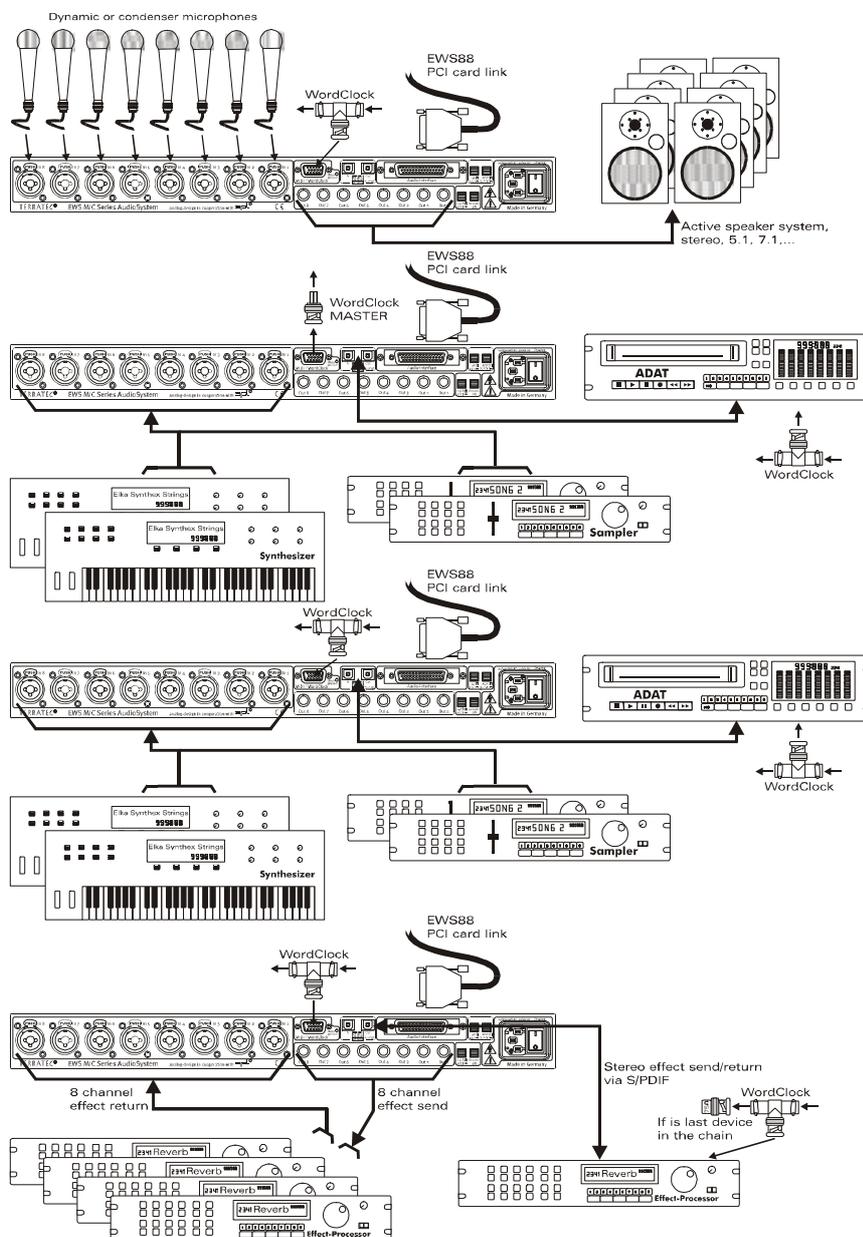

Setup B - The EWS MIC8 system as a high-quality mixer replacement for live recordings.

[1] Up to eight microphones can be connected to an EWS rack. The gain can be adjusted individually and the signals are available in digital form at the ADAT output of the module (see connection [2]). When the DIRECT switches on the EWS rack front panels are pressed, the channels are switched additionally (!) to the analog outputs.

Set C - The PC as a digital mixer.

Our third example will certainly be very appealing for many users - the use of the PC as a complete replacement for a mixer. Thanks to the low latencies possible with the EWS MIC system and the option of cascading up to 4 EWS MIC2/8 systems, a powerful PC running the appropriate software can serve as a 40-channel digital mixer and recorder. External hardware controllers make the deployment of such a system completely feasible for the day-to-day production work of a medium-sized project studio.

An example for a full-featured "PC digital mixer" with a wide range of analog and digital sources.

Up to four EWS MIC-2/8 can be cascaded or linked in a single PC. The synchronization is handled (in this example) via a WordClock connector cable.

[1] A total of 32 analog signals are distributed in the example across the four used EWS-MIC modules. A possible combination is one MIC8, which is initially used for 8 microphones, while three MIC2 24 handle additional line sources (e.g. 16 channels from a variety of audio sources plus 8 returns from external effects processors). Depending on the specifications of the audio sources and effects devices, the ADAT interfaces can also be used as an alternative to the analog inputs of the modules.

[2] Two of the modules (here: top and bottom) each return eight audio channels to the outputs: while the MIC2 module shown below provides eight SEND paths for outboard equipment (effects), the upper MIC8 provides the output signals for monitoring (5.1 + 2) and/or master recorders.

[3] Needless to say, the PC with the EWS control software and sequencer is the center of attention in our example. If you are going to use the system professionally - and we're assuming that you will - careful planning and configuration of the software is essential to prevent wasting valuable production time repeatedly setting up new routings. No matter what shape your setup finally takes - the combination of modern audio software from the leading manufacturers and our hardware will convert your PC into a powerful, open mixer system.

Multiple audio cards in a single system.

Modern PC systems can accommodate multiple audio cards from a variety of manufacturers and can run them in parallel. The extent to which the audio interfaces can be combined in practice depends on the software used.

A wide range of combination options are available when using multiple TerraTec AudioSystems. In short, all PCI cards of the EWS and EWX series can be combined with one another in a single computer. The consumer products DMX 6fire 24/96 and 6fire LT can also be used simultaneously.

In addition PCI AudioSystems of the EWS series (at the time of printing: EWS88 MT, EWS88 D, EWS MIC2+ and EWS MIC8+) can be synchronized via an internal cable connection or Word-Clock and can be configured using a shared ControlPanel application. In an ASIO environment, the system is then displayed as a single device with up to 40 inputs and outputs. For more information on this topic,

Always right on time - digital synchronization.

When recording via the S/PDIF interface, ensure that the so-called sample frequency (clock) of the card is synchronized with the source device. To ensure the trouble-free synchronization of the devices, set the MasterClock to "External" in the ControlPanel (also). This only is neccessary if the external S/PDIF unit can not handle WordClock synchronisation (which is hard to find anyway).

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 audio system). In that case, set the EWS 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 EWS MIC2 and MIC8 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 DAT recorder, it's necessary to use suitable software to convert the file(s) to 44.1 kHz or 48 kHz first.

Dolby AC3 and DTS.

The digital interfaces of the EWS MIC system can also be used independently of the ADAT or S/PDIF standards (S/PDIF-Out to "Non-Audio"). Various manufacturers of software DVD players support the playback of DVD audio material via the audio systems by TerraTec. Signals in Dolby AC3 or DTS format can therefore also be transferred using the digital interfaces.

Useful information about digital cables (optical waveguides and AES/EBU).
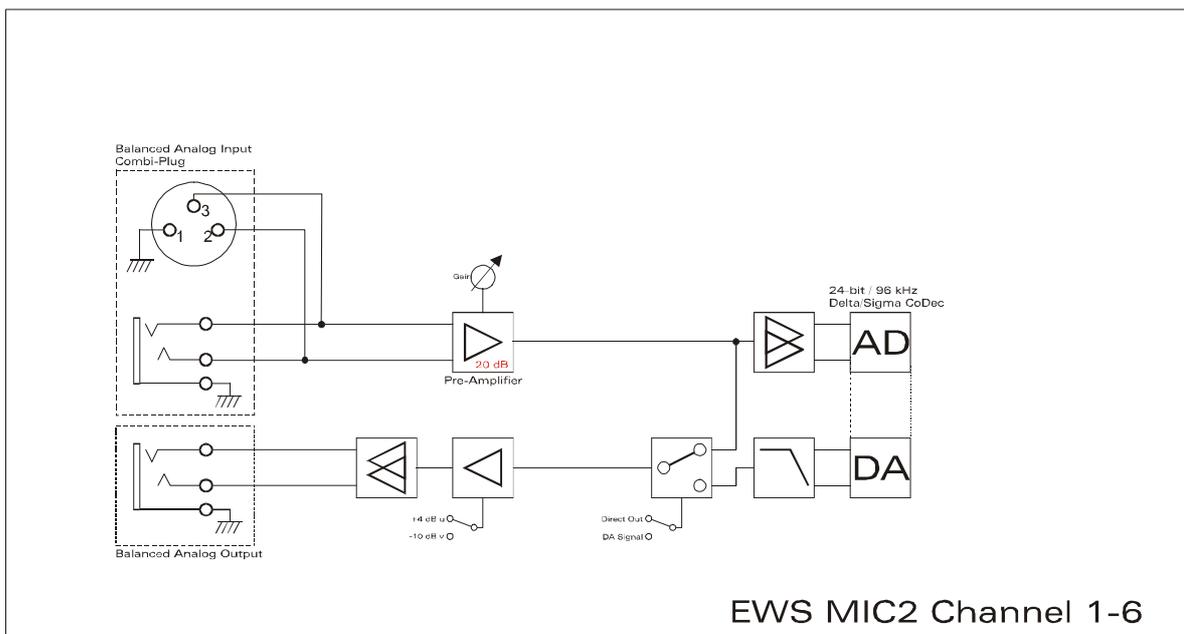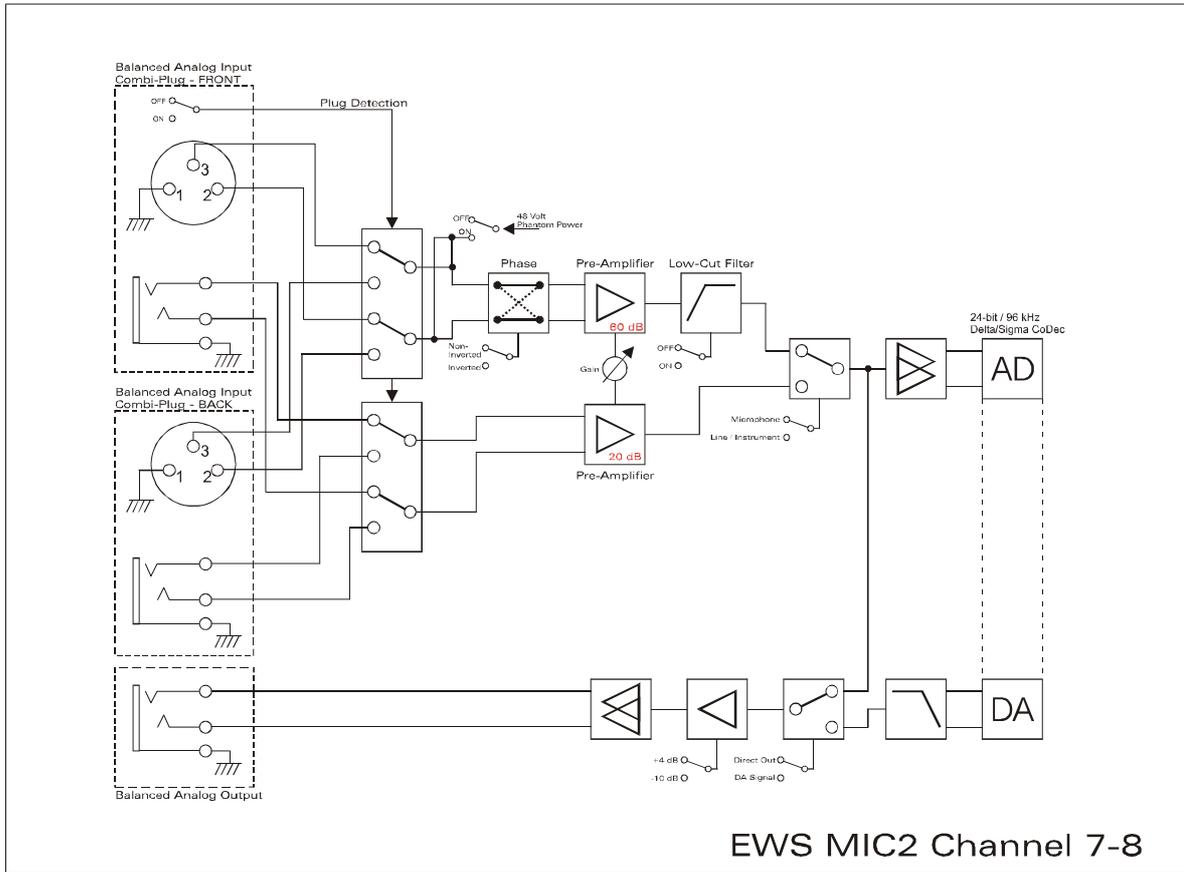
Even when transmitting audio data via optical fibers, a few, usually inaudible, errors may occur. You should therefore be sure to use high-quality cables that are not too long: flexible plastic cables should have a maximum length of 1.5 m, the less-flexible glass fiber cables may be up to 5 m long and more.

Audio differences with digital cables seem improbable at first glance, but they can happen nevertheless. This is due to the fact that error correction algorithms are obviously used more frequently at some times than at others to compensate for quality differences between individual cables. However, these audio losses are usually so minimal that you need to be careful not to mix up the myth with the reality. If you're interested, there are a number of somewhat entertaining militant newsgroups dealing with this subject on the Internet ;-).

Devices with AES/EBU interfaces cannot normally be used on S/PDIF interfaces - ambitious tinkering with simple adapter plugs will not get you anywhere. As the AES/EBU protocol is nearly identical to S/PDIF and the transmission essentially only differs in the signal strength, you can make your own converter with a bit of soldering.
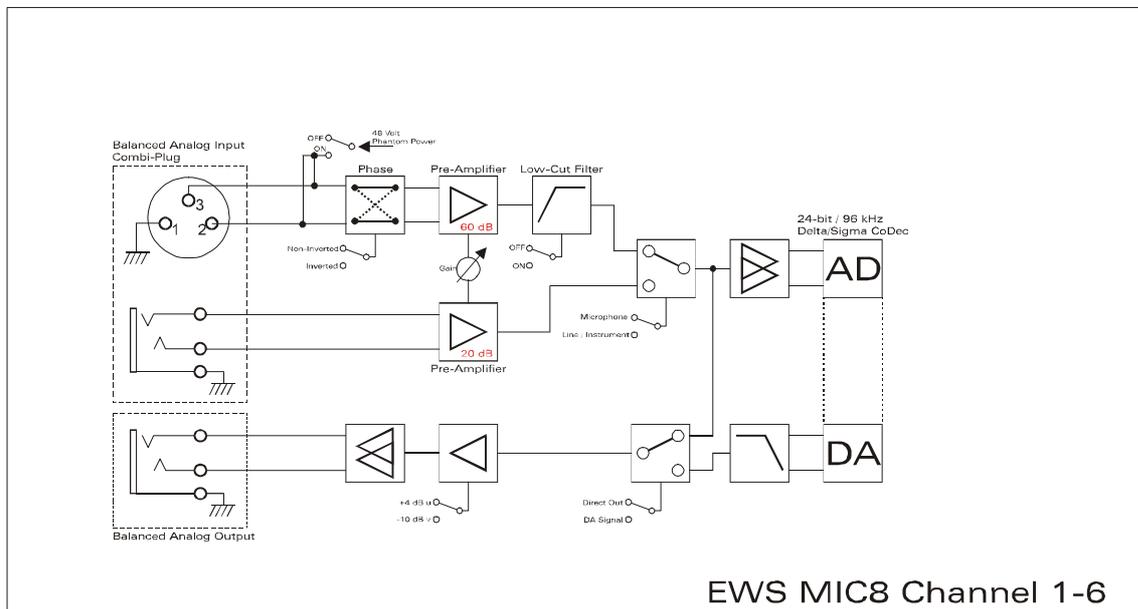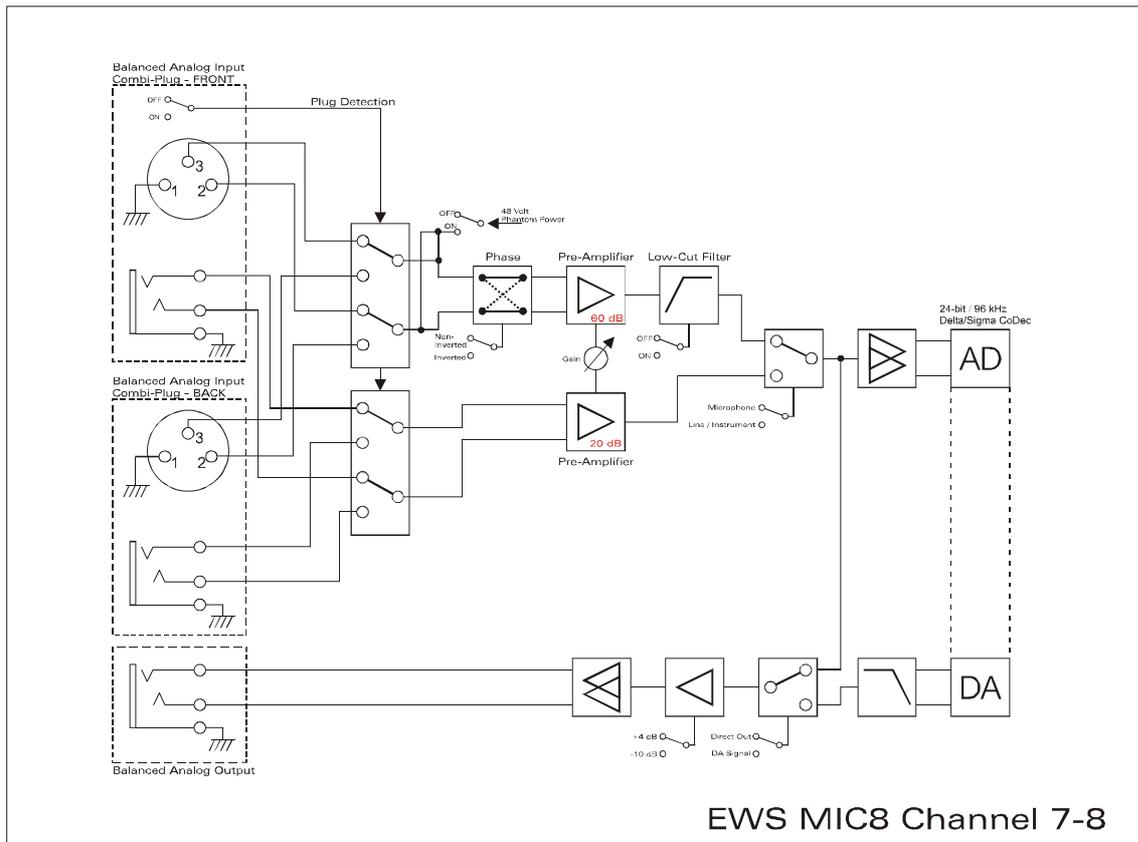
Appendix

Block diagram: EWS MIC2 analog section

EWS MIC2 Channel 7-8

EWS MIC2 Channel 1-6

EWS MIC2 Analog Section

Block diagram: EWS MIC8 analog section

EWS MIC8 Analog Section

Technical Details

EWS MIC2 / MIC8

General

- 19" rack mounted external module for EWS88 MT PCI interface or ADAT interface cards
- 2 XLR/TRS combo plugs on front side, alternatively to input 7 and 8 on back side (auto priority)
- 8 (2 with MIC2) high quality class A microphone amplifiers, developed in co-operation with SPL™ Germany
- Direct out setting on front side for all analog channels (monitoring)
- High quality headphone DAC and amplifier for monitoring the mixed signal
- 2 separate MIDI-interfaces with 32 MIDI channels (only with EWS88 Vers. 2.0 PCI card)
- Stand-alone operation mode (microphone pre-amp, ADAT interface)
- Ground-Lift switch
- Internal switch power supply for 240Volt/115Volt – 50Hz/60Hz
- Weight: 3.435 kg -› MIC Module, 100 g -› EWS88 PCI card.
- Dimensions: 482 x 44 x 245 mm

Analog

- 8 channel balanced analog inputs, XLR and 6,3 mm stereo jack
- 8 channel balanced analog outputs, 6,3 mm stereo jack
- 8 gain controls on front side for analog inputs
- Input gain range, -17,8 dBu (100 mV) to +15 dBu (4,35 V)
- 8 blue input signal LEDs on front side
- 8 red clipping LEDs on front side (clipping at −1 dB full range)
- 24 bit/96 kHz A/D converters with 105 dB (A) SNR
- 24 bit/96 kHz D/A converters with 106 dB (A) SNR
- Analog output +4dBu (max 20 dBu) / -10 dBv (max. 6dBu) setting
- Line/Instrument input impedance, 100 kOhm (unbalanced), 200 kOhm (balanced)
- Output impedance: 75 Ohm

Microphone Pre-Amplifier

- Phase, low-cut and mute settings for each microphone channel
- Low-Cut at 50 Hz, 40 dB / octave
- 48 Volt DC phantom power for each microphone channel
- Input gain range, -37 dBu (10 mV) to +17 dBu (5,5 V)
- Input impedance, 10 kOhm

Digital

- Integrated ADAT ™ interface (Light-Pipe)
- TOS-Link interface for ADAT ™ or S/PDIF
- 44,1 kHz / 48 kHz setting for stand alone operation
- Auto-Slave when external clock is detected in stand-alone operation mode
- Auto-Priority when external clock is detected in stand-alone operation mode (1. WordClock, 2. ADAT/SPDIF)
- Variable routing possibilities for ADAT ™, S/PDIF and analog channels
- WordClock I/O with "signal present" LED

EWS88 Version 2.0 PCI card

Hardware

- PCI-board
- Bus master transfer supports ‚24bit 4byte mode' (32bit)
- 10 x 24/96 inputs and 10 x 24/96 outputs in total (without System-Out part)
- Simultaneous recording and playback of all channels with up to 24bit/96kHz
- Digital Input with 2 channels (S/PDIF, coax with up to 24bit/96kHz)
- Digital Output with 2 channels (S/PDIF, coax with up to 24bit/96kHz)
- Hardware mixer with internal resolution of 36bit
- EWS-Connect**
- „None-Audio" mode for transmission of AC3 and DTS streams via digital interface
- VU-meter in control panel (hardware based)
- Analog stereo output with 18bit/48kHz converter (3,5mm stereo jack) for e.g. System-Sounds
- 2 internal stereo inputs with 18bit/48kHz converter (Molex)***
- 4 meter cable to connect the EWS MIC2/8 unit

Software

- WDM driver for Windows 98SE/ ME/2000 and Windows XP
- Supports ASIO 2.0 and GSIF (GigaSampler/Studio)
- ASIO/GSIF multi-client mode
- WDM Kernel Streaming (e.g. for Sonar ™)
- MME- and DirectSound
- ControlPanel for Windows 98SE/ME/2000 and Windows XP

System Requirements

- Pentium II 450 or higher
- VGA graphic card, 800x600 / 256 colours
- 128 MB RAM
- Windows 98SE/ME/2000 or Windows XP

System Recommendation

- Intel Pentium III 1 GHz, Celeron 900 MHz or AMD K7 Athlon 1 GHz
- ULTRA DMA or SCSI Controller
- VGA graphic card, 1024x768 / HiColor
- 256 MB RAM

Measurements:

Rohde & Schwarz Audio Analyzer 10 Hz ... 110 kHz . UPL

Calibration: 02.07.2002, Re-No.: 900229/000

Input voltage: +4dBu, gain setting to achieve 0 dBu FS

D/A Conversion - WavePlay at 48 kHz

Dynamic Range: 109,59 dBr (A-weighted),

THD +N: -102.91 dBr

D/A Conversion – WavePlay at 96 kHz

Dynamic Range: 102,30 dBr (A-weighted)

THD +N: -99,10 dBr

A / D Conversion –WaveRec at 48 kHz Sample-Rate

Dynamic Range: 106,21 dBr (A-weighted)

THD +N: -99.96 dBr

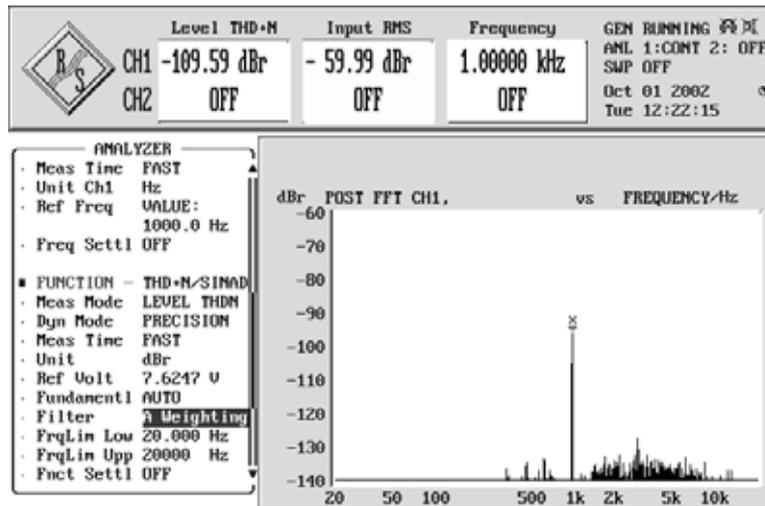## A / D Conversion – WaveRec at 96 kHz Sample-Rate

Dynamic Range: 102,30 dBr (A-weighted)
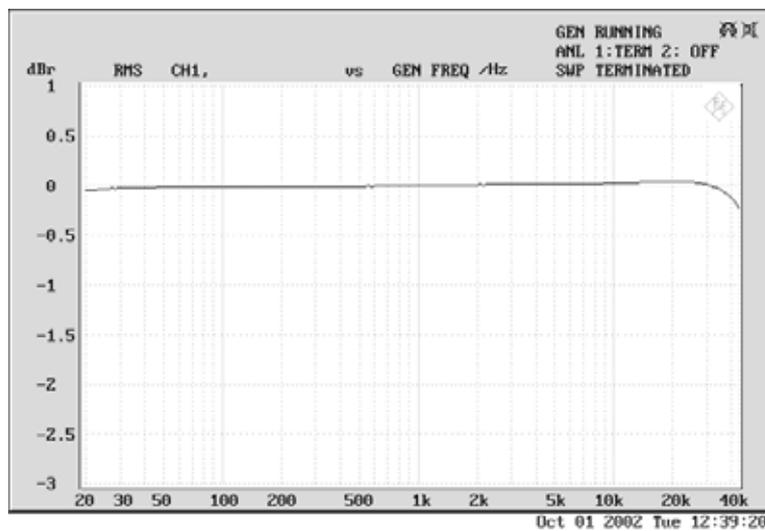
THD +N: -99,10 dBr

Microphone Input – A/D Conversion at 44,1 kHz

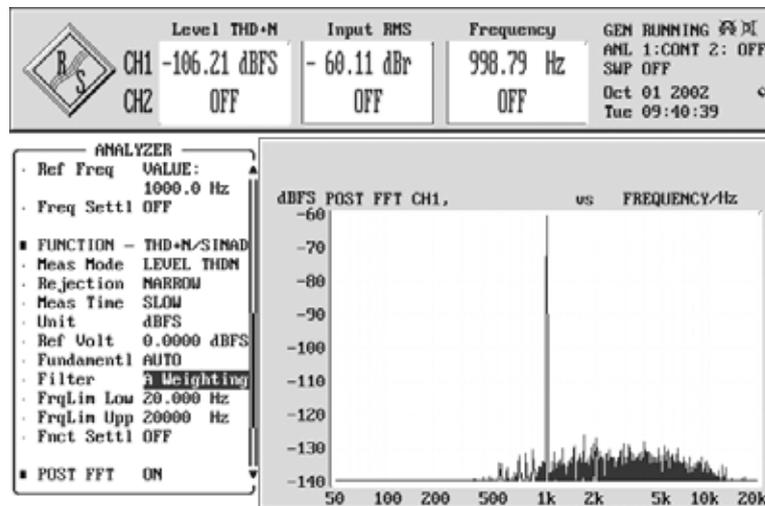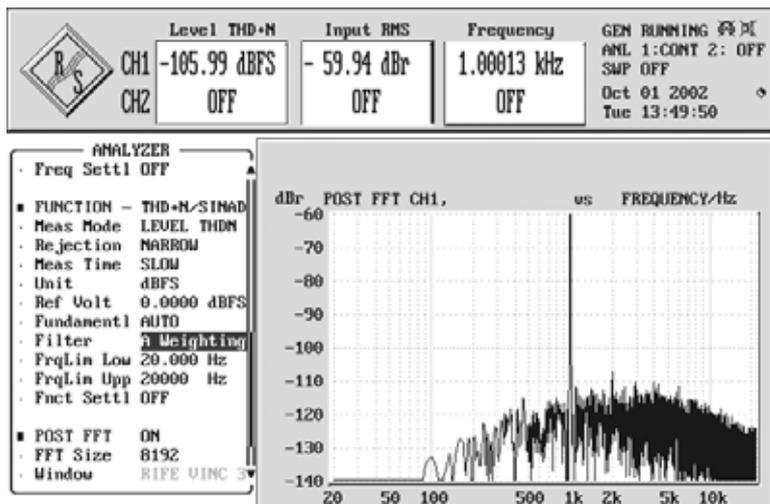Dynamic Range: 105,99 dBr (A-weighted)

THD +N: -99,30 dBr

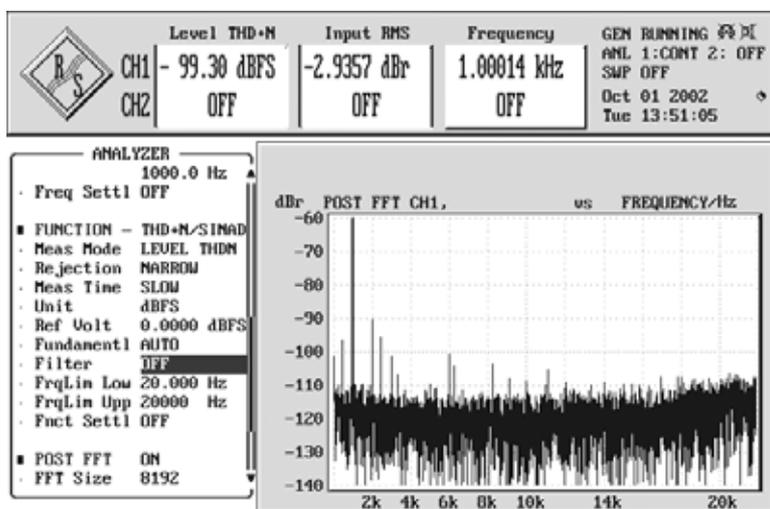*THD+N (Total Harmonic Distortion + Noise) – D/A conversion, WavePlay at 48 kHz*

Frequency Response – D/A conversion, WavePlay at 96 kHz

Line/Instrument Input Dynamic Range – A/D conversion, WaveRec at 48 kHz

Microphone Input Dynamic Range – A/D conversion, WaveRec at 44,1 kHz

Microphone Input THD + N – A/D conversion, WaveRec at 44,1 kHz

Service at TerraTec.

Sometimes, no matter how good the weather is, things do not always work as they should. Problems can arise in the best computer systems. In such a case, the TerraTec Team is always ready to provide service and support.

Hotline, Mailbox, Internet.

In case of a serious problem - where you can neither solve the problem on your own nor with the guided help found in this manual, nor with the help of your dealer - please contact us directly.

The first way should be the Internet: under **http://www.terratec.com/** you will always find current answers to frequently asked questions (FAQ) and the latest drivers. All of that is also accessible via our mailbox system. To call us: **+49-(0)2157-8179-24** (analog) and **+49-(0)2157-8179-42** (ISDN).

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 under **http://www.terratec.com/support.htm**.

In both cases, please have the following information handy:

- your registration number
- this documentation.

In addition, it would be helpful to our technicians if you are at your device during the phone call to directly carry out tips and tricks. 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 device needs to be mailed to us.