

**ST Audio DSP24 series**

# **E-WDM driver v8.x for Windows 2000/XP**

DSP24 Value - DSP24 - DSP24 MK II -  
DSP24 ADAT - DSP24 MEDIA 7.1 -  
DSP2000 C-Port - DSP24 System III -  
DSP3000 M-Port



**About this document:**

It is the policy of ST Audio to improve products as new technology and newer components become available. ST Audio, therefore reserves the right to change specifications without prior notice. All the information in this manual has been checked thoroughly when it was created. ST Audio and the authors of this text cannot be held responsible for any misleading or incorrect information provided in this documentation.

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**Note:** We strongly recommend to read the full document before you start to install and use the described drivers. Especially the information about preparation, uninstallation of previous drivers and installation is very important.

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## I. Introduction

This document describes the new driver for the DSP24 series of cards. It describes the installation of the driver; at the same time, it's an addendum to the existing DSP24 manual.

The new drivers with version 8 are based on the E-WDM technology from ESI (Ego Systems, Inc.), while the version 7 drivers are standard WDM drivers that have been developed by Hoontech. After the acquisition of the ST Audio product line (1<sup>st</sup> of september 2003), ESI developed the new version 8 drivers based on the E-WDM technology from scratch.



This fundamental new driver also changes the installation process and the usage of the driver inside your audio applications. Because of the major change, we provide this document that describes the new driver. Please make sure to check the complete document, especially the driver installation, preparation and the uninstallation sections.

If you have any questions about the usage of this driver, please use our ST Audio Q&A Forum on [www.STAUDIO.com](http://www.STAUDIO.com).

## II. Preparation

Before you can install the driver, you need to unzip the zip-file. You can use any directory for that. On the following pages, we assume that you unzip the file into the directory C:\TEMP\DSP24.

Typically there are four different situations before you want to install the new drivers:

- You currently have installed v7.x of the drivers (please verify the current driver version in the *H/W settings* dialog of *External Links / Output Mixer*).

If this is the case, you need to uninstall the v7.x drivers. Follow the instructions in the section UNINSTALLATION OF V7.X DRIVERS below, then proceed to chapter III. INSTALLATION UNDER WINDOWS 2000 or IV. INSTALLATION UNDER WINDOWS XP.

- You currently have installed v8.x of the drivers (please verify the current driver version in the *H/W settings* dialog of *External Links / Output Mixer*).

If this is the case, you need to uninstall the v8.x drivers. Follow the instructions in the section UNINSTALLATION OF V8.X DRIVERS below, then proceed to chapter III. INSTALLATION UNDER WINDOWS 2000 or IV. INSTALLATION UNDER WINDOWS XP.

- You have installed Windows 2000 or XP but did not install drivers for your DSP24 hardware yet.

If this is the case, you need to goto *Control Panel > System > Hardware > Device Manager*. There you will find an unknown device with yellow exclamation mark called *PCI Multimedia Device* (note: if there are several devices with this name, you have other audio devices in your system -e.g. the onboard soundcard- we recommend to install drivers for the other devices before you install the DSP24 drivers). Delete this entry and then reboot the system. Proceed to chapter III. INSTALLATION UNDER WINDOWS 2000 or IV. INSTALLATION UNDER WINDOWS XP.

- You have not yet installed the PCI card into the system and you are about to install it now.

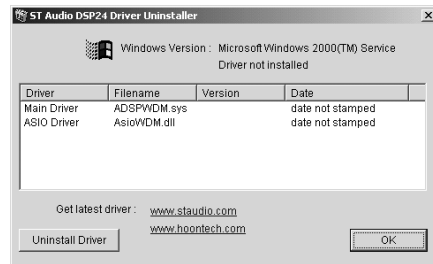
Install the PCI card into an empty PCI slot of your PC. Please follow the instructions of the printed manual. Once the card is installed, turn on the PC and proceed to chapter III. INSTALLATION UNDER WINDOWS 2000 or IV. INSTALLATION UNDER WINDOWS XP.

Note: You **cannot use** the *Update Driver* function in the Windows *Device Manager* to update the drivers for your DSP24 card. If you do that, you will run into problems and the drivers might have to be removed manually after that. Please read this manual carefully to learn how to install / update the drivers.

## Uninstallation of v7.x drivers

To uninstall the v7.x WDM driver, open *External Links* (or *Output Mixer* if you have a DSP24 Value or DSP24 MEDIA 7.1). Click on the *Help > Uninstall* entry in the menu. The window on the right will appear.

Note: You can also manually launch the uninstall utility by starting *DSP24INF.EXE* from the original v7.x driver package (zip-file or Installation CD).



Now click on *Uninstall Driver* to remove the driver information from your system. After this is done, the application will ask you to reboot the system. You can confirm this and then proceed to chapter III. INSTALLATION UNDER WINDOWS 2000 or IV. INSTALLATION UNDER WINDOWS XP in order to install the new driver.

## Uninstallation of v8.x drivers

To uninstall the v8.x E-WDM driver, goto the directory in which you have unzipped the drivers. Launch the *INFCLEAR.EXE* application from this directory. The window on the right will appear.

Now click on *Remove Driver* to remove the driver information from your system. The process will take a few seconds. Please do not interrupt the process even if it takes longer. Once it is finished, a message will appear with a confirmation and the utility will open the *Control Panel > System* for you. If you want, you can verify the removal of the driver by going to *Hardware > Device Manager*.



Now reboot the system – you can use the *Restart* button and proceed to chapter III. INSTALLATION UNDER WINDOWS 2000 or IV. INSTALLATION UNDER WINDOWS XP in order to install the new driver.

### III. Installation under Windows 2000

The following instructions refer to Windows 2000. Please note that you must be logged in as Administrator or with similar rights in order to install the DSP24 driver under Windows 2000. If you install audio drivers for the first time, it is possible that Windows will ask for the original Windows 2000 CD during installation.

After installation of the DSP24 PCI-card in a PCI slot in the computer or after uninstallation of a previous driver (check the previous chapter), boot up the system. Windows will detect the new hardware **automatically** a few seconds after you have entered your password and display the following screen.

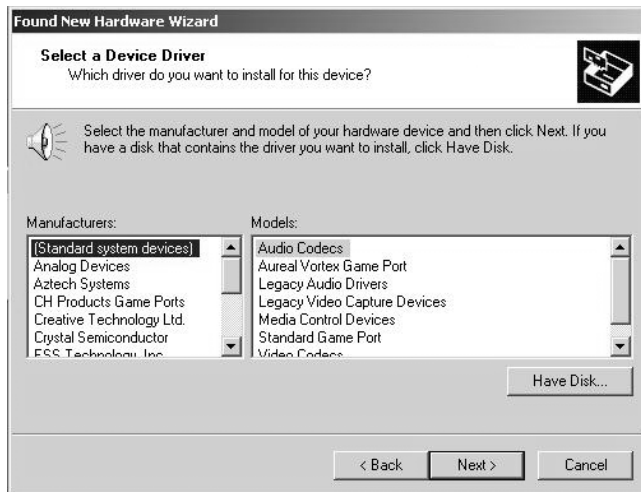


Click *Next*.



Select *Display a list of the known drivers for this device so that I can choose a specific driver* (very important!) and click *Next*.

Select *Sound, video and game controllers* on the next dialog and again click *Next*.

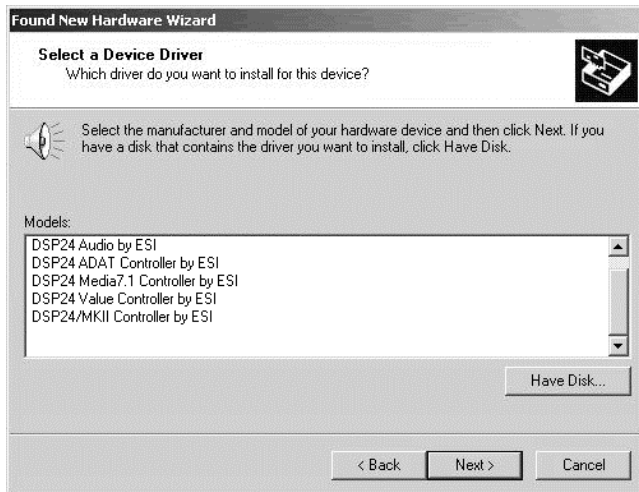


Select *Have Disk...*





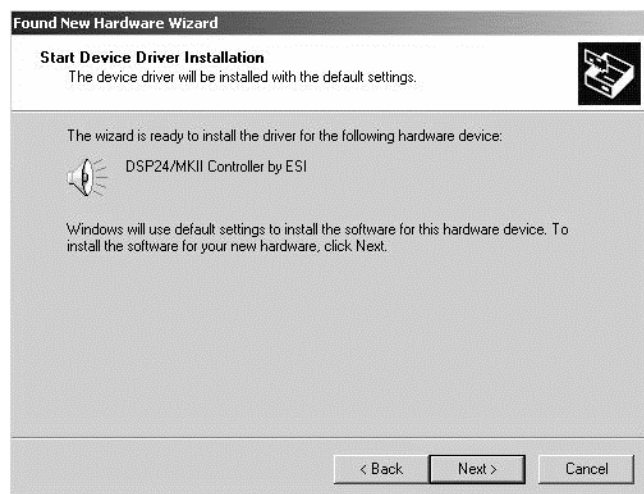
Type in C:\TEMP\DSP24 (or use the directory in which you unzipped the driver zip-file) in the window displayed above and click *OK*. Alternatively, you can click *Browse* and select the correct directory manually, then click *OK*.



On this dialog, you need to select the correct driver for your DSP24 hardware:

- select *DSP24/MKII Controller by ESI* if you have a DSP24, DSP24 MK II, DSP2000 C-Port, DSP24 System III or DSP3000 M-Port
- select *DSP24 Value Controller by ESI* if you have a DSP24 Value
- select *DSP24 ADAT Controller by ESI* if you have a DSP24 ADAT
- select *DSP24 Media7.1 Controller by ESI* if you have a DSP24 MEDIA 7.1

Note: Do not select any of the other entries (very important!) – especially, do not select *DSP24 Audio by ESI* in any case! Click *Next*.



This dialog is displayed to confirm the correct selection. Click *Next*. If you get a dialog box about a missing driver signature, you can ignore it and just continue with *Yes*. The driver files are now copied to your system.

At the next window, complete the installation by clicking *Finish*. On some systems you will be prompted to reboot the system. If that is the case on your PC, click *Yes* and login again after the reboot.

Now Windows will detect a second new device, called *DSP24 Audio by ESI*. If you also get a dialog box about a missing driver signature, you can ignore this one as well and just continue with *Yes*. More files are copied to your system.

After the driver is installed, ensure the installation worked by selecting *Start > Settings > Control Panel > System > Hardware > Device Manager > Sound, video and game controllers*. You should see the audiocard's device listed there. Highlight it and click on *Properties*. You should see the message *This device is working properly*. If so, congratulations are in order. You have successfully installed the E-WDM drivers for the DSP24 PCI-card under Windows 2000.

## IV. Installation under Windows XP

The following instructions refer to Windows XP. If you use Windows XP Professional, you must be logged in as Administrator or with similar rights in order to install the required DSP24 driver. If you install audio drivers for the first time, it is possible that Windows will ask for the original Windows XP CD during installation.

After the installation of the PCI-card in the computer, boot up the system. Windows will detect the new hardware **automatically** a few seconds after you have entered your password and display the following screen.

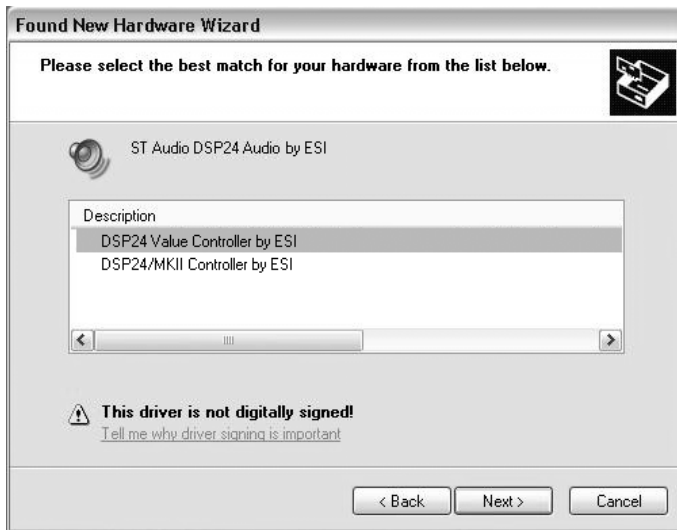


Select *Install from a list or a specific location (Advanced)* and click *Next*.



On this dialog, select *Search for the best driver in these locations* and make sure *Include this location in the search:* is checked. Type in *C:\TEMP\DSP24* (or use the directory in which you unzipped the driver zip-file) in the text box below above and click *Next*. Alternatively, you can click *Browse* and select the correct directory on the CD, then click *Next*.

If you have a DSP24, DSP24 MK II, DSP24 Value, DSP2000 C-Port, DSP24 System III or DSP3000 M-Port, a new selection dialog (shown on the next page) will appear that allows you to select the correct driver for the card you are using. The same dialog will not be shown if you have a DSP24 ADAT or DSP24 MEDIA 7.1 (these cards will be detected automatically and no manual selection is needed).



On this dialog, select *DSP24/MKII Controller by ESI* if you have a DSP24, DSP24 MK II, DSP2000 C-Port, DSP24 System III or DSP3000 M-Port. If you have a DSP24 Value, select *DSP24 Value Controller by ESI* instead. Once you are sure that you have selected the correct entry (a selection is not needed if you have a DSP24 ADAT or DSP24 MEDIA 7.1), click *Next*.



If you get this dialog box about the missing driver signature, you can ignore it and just select *Continue Anyway*. Driver files are now copied to your system. Once the installation is completed, the following dialog will be displayed.



Click *Finish*.

Windows will now again detect a new device, called *DSP24 Audio by ESI*. Confirm the installation of the device with *Next*.



When you get this dialog, click *Continue Anyway*. More files are copied to your system. You will be prompted to reboot the system. Confirm it and click *Yes*.

After the reboot, ensure that the driver installation worked by selecting *Start > Control Panel > System > Hardware > Device Manager > Sound, video and game controllers* (you might have to switch your Windows XP *Control Panel* to *Classic View* to get to the *System* applet directly). You should see the audiocard's device listed there. Highlight it and click on *Properties*. You should see the message *This device is working properly*. If so, congratulations are in order. You have successfully installed the E-WDM drivers for the DSP24 PCI-card under Windows XP.

## V. Changes between v7.x and v8.x

This chapter describes the changes of the version 8 E-WDM drivers compared to the previous version 7 of the drivers.

### Wave Devices

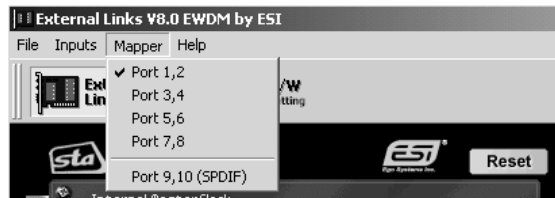
The driver provides 2 MME wave devices:

- *DSP24 2ch Mapper (PCM/SPDIF)* – this device is used to playback or record 2 audio channels. Which output channels are used is defined via the *Mapper* menu of *External Links / Output Mixer* (described in the next section). Typically this will be the default playback device that you have selected in *Control Panel > Sounds/Multimedia > Audio* if you have only the DSP24 series card installed in your system. You can use this wave device for example to playback Windows system sounds (at any samplerate), signals from programs like the Windows Media Player, to send out digital data via the S/PDIF output of the card or to send out AC-3 streams from DVD playback applications; also it can be used for basic 2 channel playback from games.
- *DSP24 10ch EWDM* – this device allows modern applications optimized for Windows 2000/XP WDM standard to playback or record multiple channels over one device. Typically this output will be used by DVD playback applications or by any other program that plays multiple channels via a MME device. Via *Control Panel > Sounds/Multimedia > Audio > Playback > Advanced* it is possible to define what speakers you are using for monitoring when you use this device. Note that professional audio applications, usually ignore these settings (e.g. when you are producing surround sound).

In addition, the ASIO driver (now with better performance and more stable operation: low latency even at high CPU load) *ASIO ADSP24 (WDM)* and the GSIF device for Tascam GigaStudio is still available as before. Check the section MULTICLIENT SUPPORT below for more info).

### Mapper

The *Mapper* menu in *External Links* (*Output Mixer* if you own a DSP24 Value or DSP24 MEDIA 7.1) allows you to define the default playback channel you want to use for applications using MME wave devices (see previous section). You can select channels 1,2 ~ 7,8 and 9,10 for the S/PDIF or AES/EBU output. On hardware with multiple output channels (e.g. the DSP2000 C-Port or the DSP24 ADAT), the channel is identical with the hardware output channel and/or the



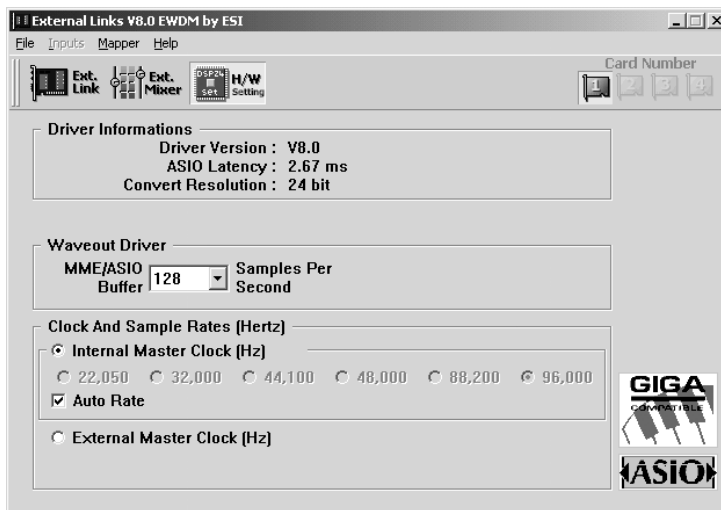


channels of the *External Mixer*. On hardware with a lower number of physical outputs (e.g. the DSP24 Value), the channels correspond to the virtual channels of the *Output Mixer*.

Every signal that is played via *DSP24 2ch Mapper (PCM/SPDIF)* is sent out through the channel you have selected in the *Mapper* menu. Signals that are played via *DSP24 10ch EWDM*, via the ASIO or GSIF drivers of the card are not affected by the setting in the *Mapper* menu.

## Auto Rate

The *H/W settings* dialog in *External Links / Output Mixer* has been simplified. You have to worry about a lower number of settings with the new E-WDM drivers – that simplifies the usage of the card.



The major change are the missing parameters *Reset Rate After Play* and *Rate Locked*. Both have been replaced by *Auto Rate*.

The new E-WDM driver allow you to use the card with different samplersates and different applications simultaneously. For example, you can use the ASIO driver with 44.100Hz and playback Windows system sounds with 22.050Hz at the same time. This was not possible with the

previous versions of the DSP24 drivers as all channels had to be used with the same samplerate at the same time.

Still, as the DSP24 is a professional hardware that allows integration into most digital studio environments, you have full control over the samplerate the card (= the hardware) operates. There are now two different modes that define how samplerate changes are handled:

- *Auto Rate* enabled – in this mode, the card changes the samplerate everytime an application opens the driver at the samplerate specified inside the application. For example, if you launch your sequencer and open a 48kHz project, the samplerate is changed to 48kHz. You can see that in the *H/W settings* dialog when you look at it. Still, you cannot change it there because

your sequencer application has full control over the samplerate. If you want to change the samplerate, you can do it in the sequencer.

Another example would be the Windows system sounds. If a sound is played with 22.050Hz and *Auto Rate* is enabled, the actual hardware clock of the card is changed. This means that the quality of the sound would not be very good ... simply because 22.050Hz does not sound that good.

- *Auto Rate* disabled – with this setting, the samplerate will always be controlled by the *H/W settings* dialog (before you launch your audio applications) and not by your applications. This is a great setting if you want to synchronize external digital equipment to the S/PDIF (or ADAT or AES/EBU) output of your DSP24 card as the clock will remain unchanged.

If you launch an ASIO (or GSIF) application, the samplerate is still changed simply because that is the only way to provide 100% stable operation (= the hardware and the software is synchronized exactly on sample level). When *Auto Rate* is disabled and your sequencer software works with 44.100Hz (example), the signals from simultaneous MME playback (e.g. Windows system sounds at 22.050Hz) are resampled on-the-fly to 44.1kHz. In this example, the quality of the Windows system sound playback would be better ... simply because 22.050Hz upsampled to 44.1kHz before playback sounds nicer.

When the card is set to *External Master Clock*, the actual samplerate that is used for recording will be defined in your audio application. This is different compared to the previous drivers, where you could verify the external samplerate in the *H/W settings* dialog. Now you need to do this inside your audio application.

## **Multiclient support**

The new E-WDM drivers provide, as the previous drivers, full multiclient support. This means that several applications using MME, ASIO or GSIF can use the card at the same time. In the past, you had to assign individual channels via the *DeviceMixing* options in the *H/W settings* dialog to the different driver models before you launch your audio applications – this is no longer needed with the new drivers. The channels are assigned automatically!

In addition, the same channels can be used simultaneously. For example, you can play Windows system sounds via channel 1/2 even if the ASIO driver of the card is already opened incl. channel 1/2 by your sequencing software. In the past, this was not possible, as the channel had to be assigned to ASIO or MME but could not be assigned to both simultaneously.

## **Internal Mixer**

The new E-WDM drivers do not support the Internal Mixer section of the DSP24 hardware. Because of the feature of the driver to change the playback samplerate in realtime if needed and

because of the better MME support, the Internal Mixer section of the card is no longer needed for compatibility (e.g. Windows system sounds). As result, the 1/8" Line Out on the DSP24 and the DSP24 Value is no longer supported by the driver. Make sure to use the 'external' section of the card (Output 1/2 the DSP2000 C-Port, DSP24 System III, DSP24 MEDIA 7.1 or DSP3000 M-Port; the RCA outputs on the DSP24 Value; or the XLR outputs on the DSP24 MK II) for monitoring as master output.

## Latency

The *H/W settings* dialog now shows the exact latency value depending on the selected *MME/ASIO Buffer* size up to two digits behind the comma (in ms).

The latency display is always updated automatically depending on changes of the current samplerate (a higher samplerate means a smaller latency, a lower samplerate means a higher latency).

Note that the Envy24 controller chip that is used on the DSP24 hardware works with 2 DMA buffers on both recording and playback. Some older drivers only displayed the latency of one buffer even though the hardware was using two. This is behaviour is also common for some other drivers for other Envy24 based hardware. You can be sure that the latency that is displayed by the v8.x drivers is absolutly correct!

At the same (small) latency, the performance and stability will be higher with v8.x E-WDM drivers compared to v7.x WDM drivers, especially when the CPU usage is higher (e.g. you use more software synthesizers or more effect plugins simultaneously). The CPU load between the older and newer drivers might appear similar, however the differences in favour of the v8.x drivers will be obvious when you work with large projects that are causing more CPU load in playback and/or recording. Please also note that the CPU load does get affected by the amount of MIDI data that is sent out through the DSP24 MIDI ports. You might want to work with one buffer setting bigger than usual if you are working with the MIDI output of your DSP24 hardware intensively.

As before, the performance at a given latency setting, depends very much on the performance of your system ... on a faster system with more modern chipset, faster memory and a faster HDD, you can work with lower latency compared to higher latency at similar stability on a slower system.

## VI. Troubleshooting

This section provides you advanced information about manual driver installation, error messages that might be displayed and tuning options to increase the performance of your system. If you are not familiar with some of the terms and information used in this chapter, you might want to ask a friend or a professional to help you.

### Manual driver uninstallation

In some cases it is needed to remove drivers manually from your system. For example, if you have had installed several different drivers on your system but none of them was removed properly with the utilities that we provide for driver removal, manual driver removal might be required. Please note that normally our support staff will advise you to do this if you seek help with driver installation. Under normal circumstances, you do not need to manually remove a driver.

This section divides into ...

- manual deletion of the driver entry in the Windows Device Manager – see DEVICE MANAGER below
- manual removal of the driver INF-file from the Windows driver database – see OEMX.INF FILE below
- semi-manual removal of v7.x drivers – see DSP24INF.EXE (v7.x) below
- semi-manual removal of v8.x drivers – see INFCLEAR.EXE (v8.x) below

To remove the drivers totally, all four or at least three of the four steps might be necessary.

#### Device Manager

In order to make sure that Windows is not loading the driver, you have to open the *Device Manager* via *Control Panel > System > Hardware > Device Manager*. There you can remove the entries of the card under *Sound, video and game controllers*.

If you have installed the v7.x drivers of the card, there will be one entry (one of the following, depending on the DSP24 model you have):

- *ST Audio DSP24/DSP24 MK II WDM Audio System*
- *ST Audio DSP24 Value WDM Audio System*
- *ST Audio DSP24 MEDIA 7.1 WDM Audio System*
- *ST Audio DSP24 ADAT WDM Audio System*

If you have installed v8.x of the E-WDM driver, there will be two entries with the following names (depending on the DSP24 model you have):

- *DSP24/MKII Controller by ESI*  
*DSP24 Audio by ESI*
- *DSP24 Value Controller by ESI*  
*DSP24 Audio by ESI*
- *DSP24 ADAT Controller by ESI*  
*DSP24 Audio by ESI*
- *DSP24 Media7.1 Controller by ESI*  
*DSP24 Audio by ESI*

To remove the driver, delete both (for v8.x) or the single (for v7.x) entry by clicking on it and hitting the *DEL* key on your keyboard.

Note: If you had problems installing the driver before and the system did not boot, you can remove the driver entries by in by booting Windows in *Safe Mode*.

Note: It is not enough to remove entries in Device Manager if you want to install a new driver. When Windows reboots, it would automatically install the same driver again as long as you don't remove the driver INF file as described in the next section.

#### **OEMx.INF file**

If you want to remove drivers manually, you have to delete the driver INF files that contain the information for drivers that have been used for the previous installations. If this is not done, Windows will always try to install the previous drivers again.

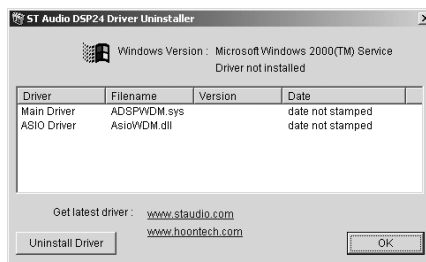
The Windows directory (typically *\WINDOWS* or *\WINNT*) contains a subdirectory with the name *INF*. This directory is normally not displayed in the Windows *Explorer*. Make sure to enable the display of hidden files and system files via the display options inside the *Explorer*. Consult the Windows help files / documentation for more information about this.

The *INF* directory contains several files that are named *OEMx.INF* where x is a number from 0 up to the number of hardware drivers you installed after the Windows installation itself (for any hardware, not only the DSP24). You can open the *OEMx.INF* files in *Notepad* simply by double clicking on the files in *Explorer*. Please do this for all the files with this name (don't open the files with different names). If the first few lines in the file contain "ESI", "AUDIOTRAK", "ST AUDIO" or "HOONTECH" (in upper or lower case), close the editor and delete the file with *Explorer*. All *OEMx.INF* files from ESI / Hoontech must be deleted.

**DSP24INF.EXE (v7.x)**

The *DSP24INF.EXE* utility is part of all WDM drivers with version 7.2 and newer. It is used to uninstall / remove the driver. It can be found in any zip-file with drivers v7.2 and newer (except the E-WDM drivers with v8.0 or newer). If you don't have the file on your system, download the a driver from our website and unzip it.

To uninstall the 7.x WDM driver and to make sure that all critical information is removed, launch the application. The window shown on the picture will appear.



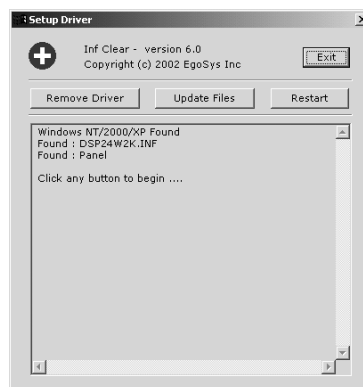
Now click on *Uninstall Driver* to remove the driver information from your system. After this is done, the application will ask you to reboot the system. Only confirm this if you want to install a new driver.

If you want to remove other driver information manually, do not allow the utility to reboot the system. For example, if you want to remove traces of several driver installations that requires you to run *INFCLEAR.EXE* (see below) as well, a reboot must be avoided at this moment.

**INFCLEAR.EXE (v8.x)**

The *INFCLEAR.EXE* application is used to uninstall the E-WDM driver (v8.0 and higher). It can be found in any zip-file with drivers v8.0 and newer.

To uninstall the E-WDM driver and to make sure that all critical information is removed, launch the application. The window on the right will appear.



Now click on *Remove Driver* to remove the driver information from your system. The process will take a few seconds. Please do not interrupt the process even if it takes longer. Once it is finished, a message will appear with a confirmation and the utility will open the *Control Panel > System* for you. If you want, you can verify the removal of the driver by going to *Hardware > Device Manager*.

If you want to reboot the system immediately, you can use the *Restart* button. Otherwise exit the application with *Exit*.

## Error Messages

### The software you are installing has not passed Windows Logo testing

If you get this message during driver installation, you need to click *Continue Anyway*. This message does **not** mean that the driver is not compatible with your version of Windows!

### DSP24 card not found / hardware not enabled properly

If the message *DSP24 card not found* and/or *hardware not enabled properly* is shown in dialog boxes when you start the system, the older Windows 9x/Me software for your DSP24 card has been installed under Windows 2000/XP. However, under Windows 2000/XP, this software is not needed and it must be removed. Please go to *Control Panel > Add/Remove Programs* and search for a DSP24 entry. Uninstall it. The message will no longer appear after the next reboot.

## Performance

Windows 2000 and Windows XP are based on the Windows NT operating system. **If you have to choose between Windows 2000 and Windows XP, the last option (XP) will provide you better performance with most modern mainboards and most audio applications.** Many rumours (e.g. spreaded in online discussion forums, etc.) claim that Windows 2000 would be the better option compared to Windows XP. This is simply incorrect and not based on any real facts.

This section mainly deals with the most important issues related to the installation and configuration of both, Windows 2000 and Windows XP.

### Memory optimization

If you have upgraded from v7.x of the WDM driver to v8.x of the E-WDM driver and if you use more than 256MB of memory, we recommend to add the information of the file *memorypatch.reg* to the Windows registry. To do so, double click on this file in *Explorer* and confirm that you want to add the settings to the registry. This improves the memory usage as it changes back a custom setting changed by the v7.x drivers to the default setting. If you had not installed the v7.x driver before, this is not needed.

### ACPI under Windows 2000

The Automatic Configuration Power Interface (ACPI) functionality of Windows 2000 can be very critical on PCs dedicated to HD-recording. If ACPI is enabled, Windows 2000 will use one IRQ (usually 9, sometimes 11 - depending on the mainboard BIOS) for all PCI and all onboard devices in your system. IRQ sharing generally is not a big problem for modern PCI devices. However, it always affects the performance. As we want that your DSP24 series PCI card works with best possible performance, IRQ sharing should be avoided. In the case of ACPI, the IRQ sharing

sometimes even causes bigger conflicts if one of the other devices in the system have problems with ACPI installations.

When you are installing Windows 2000, disabling ACPI is very easy. Before you install Windows, check your BIOS for the *PNP OS INSTALLED* setting. Set it to *NO* or *DISABLED*. During the installation process, you can select the *Standard-PC* HAL (Hardware Abstraction Layer) instead of the *ACPI-PC* HAL. To select this HAL, you need to hit *F6* when you are asked to install updated device drivers for HDD controllers (SCSI, ...). Then hit *F5* to choose *Standard-PC*.

If Windows 2000 is already installed, it is also possible to replace the *ACPI-PC* HAL with the *Standard-PC* HAL. It is important to know that the process that is described in the next few lines is risky in certain configurations and not recommended at all. To stay on the safe side, it is better to directly re-install Windows 2000 as described above with *Standard-PC*.

Make sure that the *PNP OS INSTALLED* setting in your BIOS is disabled. No open the Device Manager (*Control Panel > System > Hardware > Device Manager*). Check the Computer section. Under it, you will see an entry that is called *ACPI-PC* when ACPI is enabled. When ACPI is not enabled, you will see an entry called *Standard-PC* instead (as on the picture).



Now double click on *ACPI-PC*. Continue with *Driver > Update Driver > Display a list of the known drivers for this device > Show all hardware of this device class*. In the list dialog, you can select *Standard-PC* now. Confirm your selection. Windows 2000 will reboot your system after that. Note that all device drivers for all your hardware components are re-installed then because the IRQ assignment from your BIOS will be used. Once the process is completed, check the Device Manager again. It should have a *Standard-PC* entry as on this picture now.

### ACPI under Windows XP

The possible performance problems that are mentioned in the section above for Windows 2000 resulted in some changes to improve ACPI functionality under Windows XP. On many systems, the selection of the *ACPI-PC* HAL instead of *Standard-PC* will provide better performance. New developments on modern mainboards like *APIC* (Advanced Programmable Interrupt Controller; don't confuse this with ACPI) allow Windows XP to assign / use different IRQs for different hardware components even if the *ACPI-PC* HAL is used.

As a general and simplified rule: on older systems, *Standard-PC* is recommended under Windows XP. On newer systems, the *ACPI-PC* HAL should be preferred under Windows XP. If you run into



problems, change it later. Under Windows 2000, *Standard-PC* is recommended in any case. To explain this for Windows XP more detailed, check this table with a few of the major mainboard chipsets:

chipset	preferred HAL	comment
440BX, 440LX (Intel)	Standard-PC	-
i815 (Intel)	Standard-PC	-
i845, i850, i865, i875 (Intel)	ACPI-PC	enable APIC in BIOS
KX133, KT133, KT133A, KT266 (VIA)	Standard-PC	make sure the card gets its own unshared IRQ
KT266A, KT333, KT400 (VIA)	ACPI-PC	enable APIC in BIOS if available
AMD761, AMD751 (AMD)	Standard-PC	-
nForce 415, 420 (nVidia)	ACPI-PC	enable APIC in BIOS if available
735, 745 (SiS)	ACPI-PC	enable APIC in BIOS if available
645, 648 (SiS)	ACPI-PC	enable APIC in BIOS if available

For example: if you use an ASUS A7M266, which is based on the AMD761 chipset, you should disable ACPI and use the *Standard-PC* HAL instead under Windows XP. Please refer to the instructions for Windows 2000 above to learn how to select *Standard-PC* instead of *ACPI-PC*.

Note: Please do not confuse APIC with ACPI when you check the table above. Always check the documentation of your mainboard. If your mainboard does not support APIC, check if there is an updated BIOS available for it. On some newer mainboards (ACPI and APIC is enabled by one switch in BIOS simultaneously).

### **Background services**

Some software vendors recommend their users to change the processor scheduling option from Programs to Background services, e.g. Steinberg. We noticed that especially applications using ASIO for recording and playback are working better when you use small buffer settings (low-latency). Under Windows 2000 (not XP), goto *Control Panel > System > Advanced > Performance Options* and select *Background services*. Under Windows XP, goto *Control Panel > System > Advanced > Settings > Advanced > Processor scheduling* and select *Background services*.