

LAGOON™

LAGOON



MANUAL

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FCC Class B / European CE Compliance

WARNING: This equipment has been tested and found to comply with the limits for a CLASS B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions contained in this manual, may cause harmful interference to radio and television communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: 1) reorient or relocate the receiving antenna; 2) increase the separation between the equipment and the receiver; 3) connect the equipment into an outlet on a circuit different from that of the receiver; 4) consult the dealer or an experienced audio television technician.

NOTE: Connecting this device to peripheral devices that do not comply with CLASS B requirements or using an unshielded peripheral data cable could also result in harmful interference to radio or television reception.

The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

To ensure that the use of this product does not contribute to interference, it is necessary to use shielded I/O cables.

This product also complies with European CE requirements.



Introduction

Congratulations on your purchase of a LAGOON PCI Digital Audio Card! With this card, high-quality digital audio processing becomes possible with your PC. The card offers optical digital I/O and an ADAT Sync connector (standard Alesis 9-pin DB connector).

The optical digital I/Os may be software-configured to S/PDIF or ADAT mode while supporting Full Duplex for simultaneous record and playback (e.g. simultaneous recording from ADAT and playing back over S/PDIF is possible) The S/PDIF mode supports several sample rates and sample resolutions up to 24 Bit at 96 kHz. Using ADAT, you may record and play back simultaneously 8 channels of digital audio at up to 51 kHz and 24 Bit. Using the ADAT Sync, synchronization to your ADAT recorder is easy. If this is not needed, this connector can alternately be used as a MIDI In/Out interface by simply plugging in the included MIDI adapter cable.

Beyond these versatile interfacing possibilities the Motorola 56301 DSP used on this card offers 80 MIPS of DSP computing power. Combined with 768 kBytes of fast EDO DRAM, a variety of audio effects may be run on this system with simultaneous digital I/O operation.

Features

Low profile PCI card (requires PCI BIOS version 2.1).

Operates in Full Duplex for simultaneous record and playback.

Onboard Motorola 56301 running at 80 MHz, delivering 80 MIPS computing power.

Onboard 768 kByte fast EDO-DRAM to ensure reliable audio streaming and effects.

Onboard DSP supports downloadable audio effects and processing.

1 Toslink Optical In and 1 Toslink Optical Out supports the following I/O modes:

- ADAT 8-Channel Optical
 - All ADAT word widths up to 24 bit
 - ADAT sample rates from 39 kHz to 51 kHz
- S/PDIF Optical
 - All word widths up to 24 bit
 - Sample rates: 32, 44.1, 48, 64, 88.2, 96 kHz
 - Consumer or Professional mode
- Mixed mode: S/PDIF In and ADAT Out or ADAT In and S/PDIF Out

ADAT Sync In or MIDI Options via 9-pin DB connector supports:

- ADAT Sync In using standard Alesis ADAT Sync cables.
- 1 In and 1 Out MIDI Interface
 - Uses supplied break out cable to connect to MIDI devices.
 - Allows for MTC or MIDI clock synchronization through user application software.

Included Drivers:

- Windows 95/98 MME driver
 - Supports Mono, Stereo, 8-channel and MIDI devices
- Windows 95/98 ASIO driver

Minimum System Requirements

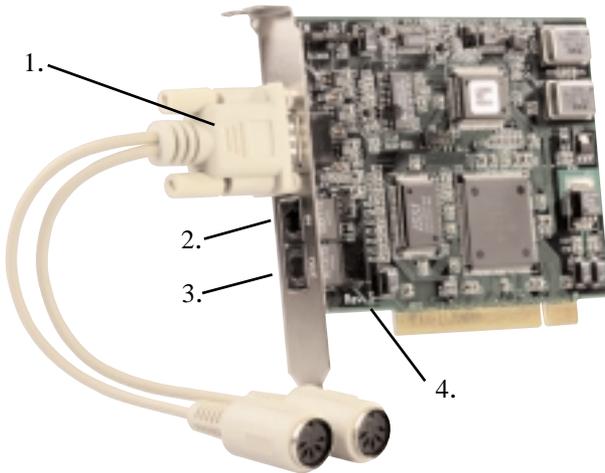
- Windows 95 or 98
- Pentium 166 or higher with MMX, 200 MHz recommended.
- 32 MByte RAM, 64 MByte recommended.

What's in the Box?

Your LAGOON box contains:

- This Instruction Manual
- The LAGOON PCI card
- 1x1 MIDI Interface Cable
- Diskettes for Windows 95/98 installation
- Midiman Warranty Registration Card

Important: Please fill out the included Warranty Registration Card and mail or fax it to us as soon as possible. Registering your LAGOON will help us to give you the best possible service and support.



The Lagoon Card

1. ADAT Sync Input/MIDI I/O: This 9-pin DB female connector will accept the synchronization output of an ADAT tape recorder. Switching the K9 jumper on the Lagoon board will alter the function of this connector to a 1 in/1 out MIDI interface (see #4 in this list). Shown here MIDI cable is attached.
2. Toslink Optical Input: This standard female Toslink input jack accepts a standard male Toslink plug, either ADAT 8-channel format output or S/PDIF 2-channel format output as configured in the Lagoon Tools Applet (see section, "Lagoon Tools Applet").

3. Toslink Optical Output: This standard female Toslink output jack accepts a standard male Toslink plug, typically connected to either an ADAT 8-channel format input or S/PDIF 2-channel format input (as configured in the Lagoon Tools Applet).
4. ADAT Sync/MIDI Jumper: (see section, “Hardware Installation”).

Installation

Here is a list of the steps required to get your LAGOON PCI Digital Audio Card up and running. Please read the associated section of the manual and follow the instructions carefully.

1. Check the Computer Properties in your Windows Device Manager for an available IRQ for the LAGOON to install to. Although the LAGOON supports shared IRQs it is desirable the LAGOON gets its own IRQ so that can properly interact with the computer’s microprocessor (see “Checking IRQs”).
2. Physically install the LAGOON card in your computer (see “Hardware Installation”).
3. Install drivers and support software (see “Windows Driver and Software Installation”).
4. Attach the LAGOON to other pieces of equipment in your studio (see “Setting Up Your Digital Studio”).
5. Configure your application software to properly communicate with the LAGOON PCI (see “Using LAGOON with Application Software”).

Checking IRQs

The LAGOON PCI Digital Audio Card needs an Interrupt Request line, or IRQ (basically, a line of communication between the LAGOON and the microprocessor) to function properly. It is best to check for IRQ availability before installing a new device, as it will prevent resource conflicts that may be otherwise avoidable.

Open the Windows Control Panel (Start|Settings|Control Panel). Double click the “System” icon, then click the Device Manager tab. The word “Computer” will be highlighted (if not, highlight “Computer”). Click “Properties.” This will bring up the Computer Properties screen, with a list of IRQs on the left, and devices on the right. If a number does NOT show up in the list, it means that it is available for use. The IRQ numbers 5, 9, 10, and 11 are most often the ones to look to for availability, although 3, 4, 7, 12, and 15 may also be a possibility (depending on your system’s configuration). IRQs 3 and 4 are often used for the COM Ports (this is controlled by the system’s BIOS), and are sometimes instructed by the BIOS to receive a “Legacy ISA” device rather than a PCI or ISA “PnP” (Plug and Play) device. This is discussed later in the section “Troubleshooting”, though you may want to consult your computer’s user guide for more information.

Once you have determined that there is an IRQ available for the LAGOON card, it is safe to proceed to the next step, which is to physically install the LAGOON.

Hardware Installation

To physically install the LAGOON card into your computer, please do the following:

1. Turn off your computer.
2. Remove the cover and position the computer so that you can easily access its PCI slots.
3. Select the PCI slot into which you will install your LAGOON card. PCI slots are distinguishable from ISA slots by being shorter and set back farther from the outside of the computer. If you're still unsure, consult your computer or mainboard user's guide.
4. The PCI slot you just selected should have a metal bracket associated with it that covers the PCI slot's access hole on the back of the computer. This bracket is usually fastened to the computer with a single screw. Remove the screw and bracket- be sure not to lose the screw as you will need it later!
5. Before removing the LAGOON from its protective antistatic bag, touch the metal power supply case of the computer in order to dissipate any static electricity charge your body may have accumulated.
6. Remove the plastic terminators that are plugged into the optical jacks of the LAGOON card. This is only possible before inserting the card !
7. Set the jumper K9 corresponding to your demands (see picture below). When using the LAGOON MIDI cable, close K9 for proper cable shielding. When using an ADAT Sync cable, do not close K9 to avoid ground loops.



closed for MIDI



open for ADAT

8. Position the LAGOON card over the target PCI slot and fit the card loosely over it with the LAGOON card upright. Press the card gently but firmly downward into the slot until the card is completely and squarely seated in the slot. If the card seems difficult to seat, a slight rocking motion may help. If the card is impossible to seat, you may be trying to install the LAGOON in a non-PCI slot. If this is the case, go back to Step 3.
9. Once the LAGOON card is firmly seated, fasten its metal bracket down into the computer chassis, using the screw you removed in Step 4 above.
10. Place the cover back on your computer.

Windows Driver and Software Installation

The Lagoon PCI includes a Windows 98/95 diskette containing the Windows drivers, ASIO drivers, and Lagoon Tools Applet software. To install these on your system, please follow these steps:

Windows 98 Installation

1. After installing the Lagoon hardware, boot your system and start Windows. During the Windows boot procedure, new hardware will be automatically detected by the Add New Hardware Wizard as shown here. Click 'Next>'.
During the Windows boot procedure, new hardware will be automatically detected by the Add New Hardware Wizard as shown here. Click 'Next>'.
2. The 'Add New Hardware Wizard' will now ask how you want to find the driver. "Search for the best driver for your device" is already selected. Click 'Next>'.
3. Windows will give you a selection of locations to search. Make sure that 'Floppy disk drives' is checked, or click on the check box to do so. Insert the Lagoon 95/98 Driver and Tools Applet Disk #1 into your floppy drive. Click 'Next>'.
4. The 'Wizard' reports that its Windows driver file search has found the Lagoon Audiocard. Click 'Next>'.
5. Windows is now ready to install the driver files from the specified location. Click 'Next>'. Windows will start to copy the files and show you a progress report screen.
6. The Wizard reports that Windows has finished installing the software. Click 'Finish'. Your Lagoon is ready for action.

After completion of the driver installation, Windows may require you to restart Windows. If it does request a restart, remove the Lagoon Disk from the floppy disk drive and respond 'Yes'. The system will restart and you are ready to install the Lagoon Tools Applet software.

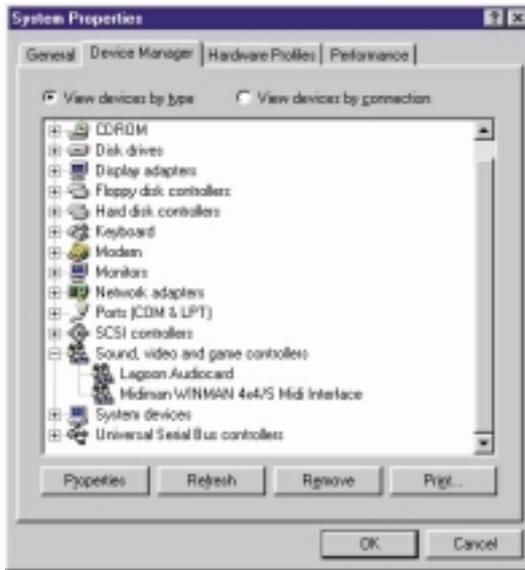
Windows 95 Installation

1. After installation of the Lagoon hardware, boot your system and start Windows. During the Windows boot procedure, new hardware will be automatically detected.
2. Choose the Install of "driver from disk provided by hardware manufacturer," then click 'OK'.
3. An 'Install From Disk' will prompt you to copy files from the A:\ drive (if your floppy drive is a different drive letter, then change it at this time). Insert the Lagoon 95/98 Driver and Tools Applet Disk #1 into the drive then click 'OK'.
4. Windows will start to copy files, with a progress indicator on the screen. Once this process completes itself, you will be ready to install the Lagoon Tools Applet.

After completion of the driver installation, Windows may require you to restart Windows. If it does request a restart, remove the Lagoon Disk from the floppy disk drive and click 'Yes,' and the system will restart.

Verifying Windows Driver Installation

Windows displays the Lagoon driver status in the Device Manager page of the System Properties dialog box. The Device Manager page is opened via the Windows Start button: select Start | Settings | Control Panel | System | Device Manager. With the Device Manager displayed, click on the “+” next to “Sound, video and game controllers” to open a list of devices, the Lagoon being a device of that nature. Below is an example view of the Device Manager.



This example shows the M Audio Lagoon and Midiman WINMAN 4x4/S (another product shown here only as an example) entries in the Windows Device Manager device list. The Lagoon is properly installed with no conflicts, as is the WINMAN 4x4/S. If you do not see your M Audio Lagoon in your Device Manager in this fashion, please jump ahead to the “Troubleshooting” section of this manual.

Software Installation

Once the Lagoon driver software is installed in your system, you are ready to install the Lagoon Tools Applet. The Lagoon Tools are necessary to properly control the functions of the card, as well as monitor the status of your signal.

1. Insert the Lagoon 95/98 Driver and Tools Applet Disk #1 into your floppy drive. Open your Start menu and select 'Run'. Type in the path, "A:\Setup". Click 'OK'.
2. The Lagoon Tools installer will say “Welcome to Lagoon Tools Setup.” Click 'OK'.
3. Lagoon Setup will ask you to “Select Components and Folder.” We suggest clicking 'OK' and installing the defaults, which will create a Lagoon folder in your Programs

folder on your C: drive, install the Multimedia and ASIO drivers, plus install a groovy monophonic virtual analog synthesizer. This synth is the first of a series of synthesizers and effects that will be made available for the Lagoon as they are developed. Click 'OK'.

4. Lagoon Setup will allow you to select a folder into which to install the Tools Applet software. Again, we suggest just sticking with the "Lagoon" folder, but advanced users can make another selection here. Click 'OK'.
5. The "Ready to Start" dialog box will display the components you have selected for installation. Clicking "Allow Setup to reboot your system automatically" is suggested. Click 'Start' to begin installing.
6. When Setup prompts, insert the Lagoon 95/98 Driver and Tools Applet Disk #2 into your floppy drive. Click 'OK'.
7. When installation is completed, your system will reboot. If you had not selected the automatic reboot option, Lagoon Setup will give you the option to do so at the completion of the installation. Once you have rebooted, the Lagoon Setup will return and announce that setup is complete. Click 'Finish' and the Lagoon Tools Applet will appear opened on your desktop. Your Lagoon is now ready for use.

Verifying Lagoon Tools Applet Software Installation

After completing the Lagoon Tools setup, the Lagoon Tools Applet will appear on your desktop. Refer to section 5, "The Lagoon Tools Applet" for more information on its use with your Lagoon card. If you've chosen to install the virtual synthesizer, you will see a "Synth-A" button on the Info page that is currently open. Clicking on that button will open the Synth-A controls. Clicking on the question mark in the upper right-hand corner (?) will open up an Info page with a "Manual" button that will open the Synth-A manual readme file. You may open the File menu and select 'Print' if you wish to print this out for easy reference.

A Lagoon icon should now exist on your Windows taskbar, which is your quick and easy access to your applet software. Clicking on the X in the upper right-hand corner of the applet will close it

Setting Up Your Digital Studio

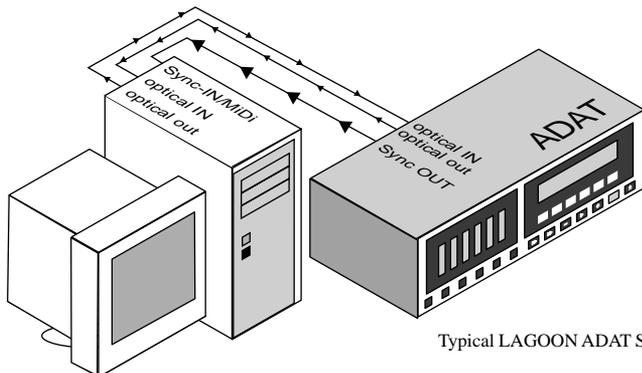
Once the LAGOON PCI Digital Audio Card is installed in your computer, you are ready to make the necessary connections to external devices. The following setups, 1-3, illustrate several configurations in which the LAGOON is most often used.

The LAGOON is an extremely versatile card that can be used in a number of configurations. You may find yourself using one or more setups while recording, and a different setup when mixing down. To avoid having to patch and repatch inputs and outputs, it may be reasonable to consider the purchase of a digital patchbay such as Midiman's Digipatch 12x6. A Typical LAGOON ADAT Setup follows this section.

1. Connect the LAGOON PCI Toslink Optical Output to the Input of your receiving device.
 - a) If you are sending a 2-channel signal, your receiving device may be the S/PDIF digital input of a stereo amplifier or mixer, DAT mixdown deck, or stereo D/A converter (such as Midiman's Flying Calf D/A or the M Audio SuperDAC). A D/A converter will convert the digital signal to analog, which would allow input to the same types of analog receiving devices.
 - b) If you are sending an 8-channel signal to the LAGOON PCI Toslink Optical Output, your receiving device may be the optical input of an ADAT, 8-channel optical input of a digital mixer, or the optical input of an 8-channel D/A converter.

2. Connect the outputs of your digital source to the LAGOON PCI Toslink Optical Input.
 - a) If your source is 2-channel optical, this may be the digital outputs of a DAT deck, CD player, digital mixer, or A/D converter (such as the Midiman Flying Calf A/D) that is converting the analog outputs of a similar source to a 2-channel digital signal.
 - b) If your source is 8-channel optical, this may be an ADAT optical output, the 8-channel optical buss outs of a digital mixer, or the 8-channel optical output of an A/D converter.

3. Connect either the Sync Output of your ADAT recorder or the supplied MIDI breakout cable to the 9-pin DB connector. The LAGOON will provide either ADAT Sync or MIDI In and Out (depending on the jumper settings), controlled by the LAGOON Tools applet (see section, "The LAGOON Tools Applet").
 - a) If you are using ADATs in your system, the sync output of the last ADAT in your chain should be connected to the 9-pin DB connector. This will allow the Lagoon to receive a sync signal from the ADATs, making the ADATs the sync "master," and your computer the sync "slave."
 - b) This 9-pin connector can alternately be used as a 1 In, 1 Out MIDI interface. A MIDI interface will allow you to record and playback information from your MIDI compatible keyboards and sound modules, as well as open up synchronization possibilities using MIDI sync (MTC or MIDI clock).



Typical LAGOON ADAT Setup

Using LAGOON with Application Software

Once the Lagoon's hardware, driver software, and Tools Applet are properly installed, it is ready for use with your music application software. Some of these applications may require you to highlight or enable the Lagoon drivers within the program, and others may have a utility that analyzes or profiles the audio cards in your system and enables the drivers. Your software should have an audio device driver setup page, as well as a MIDI driver setup page.

NOTE: If you have selected S/PDIF as your input or output format, this will dedicate the software input and output devices 1 and 2 (1/2) for use with your S/PDIF signal. When selecting S/PDIF as your input signal, choose Lagoon in 1/2 (or ADAT1 1/2 for ASIO) as the source within your music software. Set your output port to Lagoon out 1/2 (or ADAT1 1/2) when selecting S/PDIF as your output format (see section 5, "Lagoon Tools Applet" for information on making these selections).

WINDOWS MME AUDIO INPUT DEVICES: The Lagoon optical input may be used for a total of either 2 (S/PDIF) or 8 (ADAT) input channels. Within your software application(s), the names of the possible Lagoon audio input devices are:

- Lagoon in 1/2
- Lagoon in 3/4
- Lagoon in 5/6
- Lagoon in 7/8

The Lagoon input devices allow recording a stereo (S/PDIF) or 8-channel (ADAT) stream directly from the optical input specified in the Lagoon Tools software (see Lagoon Tools Applet section). Note that all of the input devices are stereo. Your application software may break these down further to "left" and "right" mono devices. Therefore you may see them as "Left Lagoon in 1/2, Right Lagoon in 1/2, Left Lagoon in 3/4, Right Lagoon in 3/4," etc., from within your recording software.

WINDOWS MME AUDIO OUTPUT DEVICES: All Lagoon optical outputs may be used simultaneously for a total of 2 (S/PDIF) or 8 (ADAT) output channels. Within your software application(s), the names of the Lagoon audio output devices are:

- Lagoon out 1/2
- Lagoon out 3/4
- Lagoon out 5/6
- Lagoon out 7/8

All Lagoon output devices allow playing a stereo audio stream to the hardware optical output. Your application software may break each of these stereo devices down further to "left" and "right" mono devices. Therefore you may see them as "Left WavOut 1/2 Lagoon, Right WavOut 1/2 Lagoon," or "Left WavOut S/PDIF Lagoon, Right WavOut S/PDIF Lagoon," etc. from within your music software. Other software will handle the outputs as stereo pairs, but allow you to pan audio left or right within the pair.

ASIO DRIVER INPUT DEVICES: When using the ASIO audio drivers with programs that support ASIO-style audio, the input devices are displayed as mono devices. Within ASIO software applications, the names of the Lagoon audio input devices are:

ADAT1 1/2
ADAT1 3/4
ADAT1 5/6
ADAT1 7/8

ASIO DRIVER OUTPUT DEVICES: The Lagoon's ASIO output devices appear in stereo pairs. Because each device is stereo, you may see "left" and "right" references within your software application. This allows the application to pan audio left and right under software control. To send a signal to a Lagoon ASIO output 1 (for example) as a mono output send, one would choose "Analog 1/2 Lagoon" for that track's output port, and then pan that output hard left. The ASIO outputs are named as follows:

ADAT1 1/2
ADAT1 3/4
ADAT1 5/6
ADAT1 7/8

WINDOWS MULTIMEDIA SETTINGS: Windows may be set up to use the Lagoon as its default audio device, allowing system sounds to be sent out the Lagoon. This also enables you to use the Lagoon with the sound applets included with Windows. To set this up, go to Control Panel | Multimedia. In the Audio Properties page, set the Playback and Recording devices to the Lagoon input and output devices of your choice.

The LAGOON Tools Applet

Using the LAGOON Tools you may configure the operation mode of the LAGOON card. The LAGOON Tools may be easily accessed by clicking on the LAGOON icon in the taskbar (alternately you can access them by clicking on the corresponding entry in the Windows Start menu / Programs). Moreover, this icon provides information about the status of the card. If it is permanently blue, everything is OK. If the icon starts blinking red/blue, an error has occurred. By clicking on this icon and selecting the *Status* page you can easily check what kind of error occurred. But let's start with the basic *Info* page.

Info Page

The *Info* page provides information about the installed drivers. In the screen shot above you can see that the driver version is 1.4 (you probably have a newer one) and that both the MME and ASIO drivers are installed. This can be modified by clicking on the button named *Start setup to modify*.

You will further notice two small buttons in the upper right corner of the LAGOON Tools window. The right one is as usual for closing the LAGOON Tools. The left one has a special function. If you click on it, the LAGOON Tools window will always stay on top of your desktop. This function is useful if you always want to be informed about the status of your LAGOON card. Clicking again will release the button and allow other windows to be displayed in front of the LAGOON Tools.



General Page

In the General page you can configure the basic functions of your LAGOON card according to your demands. Incorrect configuration can lead to distortion!



Mode

The optical input and output can be configured separately either as S/PDIF or ADAT. This means mixing of both digital formats is possible as the LAGOON supports mixed mode operation.

If you configure the input as ADAT, you may further activate a ‘Toshiba to Sharp’ filter by clicking on Options and then on T2S. (T2S is activated if you see a check). The T2S is intended to compensate for differences on the optical jacks manufactured by Toshiba and Sharp. If you have external equipment with optical jacks from Toshiba (like the LAGOON card), you will not need the T2S. If you have equipment that uses optical jacks from Sharp (like ADAT recorders), you should activate T2S (even if in most cases this is not necessary). Activating T2S then helps reduce jitter. Even if jitter does not have any influence on quality as long as you stay in the digital domain (e.g. if you are recording to a hard disk or to an external ADAT recorder), feeding external analog converters with an optical signal that has jitter usually worsens audio quality.

If you do not know what kind of optical jack is used by your external equipment, turn off T2S. Remember: T2S only achieves a slight improvement, the LAGOON card will also work without T2S using Sharp-based devices.

Warning: Always set the correct format at the output. Choosing a wrong format (e.g. sending an S/PDIF signal to an ADAT device) may result in noise signals with maximum level generated at the receiving device !

Clock Source

Whenever your intention is to synchronize your application software to an ADAT recorder, ADAT Sync In is the choice. MIDI Machine Control, ADAT Time Code and ADAT Word Clock coming in from the ADAT Sync cable then will give the LAGOON card the ability of Time Code locked recording and playback. In this case, the ADAT recorder acts as a sync master and the LAGOON as the sync slave.

For external equipment other than ADAT recorders choose Optical In as Clock source. This is suitable when recording from CD players or DAT recorders.

If you want to have the LAGOON card acting as a clock master, choose LAGOON as Clock source. Now you can play back to DAT recorders or to external D/A converters. However, recording is only possible if your external device is clocked by the LAGOON card. Otherwise recording will lead to audible distortions.

Hint: For best performance using external analog converters, they should be chosen to be the master. If this is done, they generate the clock themselves, which is much more precise than feeding them with an external clock. In that case the right setting for *Clock source* will be *Optical In*.

Sample Rate

If *Optical In* or *ADAT Sync In* is selected as *Clock source*, then there is no need for choosing a *Sample rate*. Only if *LAGOON* is selected you may choose the *Sample rate*. Configuring input or output as *ADAT* you may select among *44.1 kHz* and *48 kHz* only (as only these frequencies fulfill the ADAT demands). Configuring both input and output as *S/PDIF* you can use all sample rates up to *96 kHz* (if your external equipment supports them). Selecting *LAGOON* as *Clock source* and choosing *Auto mode*, then the *Sample rate* will be set by your application software automatically.

Hint: Sample rates of 8, 11.025, 16, and 22.05 kHz are supported at playback only using linear interpolation (*Auto mode* only).

Advanced Page

The *Advanced* page is suitable for experienced users and concerns the S/PDIF output only. Normally S/PDIF equipment connected to the LAGOONs optical output works fine without changing the default settings. However, sometimes it is desirable to have control over a bit stream called ‘Channel Bits’, always transmitted with your digital audio data. Channel Bits provide some additional information for your external S/PDIF equipment.

There are two different ways of encoding Channel Bits: *Consumer mode* and *Professional mode*. It depends on your external device which mode you have to choose. The default setting is *Consumer mode*. Most of the S/PDIF equipment accepts this mode. If not, choose the *Professional mode*. If you have doubts about what the right mode is, refer to the user manual of your device.



Hint: Channel Bits coming in from the optical input will be ignored. The LAGOON always generates and transmits its own Channel Bits.

Consumer Mode

Using the *Consumer mode*, you may change settings concerning the *Copy bit*, the *Generation status*, the *Category code*, the *Pre emphasis* and the *Sample rate*. For switching back to the default settings, click on *Default values*.

The *Copy bit* is useful when recording digital audio data to a DAT tape to inhibit or permit further copies of that tape. By default, further copies are permitted.

The *Generation status* is related to the *Copy bit*: If *Copy bit* is set to *Copy inhibited* and *No indication or 1st generation or higher* is selected, then all further copies of the audio data are inhibited. If *Copy bit* is set to *Copy inhibited* and *Original/Commercially pre-recorded data* is selected, then only one copy of the audio data is permitted.

The LAGOON category is *PCM encoder/decoder*. If this *Category code* is not accepted by your external equipment, you may choose *General*.

The default setting for *Pre emphasis* is *No emphasis*. It depends on your digital audio data if there is a need for encoding an emphasis information.

Using the *Consumer mode* you often need to indicate a *Sample rate*. You may choose among 32, 44.1, or 48 kHz. For sample rates of 96, 88.2, and 64 kHz you must choose 48 kHz. By clicking on *Auto mode*, the LAGOON Tools will automatically choose the correct settings for you. Wrong settings may lead to data formats that can not be accepted by other devices (especially some DAT recorders). Remember that *Sample rate* relates to your audio data and not to the real frequency the S/PDIF signal is transmitted with.

Professional Mode

Using the *Professional mode*, you may change settings concerning the *Sample rate*, the *Encoded audio signal emphasis*, the *Channel mode* and the *Auxiliary sample bits*. For switching back to the default settings, click on *Default values*. Equipment requiring *Professional mode* usually comes with XLR connectors instead of optical connectors. Use an external S/PDIF to AES/EBU converter for interfacing both formats.

For *Sample rate* we recommend using the *Auto mode*. Using this mode, the sample rate information will automatically be set to the value requested for playback from your application software. In the case your application requested a sample rate that does not match 32, 44.1, or 48 kHz, the sample rate is not indicated which is the usual method. You can manually override this mechanism by clicking on one of the sample rates or on *Not indicated*. Remember that some external devices do not accept a signal whose transmission frequency does not match the frequency information encoded here.

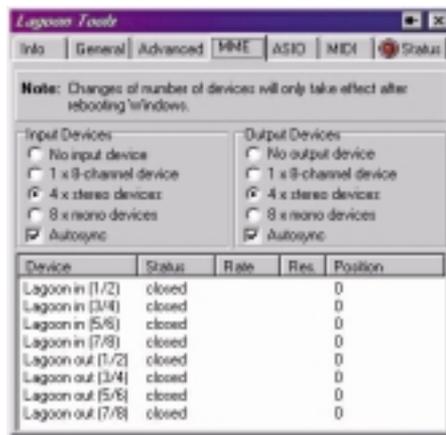
The default setting for *Encoded audio signal emphasis* is *Not indicated*. It depends on your digital audio data if there is a need for encoding an emphasis information. The *Channel mode* may also be set automatically by clicking on *Auto mode*. Overriding this is possible by clicking on either *Not indicated*, *Two channels* or *Stereophonic*.

Auxiliary sample bits determine the number of bits your audio samples have. If you want to set this information manually, you must first choose the *Maximum audio word length* (20 or 24 bits). This setting determines if the auxiliary data bits are used for audio or not. Then you can choose the exact number of bits by clicking on the appropriate checkbox.

MME Page

The *MME* page is needed to tell Windows how to handle the individual audio channels. You can deactivate input or output channels by clicking on *No input device* or *No output device*. If activation is desired, the eight input and output channels of the LAGOON card can be interpreted as a single 8 channel device, 4 stereo devices or 8 mono devices. Remember that changing the number of devices will only take effect after rebooting Windows.

The MME LAGOON driver provides a special function to synchronize multiple devices. If you check the *Autosync* box, synchronization will be performed. This is the default setting. If you experience synchronization problems (this can happen if two different applications are using the MME LAGOON driver), try to uncheck the *Autosync* box.



There are four states an MME device may enter: *Closed*, *Blocked*, *Paused* and *Playing*. If an MME device is not in use it is *Closed*. If there is an ASIO driver opened all MME devices are *Blocked*, since opening the ASIO driver and the MME driver at the same time is not allowed. *Paused* MME devices are not actually playing. *Playing* indicates that an MME device is in use by an application. In that case *Position* counts up with every sample transferred by the driver.

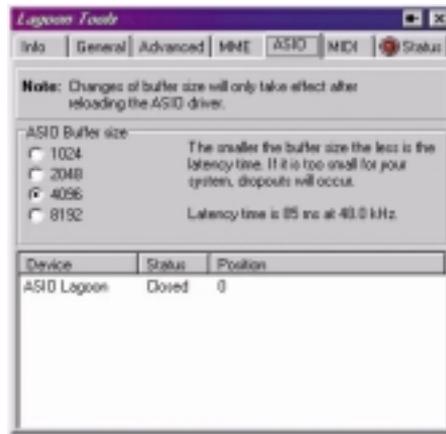
Rate and *Res* provides information about the sample rate and the bit resolution an MME device is working with.

Hint: S/PDIF signals are always related to audio channel number 1 and channel number 2. Therefore only device Lagoon In (1/2) and device Lagoon Out (1/2) are suitable when using S/PDIF signals.

Hint: The LAGOON card operates with one sample rate at a time only. Opening devices with different sample rates will fail.

ASIO Page

In the *ASIO* page you can determine the *Buffer size* of the ASIO LAGOON driver. A smaller *Buffer size* results in a smaller latency time (e.g. the time needed to hear a sound after you press the play button in your application software), but may lead to dropouts if your system is too slow to handle such short latency times. Increasing the *Buffer size* may prevent dropouts, but also increases latency time. It is up to you to find out the best settings for your system. If you are not experienced in optimizing your system use the default *Buffer size*. Remember that changes will only take effect after rebooting Windows.



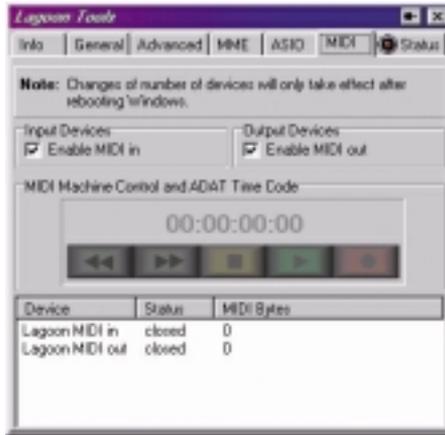
There are three states the ASIO LAGOON driver may enter: *Closed*, *Blocked* and *Playing*. If the ASIO driver is not in use it is *Closed*. If there is an MME device opened the ASIO driver is *Blocked*, since opening the MME driver and the ASIO driver at the same time is not allowed. *Playing* indicates that the ASIO driver is in use by an application. In that case *Position* counts up with every sample transferred by the driver.

Hint: If your application software supports both ASIO and MME, use ASIO as this driver has some advantages compared to the MME driver.

Hint: When using the ASIO driver, *Clock source* and *Sample rate* may no longer be set on the LAGOON Tools *General* page. Use your application software to do this.

MIDI Page

In the *MIDI* page you can activate or deactivate the MIDI input and MIDI output devices separately by using the two *Enable* checkboxes. Remember that changes will only take effect after rebooting Windows.



There are three states a MIDI device may enter: *Closed*, *Paused* and *Playing*. If a MIDI device is not in use it is *Closed*. *Paused* MIDI devices are not actually playing. *Playing* indicates that a MIDI device is in use by an application. In that case *MIDI Bytes* counts up with every byte transferred by the driver.

To obtain *MIDI Machine Control* and *ADAT Time Code* information, connect an ADAT recorder with an ADAT Sync cable to the LAGOON and choose *ADAT Sync In* (*General* page). The transport field and the time display then always will show the current status of your ADAT recorder. Assuming *Input device* is enabled, Time Code synchronization is possible now. Since ADAT recorders do not accept MIDI data coming from an application, the *Output device* will be ignored in this mode.

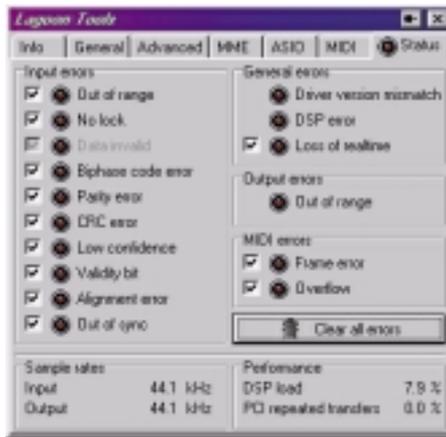
Hint: For proper MIDI timing always make sure the LAGOON is running at a valid sample rate (Output error light in the *Status* page should be turned off).

Status Page

The *Status* page will give you information about the actual state of the LAGOON card. The upper part of this page contains 4 groups of possible error messages: *Input Errors*, *Output Error*, *MIDI Errors* and *General Errors*. By checking the boxes on the left side of the error light you can determine if the corresponding error will be evaluated or if it will be ignored. If you check a box and the corresponding error occurs, the red error light will turn on. If any of the error lights on this page is turned on, the light on top of the *Status* page and the LAGOON icon in the Windows taskbar will start blinking. This way you can see if something is wrong with your LAGOON without always having the *Status* page on top of your desktop.

An error light that is turned on only indicates that this error happened in the past. It does not mean that the error still exists. To check if the error still is present, click on *Clear all errors*. If the light is still on afterwards, the error is still there. If more than one error occurs within one of the four groups, only the error with the highest priority (the most important one = the error that is listed highest) will be displayed in this group.

At the bottom of the page the detected *Input sample rate*, the current *Output sample rate*, the *DSP load* and a percentage value for *PCI-repeated transfers* are displayed. All of these values are permanently measured by the DSP on the LAGOON card.



Hint: You should only start recording or playback when all error lights are turned off. This way you will be informed about every error which occurs during record or playback. Remember: Input errors are only relevant if you are using the LAGOON card for recording.

Input Errors

Input errors are related to the optical input of the LAGOON card. Depending on your settings for the optical input (*ADAT* or *S/PDIF*) some of the errors are listed in grey color. This means that these errors may not appear with the actual input configuration. Input errors are only relevant if you are using the LAGOON card for recording.

Error	Possible Reasons and Remarks
Out of range	<ol style="list-style-type: none"> 1. You configured the input as <i>S/PDIF</i> and the sample rate detected by the LAGOON card is either below 32 kHz or above 96 kHz. 2. You configured the input as <i>ADAT</i> and the detected input sample rate is below 39 kHz or above 51 kHz. 3. There is no input signal (check cabling). 4. You configured <i>ADAT</i>, but the signal is <i>S/PDIF</i>. 5. You configured <i>S/PDIF</i>, but the signal is <i>ADAT</i>.

Error	Possible Reasons and Remarks
No lock	<ol style="list-style-type: none"> 1. The optical receiver has detected an invalid signal. 2. The optical receiver was unable to follow a frequency change fast enough. (If some external equipment changes the sample frequency, the optical receiver may take a short time to adapt to this new frequency.) 3. The incoming signal has too much jitter.
Data invalid (ADAT only)	<ol style="list-style-type: none"> 1. There is too much jitter in the incoming signal that leads to transmission errors. Maybe your LAGOON is the last device in a chain of several ADAT recorders. If so, check the <i>T2S</i> Option in the <i>General</i> page. 2. The optical cable is too long or the cable is of bad quality. 3. The optical receiver was unable to follow a frequency change fast enough (You changed the pitch by pressing the pitch button of your ADAT recorder.) <p>Remark: If a lot of transmission errors are detected, this will lead to a <i>No lock</i> error.</p>
Biphase code error (S/PDIF only)	<p>The incoming signal is erroneous. Perhaps you played back a recording that contained a cut (e.g. from a DAT tape). At the position of the cut your S/PDIF device may generate a biphase code error.</p>
Parity error (S/PDIF only)	<p>The incoming signal has parity errors, this means that the data you are receiving has errors.</p>
CRC error (S/PDIF mode only)	<p>The incoming signal is erroneous (The CRC value calculated in the LAGOON card does not match the CRC value received. This may only happen using the S/PDIF professional mode).</p>
Low confidence (S/PDIF only)	<ol style="list-style-type: none"> 1. The incoming signal is of bad quality because your optical cable is too long. 2. The connected device generates too much jitter.
Validity bit (S/PDIF only)	<ol style="list-style-type: none"> 1. The sending device (e.g. a CD player) marked the data as invalid due to errors on the storage medium (e.g. a compact disc). 2. The sending device (e.g. a CD player) is in stop or pause mode. (In this case it will send zeros and mark them as invalid.)

Alignment error	The audio channels were received in wrong order (e.g. left and right channels interchanged). This error should only appear temporarily when changing the input data format (e.g. changing from <i>ADAT</i> to <i>S/PDIF</i> .)
Out of sync	Optical input and optical output do not have the same sample rate, i. e. your external device is not synchronized to the LAGOON (e.g. there is a CD-Player connected to the optical input while your LAGOON is the clock master). Select <i>Optical In</i> as <i>Clock source</i> in this case (<i>General</i> page).

Output Error

The output error is related to the optical output of the LAGOON card. Only one output error may appear. It is called *Out of range*. The out of range error may only show up when you use *ADAT Sync In* or *Optical In* to determine the sample rate.

Error	Possible Reasons and Remarks
Out of range	<ol style="list-style-type: none"> 1. You are using <i>S/PDIF</i> as output signal and the sample rate coming in from the optical input is less than 32 kHz or higher than 96 kHz. 2. You are using <i>ADAT</i> as output signal and the sample rate coming in from the optical input is below 39 kHz or above 51 kHz. 3. The LAGOON card does not receive a valid signal at its optical input or at the <i>ADAT Sync In</i>. Check your cabling and your connected external device.

MIDI Errors

MIDI errors are related to the MIDI input of the LAGOON card. Receiving MIDI data is possible in two ways: MIDI data coming in from the LAGOON MIDI cable connected to your external MIDI equipment or MIDI data coming in from the ADAT Sync cable connected to your ADAT recorder.

Error	Possible Reasons and Remarks
Frame error	There was an error in receiving MIDI bytes. The start bit, the stop bit, or both of them are not detected correctly. Check your MIDI cable and external equipment.
Overflow	Some of the incoming MIDI data had to be discarded. Perhaps your PC was unable or too busy to process MIDI data fast enough.

General Errors

General errors are related to the basic function of the LAGOON card and its driver.

Error	Possible Reasons and Remarks
Driver version mismatch	<ol style="list-style-type: none">1. The version number of the driver and the version number of the LAGOON Tools are different. Download the newest LAGOON Tools and driver from http://www.m-audio.com.2. You are using a LAGOON card which does not fit the driver. Contact M-Audio tech support for a correct driver version.
DSP error	Something inside the DSP went wrong. Please shut down Windows and power cycle your PC. If this error appears again, contact M-Audio tech support.
Loss of realtime	The DSP was unable to transmit as many data as necessary to the PC within a given time. Probably some other PCI card blocks the PCI bus heavily. Refer to Troubleshooting.

Sample Rates and Performance

Input sample rate always shows the detected sample rate coming in from your optical cable. If this value varies continuously, please check if you configured the input correctly (Did you choose ADAT as input and falsely connect it to an S/PDIF device or vice versa?).

What will be displayed as *Output sample rate* depends on the settings in the *General* page. If you chose LAGOON as clock source, *Output sample rate* should always match the frequency you set in the LAGOON Tools *General* page. If you chose *Optical In*, *Output sample rate* should be the same as the one you are feeding in into the optical input of your LAGOON card. If you chose *ADAT Sync In*, the sample rate at the output will match the word clock frequency from the ADAT Sync In interface.

DSP load shows the percentage of the DSP power which is currently required by the system. This depends on which format (ADAT or S/PDIF) you are using and if many repeated PCI transfers have to be carried out.

The percentage of *PCI-repeated transfers* indicates if the PCI bus is behaving as it should. In most systems it should only display a few percent. If you see a large number of *PCI-repeated transfers* (up to 10 percent and above), then perhaps you have an older mainboard in your PC that is not suitable for multimedia demands.

Troubleshooting

Problem	Advice
Optical output does not work	<ol style="list-style-type: none"> 1. Check if you connected the cable correctly: You should see a red light coming out of the optical cable that comes from the output of your LAGOON card. 2. Check if you chose the correct output format (S/PDIF or ADAT) in the LAGOON Tools <i>General</i> page. 3. Check <i>MME Output device</i> settings in the LAGOON Tools <i>MME</i> page. Maybe <i>No output device</i> is selected. 4. Check your application software output configuration. Maybe the LAGOON card is not selected as output device.
Optical input does not work.	<ol style="list-style-type: none"> 1. Check if you connected the cable correctly: You should see a red light coming out of the optical cable that comes from the output of your external equipment. 2. Check if you chose the correct input format (S/PDIF or ADAT) in the LAGOON Tools <i>General</i> page. 3. Check <i>MME Input device</i> settings in the LAGOON Tools <i>MME</i> page. Maybe <i>No input device</i> is selected. 4. Check your application software input configuration. Maybe the LAGOON card is not selected as input device.
ADAT Sync In does not work correctly.	<ol style="list-style-type: none"> 1. Check <i>Clock source</i> settings in the LAGOON Tools <i>General</i> page. You <u>must</u> choose <i>ADAT Sync In</i>. 2. Check if the <i>MIDI Input device</i> is enabled in the LAGOON Tools <i>MIDI</i> page (only necessary for Time Code synchronization). 3. Check your application software MIDI input configuration. Maybe the LAGOON card is not selected as MIDI input device (only necessary for Time Code synchronization).
MIDI does not work correctly.	<ol style="list-style-type: none"> 1. Check <i>Clock source</i> settings in the LAGOON Tools <i>General</i> page. You <u>must not</u> choose <i>ADAT Sync In</i>. 2. Check if the <i>MIDI Input device</i> is enabled in the LAGOON Tools <i>MIDI</i> page. 3. Check your application software MIDI input configuration. Maybe the LAGOON card is not selected as MIDI input device.

Lifetime Limited Warranty

MIDIMAN warrants that this product is free of defects in materials and workmanship under normal use so long as the product is owned by the original purchaser and that purchaser has registered his/her ownership of the product by sending in the completed warranty card.

In the event that MIDIMAN receives written notice of defects in materials or workmanship from such an original purchaser, MIDIMAN will either replace the product, repair the product, or refund the purchase price at its option. In the event any repair is required, shipment to and from MIDIMAN and a nominal handling charge shall be born by the purchaser. In the event that repair is required, a Return Authorization number must be obtained from MIDIMAN. After this number is obtained, the unit should be shipped back to MIDIMAN in a protective package with a description of the problem and the Return Authorization clearly written on the package.

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If you have any questions, comments or suggestions about this product or any M Audio or MIDIMAN product, we invite you to contact us directly at:

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