
STUDI/O
16-CHANNELS
INPUT
OUTPUT
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TABLE OF CONTENTS

STUDI/O INSTALLATION & USAGE MANUAL

Thank you for purchasing the Sonorus STUDI/O interface card. We hope STUDI/O enables you to spend more time on creativity and less time messing around with your computer. Thanks to PCI Plug'n'Play, installation of STUDI/O is pretty straightforward. There are no jumpers or anything to mess with!

HARDWARE INSTALLATION

1. Turn OFF the power to your computer and any attached peripheral devices and unplug their power cords.

2. Remove the cover from the computer case.

3. Locate an unused PCI expansion slot. Remove the bracket that covers the card-slot opening (hang on to the bracket screw). PCI connectors are shorter than ISA or EISA connectors and are typically white. One or more slots in your PC may be shared ISA/PCI slots. STUDI/O will work in any PCI slot.

4. Insert the STUDI/O card into the PCI slot. Press it down firmly so that the contacts are securely seated in the slot.

5. When the STUDI/O card is firmly seated in the PCI slot, secure the bracket with the screw you saved from Step 3. Replace the computer's cover: you're ready to rock!

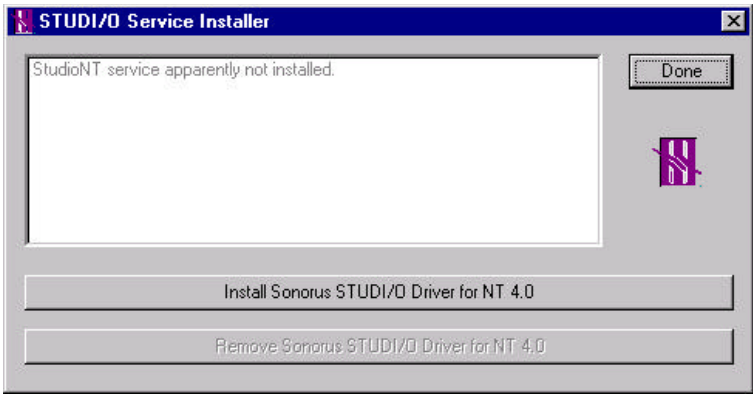
6. Thank you and good night!

SOFTWARE INSTALLATION (NT 4.0 drivers)

1. Turn ON the power to your computer.

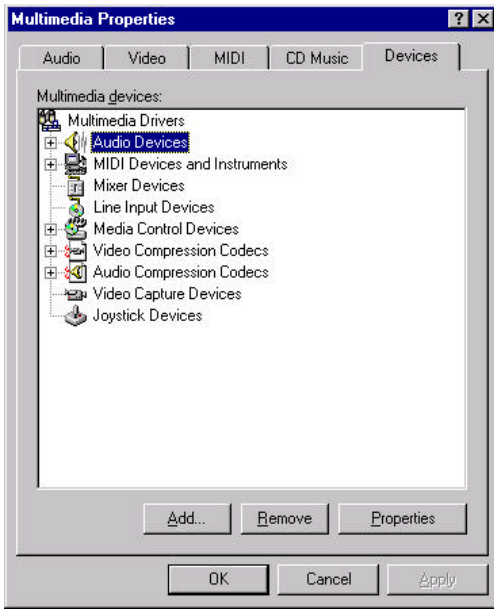
2. Locate the STUDI/O Win NT 4.0 Drivers floppy disk, if no floppy disk was provided look on the CD-ROM in the WinNT directory.

3. From the floppy disk or CD-ROM run Installer.exe You will see the window to the right.

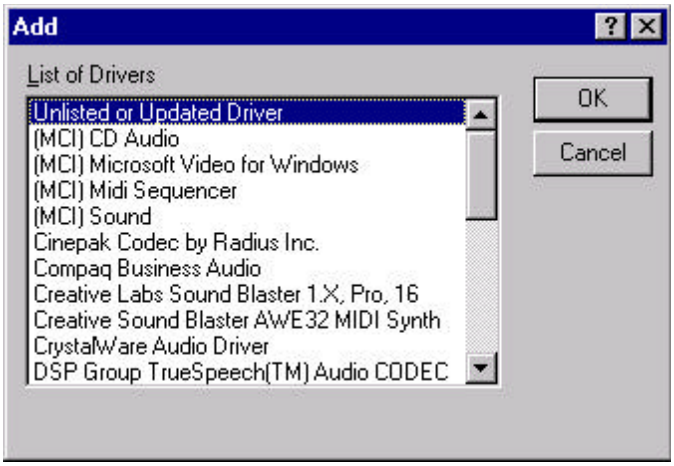


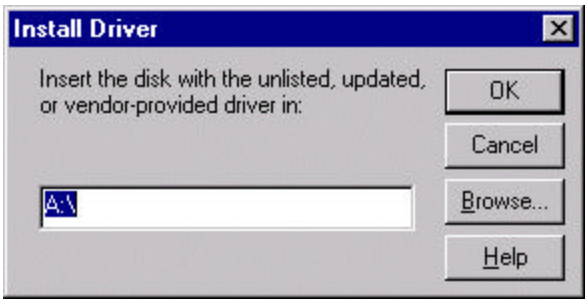
4. Press the “Install Sonorus STUDI/O Driver for NT 4.0” button. You may be prompted for the location of installation files; browse to either the floppy or the location on the CD-ROM where you found Installer.exe. The Installer will copy everything you need onto your hard drive to secret Windows NT locations. (Specifically, your WINNT\System32 and WINNT\System32\Drivers directories. Once this step is completed you will need install the STUDI/O multimedia driver.

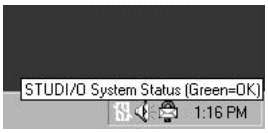
5. Go to the “Multimedia Properties Control Panel.” To go to the Multimedia Properties Control Panel, you will need to: Click on the “Start” button on your taskbar and select “Settings” then “Control Panels.” Open the Multimedia control panel and click on the “Devices” tab. Click on “Audio Devices,” then press the “Add” button.



6. Specify “Unlisted or Updated Driver” as pictured. Then specify either the floppy or CD-ROM directory in the “Install Driver” dialog. You may be told that the specified file already exists on your computer, select “new” when asked to choose.

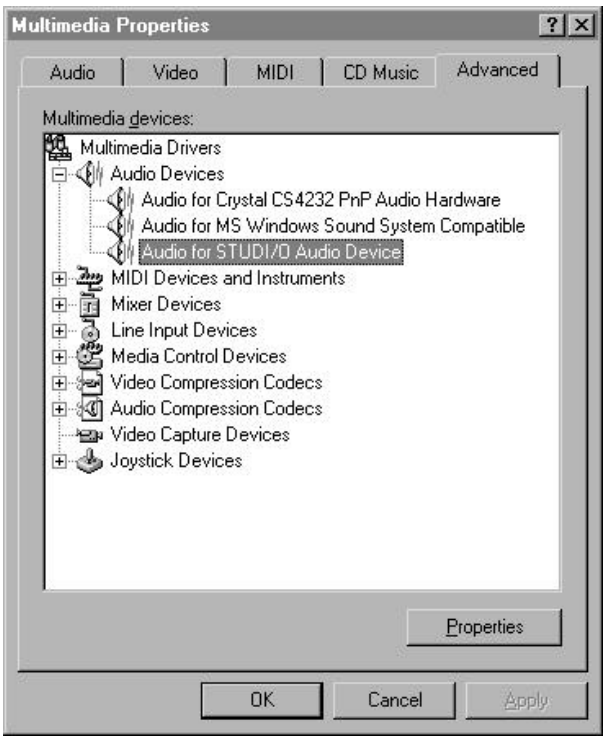






7. Click on the “OK” button when NT asks you if you want to *restart your computer*. Once your computer is *restarted*, the Sonorus logo should appear in the desktop *tray*. This indicates that the software has installed correctly and the hardware is operating properly.

8. Open the *Multimedia Properties Control Panel*. Sonorus recommends configuring the *Audio* settings so that Windows NT does not use STUDI/O for its system I/O (like beeps, etc.), or maps through it, etc.



Mapping

- Select the *Advanced* tab in the *Multimedia Properties*.
- Double click *Audio Devices*, highlight (single click) *Audio for STUDI/O Audio Device*, and click on the *Properties* button.
- Check the box next to *Do not map through this device* in the *Audio for STUDI/O Audio Device Properties* window (shown right).
- Click on the "OK" button in the *Audio for STUDI/O…* window and again in the *Multimedia Properties Window*.

9. Reboot your computer.

10. Please read the README.TXT file.

11. All you'll need to do now is run our control panel to set up the board (see the *WIN SOFTWARE YOUR/SETUP* section).

12. Thank you and good night!

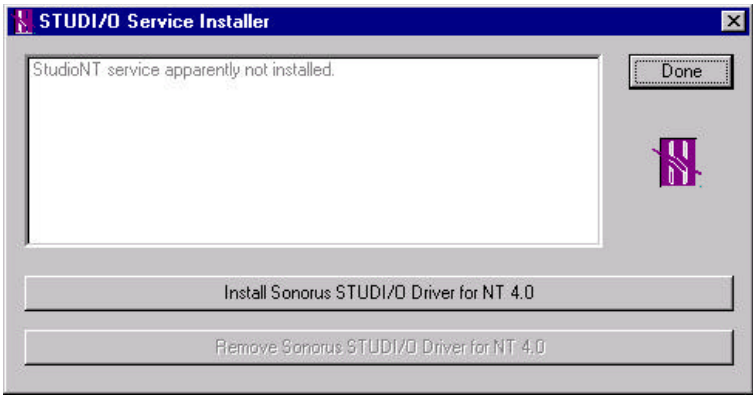
SOFTWARE REMOVAL

Follow these simple steps if you would like to uninstall the STUDI/O drivers.

1. Turn ON the power to your computer.

2. Locate the STUDI/O Win NT 4.0 Drivers floppy disk, if no floppy disk was provided, look on the CD-ROM in the WinNT directory.

3. From the floppy disk or CD-ROM run Installer.exe You will see the window to the right.



4. Press the "Remove Sonorus STUDI/O Driver for NT 4.0" button. The Installer will remove the STUDIONT service from your system. Once this step is completed you will need remove the STUDI/O multimedia driver.

5. Open the Multimedia Properties Control Panel , click on the Devices tab, Open the Audio Devices and select Audio for Sonorus STUDI/O. Click on the Remove button. That's it!

WIN NT 4.0 SOFTWARE TOUR/SETUP

The basic idea of this board is to provide a compatible interface with as many programs as possible. To that end, we support the standard Microsoft Sound System. The Microsoft Sound System does not currently provide a sufficient control interface to completely configure the STUDI/O card, so we provide two additional pieces, the Sonorus Tray application (*Little Icon*) and the STUDI/O Properties Control Panel.

TRAY

Little Icon

The *Little Icon* installed in your tray (at the lower right side of your screen), indicates the status of the STUDI/O card.

GREEN: Normally, the *little icon* is GREEN, indicating that the card is working properly.

RED: The *little icon* will turn RED if there is some kink of error, like bad data, loss of clock, etc.

Little Menu

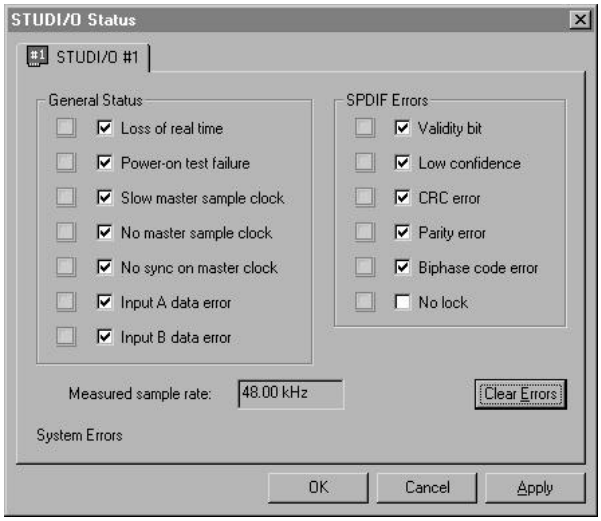
Click on the *little icon* to get the *little menu*.

From the *little menu*, you can:

- Check status and error conditions,
- Clear Error Indicator,
- Open the control panel,
- Display the meter panel,
- Display the mixer panel, and
- Activate the Punch I/O panel (The Sync Backplate option is required to use Punch I/O).

STUDI/O Status

From the *little menu* (shown above) you access the *STUDI/O Status* window by selecting *"Show Status/Errors."*



General Status & SPDIF Errors

The *STUDI/O Status* window shows you why the *little icon* turned RED. A RED light indicates an error condition.

Note: All of the error conditions are "latching", meaning that if they happen once, the red light will stay ON until you click on the "Clear

Check Boxes

The *check boxes* correspond to each error that you would like to be notified of. When they are enabled (checked) the *little icon* will turn red when the corresponding error occurs.

If you are not concerned with one or more of these errors, disable (uncheck) the *check box*. If an error is disabled then the *little icon* will remain GREEN, even if the corresponding error occurs.

Disable the *Input A data error* and *Input B data error* boxes when you aren't using either one of both of these inputs. This will prevent the little icon from constantly turning RED when they are not in use.

CONTROL PANEL

Most of the cool stuff is in the *Control Panel.* This is where you set the sample rate, clock source, and optical connector format, among other things.

A word about clocking (pun intended):

Digital audio, in all its glory, has a requirement analog doesn't: everything has to be completely in sync. If you drop a sample, all is lost! You'll probably first notice the click it produces after you've pressed 1000 CDs of your Magnum Opus.

The generally accepted approach for professional studios is to run everything off of one master clock source, and keep everything at the same sample rate. This has some profound benefits. You don't have to worry about things going off pitch if it's playing back through a different output or different machine, you don't have to worry about transfers (once everything is set up!), your sound files are all consistent, etc.

With this approach, you only have to deal with different sample rates at the "edges" of your setup. For example, if your main sample rate is 48KHz (which if you're using ADATs it probably is). then eventually you'll find yourself needing to do sample rate conversion to deal with CD players and CD recorders or DAT mixdowns for CD. You've got the tools with STUDI/O, but the main point is that most of your time is spent working on the project, and if everything's the same sample rate, then you have less headaches.

STUDI/O approaches the sample-synchronization issue with this in mind. It views the world as having one basic clock rate, with some possible "fringe" peripherals that have a different, or possible non-locked, sample rate. So, if you have two ADATs, they have to be sample-locked with the 9-pin Alesis sync cable. If you have SPDIF equipment, STUDI/O allows you to deal with common occurrences, as well as keep things in sync.

In general, when you are recording (digitizing), you should have your A/D converters be the master clock. This way, your initial recordings will have the lowest noise. This is because every clock that has to lock to the master clock will exhibit some small amount of jitter attenuation built in (like STUDI/O does). Of course, if your final format is DAT or CD, then D/A noise won't affect your recording; however, it is annoying.

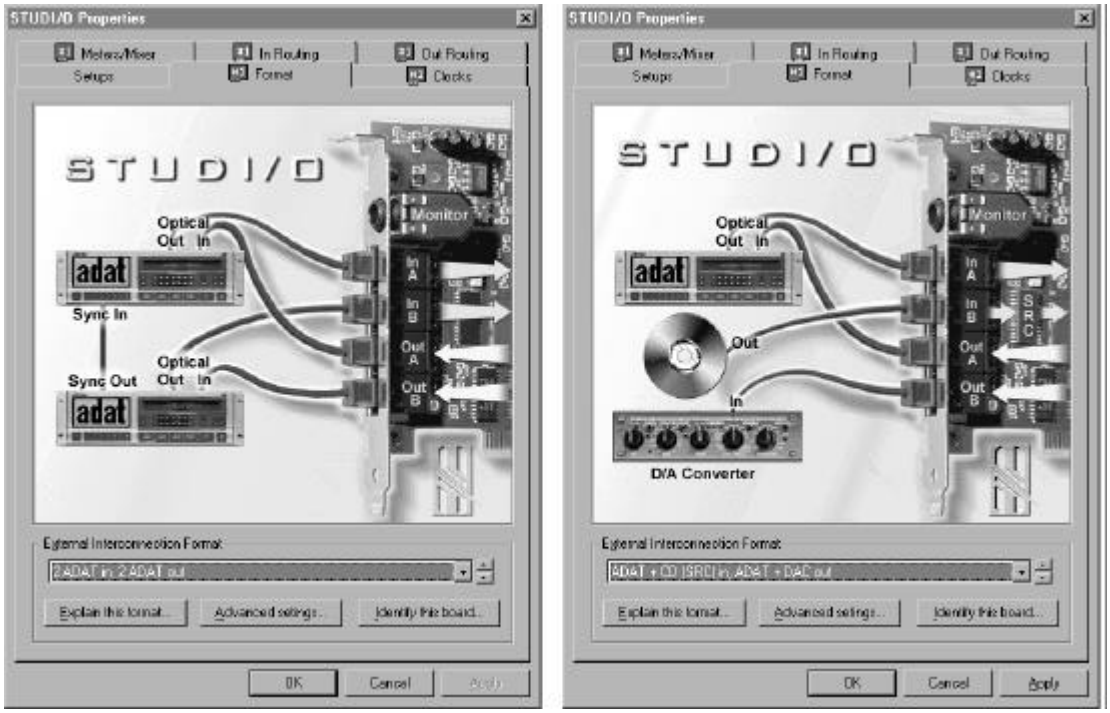
So, if you have ADATs, making them the clock source is generally recommended. However, you may run into situations where you need to use STUDI/O's onboard clocks, such as when you set your ADATs to run at 44.1KHz internal (they are actually running at 44.122KHz instead of 44.100KHz) or are outputting a different sample rate via the Sample Rate Converter.

CONTROL PANEL, cont'd

For each group of functions, there is a tab in the control panel. If you have more than one STUDI/O in your machine, you'll notice separate tabs for each, with corresponding board numbers.

FORMAT

The *Format* tab is where you set up the format for the optical connectors. Various combinations of ADAT and SPDIF are available, with the Sample Rate Converter ("SRC") inserted in different places. The diagrams show the function and appropriate connections.



Shown here are two (2) different configurations that can be selected from the *External Interconnections Format* pull down menu.

Explain this format…

Click on the *Explain this format* button to view a brief description of the format that is currently being displayed in the *External Interconnection Format* pull sown menu.

Advanced settings…

Click on the *Advanced settings* button to view the *Advanced Format Settings* window.

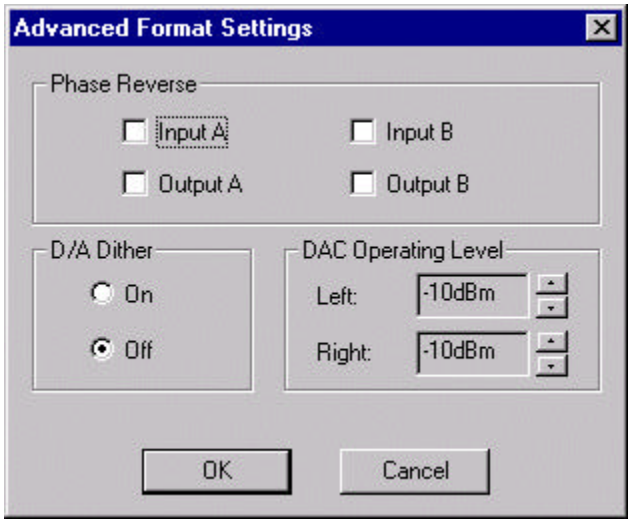
FORMAT, cont'd

Identify this board…

Click on the *Identify this board* button to cause the LEDs on STUDI/O and the optical connectors to flash. This is helpful when you are trying to sort out different STUDI/O cards and connectors. The following is a guide to use this function.

Identify a board	When you click on *Identify this board* the LEDs and optical connectors will flash.
Identify Output A	The light at then end of the cable flashes two quick flashes followed by a short pause.
Identify Output B	The light at the end of the cable flashes one quick flash hollowed by a short pause.
Identify Inputs	Loop the output cable into the inputs. If Output A is connected to Input A and Output B is connected then the lights do not flash. If the lights are still flashing, they are cross-connected.

ADVANCED FORMAT SETTINGS



D/A Dither

This setting determines whether the DAC monitor out is dithered from 18 to 16 bits. Try it both ways to see which kind of noise floor you prefer.

DAC Operating Level

STUDI/O's D/A converter has a built-in attenuator that we give you access to. Use the attenuator if the maximum output level of the headphone/monitor jack is too "hot" for your system.

Phase Reverse

We put *Phase Reverse* for each input and output to deal with the old , original ADATs. Here's a quote from the ADAT XT manual:

"The original ADAT was designed to invert its analog input signal internally before the audio was sent through the A/D converter and recorded onto tape. The digital representation of the data (as stored on tape) was therefore inverted relative to the analog input (i.e., a positive voltage at the analog input is stored as a negative number on the tape). When this digital signal was played back from tape, the data was sent to a D/A converter, and the analog signal output of the D/A was inverted once again before going

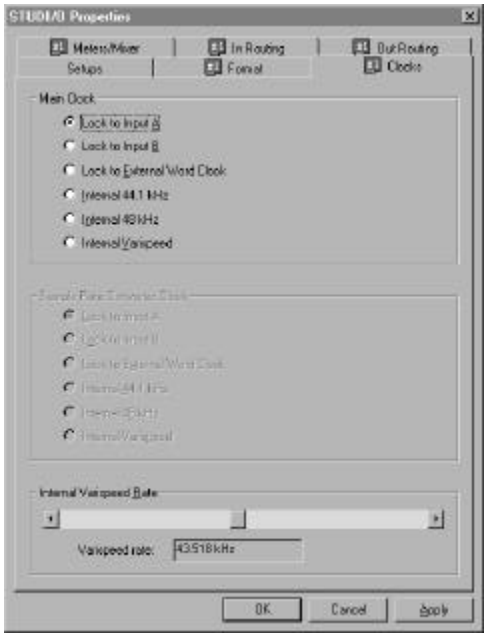
to the output jacks. This resulted in the input to the output phase being correct, and no phase problems were experienced when using a single ADAT or multiple ADAT systems.

"However, neither the digital input not the digital output was inverted. Therefore, if one transfers the ADAT's digital audio data to a DAT machine or hard disk recording system, the audio output from the other device would likely be out of phase with the ADAT, since it probably does not invert the analog signal after its D/A converters.

"To prevent this from occurring, the XT design has been improved so that the polarity remains constant from the analog to digital, and back to analog, domain."

Moral of the story? Check the *Phase Reverse* box on any input and output that is connected to an original ADAT; otherwise leave the box unchecked.

CLOCKS



The *Clocks* tab is where you set up the source of sample clocks.

Lock to Input A or B

Select *Lock to Input A* or *Lock to Input B* if you are trying to record something.

Lock to External Word Clock

You'll need the Sync Backplate option to use the External Word Clock.

Internal 44.1 kHz, 48 kHz, or Varispeed

Select one of the internal clocks, either the standard rates, or the varispeed if you're only playing back and want STUDI/O to be the sample clock master.

A note about ADATs:

When connecting to more than one ADAT, it is vital that they are all sync'd together with the 9-pin sync connector(s). In this case, STUDI/O can sync to them via the opticals.

Since the ADATs are in a chain, the sample clock jitter increases on each slave unit. That's why we generally recommend that you sync to the "optical IN" connected to the ADAT higher up in the chain, toward the master and the other optical to the ADAT lower in the chain. Of course this is true of all ADATs, regardless of the manufacturer. It's just the nature of a serial sync-chain.

You don't have to worry about this when connecting to stuff like the Yamaha of Korg digital mixing boards, as all their opticals are in parallel, not in series.

If you get some data errors when locked to one of the ADATs, try the other one; maybe you'll have better luck!

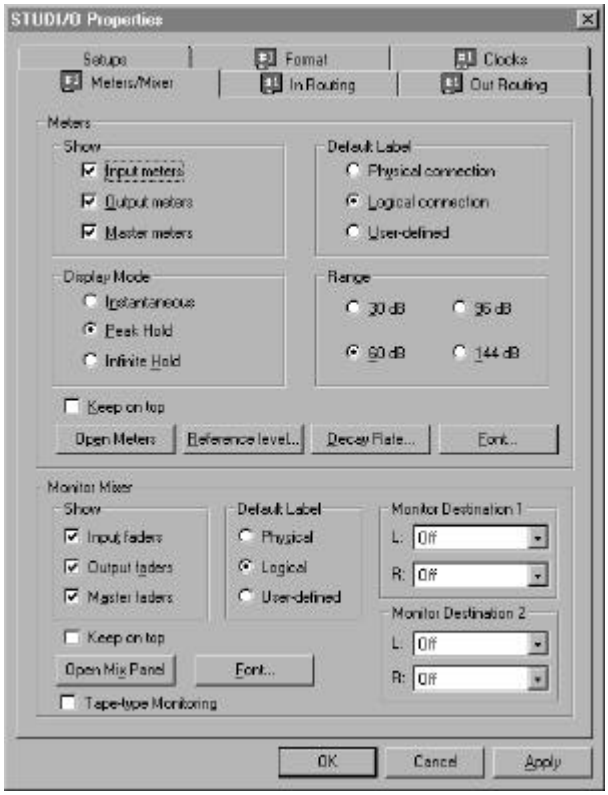
Sample Rate Converter Clock

The *Sample Rate Converter Clock* (shown grayed out) is activated when you're using the SRC (Sample Rate Converter) for an SPDIF output. When the Sample Rate Converter is in use, select the source for the new sample rate for the output.

Note: You can get a 32KHz output rate by locking to an SPDIF input running at that rate.

METERS/MIXER

On the *Meters/Mixers* tab you can fine tune the appearance of the peak meter and monitor mix fader panels.



What is the *Meters* panel, you ask? Well, the meters are true peak-reading meter. Hardware on STUDI/O checks each and every sample passing through the board, and keeps track of the peaks. So, what you see in the meter panels are the true signal peaks.

The range of meters can be adjusted (no reason to waste pixels on the noise floor of your ADATs!) and labeling can be controlled, so you can really integrate them in with your favorite editor.

The mixer allows you to create a mix of all the input and output channels, and send that to the analog line/headphone output. The same mix may also be sent to up to two digital destinations with the *Monitor Destination* selectors.

Meters — Show

Use the check boxes to select which *STUDI/O Audio Level Meters* panels (*Input, Output, and/or Master*) you would like to display.

Meters — Default Label

Select which connections you would like to assign to the *STUDI/O Audio Level Meters* panel.

Meters — Display Mode

Select which mode you would like to use for the peak level readings (*Instantaneous, Peak,* or *Hold*).

METERS/MIXER cont'd

Meters — Range

Select the decibel range you would like for the *STUDI/O Audio Level Meters* panel to display.

Meters — Keep on top

Enable (check) the *Keep on top* check box to keep the *STUDI/O Audio Level Meters* panel on the top of your desktop display.

Meters — Open Meters

Click on the *Open Meters* button to display the *STUDI/O Audio Level Meters* panel.

Meters — Reference level…

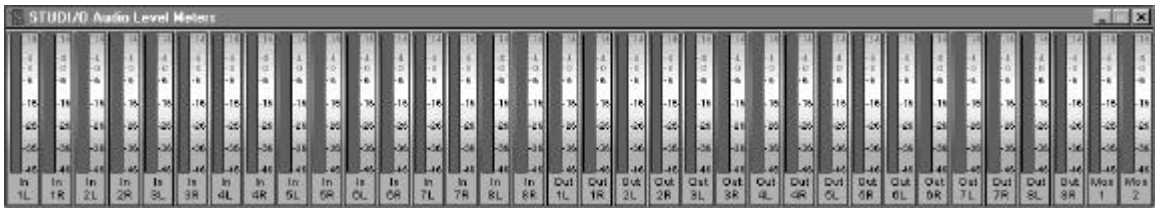
Click on the *Reference level* button to bring up a dialog box that allows you to select the reference level you would like for the *STUDI/O Audio Level Meters* panel display. Signal peaks above the reference will display in YELLOW, making it easy to monitor your levels at a glance.

Meters — Decay Rate…

Click on the *Decay Rate* button to bring up a dialog box that allows you to adjust the rate of decay of the peak level indicator.

Meters — Font

Click on the *Font* button to customize the type and size of the font used to label the meters.



Monitor Mixer — Show

Use the check boxes to select which *STUDI/O Mix Levels* panel (*Input*, *Output*, and/or *Master*) you would like to display.

Monitor Mixer — Default Label

Select which connections you would like to display in the *STUDI/O Mix Levels* panel.

Monitor Mixer — Monitor destination 1 & Monitor Destination 2

Use these drop down menus to route the monitor mix to any two (2) pairs of digital output channels (serving as an el-cheapo mixer).

METERS/MIXER, cont'd

Monitor Mixer — Keep on top

Enable (check) the *Keep on top* box to keep the *STUDI/O Mix Levels* panel on the top of your desktop display.

Monitor Mixer — Open Mix Panel

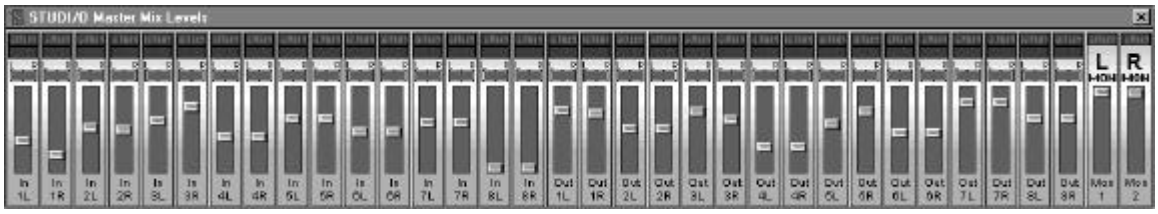
Enable the *Open Mix Panel* button to display the *STUDI/O Mix Levels* panel.

Monitor Mixer — Font

Click on the *Font* button to customize the type and size of the font used to label the mixer.

Monitor Mixer — Tape-type Monitoring

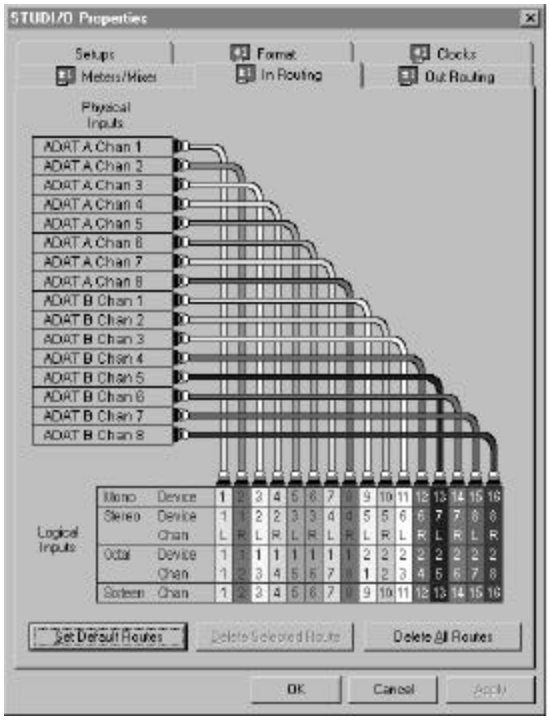
Enable (check the box) *Tape-type Monitoring* to playback the audio that is currently being recorded on any given channel.

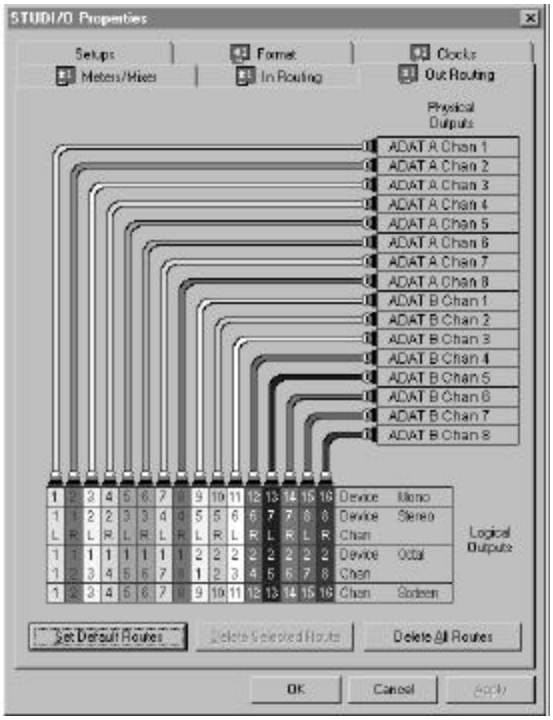


Mute and Solo

You can mute and solo channels, just like a real mixing board (hold the 'Shift" key down to solo groups of channels).

INPUT & OUTPUT ROUTING

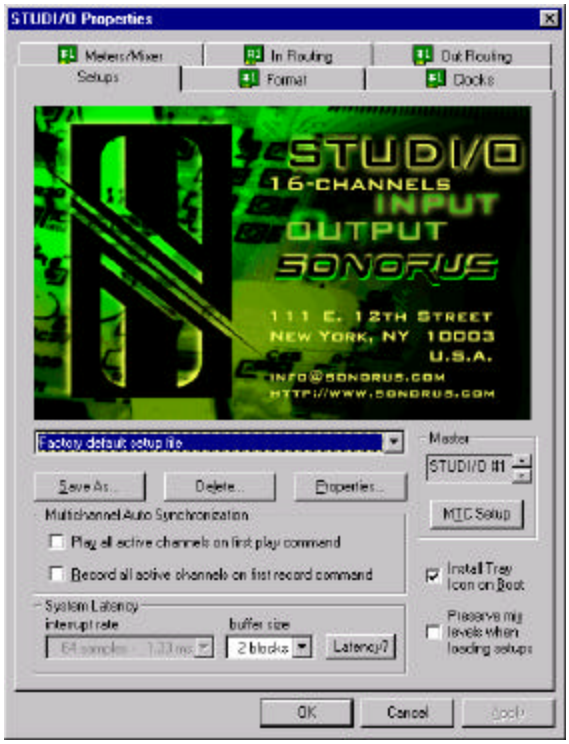




The *Input Routing* and *Output Routing* tabs allow you to get extra fancy with your patching. Here you can control what your Windows editing programs "see" for tracks.

You can easily reroute individual channels of your ADATs and/or DATs or whatever you have hooked up, so that what your Windows programs "sees" as channel #1 can be whatever you want. This might come in handy if your program won't allow you to remap or rearrange tracks on your screen. And, along with everything else in the control panel, these can be saved as a named setup. This way, you can customize the way you work.

SETUPS



On the *Setups* tab you can save and recall your setups. If your have a couple of different ways of patching together your studio, you can quickly configure STUDI/O to reflect your repatching.

All of the settings from the other tabs are saved in the setup, plus the fader levels in your monitor mixer, so it is a complete snapshot of your STUDI/O setup.

Save As…

Click on the *Save As* button to button to save a copy of the current set up. To change the description, use the *Properties* button.

Delete

The *Delete* button deletes the currently selected set up.

Properties…

Click on the *Properties* button to change the "description" that is displayed in the pull down window of the currently selected setup.

Multichannel Audio Synchronization

The *Multichannel Audio Synchronization* feature helps you deal with potential Windows problems. For example, if you are using a multichannel audio editor via a bunch of stereo drivers, Windows may have difficulty starting all the channels at exactly the same time.

Note: Since STUDI/O runs all the channels off the same sample clock, interchannel drift is a thing of the past!

WINDOWS — ERRORS

What Windows program would be complete without a wide array of error messages?? Seriously, though, here is a listing of all error codes generated by our software, with explanations and remedies.

ERROR MESSAGE	EXPLANATION/REMEDY
Non-Fatal errors	
"Cannot change mode at this time. STUDI/O	Can only change modes when other programs are not playing or recording.
"Routing table is incomplete. You must route all channels before continuing."	Pretty self-explanatory, no?
Setup file – related	
"Setup registry key was not found. Current settings have been restored to the factory-default settings."	This could happen if you changed motherboards. Try re-opening the desired settings file.
"Error: Cannot read setup file."	Uh oh! Disk corruption! Delete the current *.ssf* file.
"Setup registry key and factory default setup file are missing. Restoring settings to basic values. Please review all settings before proceeding."	This could happen if you changed motherboards, backed up your hard drive or something. Try to reinstall our drivers.
"Error: Cannot open setup file."	Our software couldn't open the *.ssf* file that was currently selected. Is something else using the file?
"Error: Cannot write setup file."	Did you somehow set the *.ssf* file as "Read-Only' from Windows or DOS?
"Skeletal setup — no presets found"	All of the *.ssf* files are missing!
"Error: No STUDI/O setup files found. Failed to find any .SSF files in the Windows system directory."	Perhaps you should reinstall our drivers, or at lest make a new *.ssf* file (by saving your settings).
"Error: Specified setup file is missing or cannot be	Our software couldn't find the *.ssf* file that was currently selected. Maybe it got deleted accidentally?
"Error: Cannot delete setup file."	Did you somehow set the *.ssf* file as 'Read-Only' from Windows or DOS?
"This setup file is erase protected and cannot be deleted. To delete this file, first uncheck the erase protect box in the properties for this setup."	Please follow the directions stated in the error message.
"Error: Settings registry key is missing."	This could happen if you changed motherboards. Try reinstalling our driver.
Big problems…	
"Error getting error/status information: IOCTL failed. Future updates disabled until reboot."	Something got toasted. You don't have to power cycle the machine, just restart Windows.

WINDOWS — ERRORS, cont'd

Big problems, con'd…	
"STUDI/O fatal error has occurred. To restart the STUDI/O board, you must power cycle your computer."	Something got *really* toasted! Time for a power cycle since that is the only way to reset the onboard DSP.
"Board failed to respond to status query after boot. A power cycle is necessary."	Something got *really* toasted! Power cycling is the only way the onboard DSP totally resets.
"Unable to load DSP code. DSP generating spurious data, not responding to reset. A power cycle is necessary."	Something got *really* toasted! Power cycling is the only way the onboard DSP totally resets.
"Unable to load DSP code. DSP not responding to reset. A power cycle is necessary."	Something got *really* toasted! Power cycling is the only way the onboard DSP totally resets.
"Unable to load DSP code. DSP not reading code from host interface. A power cycle is necessary."	Something got *really* toasted! Power cycling is the only way the onboard DSP totally resets.
"DSP code loaded, not did not boot correctly. A power cycle is necessary."	Something got *really* toasted! Power cycling is the only way the onboard DSP totally resets.
"DSP code loaded, but no cookie was returned. A power cycle is necessary."	Something got *really* toasted! Power cycling is the only way the onboard DSP totally resets.
PCI P'n'P weirdness	
"Although this STUDI/O board was detected, the driver was unable to determine which PCI bus and slot it occupied. Please contact Sonorus."	We've never seen this, that's why we want you to contact us if your do! Theoretically it's possible.
"Although an IRQ was successfully routed, the driver was unable to place it into the STUDI/O board's resource configuration. Please contact	We've never seen this, that's why we want you to contact us if your do! Theoretically it's possible.
"Unable to route interrupt to STUDI/O board. See the Setting tab for details."	Have you used up ALL your interrupts?
"The driver was unable to allocate system resources required to operate."	Generic catch-all error code… contact us if you see it (we haven't yet).
"No STUDI/O boards found."	Are you sure you put the board in *this* computer? If so, maybe it isn't seated in the connector properly.
"There are too many STUDI/O boards installed. The STUDI/O drivers support up to four."	Don't you WISH you had this problem??
System/registry problems	
"Error: No STUDI/O status key in registry."	Either your registry got trashed (hope you backed it up!) or you changed your motherboard…
"Error: Undefined value in STUDI/O status key."	Somehow the registry entry got trashed. Try reinstalling our drivers.
"Error: No system timers available for STUDI/O tray application."	Can this actually happen? Theoretically!
"Tray icon installation failed."	Perhaps you have too many things in your tray. Get two trays (just kidding).

Digital clocks, ADATs, DATs & Digital Mixing Consoles

As we've stressed though this manual, digital audio has some unique requirements concerning synchronization. One piece of equipment has to be the sample clock master, another the slave.

Some digital tape decks are more flexible than others when it comes to confiruing sample clocks.

1. **"Original" (blackface) ADATs**
   These classic machines can select either the digital input as clock source, or internal clock. Switch back and forth by holding the 'SET LOCATE' button and pressing the 'DIGITAL IN' button. You can see the display indicate 'int' or 'dig'. Unfortunately you can only check by changing it, so don't forget to change it back.

2. **ADAT XT/M20, Fostex CX-8/RD-8, Panasonic MDA-1**
   These newer machines have more buttons on the front… including a separate button for CLOCK SELECT and DIGITAL INPUT/ANALOG INPUT. Thus, you can easily select if the ADAT will follow its digital input or internal clock, and whether it takes its input from its A/D converters or the digital input.

3. **Consumer DAT machines**
   These behave such that if they are playing, they follow their internal clock, if recording they follow the digital input if it's selected. Many consumer DAT machines don't have the ability to play sound from their digital inputs when stopped (they have to be in *record-pause*). Pro DAT machines usually have more flexible and capable clocking options.

4. **Digital mixing consoles**
   Digital mixing consoles, like the KORG 168RC and the Yamaha O2R and O3D, are very flexible in their clocking schemes.

With multiple ADATs sync'd together (with the 9-pin sync cable), the slave ADATs all lock to the master. So with these rules, consider the settings of the master.

Now, what this all means can be boiled down to a few simple ideas.

BASIC SAMPLE CLOCK SETUP

1. **"Original" (blackface) ADATs**
   When using blackface ADATs, whether you're recording from an ADAT tape, or via the A/D converter, set the board up to lock to optical input A or B. On the ADAT, set the machine for 'int' (using the SET LOCATE and DIGITAL IN buttons as explained previously). Now, the ADAT is always clock master. To listen back, simply switch the ADAT XT from analog in to digital in.

2. **ADAT XTs (and clones)**
   When using ADAT XTs, you can leave them on INT 48K (internal clock) and have the board lock to optical A or B. To listen back, simply switch the ADAT XT from analog in to digital in.

3. **Consumer DAT machines**
   With consumer DAT machines, you would lock to the DAT machine if it's playing or monitoring its a/Ds. But when recording back from STUDI/O you would set STUDI/O to internal clock. However, you can also record in from the DAT via the sample rate converter, which allows the DAT (or digital-out CD player) to be unlocked or at a different sample rate. In that case you'd select a different clock, like internal or the ADAT input.

4. **KORG 168RC**
   With the KORG 168RC, set STUDI/O to Lock to A and set the 168RC to *internal clock*. Select the customized 168RC format in the *External Interconnection Format* drop down menu on the *Format* tab in the *STUDI/O Properties* window (wee the *FORMAT* section in the *WIN95 Software Tour/Setup* section).

5. **Yamaha O2R and O3D**
   With the Yamaha mixers, set STUDI/O to lock to one of its optical inputs, and set the mixing console to run from its internal clock.

6. **BRC, Midi Timepiece AV, etc.**
   With these types of synchronizers, all the ADATs slave to the synchronizer. So you can think of the synchronizer as the master. So again, you have STUDI/O "follow the leader" and lock to one of the optical inputs.

Hopefully these simple rules will keep you clocks locked and your studio rockin'!

Specifications

Size
6.85" × 3.85" (PCI 2.1 standard 'short card')

I/O Connectors
2 × TOSLINK optical receiver
2 × TOSLINK optical transmitter
1 × Stereo ¼" (tip-ring-sleeve) phone jack

Power Dissipation
3 watts

Digital I/O format
Each optical connector software selectable between ADAT (8-channel) and SPDIF (DAT) format.

Analog output
Max output: +10 dBm (into 600 ohms)
Total Harmonic Distortion + Noise: -94 dB (0.004 %) unweighted
Gain Error: ±1 %
Interchannel Gain Mismatch: 0.1 dB
Gain Drift: 140ppm/° C
Interchannel Crosstalk (EIAJ Method): 101 dB
Interchannel Phase Deviation: ±0.1°
Software Attenuator Step Size: 1.0 dB
Software Attenuator Range Span: -62.5 dB
Software Mute Attenuation: -74.2 dB
Resolution: 18 bits or 16 bits with dither (triangular PDF)

Onboard oscillators
44.1 KHz, low jitter low drift crystal type
48 KHz, low jitter low drift crystal type
Programmable timer, jitter attenuated
Low jitter L-C oscillator (VCO) for PLL

Synchronization
Basic sample rate syncable to onboard crystal oscillators or to either optical input, regardless of selected format.

Sample rate converter syncable to 'wild' SPDIF input or output.

Sample rate converter
Stereo hardware sample rate converter
Dynamic Range: 96 dB
THD + Noise: -95 dB
Interchannel Phase Deviation: 0°

Hardware processing
True peak metering for every input, output, and monitor channel.
Stereo monitor mix (48-bit summing) with pan/level for each input and output.
Monitor mix assignable to digital outputs (as well as analog output).

Software Drivers
Windows MM System (waveAudio) supplied drivers
Configuration control panel
True Peak Meter window

Included accessories
4 x 2m TOSLINK optical cables
Windows 95 drivers (3 1/2" floppy)
CD-ROM demo with editing software, soundfiles, etc.

Optional accessories
10m optical cables (package of 4)

CONTACTING SONORUS

Having a bad computer day?

Well, email us or call us, we'll try to help. If you need to return a board, call first and get a Return Authoriuzation. And of course when all else fails, *check out our web site!* http://www.sonorus.com is updated constantly. In fact, we consider our web site our primary communication and documentation center. So if we have it, it's on the web, and it's usually there first! Especially check the FAQ section, for quick solutions to common problems.

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INDEX

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Thank you and Good Night!