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Hardware I/Os and Drivers

Hardware I/Os

In keeping with the overall modular concept of our DSP products, the various hardware I/Os available with our cards are represented onscreen as modules you load into your project and connect together as desired. Certain modules are automatically loaded into the default project. Others, listed according to hardware type, are located in the ../Devices/Hardware IOs directory and in the Hardware menu in the top border of the Routing Window.

Modules representing Pulsar(2), Luna, or SCOPE I/Os include the word "Pulsar(2)", "Luna" or "SCOPE" as part of the module's name.

Unlike the other modules, modules representing the hardware I/Os can be loaded only once. (You can't add additional physical I/Os simply by reloading modules).

You can use only modules for which the corresponding I/O Plate is physically present in your system as the modules depend on the hardware to function.

If you have more than one DSP board in your system, the hardware modules in the Routing Window are labeled with a number appended to indicate the board they belong to. '1' represents the first installed board, '2' the second, and so on. The actual sequence of the boards depends on the operating system and the way it recognizes installed hardware. If desired, you can change the assigned numbers manually by editing an INI file. The printed installation guide contains the instructions on how to do this.

Because all our software supports cascading of up to three DSP boards, the descriptions that follow are generic—they apply to all boards. In each description, the symbol [...] substitutes for the board type (Pulsar I, Pulsar II, Scope, Luna, Elektra, or Powersampler).

Analog

[...] **analog source:** These modules represent the card's analog inputs.



[...] **analog dest:** These modules represent the card's analog outputs.



S/PDIF (AES/EBU)

[...] **S/PDIF source:** These modules represent the card's digital S/PDIF inputs (or AES/EBU in the PLUS version).

For proper operation of this module you must usually configure the software as word-clock slave in the Sample Rate Settings dialog.



[...] **S/PDIF dest:** These represent the card's S/PDIF digital outputs. Use the Dig connection to send audio data from the Digital Wave source module to this output (both modules have a Dig connection).



Switching Between Optical and Coaxial S/PDIF

With Pulsar I, Pulsar II, or SCOPE cards equipped with "Classic" 20, PLUS, or Z-Link I/O options you can switch the S/PDIF I/O (or AES/EBU in the PLUS version), which is normally electrical by default, to optical. To switch to optical, select *opt. S/PDIF* in the Sample Rate Settings dialog. The ADAT port, which uses the same optical cable, now transmits and receives audio data in the S/PDIF format.

Exactly what happens when you switch to optical depends on the hardware:

Case A: Pulsar I and "Classic" 20 or PLUS I/O

opt ADAT selected:

Each optical I/O operates in ADAT mode (standard)

opt S/PDIF selected:

The ADAT A optical port switches to S/PDIF mode. The S/PDIF output signal is transmitted over *both* the optical and the coaxial outputs. The optical input receives S/PDIF signals, and the coaxial S/PDIF input is disabled.

Use the normal S/PDIF source and dest modules in the routing window.

Case B: Z-Link I/O Plate

opt ADAT selected:

Each optical I/O operates in ADAT mode.

opt S/PDIF selected:

Both optical outputs switch to S/PDIF mode. With this I/O option, the optical inputs automatically configure themselves to the incoming signal (S/PDIF or ADAT).

When using the special modules [...] SP-DIF opt Source/dest for optical S/P-DIF I/O, and an ADAT signal is present at the input of the Source module, the module's label reads ADAT source. Otherwise the label reads SPDIF opt Source.

The coaxial I/Os continue to function in opt S/PDIF mode. Use the normal S/PDIF source and dest modules to access them.

ADAT

[...] ADAT A (B, C) Source: These modules provide access to the ADAT inputs on the card (ADAT C available only with the 24ADAT version).

With the Pulsar I card, both ADAT input ports are represented with a single 16-channel module instead of two 8-channel modules.

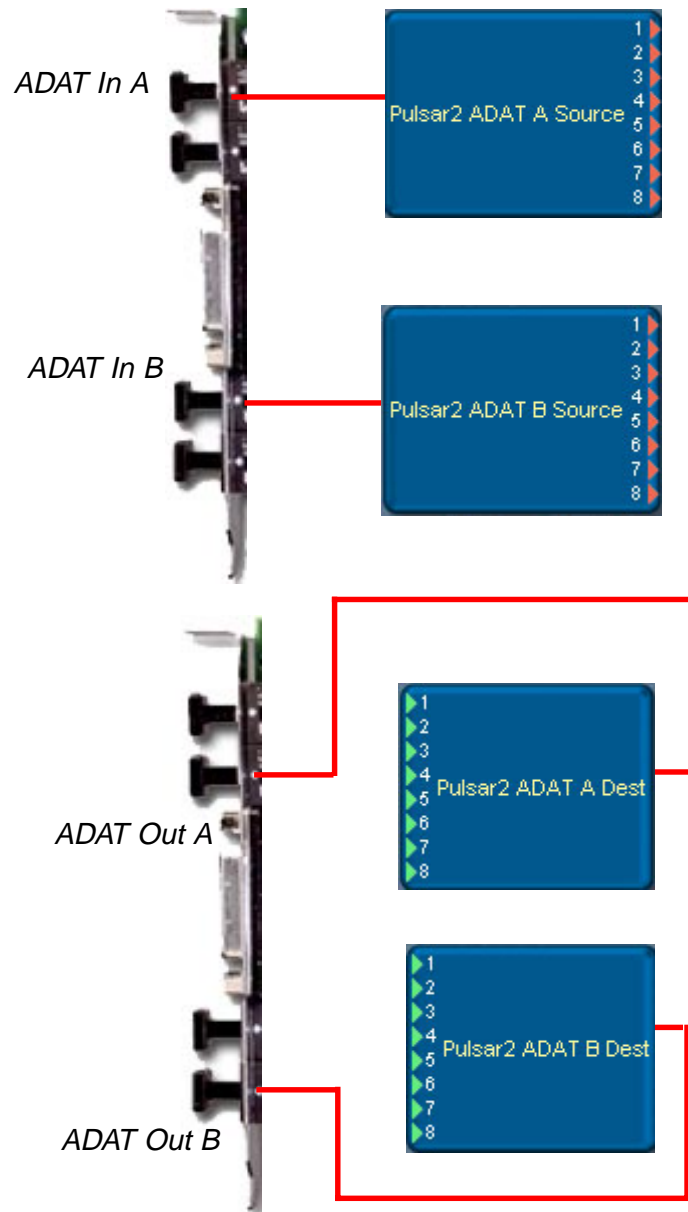
For Luna, Elektra and Powersampler, the modules refer to the ADAT inputs available on the optional *Luna ADAT Expansion* board.

[...] ADAT A (B, C) Dest: These modules provide access to the ADAT outputs on the card (ADAT C available only with the 24ADAT version).

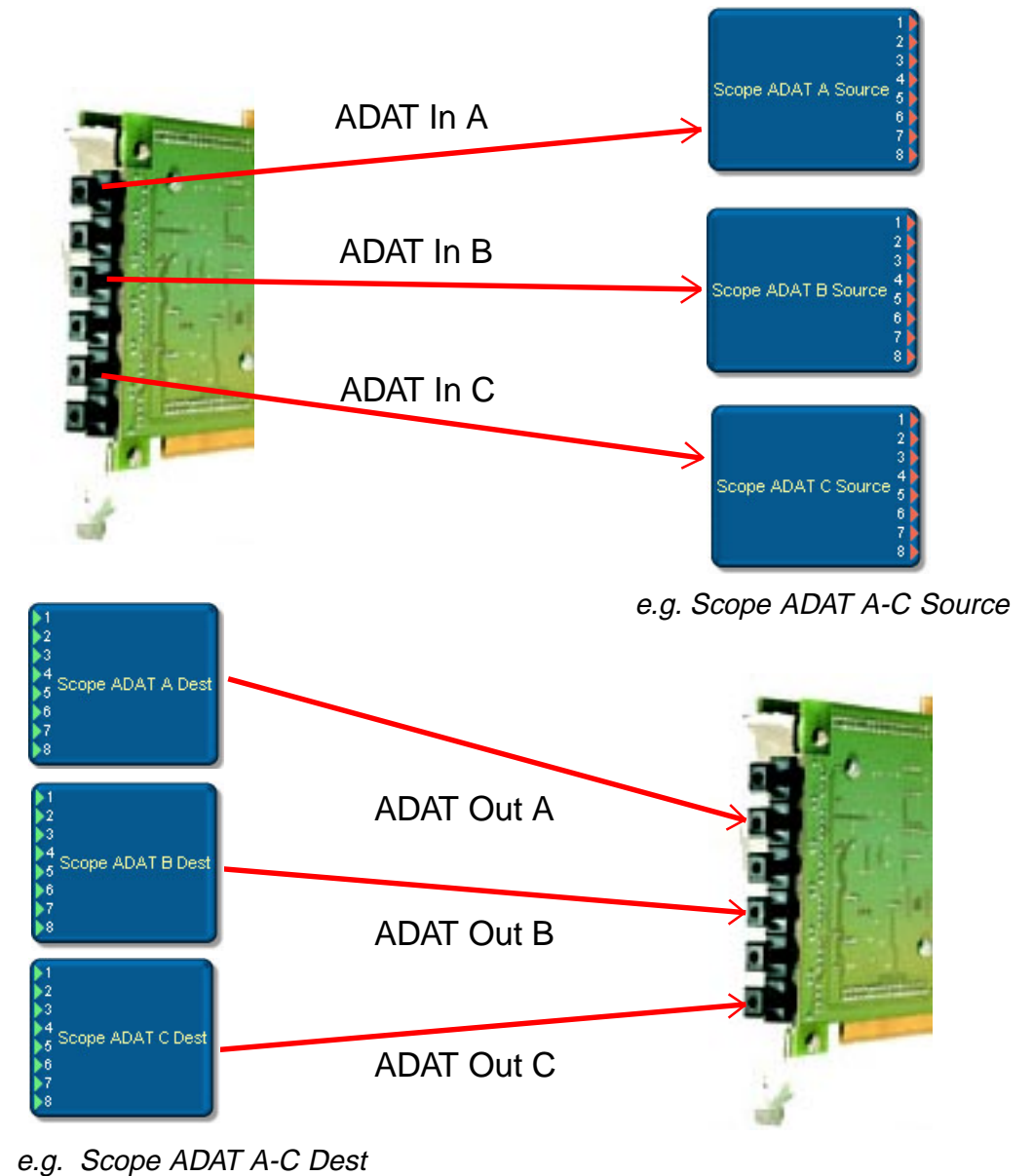
With the Pulsar I card, both ADAT output ports are represented with a single 16-channel module instead of two 8-channel modules.

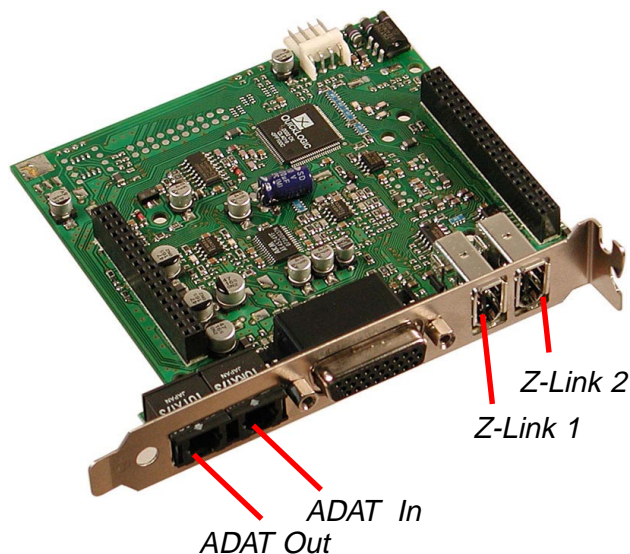
For Luna, Elektra and Powersampler, the modules refer to the ADAT outputs available on the optional *Luna ADAT Expansion* board.

ADAT ports of the "Classic" 20 / PLUS version



ADAT ports of the 24ADAT version





ADAT ports of the Z-Link version

S-MUX

(Available only with Pulsar II or current SCOPE hardware)

The ADAT interface specification limits the sample rate to a maximum of 48kHz. However, it is technically possible to transmit data over the ADAT interface at 96kHz by coupling channel pairs. This technique lets you transmit or receive 4 channels of 24-bit 96kHz audio data over each ADAT port. In addition to the following modules you will require an appropriate AD/DA converter to use the S-MUX data transfer method.

[...] S-MUX A (B, C) Source: These modules provide access to the ADAT inputs on the card (S-MUX C available only with the 24ADAT version).

[...] S-MUX A (B, C) Dest: These modules provide access to the ADAT outputs on the card (S-MUX C available only with the 24ADAT version).

If you are using S-MUX with your system configured as word clock slave, you must select the S/MUX option in the Sampler Rate Settings dialog.



*S-Mux is a registered trademark of Sonorus.

Z-Link

The Luna, Powersampler, and Elektra cards, and the Pulsar/SCOPE Z-Link I/O *Plate* option, feature Z-Link ports specifically designed to connect to the optional Luna 2496 I/O Box or A16 Ultra. Each connection transfers 8 channels of 24-bit 96kHz digital audio.

[...] **Z-Link A (B) Source:** These modules represent the card's Z-Link inputs.

[...] **Z-Link A (B) Dest:** These modules represent the card's Z-Link outputs.



MIDI

[...] **Midi (A/B) Source:** These modules represent the card's MIDI inputs (Midi B Source available only on with the 24ADAT version).

[...] **Midi (A/B) Dest:** These modules represent the card's MIDI outputs (Midi B Dest available only on with the 24ADAT version).



Sync Plate

The optional* Sync Plate provides word-clock input and output on BNC connectors for external word-clock synchronization, and a 9-pin ADAT Sync connector for ADAT synchronization.

*included with SCOPE /SP

Syncplate source: This module represents the optional Sync Plate's inputs. It also provides a MIDI output (MOut) to supply MTC derived from the ADAT time code signal. The Clk (clock) and MCS (Motion Control Signal) connections provide synchronization signals for use with certain modules that require them, such as *tripleDAT source* or *Asio2 dest* (Clk only).

Options (Surface)

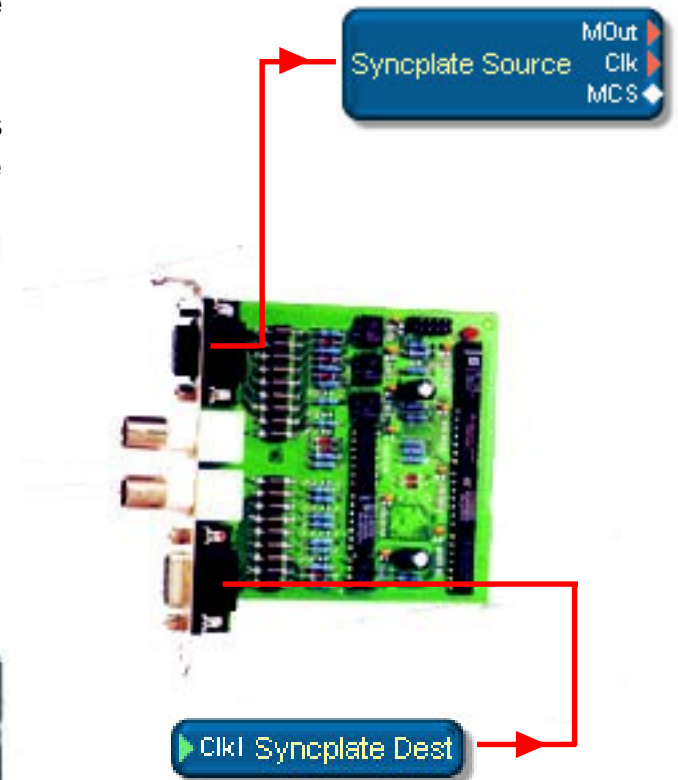
Display: Switches the time-code display between MTC and ADAT.

State: Indicates the ADAT status.

Offset: Specifies a value in hr:min:sec:fra used to offset the MTC source time code from the generated time code.

Frames: Selects the frame rate - 24, 25, 29.97 or 30 fps. Drop-frame counting can be enabled for the 29.97 and 30 fps frame rates.

Syncplate dest: This module represents the Sync Plate's outputs. Use this module to transmit control or clock signals from, for example, the VRC-128, to external ADAT devices.



Driver Interfaces

Audio and MIDI communication with the operating system or other applications such as hard disk recorders or MIDI sequencers is also handled with modules. In this case, modules represent specific software drivers. All you need to do to enable a driver is to load the corresponding module into the routing window. Then, to establish communication (signal routing), simply connect the appropriate inputs and outputs of the various modules together as desired. Driver interface modules are located in the directory ../Devices/Software IOs

Note that other programs will recognize a driver only if it is loaded into the project. For this reason, configure the project with the required driver module(s) before running the other program.

ASIO

Steinberg developed the ASIO driver to deal with latency issues (signal delays) imposed by the computer's operating system. In addition to Steinberg's own Cubase VST, ASIO has been adopted by other manufacturers, such as E-Magic (Logic Audio 4.x).

Our software offers a range of ASIO drivers to support resolutions of 16, 24, or 32 bits, ASIO versions 1 and 2, and a maximum of 32 or 64 channels of I/O. Generally you should use the "smallest" driver sufficient for your needs to conserve DSP resources.

ASIO(1) Modules

You can adjust the number of input and output channels independently from 2-32 or 2-64, depending on the specific module. Set the number of channels by double-clicking on the module surface, or opening the shortcut menu.

ASIO ... source ...: These modules deliver the audio output signals from the hard disk recording program to the SCOPE Fusion Platform environment.

ASIO ... dest ...: These modules send audio signals to the recording program's virtual inputs.

For each module above several variations are available. Note that you can load only respective source/dest modules of the same type.



ASIO source/dest: 2-32 channels, 16-bit.

Instead of these modules, you can use the newer *ASIO1-16 source/dest 64* modules. The basic ASIO source/dest modules are provided for compatibility with earlier projects.

ASIO1-16 source/dest 64: 2-64 channels, 16 bit.

ASIO 24 Bit source/dest: 2-32 channels, 24 bit.

Instead of these modules, you can use the newer *ASIO1-32 source/dest 64* modules. The basic ASIO 24 Bit source/dest modules are provided for compatibility with earlier projects.

Using the 24-bit drivers doubles the number of channels used on the PCI bus and requires increased storage space for the audio files.

Use only 16 OR 24 bit drivers for both the source and dest modules - you cannot use one resolution for input and another for output.

ASIO1-32 source/dest 64: 2-64 channels, 24 or 32 bit integer.

Use this module for 24 bit recording.

ASIO1-Flt source/dest 64: 2-64 channels, 32 bit floating point.

Use this module for 32 bit recording with Cubase VST.



The different ASIO1 modules

ASIO2 Modules

In addition to the ASIO driver, the SCOPE Fusion Platform provides an ASIO-2 driver conforming to Steinberg's ASIO-2 extensions to the original ASIO standard. This driver has the following enhancements:

Direct Monitoring: Routes specified audio signals directly to an output. It has always been possible with our software to monitor a signal, latency-free, during recording by routing it to the monitoring system in the routing window. However, during punch in/out recording, the routing introduces latency. The Direct Monitoring feature allows you to switch between monitoring the recorded signal and the input signal, without latency, during punch in/out recording. To use this feature, enable *ASIO Direct Monitoring* in the ASIO-2 driver in Cubase's Audio/System menu. Punch in/out monitoring now operates as follows: Initially you hear the signal recorded on the track you are about to punch in on. When you punch in, the monitored signal switches to the input signal. Then, when you punch out, monitoring switches back to the recorded signal.

Sample-Accurate Synchronization with External Digital Devices: With the optional Sync Plate you can route time code from, for example, an ADAT device to the MTCtoClk module, and from there to the Clk input on an ASIO 2 dest module. This makes possible sample-accurate synchronization between Cubase and the ADAT device.



The ASIO 2 driver modules are available in the same variations as the ASIO 1 modules described previously.

The single ASIO Dest module supports all sample resolutions and adapts itself automatically to the resolution of the Source module connected to it.

The source modules provide a control panel with which you can adjust the number of channels for both the source and dest modules.

Always make sure the appropriate ASIO modules are loaded into your project before running the recording/sequencer program.



Wave

The *Wave source/dest* and *Wave 24 source/dest* modules represent the standard interface to your operating system's audio features. These are stereo modules, implementing two channels each. For more channels you can load up to 16 source and dest modules for a maximum of 32 channels. In your recording program, the SCOPE Fusion Platform appears as multiple audio ports (CreamWare Play/Rec 1 to CreamWare Play/Rec 16).

The maximum number of Wave drivers available for recording and playback must be configured in the driver setup (see the discussion of the driver setup in the appendix). After changing these settings, you must restart the computer for them to take effect. If you load more drivers into a project than the number configured in the driver setup, the software adjusts the driver setup automatically. However, you must still restart the computer for the change to take effect.

Wave source: This module provides access to the signals sent from your recording software to the respective Wave audio port.

Wave dest: Signals connected to this module appear at the respective inputs in your recording software.

Wave 24 source: Use this module in place of the standard Wave source module when recording at 24-bit resolution.

Wave 24 dest: Use this module in place of the standard Wave dest module when recording at 24-bit resolution.

Using the 24-bit drivers doubles the number of channels used on the PCI bus and requires increased storage space for the audio files.

Use only 16 OR 24 bit drivers for both the source and dest modules - you cannot use one resolution for input and another for output.

IMPORTANT NOTE: On the MAC, use the driver modules designated *Sound Manager source/dest* in place of the Wave source/dest modules to access the MacOS audio system.



In external software the name of this module is "CreamWare Play 1"



In external software the name of this module is "CreamWare Rec 1"

24-Bit Versions

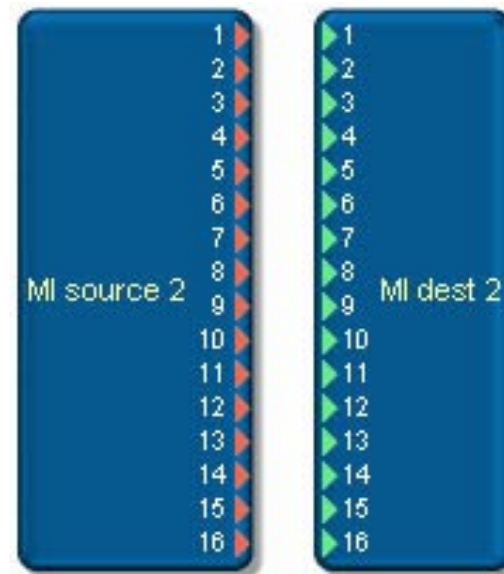


Wave Interleaved

With Logic Audio you have the option of using the 16 Wave interleaved source and dest modules. In principle this is a Wave driver, but it appears in Logic Audio as a single driver with 16 channels rather than as 8 individual stereo Wave drivers. (For more information, see the section on Integrating Logic Audio into our Software). Because ASIO drivers generally provide superior performance, we do not recommend using the interleaved driver.

MI source: This module provides the audio output signals from the recording program.

MI dest: This module provides signals from SCOPE Fusion Platform to the audio input channels of the recording software application.



tripleDAT Interface

This interface provides 16 channels of input and output between the SCOPE Fusion Platform and our hard disk recording program, tripleDAT. You'll find additional information in the chapter describing how to integrate your recording software.

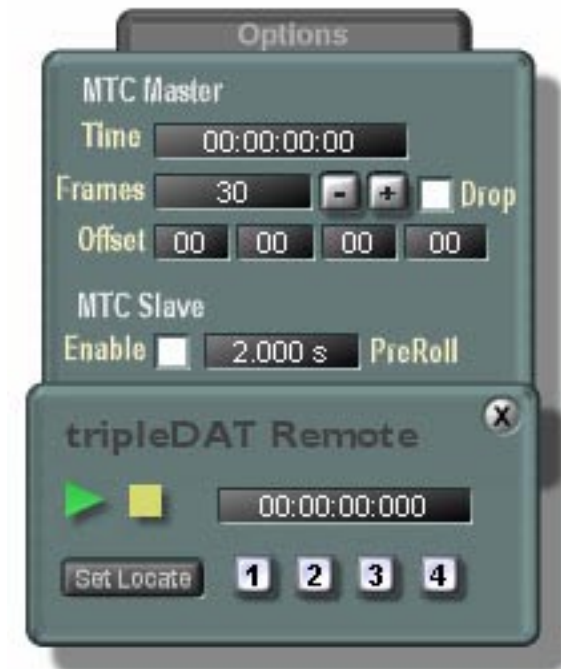
tripleDAT dest: Used to send audio signals to tripleDAT's 16 audio inputs.



tripleDAT source: This module provides connections to access tripleDAT's 16 audio outputs. The module's surface offers the following controls:

Play: This button starts tripleDAT from its current locator position.

Stop: Stops playback and sets the locator to 00:00:00:00.



Set Locate: You can set and locate to up to four locate points. To set a locate point, first move the locator in tripleDAT to the desired position (or you can set the locator point in the SFP software on-the-fly during playback). Next, click the *Set Locate* button, and then click on one of the position buttons (1-4). Now, when you click on one of the position buttons, the locator jumps to the stored location. Locate points cannot be deleted, just overwritten.

Options Drawer

MTC Master

Time: Displays the current MTC position (calculated from the locator position and the offset value).

Frames: Displays the generated MTC format - adjustable using the +/- buttons. Pulsar supports the following formats: 24 fps, 25 fps, 29.97 fps, 30 fps, 29.97 fps drop-frame, and 30 fps drop-frame.

Drop: This option sets the 29.97 or 30 fps frame rates to the drop-frame counting format.

Offset: Here you can adjust and offset value for the MTC output. This value is added or subtracted to the current locator position. The value is specified as hr:min:sec:fra.

MTC Slave

Enable: When slave mode is enabled, tripleDAT synchronizes to incoming MTC.

PreRoll: Sets the number of seconds after receiving an MTC signal that tripleDAT starts playback. This lead time is necessary in order for all samples to be set up and prepared for playback.

tripleDAT source Module Connections

In addition to the audio outputs, the tripleDAT source module provides three other connections:

Clk: When tripleDAT is configured as MTC slave, connect the Clk (Clock) signal of the MTCtoClk module here.

MCS: Connect the MCS (Motion Control Signal) signal from an MTCtoClk module here.

MOut: Provides the MTC MIDI output signal when tripleDAT is in master mode.

Direct Sound (PC only)

The Direct Sound source module delivers an audio signal from any Direct Sound compatible program. This interface was developed by Microsoft, and is used for audio playback by many multimedia applications, including games. This is a two channel interface (stereo).

There is no Direct Sound dest module, as this interface is defined as unidirectional. Communication is possible *from* a Direct Sound source to the SCOPE Fusion Platform, but not the other way.

First load the Direct Sound source module, and then start the Direct Sound application. In the application, select the *Pulsar/Scope Direct Sound Driver*.

You can load only one Direct Sound module, and only a single application can use it at a time.

Under Windows 2000 or Windows XP, use the Wave source module instead of DirectSound.

Direct Sound source: Provides audio from the stereo signal supplied by a Direct Sound-compatible program.



Digital Wave

This Digital Wave module (source module only) lets you capture the digital output of your software DVD player. Connect the Dig output of this module to the input with the same name on the [...] **S/PDIF dest** module.

With this module you can send AC-3 encoded Surround Sound to your surround audio system.



Gigasampler (PC only)

The Gigasampler source module delivers audio signals from Nemesis' Gigasampler to your project. The control panel for this module lets you select from 2 to 32 channels of audio input.

The Gigasampler interface is unidirectional, so there is no Gigasampler dest module.

First load the GSIF source module, and then start Gigasampler. In the Gigasampler program, select the appropriate driver.

GSIF source (Gigasampler Interface):

Supplies audio output signals from the Gigasampler program.

This module is not yet supported under Windows 2000/XP.



MIDI

Modules representing MIDI interfaces can also be loaded into the project. Each module represents a virtual MIDI port that you can select in your MIDI program. Each MIDI port supports 16 channels.

You can load these modules repeatedly up to the maximum number specified in the Device Manager driver dialog. If you change the maximum number of MIDI ports you must restart the computer. After that, each module will be designated with an added module number coinciding with the CreamWare MIDI port numbers as displayed in your sequencer program.

Sequencer Midi source: This module provides access to the MIDI output signals (CreamWare MIDI Out) of other programs.

Sequencer Midi dest: Routes MIDI signals from SCOPE Fusion Platform to the MIDI inputs of other programs (CreamWare Midi In).

A blue button with a gradient and a shadow, containing the text "Sequencer Midi source 1 Out" in a yellow, monospace-style font. A small red triangle points to the right at the end of the button.

CreamWare Midi Out 1

A blue button with a gradient and a shadow, containing the text "In Sequencer Midi dest 1" in a yellow, monospace-style font. A small green triangle points to the left at the beginning of the button.

CreamWare Midi In 1

Other Sound Cards

The *Soundcard source/dest* modules provide input and output connections to another sound card. This allows you to record or playback audio using another audio hardware device in addition to CreamWare hardware. The sound card must be correctly installed and operational in your computer system.

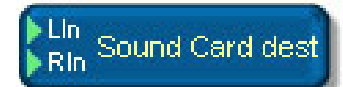
It is not always possible to transmit all audio from a sound card. For example, it may not be possible to transmit the Wavetable synthesis audio directly over the virtual audio channels.

Because sound cards use the operating system for audio transmission, latency issues are unavoidable. Therefore, synchronous transmission to our I/Os is not guaranteed. For this reason, the I/Os of other sound cards are best used for purposes that are not time-critical, such as talkback, or perhaps certain mastering functions.

Soundcard source: This module provides access to the soundcard's physical audio inputs.



Soundcard dest: Provides connections to the soundcard's physical outputs.



Control Panel

Wave In (Out) Devices: Select the desired sound card for audio input or output from the list on the left.

Frequency : When you select a soundcard from the list on the left, its supported frequencies are displayed. Click on a frequency to select it for use.

Refresh: Updates the list contents.



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