miniSTREAMER

USER MANUAL

V1.2

Revision	Description	Date
V1.0	User manual – Initial version	01-09-2010
V1.1	miniSTREAMER with I2S configuration	23-05-2011
V1.2	Power consumption	29-03-2012

Minimum System Requirements for software installation

miniSTREAMER is a driverless audio interface running on both Windows & Mac environments. The following minimum requirements are required to make it operate.

PC environment
- PC with 1GHz or higher processor clock speed recommended / Intel® Pentium®/Celeron® family, or AMD K6®/AMD Athlon®/AMD Duron® family, or compatible processor recommended.
- 256 megabytes (MB) of RAM or higher recommended
- USB 2.0 port
- Microsoft• ® Windows® XP SP2/Vista/7

Mac environment
- Power PC/Intel Core Duo
- 256 megabytes (MB) of RAM or higher recommended
- USB 2.0 port

Linux environment
- Power PC/Intel Core Duo
- 256 megabytes (MB) of RAM or higher recommended
- USB 2.0 port

Important note: miniSTREAMER requires one USB 2.0 port for streaming native signal at 24/96kHz.

Package content

Your miniSTREAMER package includes:
- miniSTREAMER board
- 1m long USB cable
- 2 x M3 screws for chassis mount

miniSTREAMER Basics

miniSTREAMER is a miniature USB to SPDIF-I2S interface, allowing native support of audio files with format up to 24bit/96kHz. Packaged on a tiny PCB of only 2.3" by 1.4", this interface is the perfect fit for OEM integration or as an element of a customized high performance A/V product.

miniSTREAMER combines native high resolution audio (24bits/96kHz) along with galvanic isolation (SPDIF transformers) to achieve the best audio quality for both playback and recording. Without any driver installation required, this USB/I2S/SPDIF dongle is a true plug & play experience, up & running in a matter of seconds. From its I2S Master/Slave selection to its external power supply option, it's all there to make sure this tiny interface fits needs of a wide range of applications.
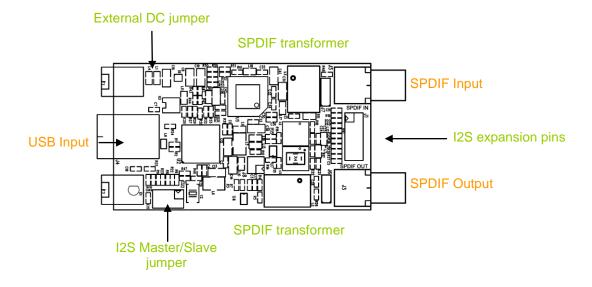
miniSTREAMER Applications

- High resolution USB DAC interface
- High resolution USB Audio recording interface
- USB amplifier
- USB to I2S/SPDIF interface

![miniDSP logo]

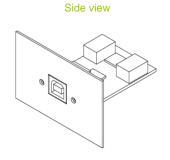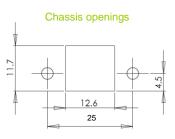## Board diagram

miniSTREAMER Top View

- External DC jumper
- SPDIF transformer
- SPDIF Input
- USB Input
- I2S expansion pins
- SPDIF Output
- SPDIF transformer
- I2S Master/Slave jumper

Expansion connector Pin Out

Pin#	Type	Description
1	Output (I2S master mode)	SCLKOUT - I2S system clock - Playback
2	Output (I2S master mode)	LRCLKOUT - I2S frame sync - Playback
3	Output (I2S master mode)	SCLKIN - I2S system clock - Recording
4	Output (I2S master mode)	LRCLKIN - I2S frame sync - Recording
5	Input	SDIN - I2S data - Recording
6	Output	SDOUT - I2S data - Playback
7	Power	GND
8	Output	MCLK OUT - Master clock Playback
9	Output	MCLK IN - Master clock Recording
10	Input Power	+5VDC from external supply (60mA required) Warning: DC power jumper must be removed when board is powered from external supply

miniSTREAMER Mechanical front view

Side view

Chassis openings

11.7
4.5
12.6
25

Disclaimer / Warning

- An incorrect miniSTREAMER configuration could easily damage your audio system. MiniDSP and DSP4YOU Ltd can not be held responsible for any damage that may result from the improper use of this kit. As with any other product, we do recommend that you carefully read the manual and other technical notes to insure you fully understand how to operate the board.

- This manual does not intend to cover the wealth of knowledge about I2S and other digital electronic concepts. I2S comes in a wide range of configurations (clock rates /ratio / bit depth…) and you should never assume that I2S is plug&play. Do your homework in making sure signals will be compatible first.

- The target audience of this material is expected to have the necessary electronic background and knowledge required to understand the basic electronic concepts along with equipment to potentially troubleshoot his configuration (Scope/Logic analyzer).

- If you decide to customize our boards, be warned that it is outside of our support and you will be on your own. miniDSP technical support team simply can not support the wide range of ADC/DAC configurations.

Connectivity on miniSTREAMER

miniSTREAMER can transmit (audio playback) and/or receive (audio recording) a native audio stream from/to a PC as follow:

- Using SPDIF signal on a Coaxial cable. This is the easiest method since it doesn't require any configuration nor electronic knowledge. Audio Playback and Transmit works Plug & Play. Two holes with 5mm pitch allow soldering of a connector or cable to the board.

- Using I2S (digital Audio Inter-I.C protocol). This method is more flexible but requires more understanding about the I2S protocol. All I2S signals are provided on an expansion connector. See the below section on I2S for more information.

Jumper configurations

miniSTREAMER requires 2 jumper configurations to operate correctly:

- I2S Master/Slave Jumper: This jumper toggles the I2S signals on the expansion connector from I2S master to I2S slave.
- DC power supply jumper: This jumper toggles the device between self powered and USB powered mode.

Make sure to read the following section to correctly configure your miniSTREAMER board <u>before</u> applying any power to the module.

I2S configuration

I2S stands for Inter-IC Sound protocol and is most commonly used to carry audio information between IC's. This protocol is not intended to run long cables lengths, but only short Inter-IC, board to board connections. The bus consists of the following lines:

<u>Clock lines</u>

- LRCK: The frame synchronization which is equal to the sampling frequency (Fs) of the native signal being streamed To/From the USB port. This clock line can either be an output (miniSTREAMER in I2S Master) or an input (miniSTREAMER in I2S slave)

- BCLK/SCLK: This clock line can either be an output (miniSTREAMER in I2S Master) or an input (miniSTREAMER in I2S slave)

- MCLK: Master clock of the device for both playback and recording. This clock line outputs a reference clock at the following ratios:
    - @ 96kHz => MCLK = 128 * Fs = 12.288MHz
    - @ 48kHz => MCLK = 256 * Fs = 12.288MHz
    - @ 44.1kHz => MCLK = 256 * Fs = 11.289MHz

<u>Data lines</u>
- SDIN: 16/24bit data input to the miniSTREAMER for audio recording.
- SDOUT: 16/24bit data output from the miniSTREAMER for audio playback.

The following timing diagram illustrates the expected I2S audio format.
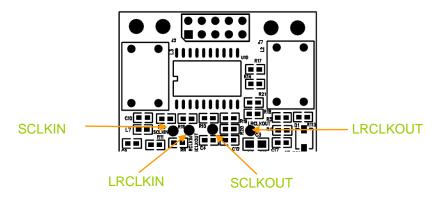

Figure 31. I²S Mode—16 Bits to 24 Bits per Channel

I2S Expansion connector
The following I2S signals are initially buffered and available on the expansion connector. Due to the location of the buffer on the signal path, Pin 1 to 4 are only to be used for Master mode, i.e. outputs.

Pin#	Type	Description
1	Output (I2S master mode)	SCLKOUT - I2S system clock - Playback
2	Output (I2S master mode)	LRCLKOUT - I2S frame sync - Playback
3	Output (I2S master mode)	SCLKIN - I2S system clock - Recording
4	Output (I2S master mode)	LRCLKIN - I2S frame sync - Recording
5	Input	SDIN - I2S data - Recording
6	Output	SDOUT - I2S data - Playback
7	Power	GND
8	Output	MCLK OUT - Master clock Playback
9	Output	MCLK IN - Master clock Recording
10	Input Power	+5VDC from external supply (60mA required) Warning: DC power jumper must be removed when board is powered from external supply

In I2S slave mode, SCLKOUT, LRCLKOUT, SCLKIN, LRCLKIN are inputs to the board and signals need to be connected directly to the board at the locations shown in the below diagram.
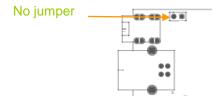
SCLKIN · LRCLKOUT · LRCLKIN · SCLKOUT

DC power supply options

miniSTREAMER will operate in two DC supply modes to fit various system integrations:

- USB powered mode: miniSTREAMER receives power from the USB cable (i.e. from the PC). This method is the easiest since it doesn't involve any modification to the board. Make sure that jumper is in place and no power is applied to the +5V pin of the expansion connector.

Jumper in Place

- Self powered mode: miniSTREAMER receives power from an external +5VDC supply. With this method, miniSTREAMER is able to receive a good and clean supply, which may provide better results than using the PC as a power supply. In this mode of operation, make sure to remove the DC jumper (as show here) to prevent any damage to the board. Power is provided from an external "regulated"

No jumper

miniSTREAMER installation

This part is by far the easiest since miniSTREAMER will literally installs in a matter of seconds! Being an Audio Class 1.0 device, it doesn't require any drivers for either Windows or Mac. Device will show as a "miniStreamer" sound card in your Windows configuration. Few things to know about miniSTREAMER configuration are summarized below.

1) Selecting the SPDIF vs I2S source for Recording
miniSTREAMER is a USB playback/recording device showing as a USB sound card in your Windows/

To enable SPDIF input in your Windows setup, simply go to the sound card properties (speaker icon) -> Click on Options -> Properties - > Select the "miniStreamer" device - > Click on the "Recording radio button". Make sure that both SPDIF is select in the "Show the following volume controls"

The following symptoms were found to be the most likely cause of issues.

Item#	Symptoms	Troubleshooting recommendation	If not solved go to item
1	No audio on outputs in SPDIF mode	- Make sure the correct sound card is selected as a default audio playback device in your PC/Mac environment	3
2	No audio on inputs in SPDIF mode	- Make sure the correct sound card is selected as a default audio recording device in your PC/Mac environment.	3
3	No LED light up	- Make sure miniSTREAMER's DC supply jumper is correctly configured	5
5	Problem unsolved by above suggestions	- Have a look at our forums to see if someone else already had this issue. - Send us an email (info@minidsp.com) with a clear explanation of the symptoms and descriptions of the troubleshooting steps already performed	n/a