Audio galvanic isolator
For soundcards and SDR receivers

1. Principle

A ground loop through receivers between antenna or USB connection and soundcard input is very common for soundcard based SDR receivers, where the soundcard are used to sample the I/Q channels. This type of ground loop problem can be solved by using suitable galvanic isolation between the receiver I/Q output and the soundcard input:

The audio galvanic isolator is build by a couple of broadband audio transformers and have a symmetrical design. The input / output impedance is 600 Ohm (turn ratio = 1:1), therefore you can also invert the input and output connections.
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2. Kit parts

The kit include:

- 1 PCB board 37x19mm, single layer
- 2 pcs. 3,5mm Jack - Female stereo connectors
- 1 3,5mm Jack – Jack Male stereo cable (30cm)
- 2 pcs. high reliability, MIL STD broadband audio transformer TRIAD MAGNETICS SP-70
- 1 enclosure kit (white POM)
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3. Assembly

Solder the transformers and the connectors:

Place transformers and connectors

Sold all pads

(c) RF<=>SYSTEM Telecommunication and electronic components
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3. Assembly
Put the pcb in the enclosure kit:
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4. A usage example

(c) RF<->System  Telecommunication and electronic components
5. Results

Here some comparisons on systems with different soundcards.

The follow example show the spectrum with a Soundblaster X-Fi Extreme PCI at 96kHz sampling rate on a PMSDR:

I/Q Output directly connected to the Line-IN of the soundcard without galvanic isolator

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5. Results

The follow example show the spectrum with a built-in RealtekHD at 48kHz samplingrate on a PMSDR:

I/Q Output directly connected to the Line-IN of the soundcard without galvanic isolator

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5. Results

The follow example show the spectrum with a low cost USB-Stick soundcard at 48kHz samplingrate on a PMSDR:

I/Q Output directly connected to the Line-IN of the soundcard without galvanic isolator

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5. Results

There are also cases, where are present a very narrow center peak also without a galvanic isolator. In this case no galvanic isolation are necessary. Here a zoomed portion of 24 kHz spectrum with a Creativ E-MU 0202 external USB soundcard at 192kHz samplingrate on a PMSDR as example:

I/Q Output directly connected to the Line-IN of the soundcard without galvanic isolator

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6. Technical specifications

- Input/output impedance : 600 Ohm (1:1 turn ratio)
- Frequency response: +-2.0dB, from 30Hz to 100kHz
- Maximum Power level : 50mW
- Number of Channels: 2 / stereo

Here a comparison between two measurements of frequency response: with (green) and without (white) galvanic isolator on a EMU0202 soundcard: