

RIAAPhaseErrors

Contents

RIAAPhaseErrors is supplied as a zip file, riaaphaseerrors.zip. When unzipped it should contain:

- RIAAPhaseErrors.exe
- CT_Pro.dll
- FO.dat
- FOP.dat
- SO.dat
- SOP.dat

and this information file.

Description

RIAAPhaseErrors variously simulates the replay amplitude and phase errors that result from curtailing the 6dB per octave rise of the standard RIAA record characteristic at ultrasonic frequencies. It does this by applying the amplitude and phase errors to a user-specified 24/96 stereo Wave file.

System requirements

RIAAPhaseErrors should run under any Windows 32-bit operating system, from Windows 95 onwards. It has been tested on Windows XP Pro.

To run, RIAAPhaseErrors requires that the supplied CT_Pro.dll be installed in the same directory as the executable. This file contains the runtime files of Perfect Sync Inc's Console Tools Pro (<http://perfectsync.com>) which provides enhanced control over the console window's appearance and function.

The four .dat files, which contain filter coefficients, must also be in the same directory as the executable.

Operation

RIAAPhaseErrors's operation is largely self-explanatory. It first asks you to identify the Wave file to be processed. This must be stereo, 24-bit packed integer format with a sampling rate of 96kHz. It must also be a WAVE_FORMAT not WAVE_FORMAT_EXTENSIBLE file, with the signal data in Subchunk2. Error trapping is included in the code to prevent the processing of files which don't meet this description. If a stereo 24/96 file fails to load, you may be able to convert it into a suitable format by loading it in audio editing software and saving it with a new file name.

If the specified file passes these format tests, its details (number of channels, sample rate, resolution, length and duration) are displayed. Execution then begins, the result being four 24/96 output Wave files which are written to the same directory as the input file and have the names of the original file plus ' RIAA error 1', ' RIAA error 2', ' RIAA error 3', and ' RIAA error 4'. These files represent the following:

RIA error 1 – amplitude and phase errors resulting from the addition of a first-order filter with a corner frequency of 50.05kHz (time constant 3.18 microseconds).

RIA error 2 – amplitude and phase errors resulting from the addition of a second-order filter with a corner frequency of 49.9kHz and a Q of 0.72 (ie the filter fitted to the Neumann SAL 74B cutter amplifier).

RIA error 3 – as 'RIA error 1' but phase error only.

RIAA error 4 – as 'RIAA error 2' but phase error only.

Note that RIAAPhaseErrors is not optimised for processing large Wave files. It is recommended that you use short excerpts of perhaps a minute in length, which is ample for subjective comparison of the different error files. If necessary, excerpts can be created from longer files using audio editing software.

RIAAPhaseErrors includes no protection against clipping. It is possible that a fully modulated input file may be clipped in one or more of the output files. If this occurs, the input file must be slightly attenuated (-0.1dB is sufficient) before processing. Again this can be done in audio editing software.

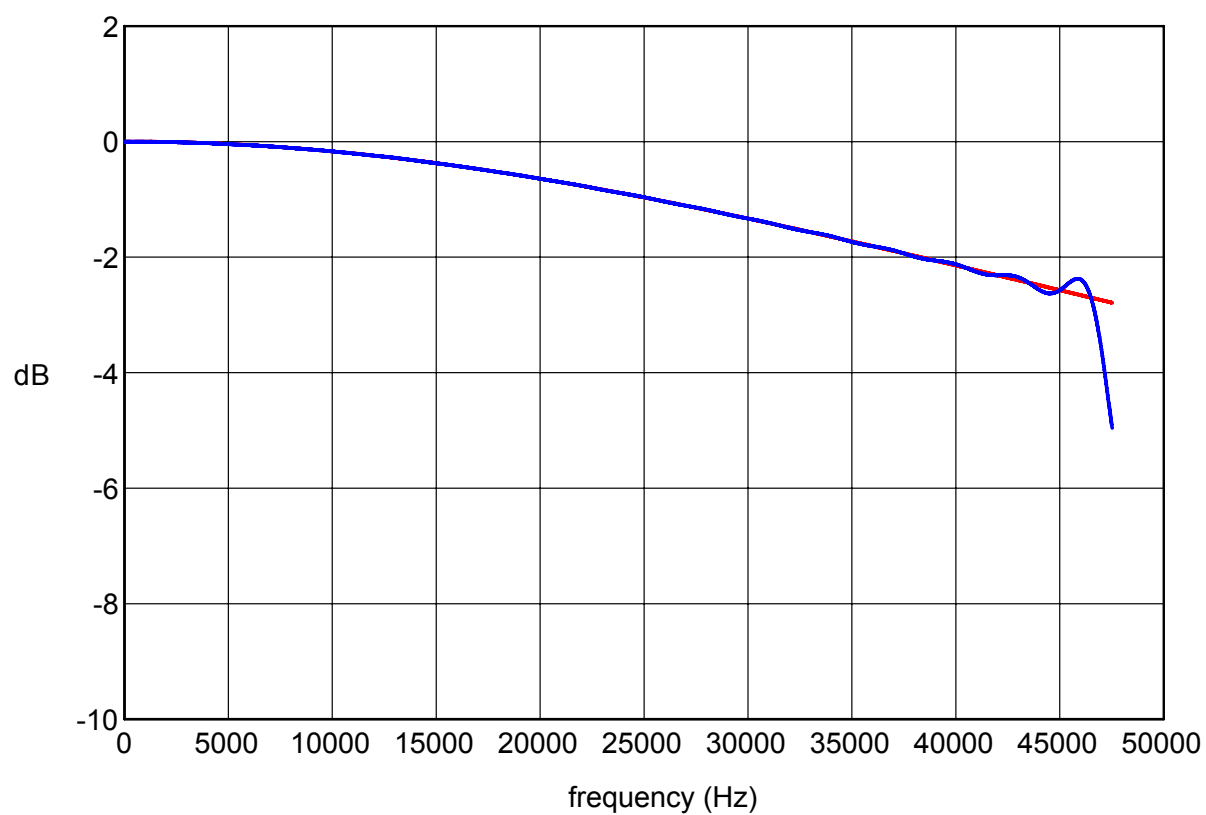
The filters used to create the four output files all incur frequency response errors which are negligibly small in the audio band (20Hz-20kHz) but become larger towards 48kHz. The graphs on the following pages illustrate these errors. The larger errors above 45kHz fall within the frequency range that will also be affected by a DAC's reconstruction filter.

Licence

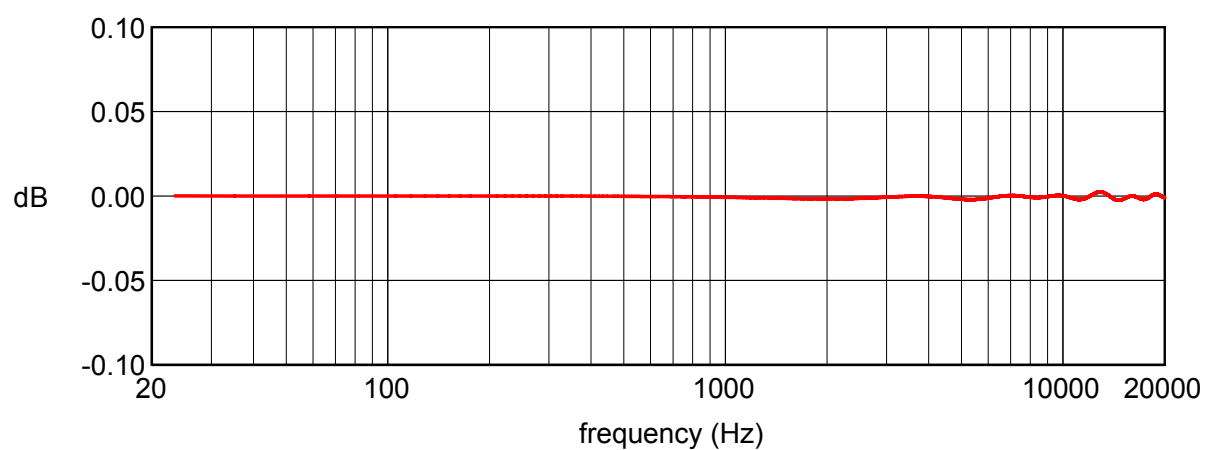
This software may be freely distributed provided that it is unaltered and distributed in its entirety, including the supplied DLL, .dat files and this information file. It may not be used for any commercial purpose. No support or warranty is implied or given: this software is supplied 'as is' and you use it entirely at your own risk. If you encounter any bugs or have suggestions for improvements you are invited to post them via freeware@audiosignal.co.uk.

Keith Howard
February 2009

RIAA error 1 (first-order filter, amplitude and phase error)

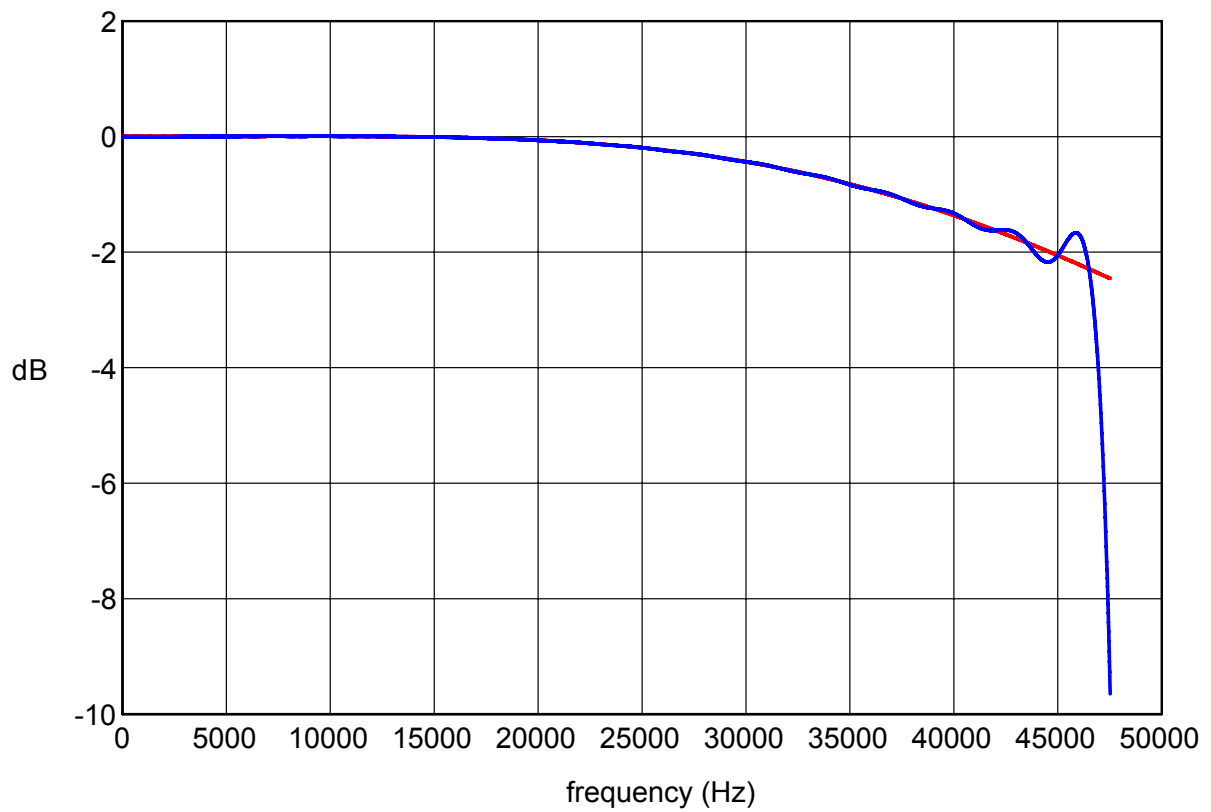


Target response (red trace) and actual response (blue trace)

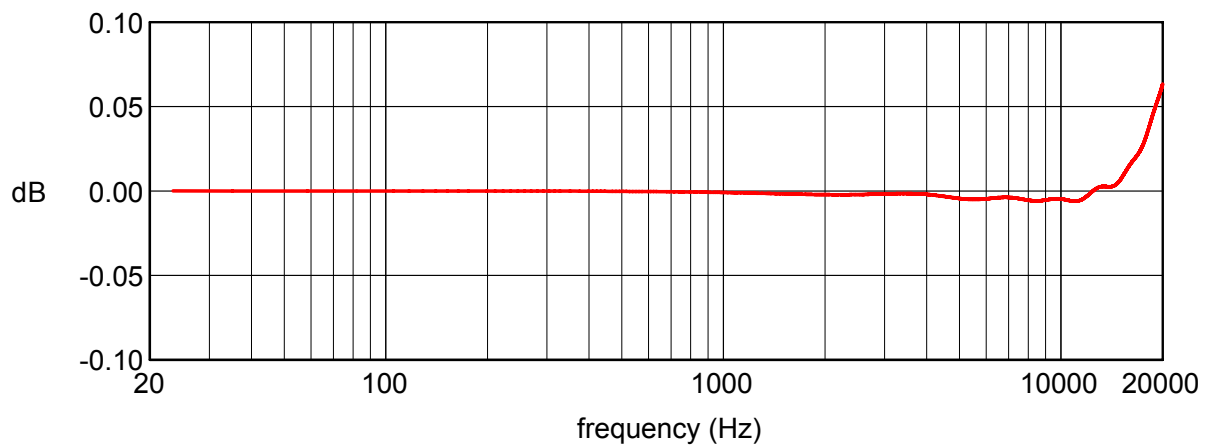


In-band response error, 20Hz-20kHz

RIAA error 2 (second-order filter, amplitude and phase error)

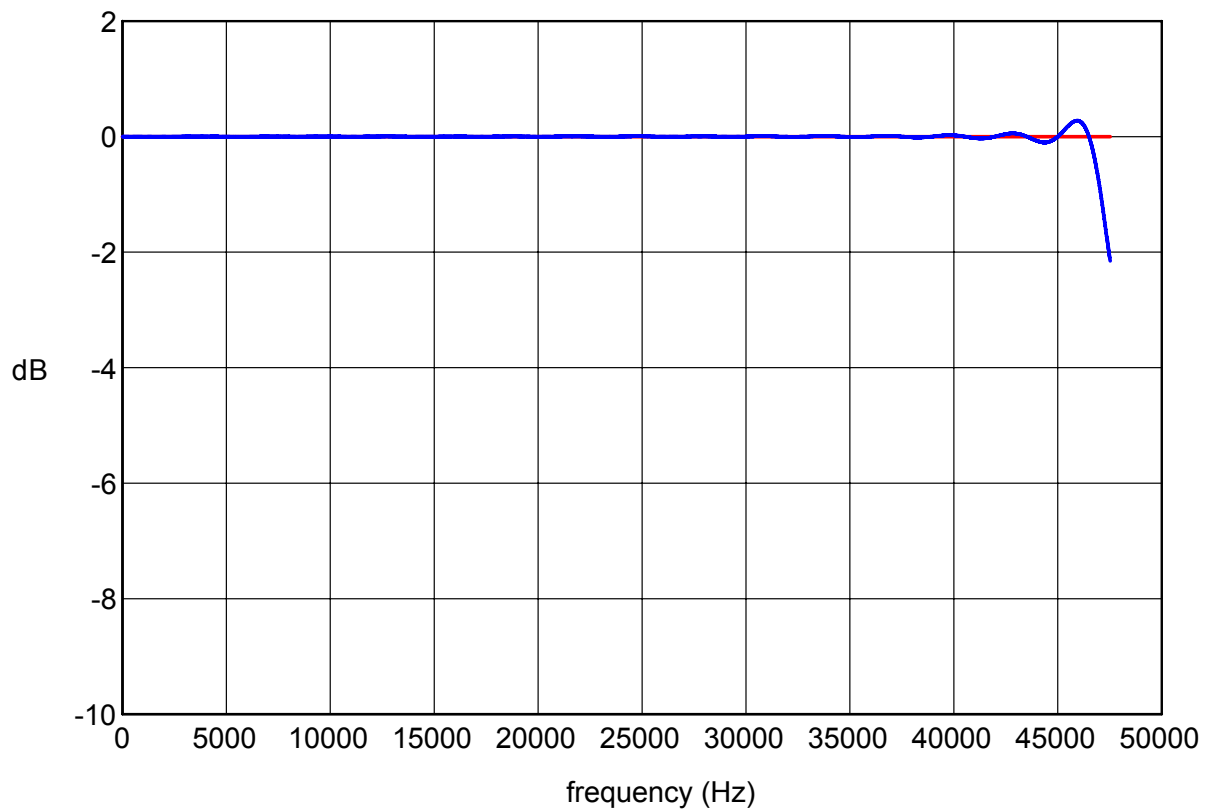


Target response (red trace) and actual response (blue trace)

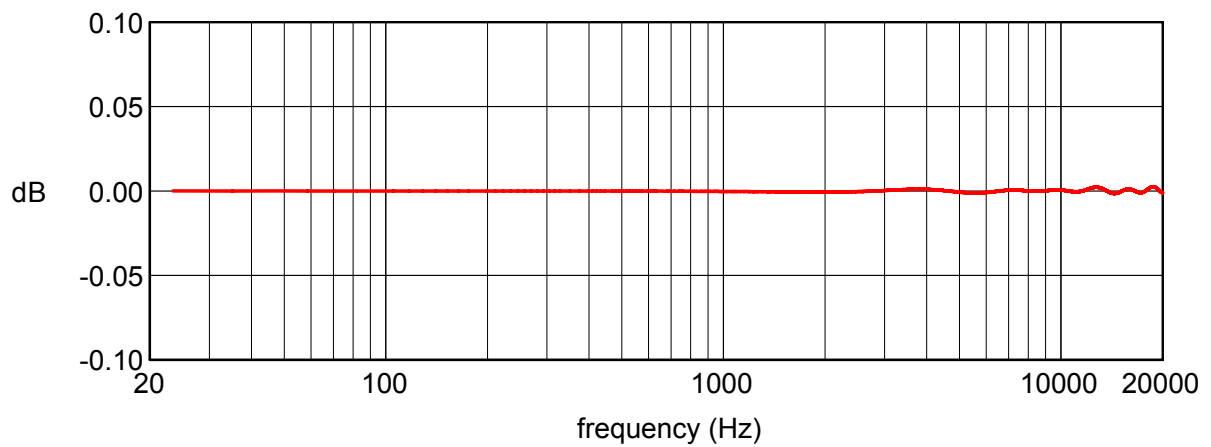


In-band response error, 20Hz-20kHz

RIAA error 3 (first-order filter, phase error)

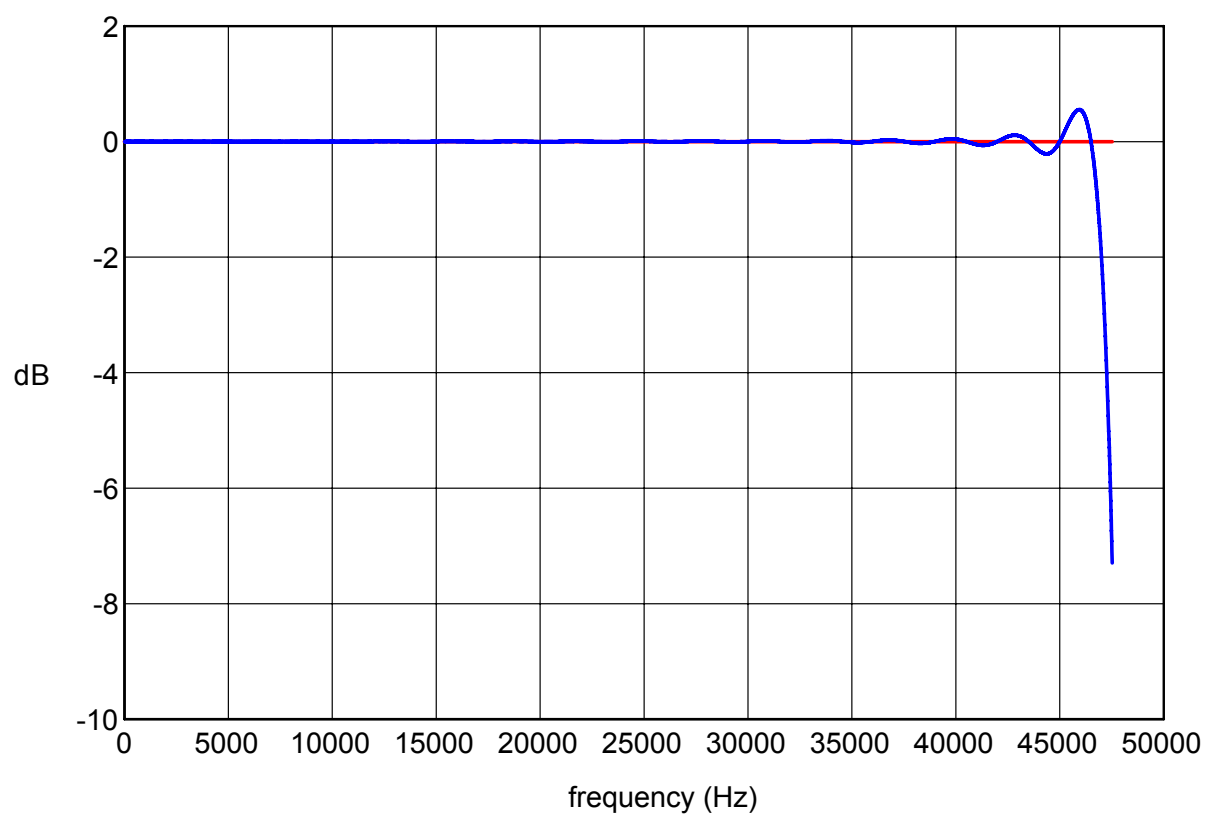


Target response (red trace) and actual response (blue trace)

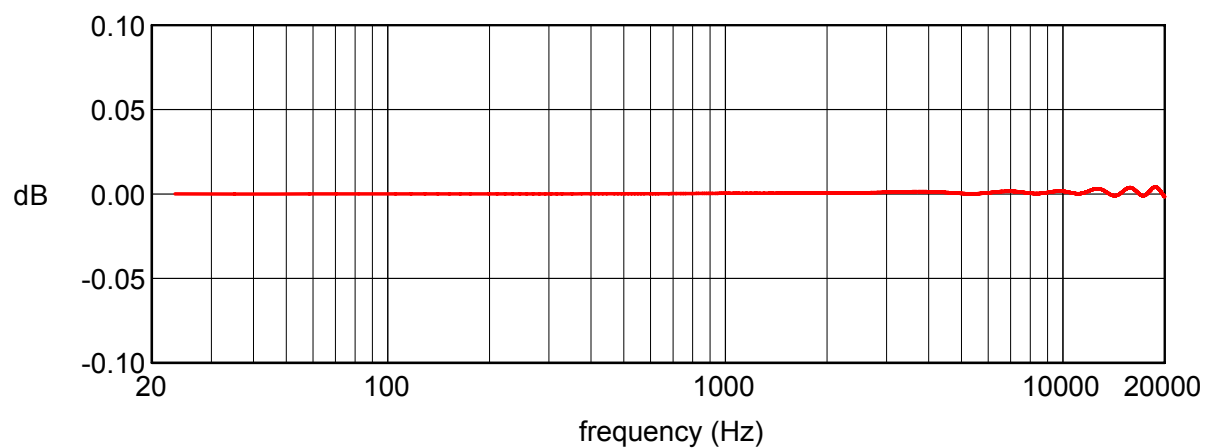


In-band response error, 20Hz-20kHz

RIAA error 4 (second-order filter, phase error)



Target response (red trace) and actual response (blue trace)



In-band response error, 20Hz-20kHz