3. Using Acourate to Generate FIR Filters

By David Das

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Overview

In the previous article you learned how to take the initial measurements of your Left and Right speakers using the Room EQ Wizard (REW).

In this article you will learn how to measure your speakers using Acourate, analyze the measured Impulse Response curves, design a Target Curve and run through a series of Macros to generate a set of FIR Filters that would add corrections to the Amplitude and Time domains.

In the next article you will learn how to import these FIR Filters into ROON's Convolution Engine.

Acourate is the most advanced and feature rich Digital Room Correction software available today. With a myriad of functions offering a granular level of control, this is the professional's choice.

This software has been designed by Dr. Ulrich Brüggemann

Purchasing an Acourate License

The easiest way to obtain an Acourate license for personal use is to contact Dr. Brüggemann directly via email uli.brueggemann@gmail.com

You may also fill out this contact form:

https://www.audiovero.de/en/contact-form.php

The price is about $520.

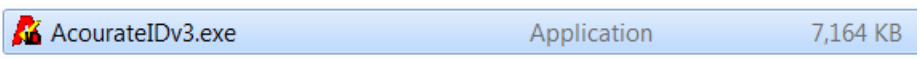
These are the hardware requirements:

https://www.audiovero.de/en/system-requirements.php

Acourate licenses are tied to your CPU.

You must generate an ACOURATE ID for the device you plan to run this software.

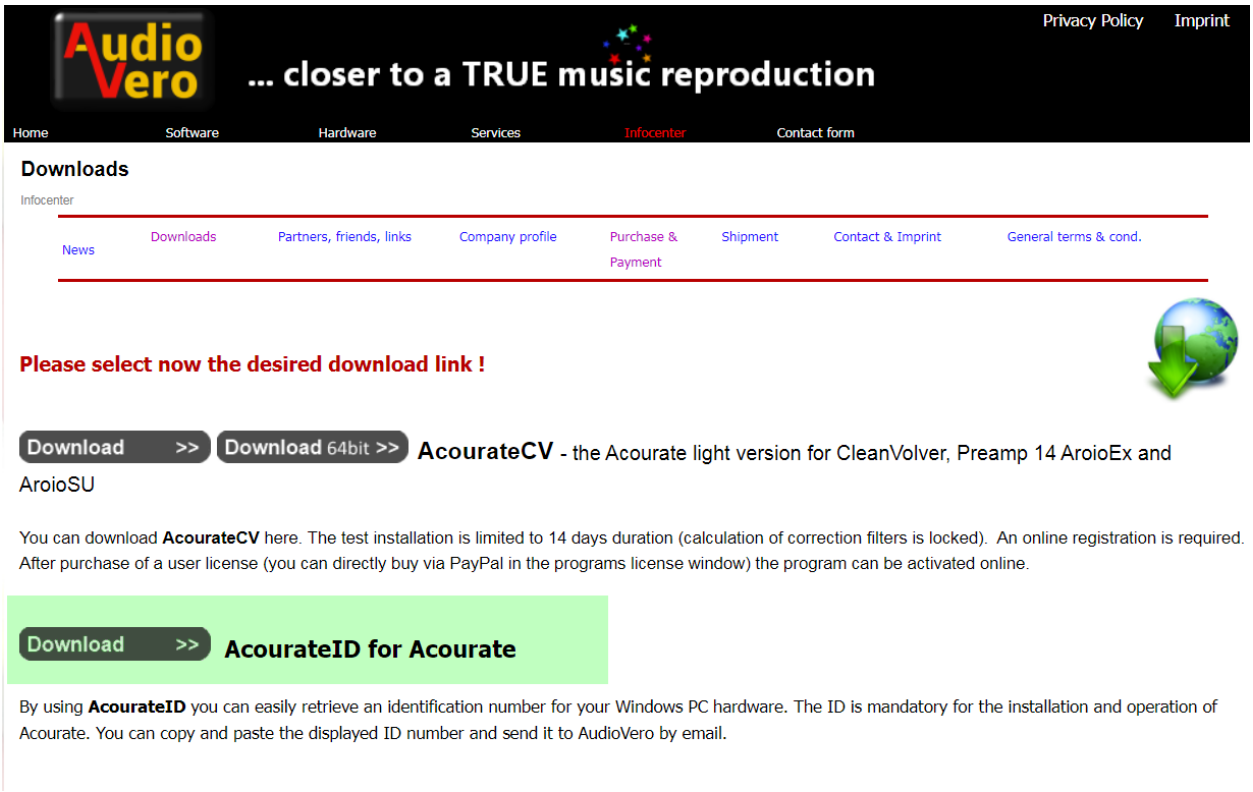
To do this you need to run AcourateIDv3.exe



You can download AcourateIDv3.exe from the Downloads page:

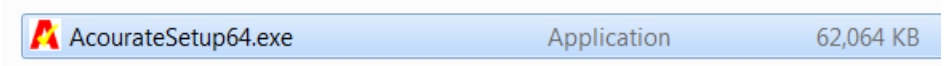
https://www.audiovero.de/en/downloads.php

Login = Guest
Password = five



Running AcourateIDv3.exe will generate a **text file** with a unique Acourate ID.

Email this text file back to Dr. Brüggemann when you are ready to purchase a license. Uli will create AcorateSetup64.exe authorized to run on your device.

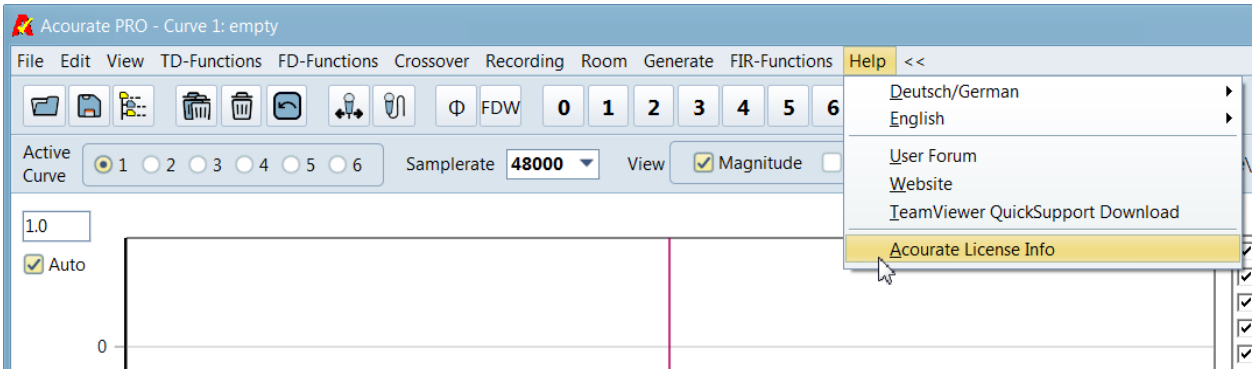


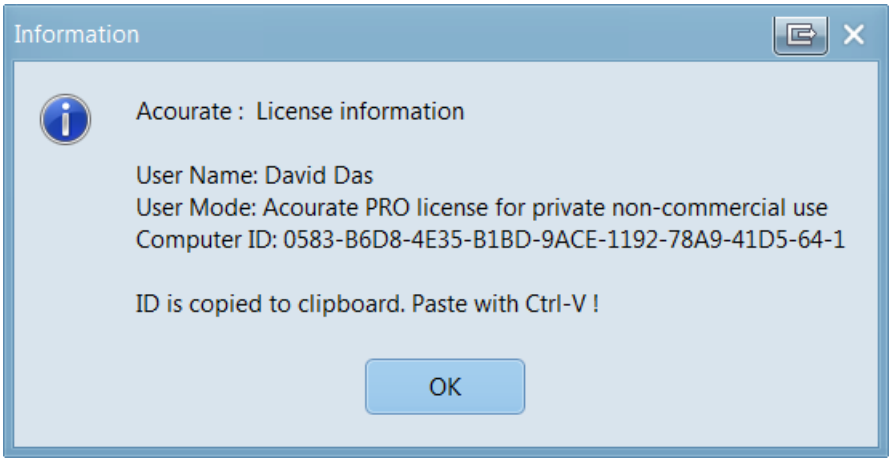
Install this program on your device and you are ready to go.

Note: To switch this license to a different device you must contact Uli. You can switch devices up to 3 times.

Here is an example of an Acourate ID.

After installation, the License Information will appear under the **Help** Menu.





Downloading an Acourate Trial Version

You can download the Acourate Trial Version from the Downloads page:

https://www.audiovero.de/en/downloads.php

Login = Guest
Password = **five**

Download >> **AcourateLSR2 Logsweep Recorder**

The free logsweep recorder allows the recording of impulse responses. The test signal is a logarithmic sine sweep. An omni-directional microphone and a soundcard with ASIO driver is required. AcourateLSR2 is freeware.

Download >> **Acourate Trial Version**

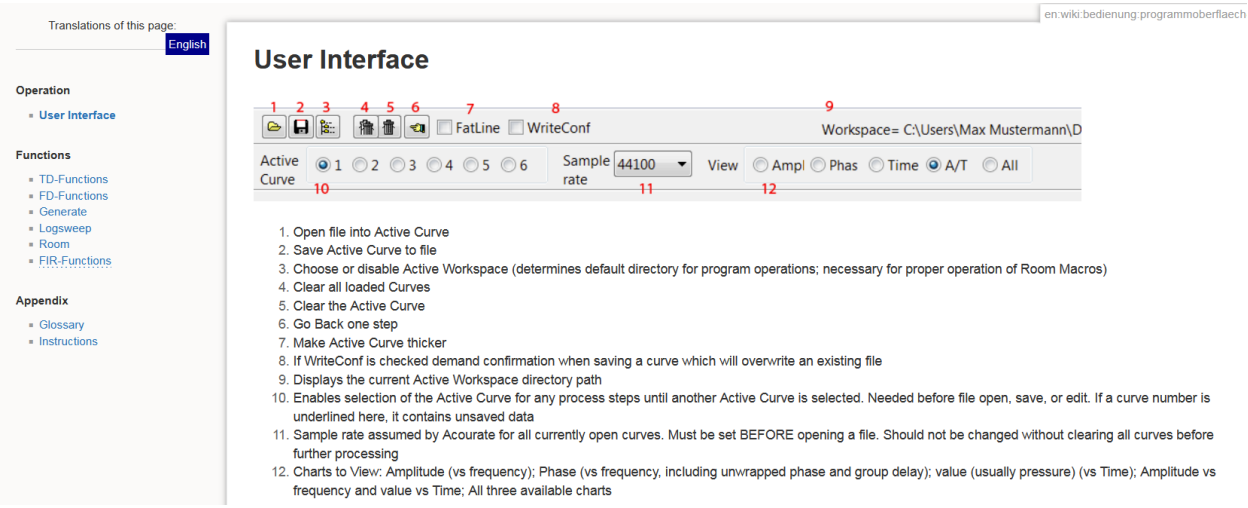
The trial version is valid for 14 days. It demonstrates the user interface of Acourate. It does not allow generation of filters, in addition some functions are limited.

Download >> **STransform**

The Stockwell Transform program visualizes a given pulse response (length 65536 samples) in an amplitude-frequency-time-chart. Please note: it is intended to improve the GUI, but we must ask for your patience.

The Trial Version is valid for 14 days. You cannot generate Filters.
You can examine all the features and functions while referencing the **Online User Guide**:

https://www.audiovero.de/acourate-wiki/doku.php?id=en:start



You will quickly discover that purchasing a personal license to run Acourate from Dr. Ulrich Brüggemann is a very different experience from buying a commercial product.

Uli takes personal interest on your specific needs from the very first day you initiate contact. He will continuously guide you at every step. On the very first day he sent me links to a collection of articles and how-to guides to get me started. He even made useful suggestions looking at pictures of my setup.

Acourate is a complex tool designed for professionals. This software is a tweakers delight. One can spend weeks and months fine-tuning their 2-channel audio setup exploiting the power of Acourate to arrive at the best frequency response curve to match one's musical tastes.

Uli has made the software easy to use for beginners by providing a set of Macros that walk you through all the essential steps. Simply using the default settings in these Macros would lead to good results in your very first iteration. Later as you become more experienced you can modify the default settings to achieve even better results specific your situation.

In this section you will learn how to start from scratch with a new Acourate Project Workspace and Generate a FIR Filter as your first iteration.

Let's begin!

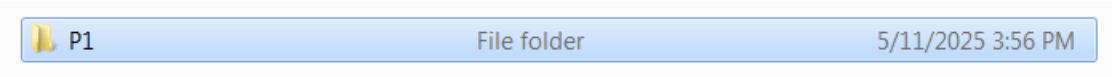
Create an Acourate Project Workspace

Create a Folder named **ACOURATE** on your hard drive to hold all your Project Workspaces.

C:\ACOURATE

Within this folder create a new folder named **P1**

C:\ACOURATE\



All the files that you would be creating for this Project will reside under this folder P1.

C:\ACOURATE\P1

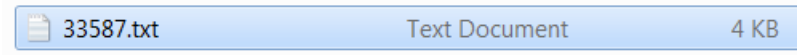
P1 will be the name of your first project.
You can name subsequent project workspaces as P2, P3, P4, etc.

The file structure would look like:

C:\ACOURATE\
P1
P2
P3
P4

Copy the Microphone Calibration file into your Project Workspace

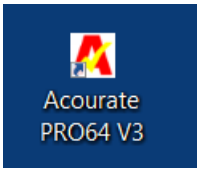
Copy 33587.txt into C:\ACOURATE\P1



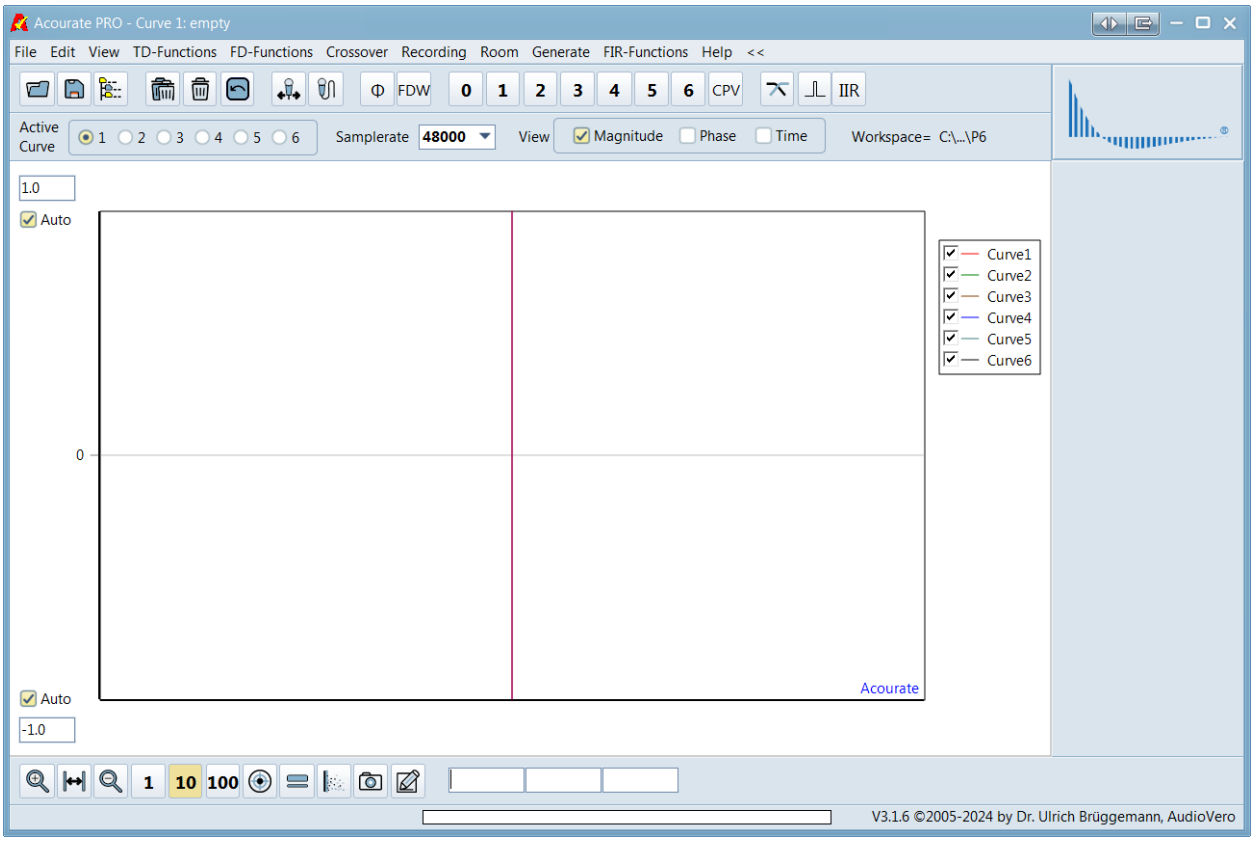
This is all you need to get stated.

Launch Acourate Version 3

Launch the program by clicking the **Acourate PRO64 V3** Desktop Icon.

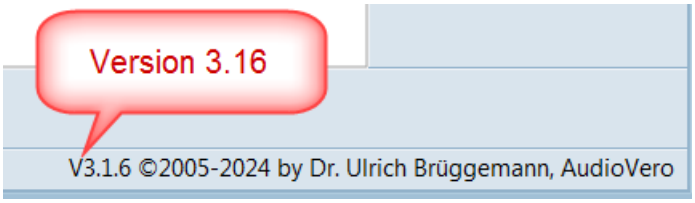


Be patient! It will take a while to load.
This will be your initial screen.

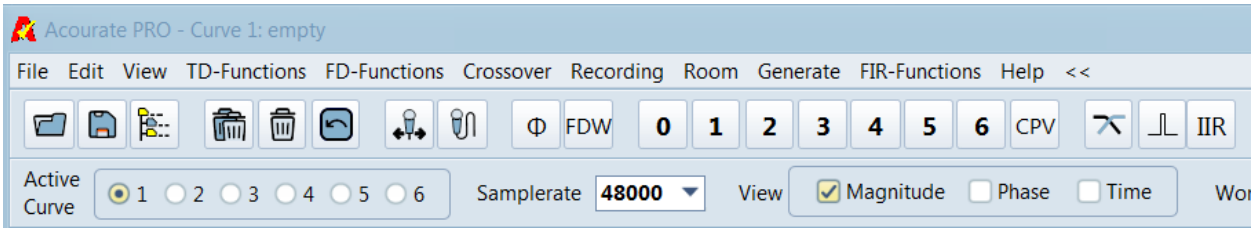


Examine the Acourate User Interface

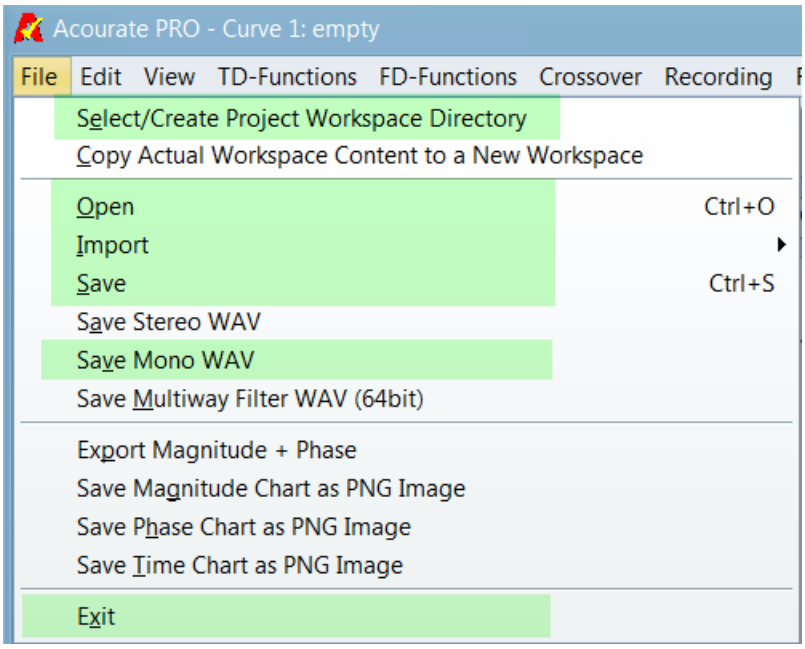
At the bottom right you will find the Acourate version you are using.
The latest version is 3.16 as of 5/11/2025.



All the available functions are listed on the top.

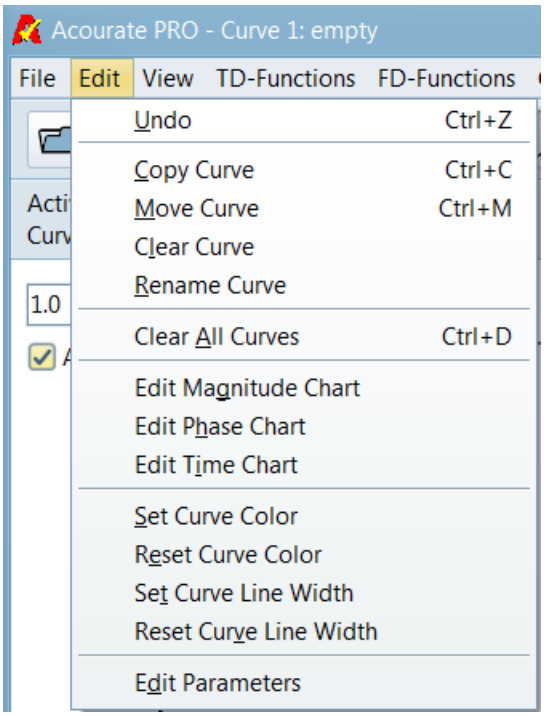


Open the File Menu

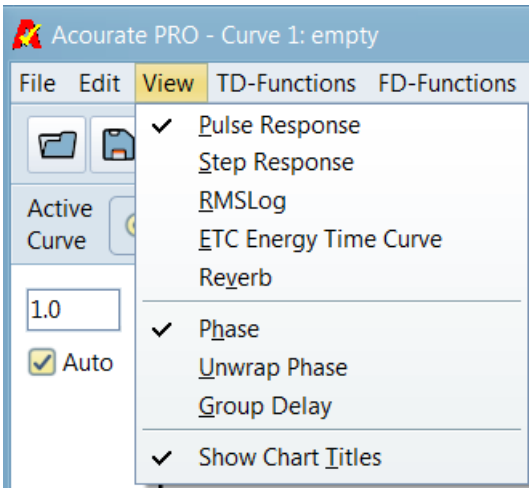


To keep matters simple, only the commands highlighted in green will be used during this first Project P1.

Open the Edit Menu



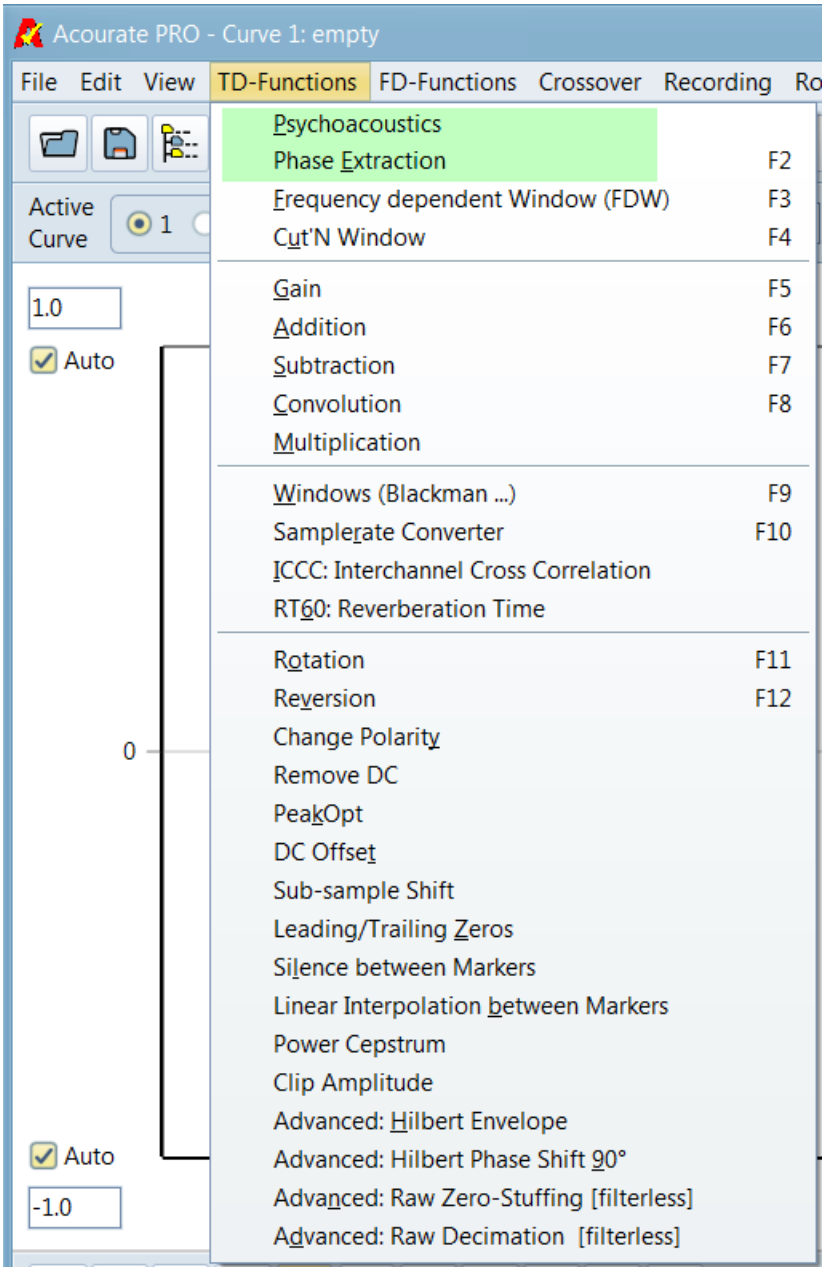
Open the View Menu



Open the TD-Function Menu

These are all your Time Domain Functions.

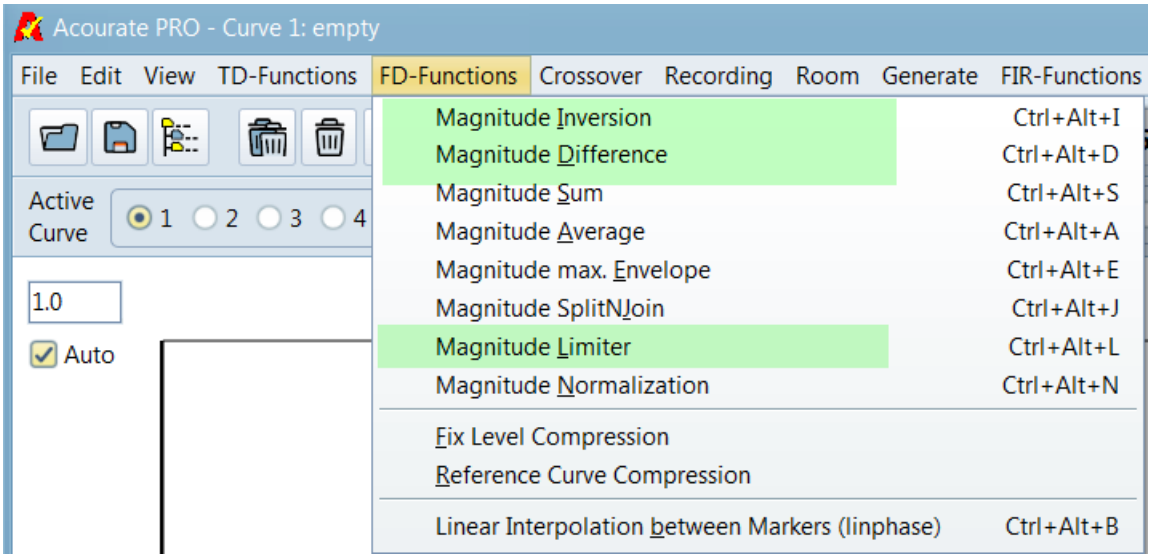
You will be using only the top 2 highlighted in green.



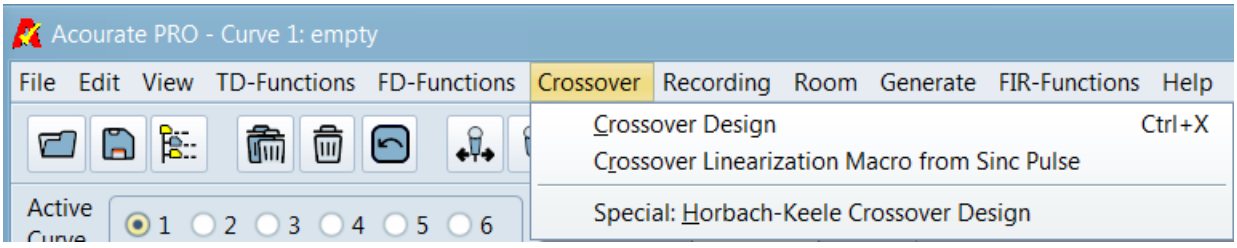
Open the FD-Functions Menu

These are you Frequency Domain Functions.

You will be using only 3 that are highlighted in green.

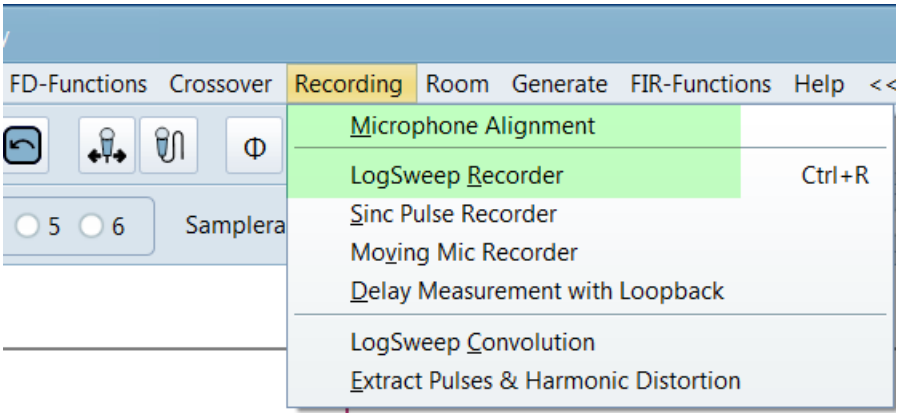


Open the Crossover Menu.



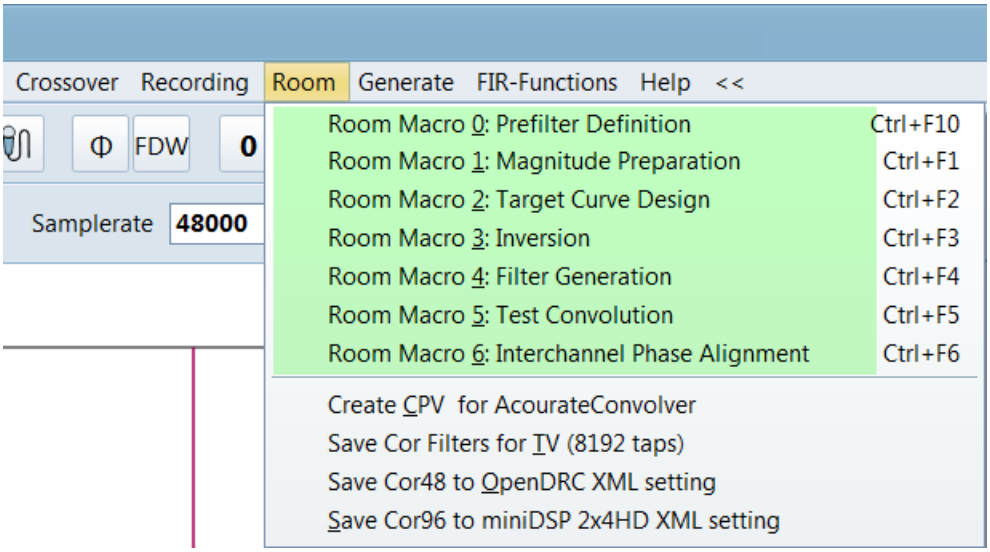
Open the Recording Menu

You will be using only the first 2 highlighted in green.

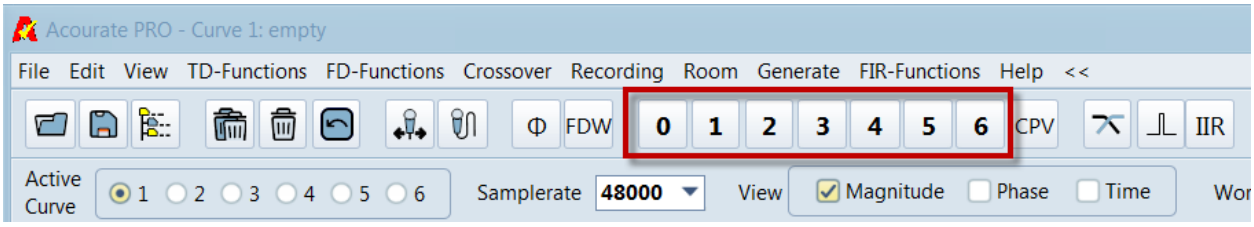


Open the Room Menu

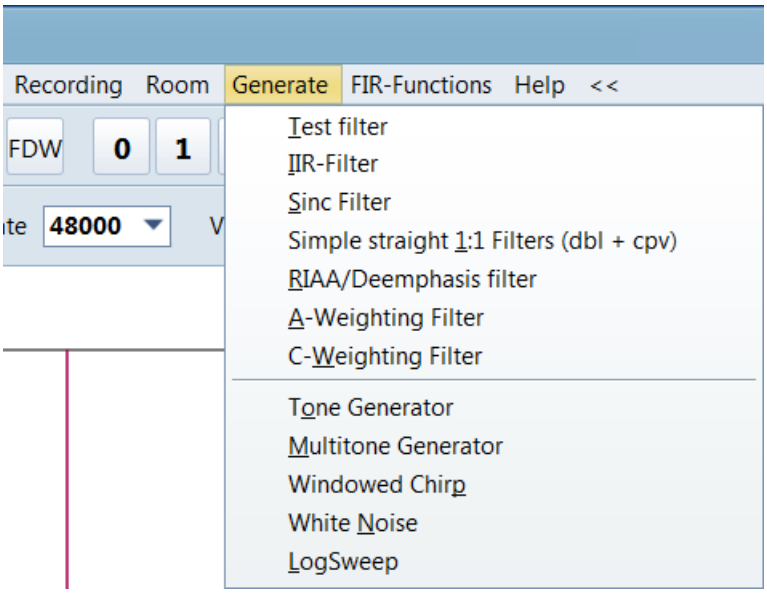
You will be running the Room Macros 0 through 6



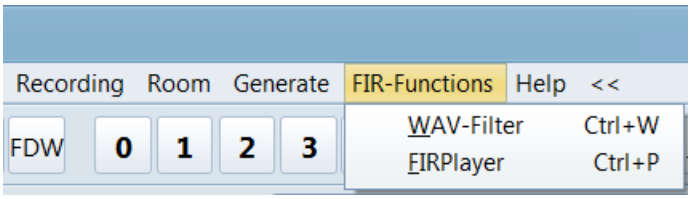
As a shortcut these macros can be invoked by pressing these buttons numbered 0 through 6.



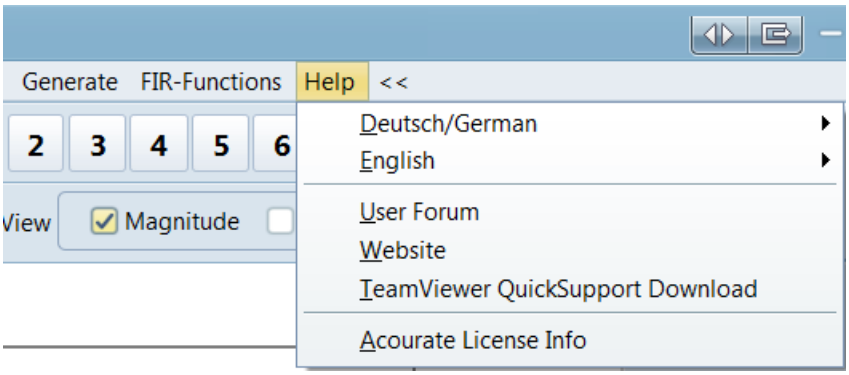
Open the Generate Menu



Open the FIR-Functions Menu



Open the Help Menu

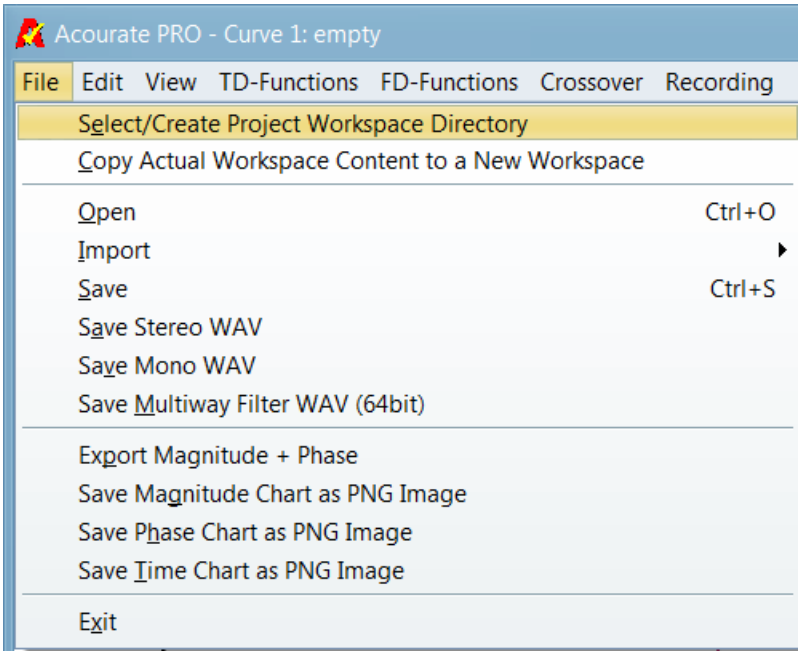


As you can see from the list of available functions, this tool has been designed for professionals.

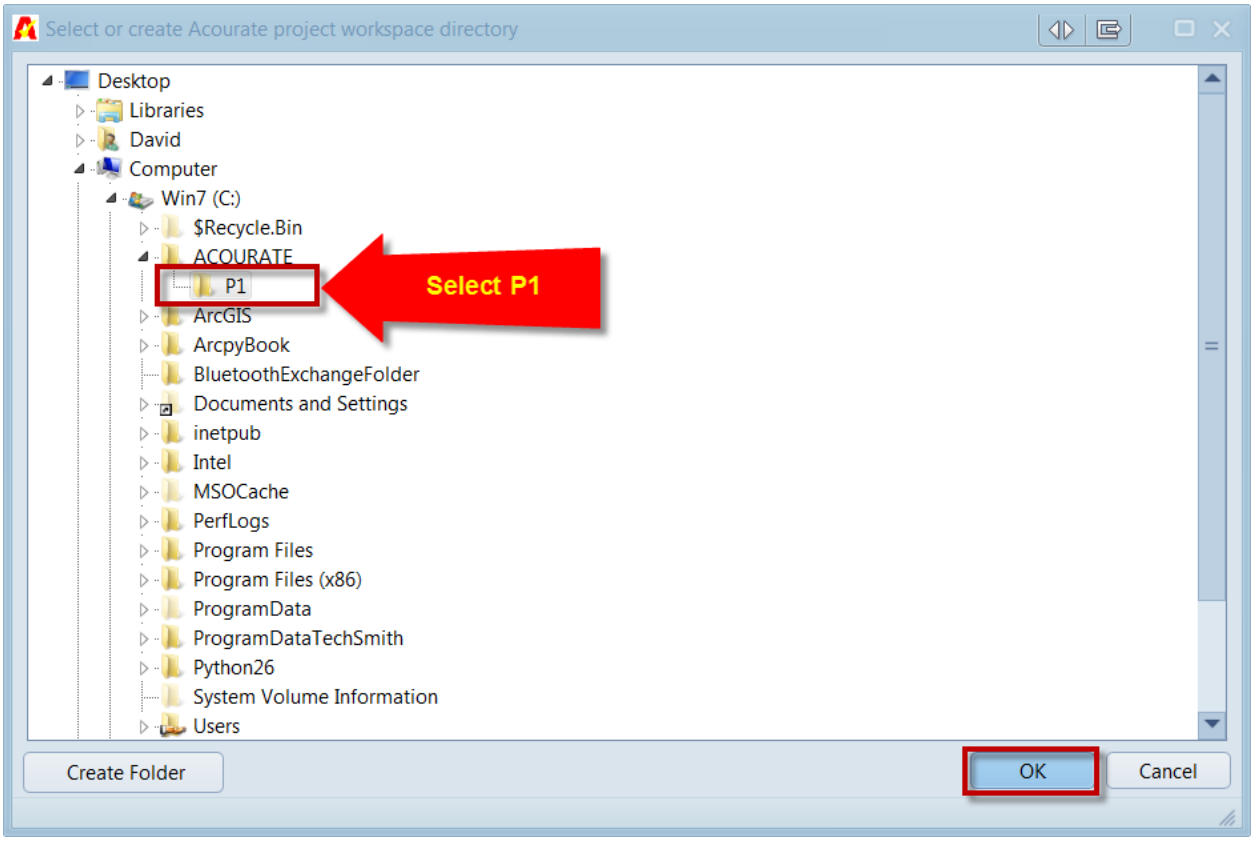
In this exercise you would be using only a few of the functions highlighted in green and use the Macros with their default settings for this initial test Project P1.

Select Project Workspace Directory

File > Select/Create Project Workspace Directory

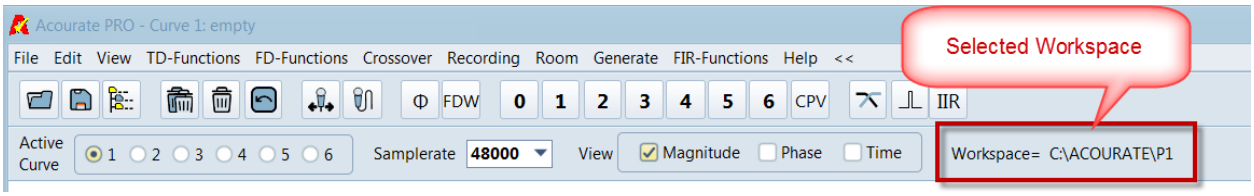


Select P1



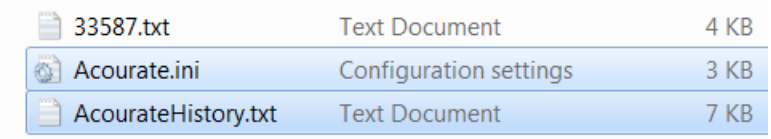
OK

Notice, how Acourate displays the selected Workspace = C:\ACOURATE\P1



Open Windows Explorer and view the contents of:

C:\ACOURATE\P1



You will see that Acourate has created 2 new files.

Acourate.ini

[Access]
LastSaveDir=C:\ACOURATE\P1\

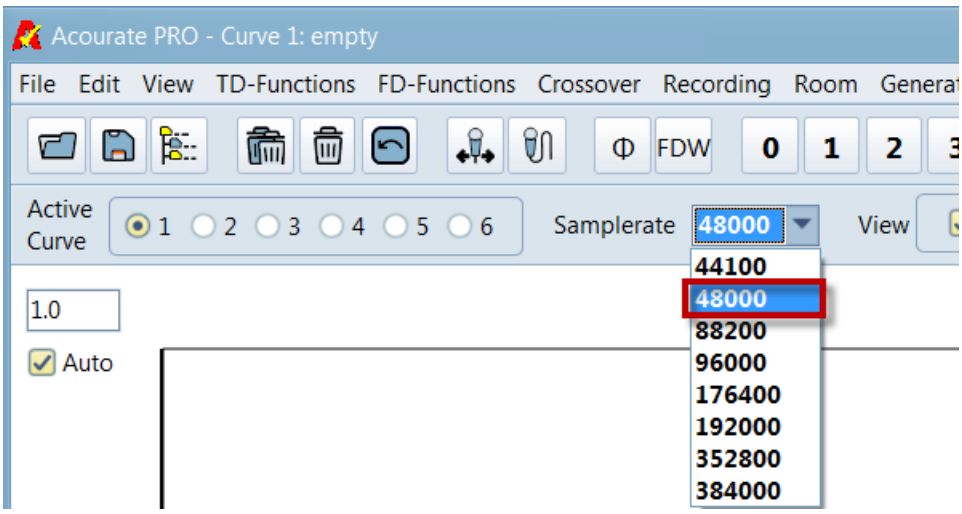
AcourateHistory.txt

#1;SetWorkspace;C:\ACOURATE\P1\

These two files keep track of every operation you execute within Acourate.
If you ever want to revisit your past Acourate Projects and find what Parameters you had used, these are the two files you would need to examine.

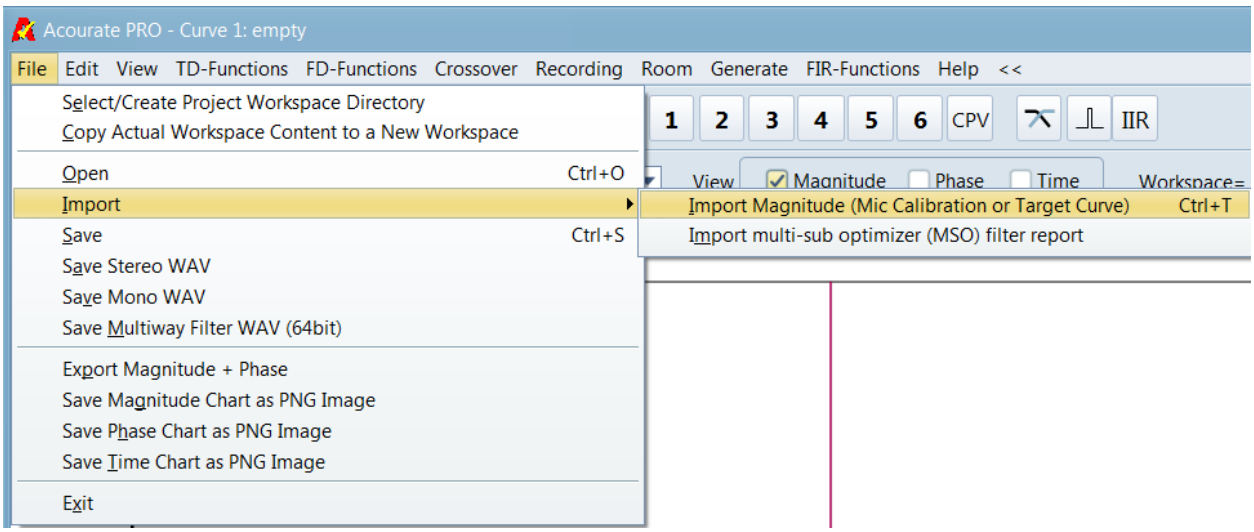
Set Sample Rate to 48,000 Hz

The default Sample Rate is 48,000 Hz. Keep this default.
You would be using the same sample rate throughout this Project.

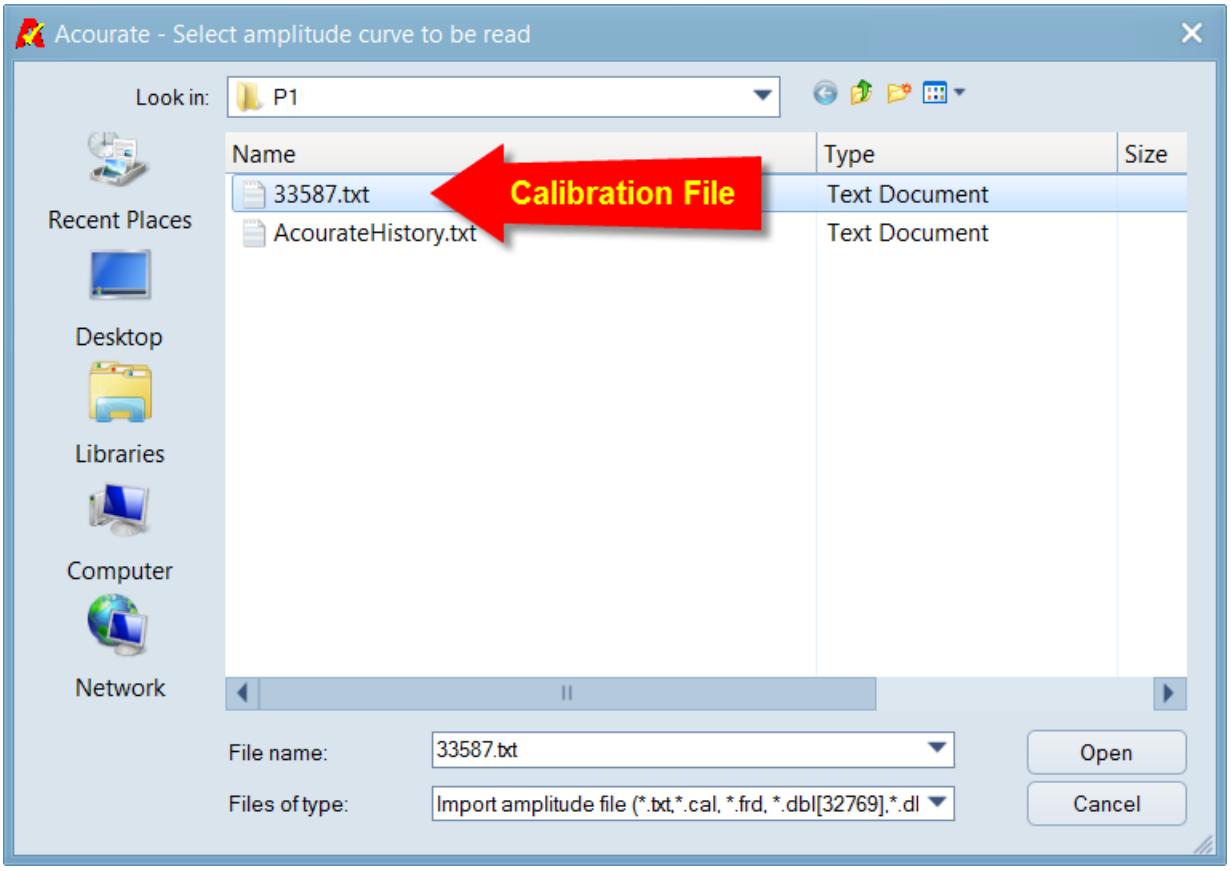


Import Magnitude

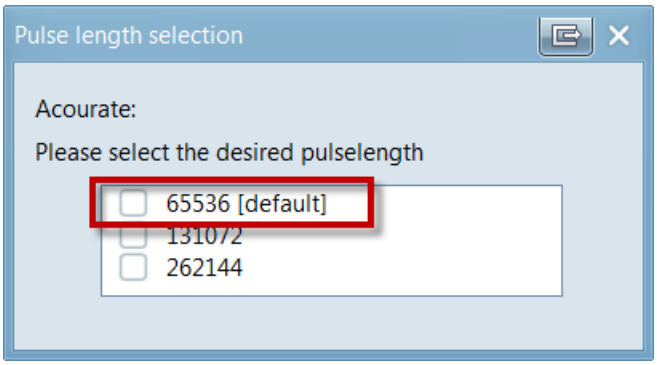
File > Import > Import Magnitude (Mic Calibration or Target Curve)



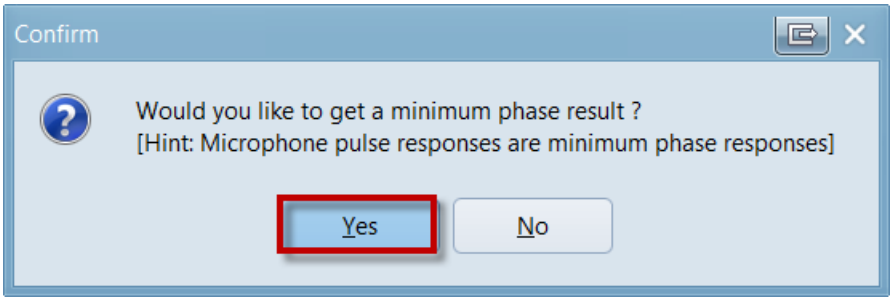
Select the Mic Calibration File **33587.txt**



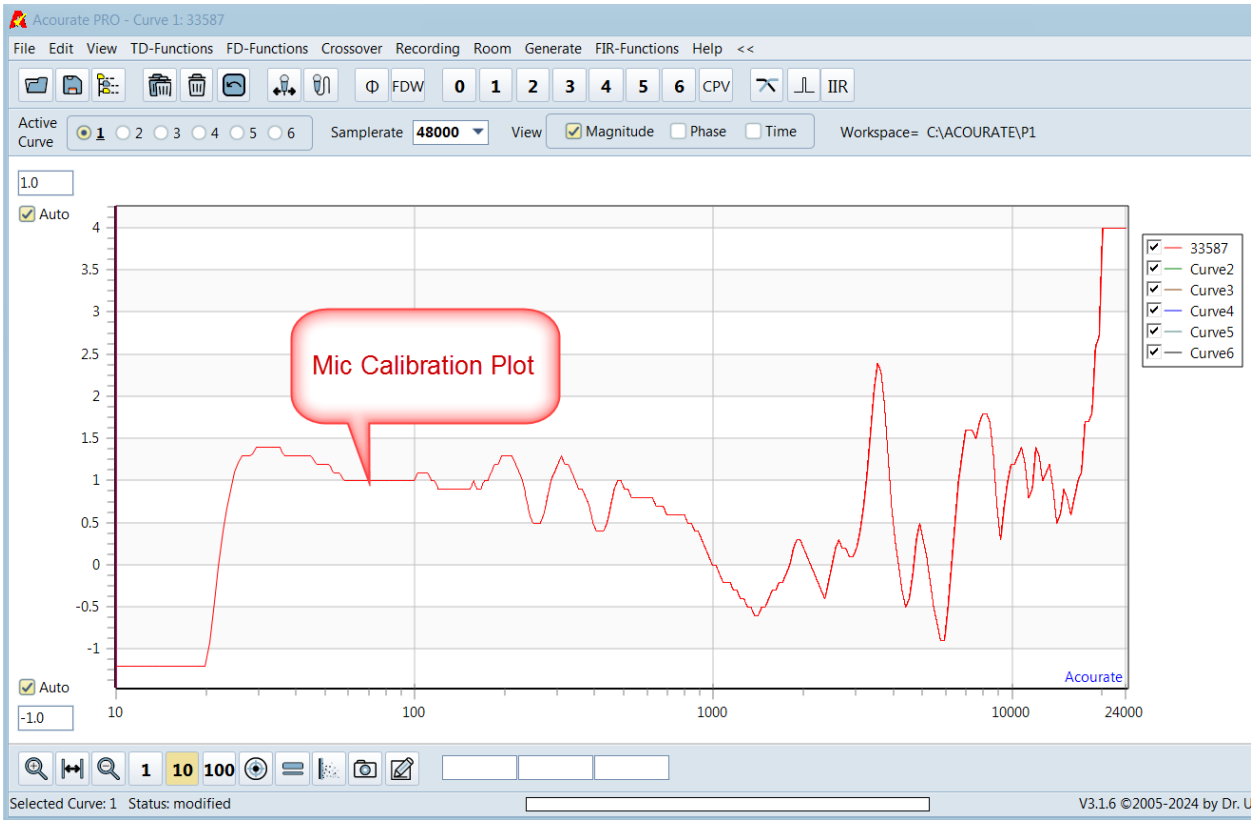
Select the default Pulse Length = 65536



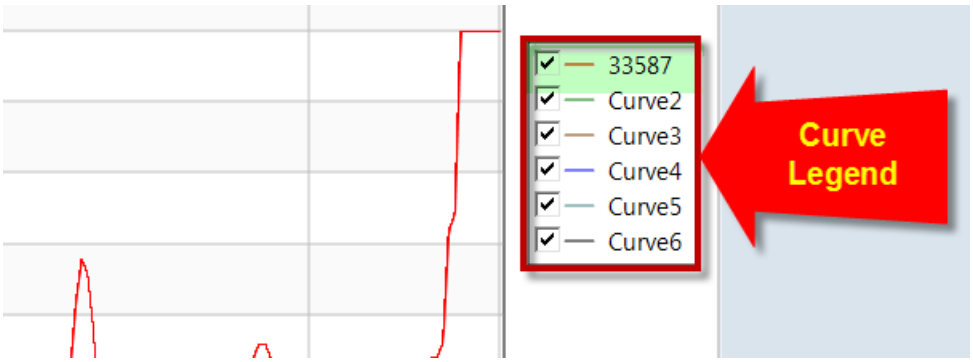
Note: Whenever you see such a choice list, always pick the default or the highest value.



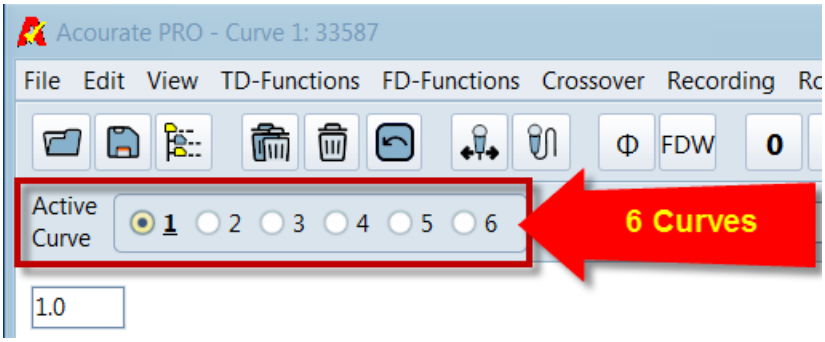
This is the graphical representation of your Mic Calibration file 33587.txt



On the right of the plot you will find the Curve Legend



Acourate allows you to load a maximum of 6 Curves at a time.

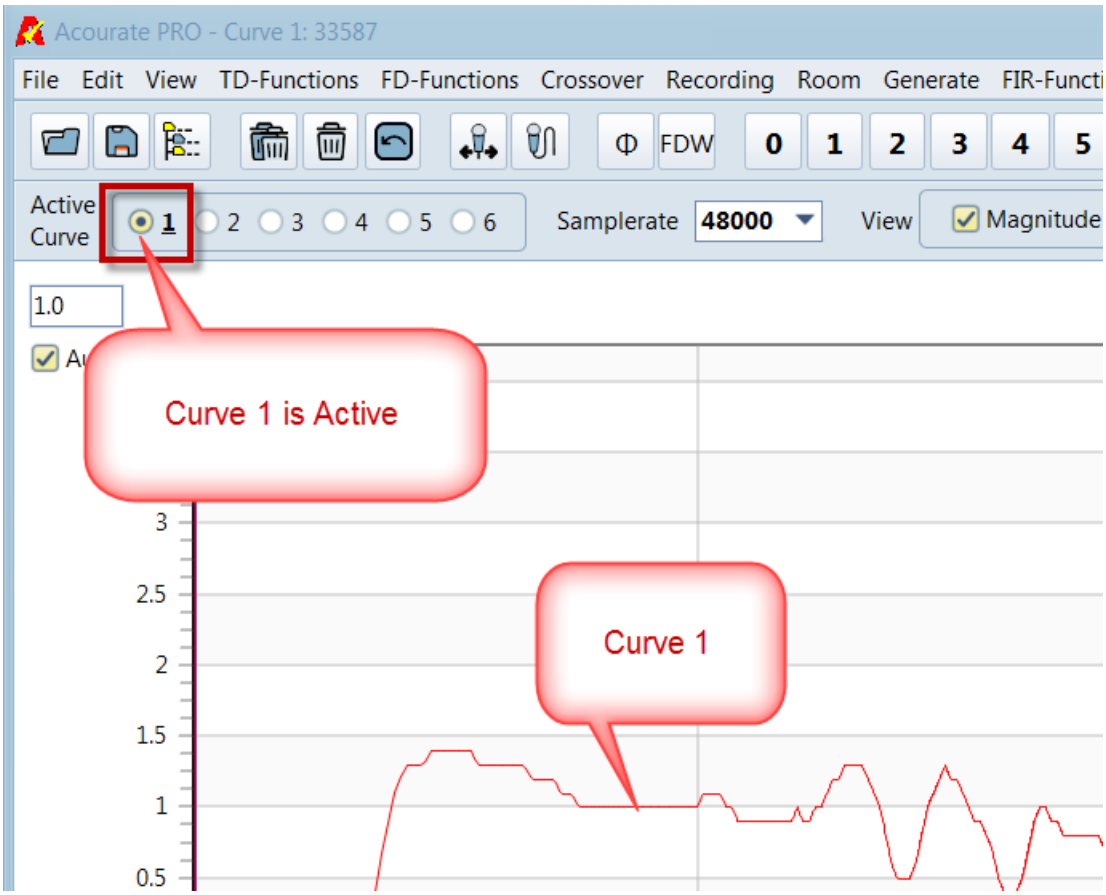


While you can have up to 6 Curves loaded, only 1 Curve can be Active at a time.

To make a Curve Active, select its corresponding **Radio Button**.

When you execute a function, it applies to the Curve that is Active.

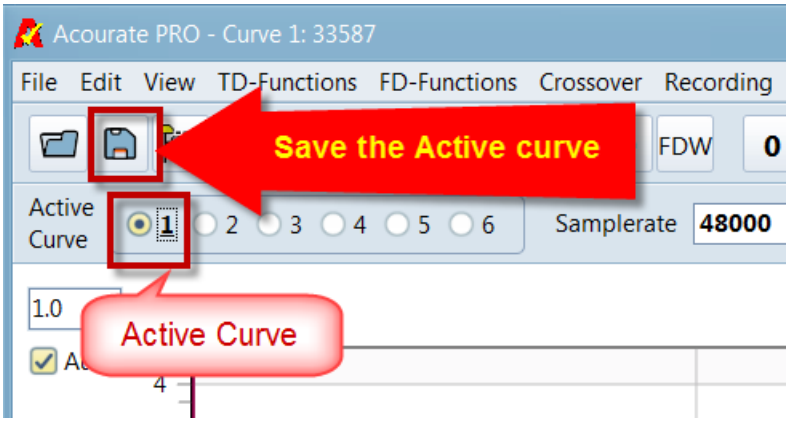
In this example, Curve 1 is Active.



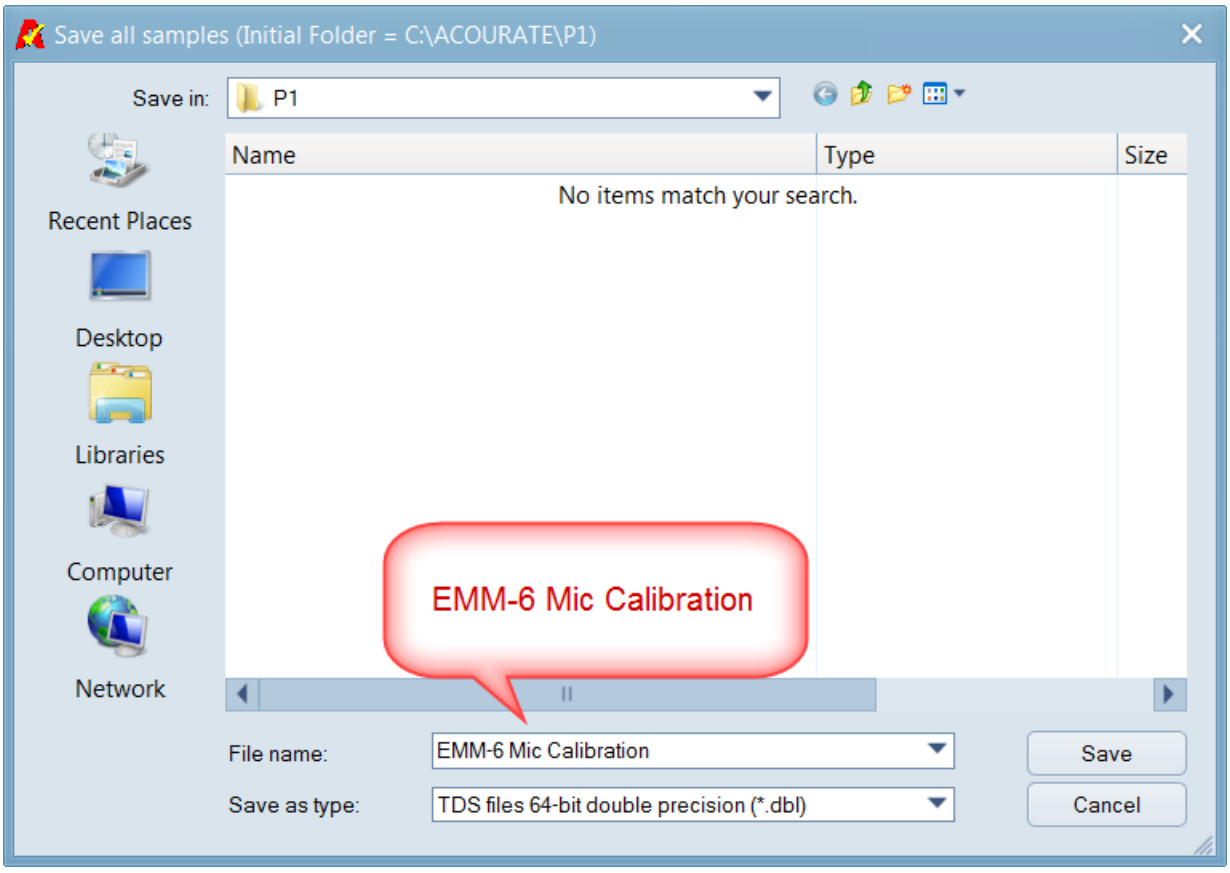
Save this Microphone Calibration Curve.

Click on the Save Icon

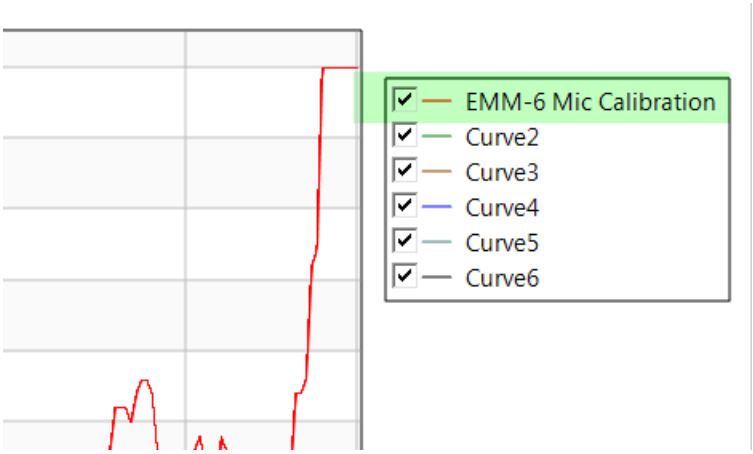
This will save the Active Curve



Name this file **EMM-6 Mic Calibration**

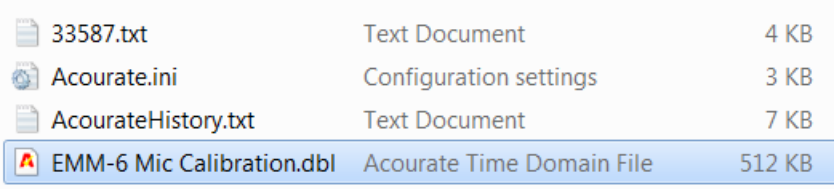


The Curve Legend will show the new name.



Examine the contents of:

C:\ACOURATE\P1



The **EMM-6 Mic Calibration.dbl** file has been saved to your Project Workspace.

Open **AcourateHistory.txt**

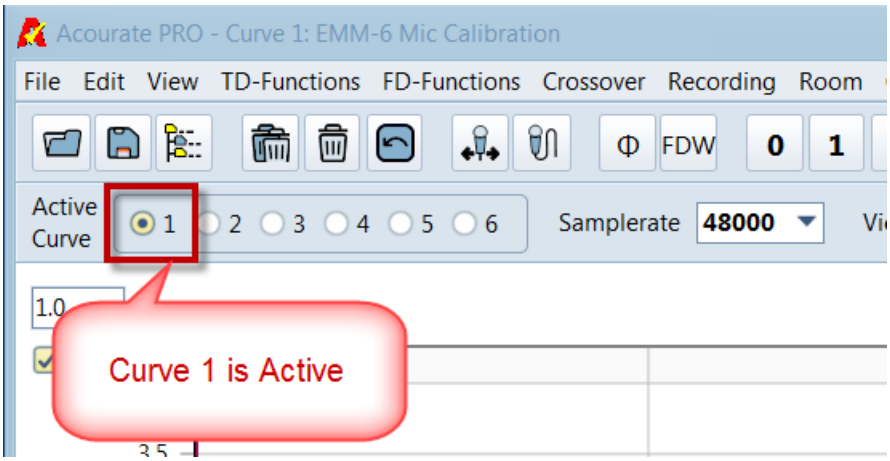
Step #4 shows that you have saved the file as EMM-6 Mic Calibration.dbl

#1;SetWorkspace;C:\ACOURATE\P1\
#2;SetSamplerate;rate=48000
#3;ImportMagnitude;to=1;filename=C:\ACOURATE\P1\33587.txt;length=65536,minphase=1
#4;SaveFile;of=1;filename=C:\ACOURATE\P1\EMM-6 Mic Calibration.dbl

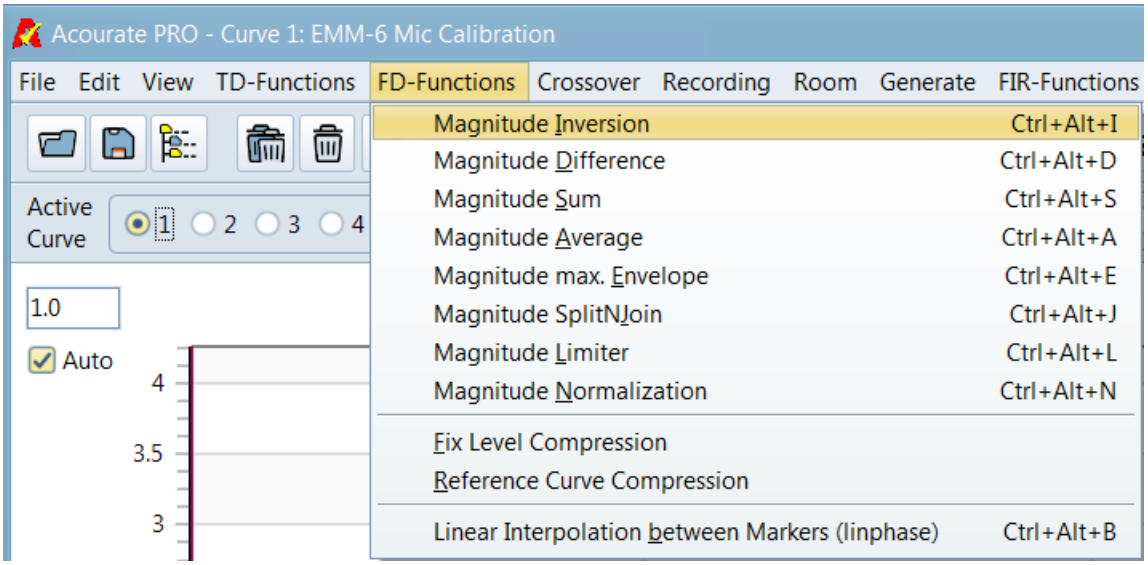
Invert the Mic Calibration Curve

Your objective is to invert the Mic Calibration Curve.

Make sure Curve 1 is Active

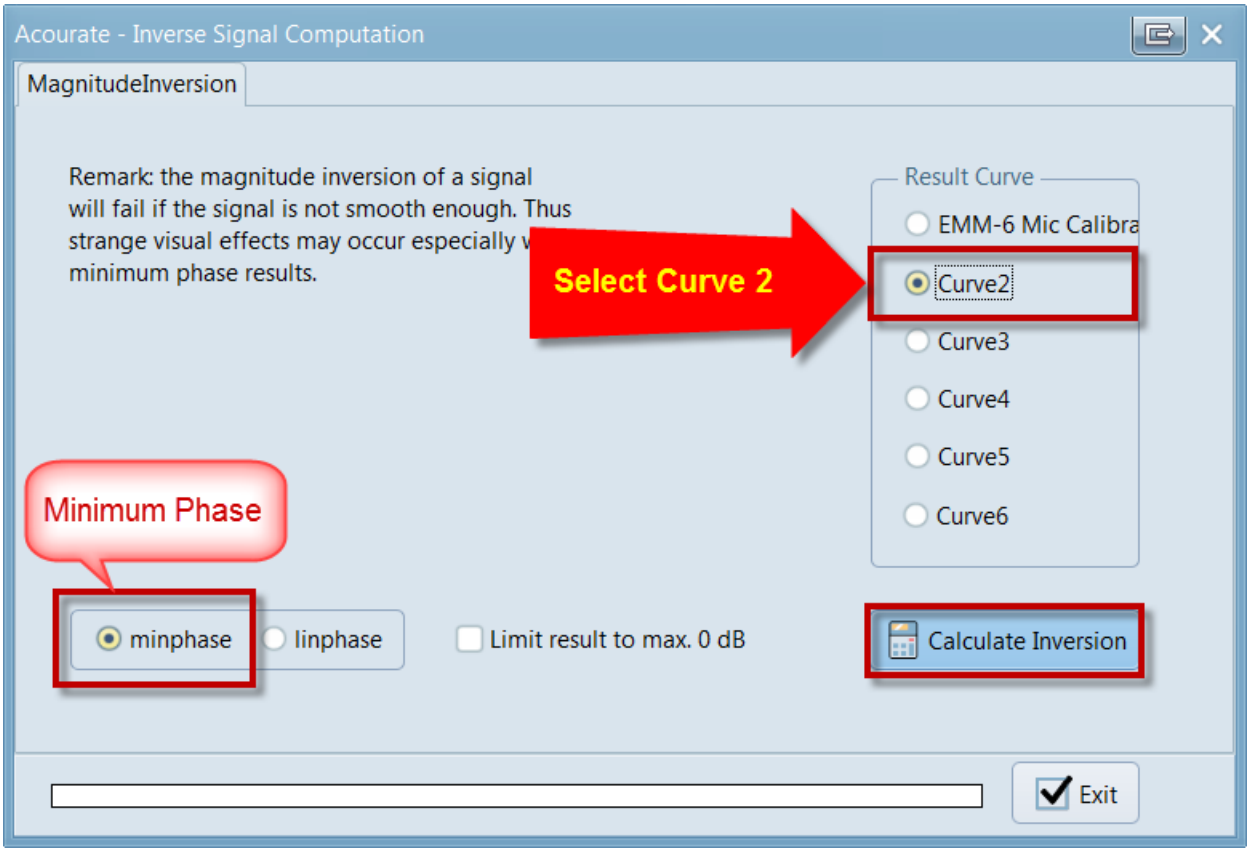


FD-Functions > Magnitude Inversion



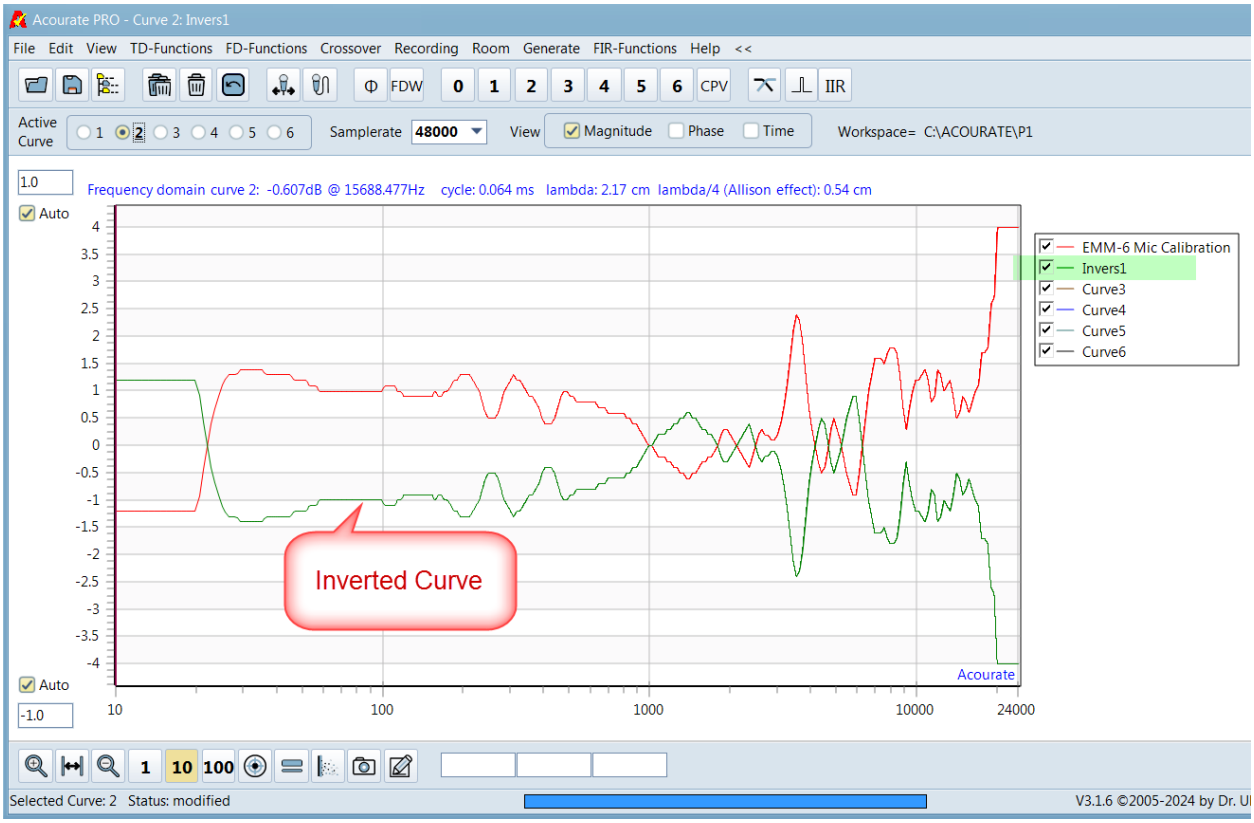
Select **Minimum Phase**. This is the default.

Select **Curve 2**. This will place the results of the Inversion into Curve 2.

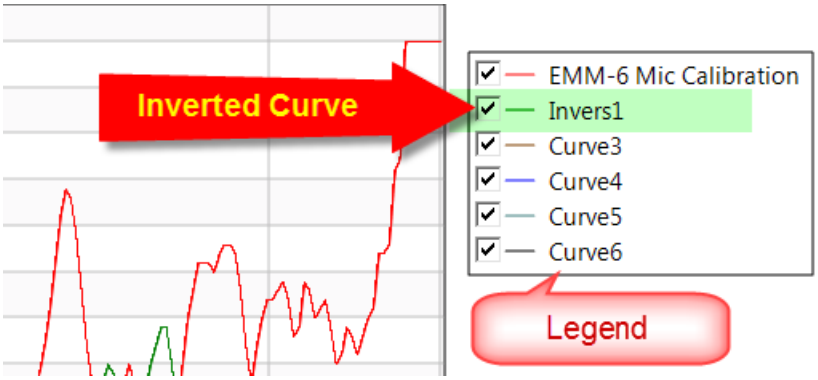


Calculate Inversion

The green curve is your Inverted Curve.

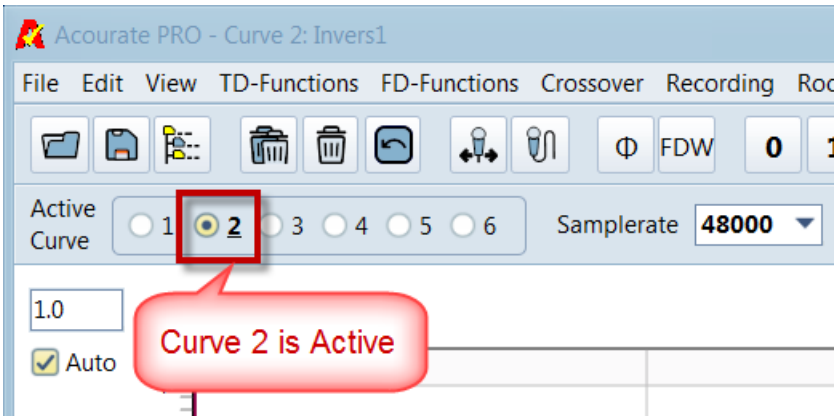


The Legend will show the Inverted Curve in green.

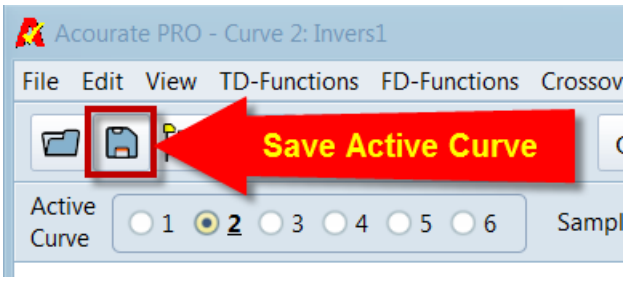


You are going to Save the Inverted Curve as **EMM-6 Inverted**

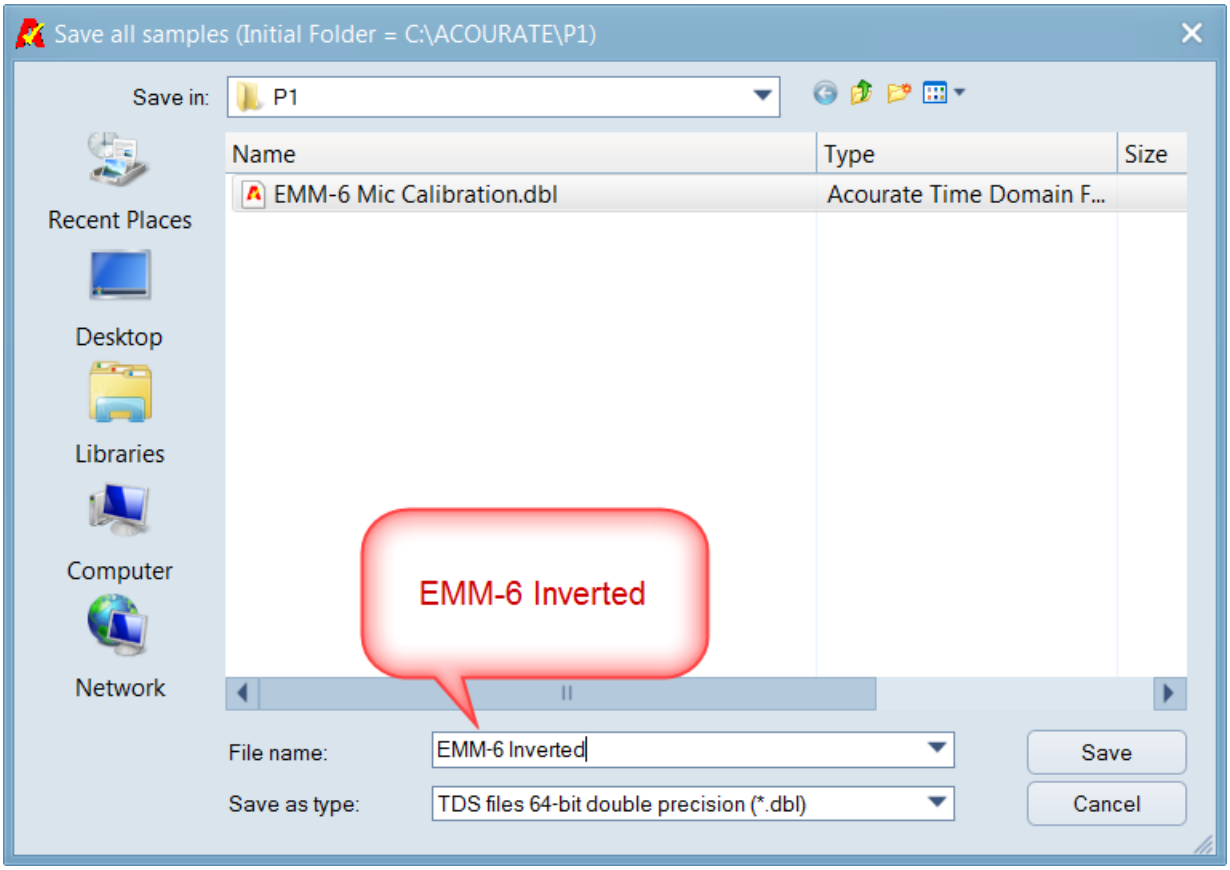
Make sure Curve 2 is Active



Click on the Save Icon.

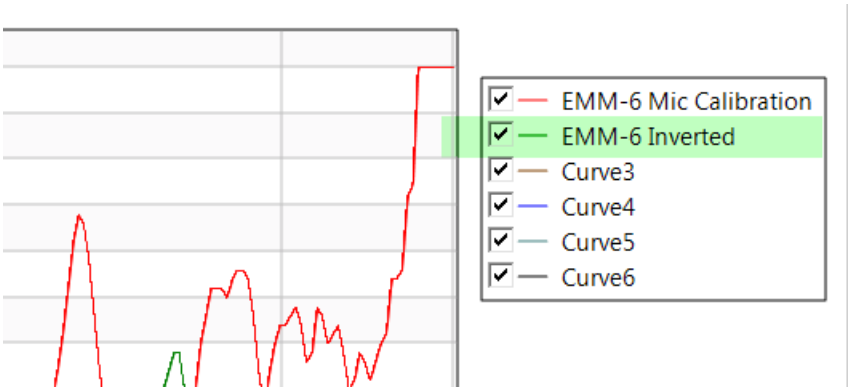


Name the Inverted Curve = **EMM-6 Inverted**



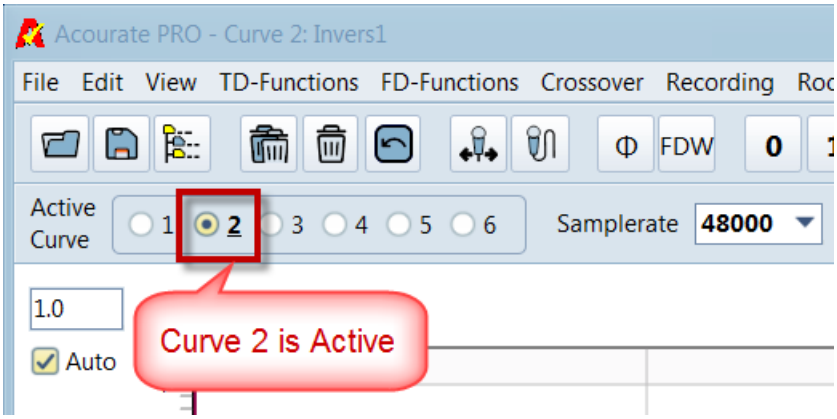
Save

The Legend will display the saved name = **EMM-6 Inverted**

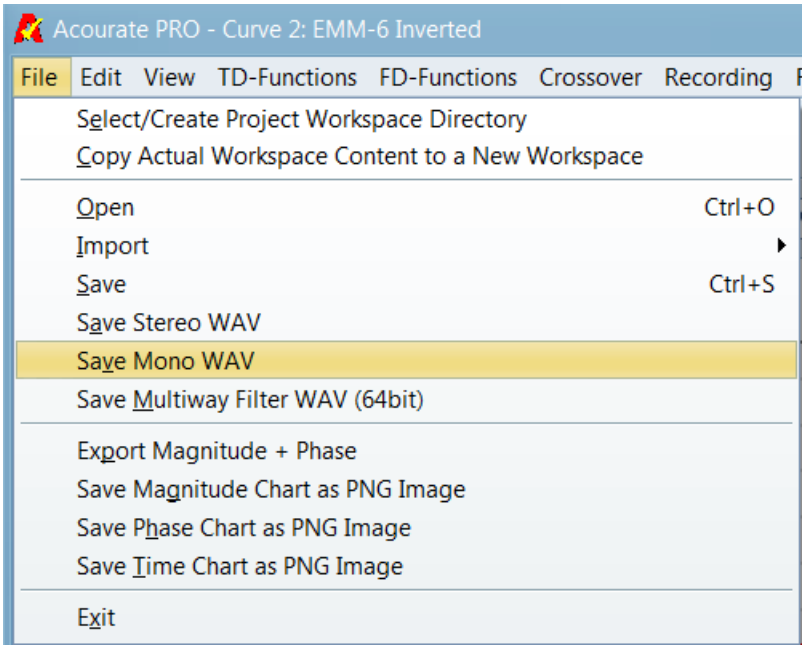


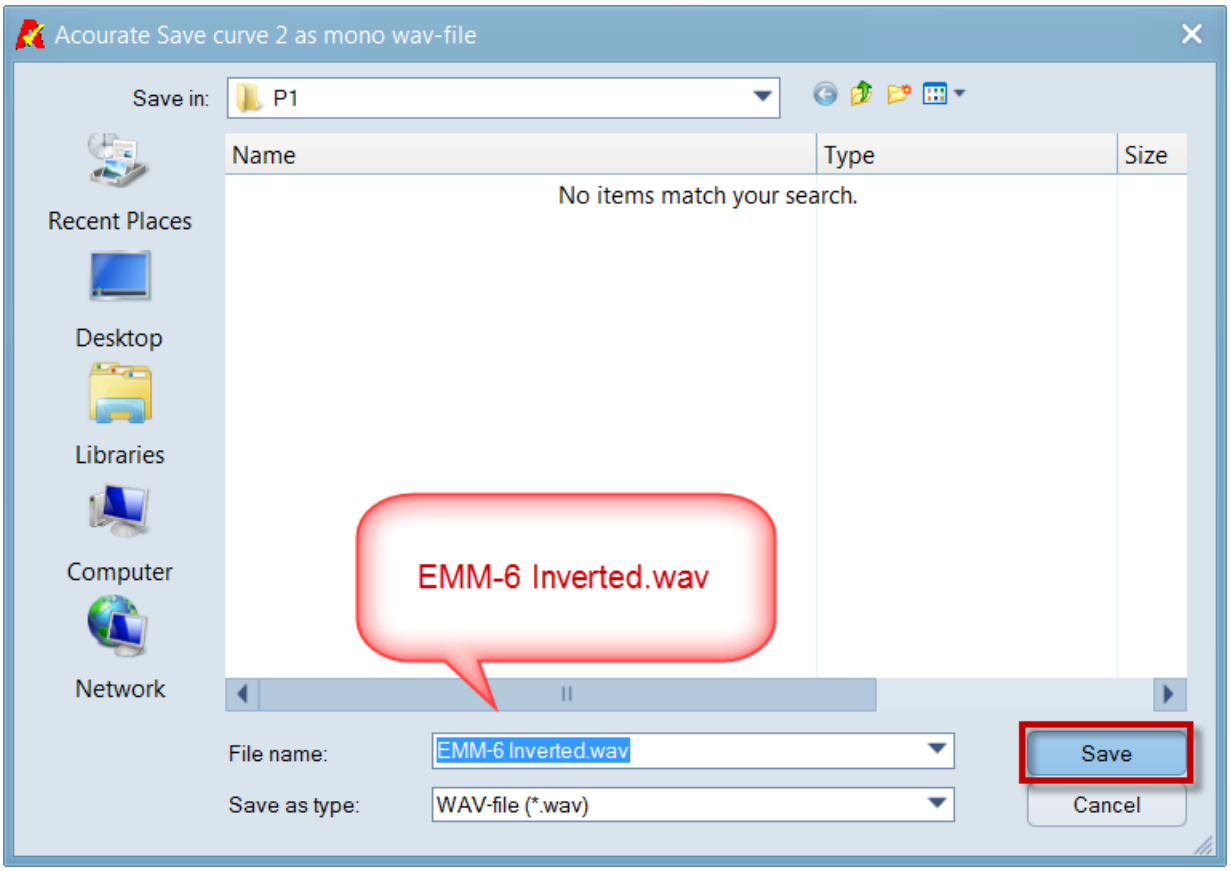
Save the Inverted Curve to a Mono WAV file

Make sure Curve 2 is Active



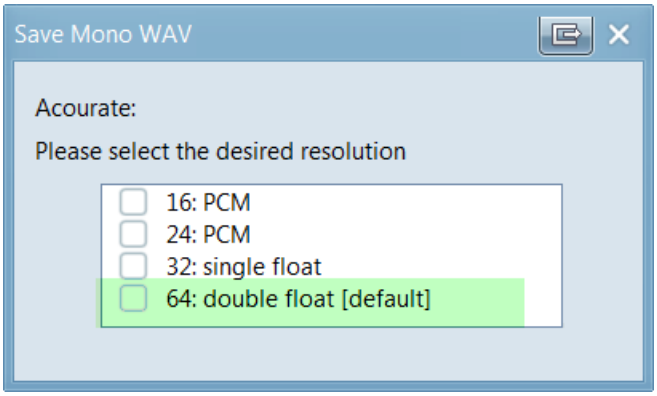
File > Save Mono WAV





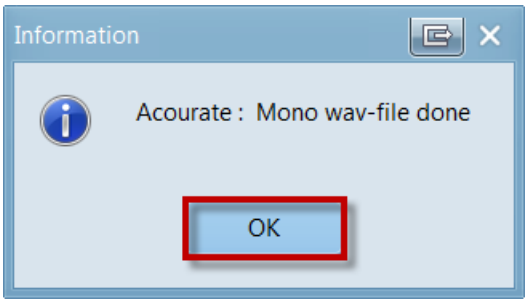
Save

Select 64: double float [default]



Note: Always select the default or the highest value.

You will get this confirmation dialog.



View the contents of C:\ACOURATE\P1

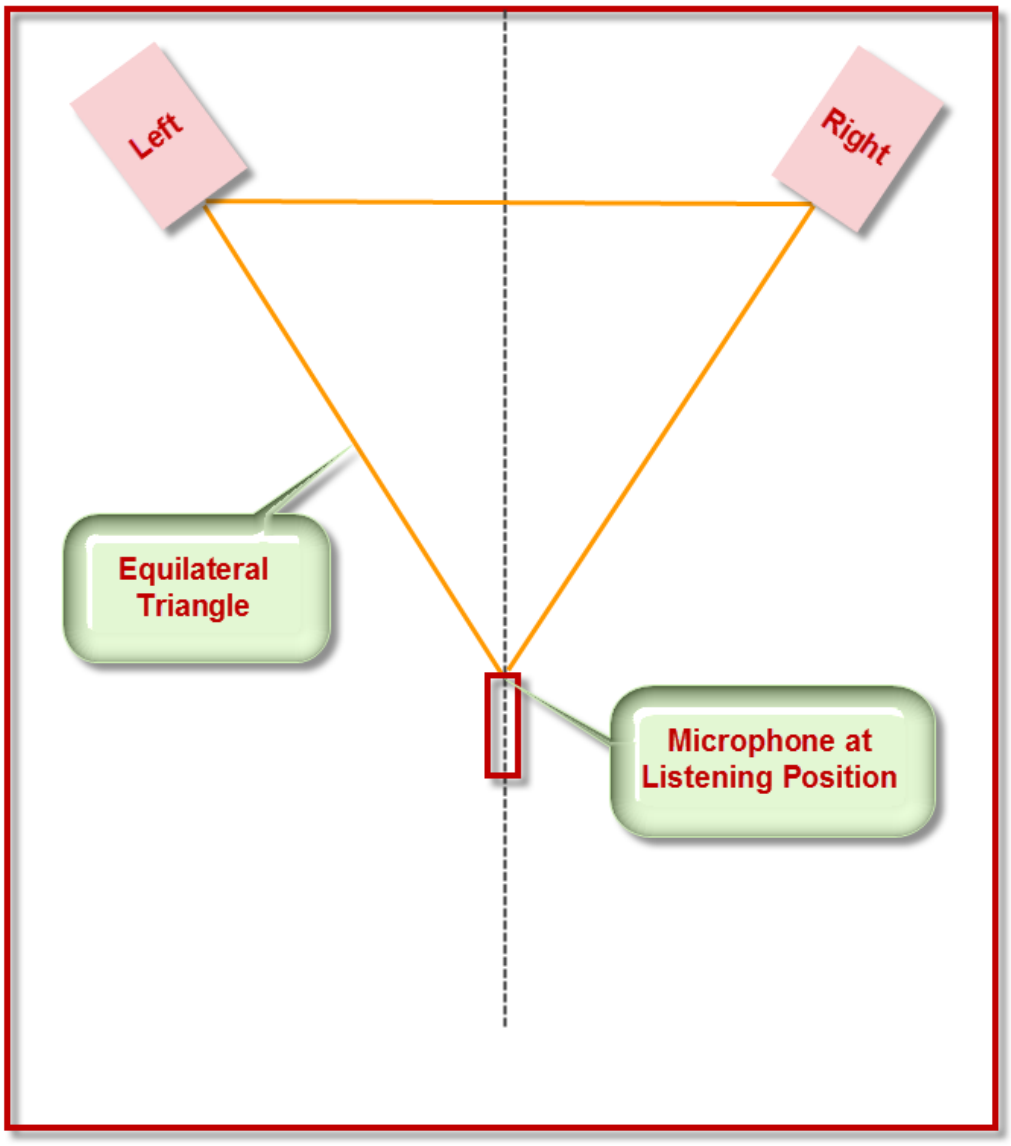
33587.txt	Text Document	4 KB
Acourate.ini	Configuration settings	3 KB
AcourateHistory.txt	Text Document	7 KB
EMM-6 Inverted.dbl	Acourate Time Domain File	512 KB
EMM-6 Inverted.wav	WAV Audio File (VLC)	513 KB
EMM-6 Mic Calibration.dbl	Acourate Time Domain File	512 KB

You will see the new **EMM-6 Inverted.wav** file in your Project Workspace.

Microphone Alignment

Orient the Microphone horizontally at the listening position at ear height.

It should *not* be pointed to the Left or the Right speaker but rather straight ahead on axis as shown in this diagram. The microphone should remain fixed at this position throughout the duration of this Project.



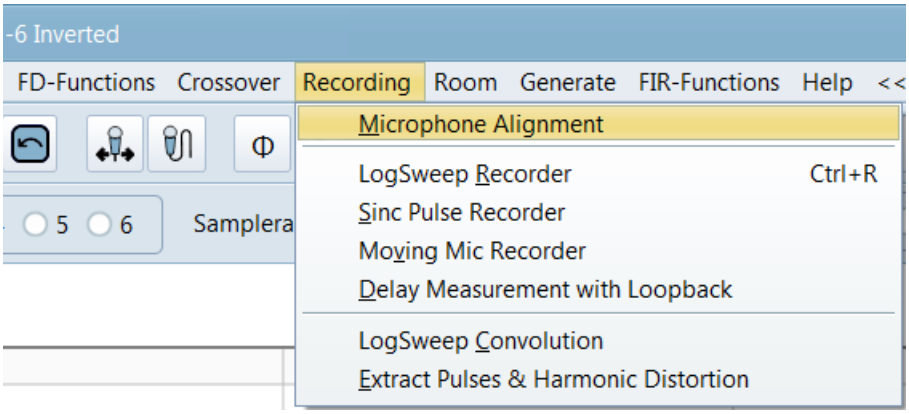
Ideally, the listening position should form an equilateral triangle for best imaging.

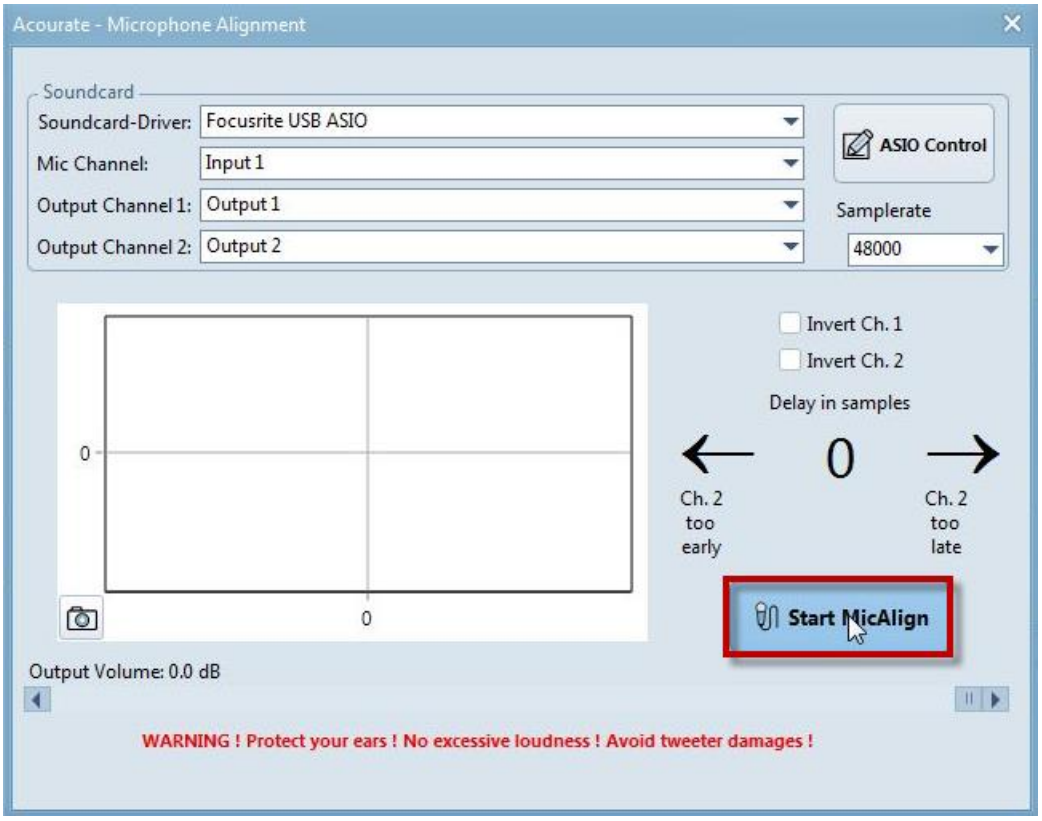
At the very least, the listening position should be equidistant from the Left and Right speakers.

Now you are ready to precisely align your Microphone.

It must be exactly on axis at the same distance from the Left and Right speakers.

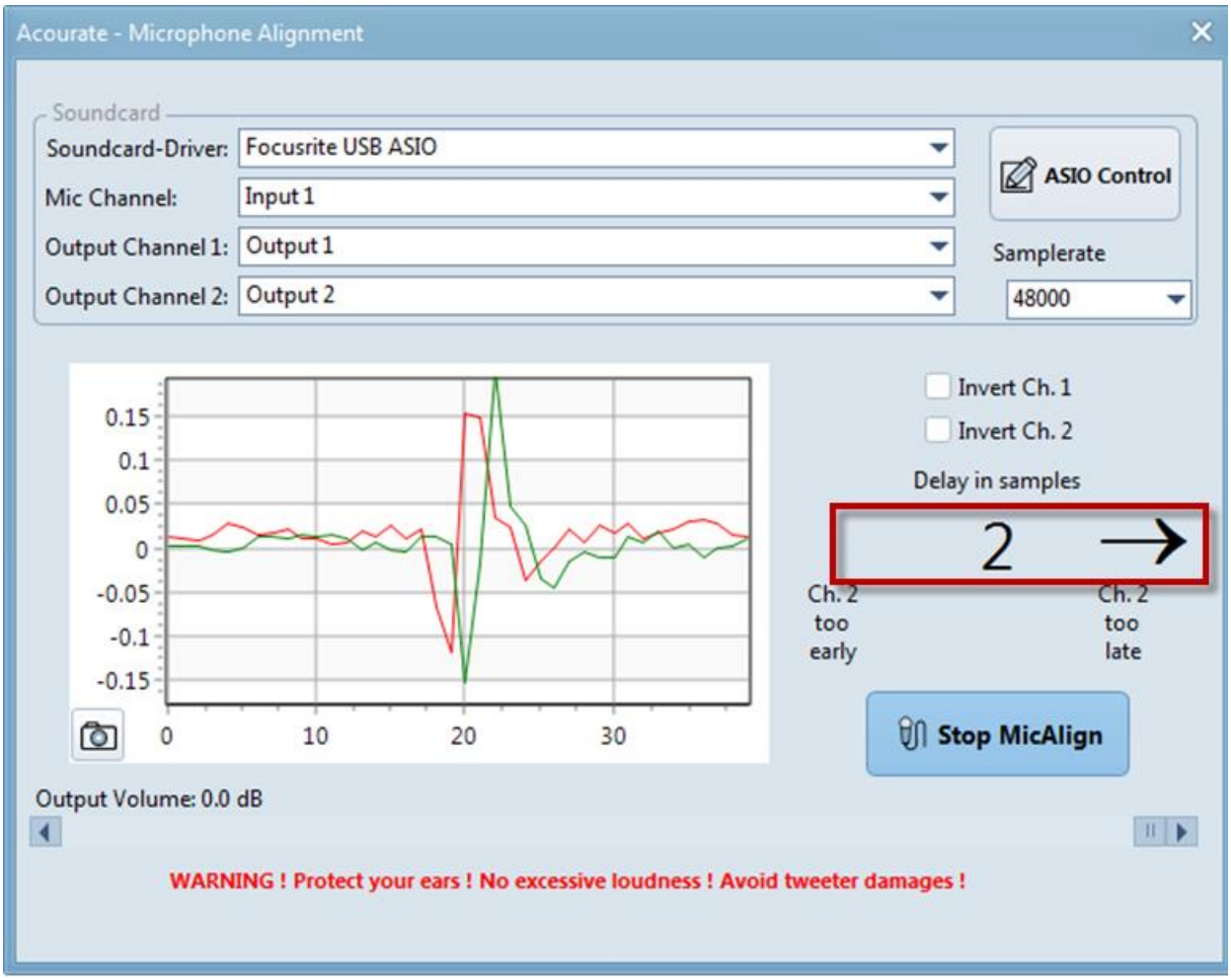
Recording > Microphone Alignment



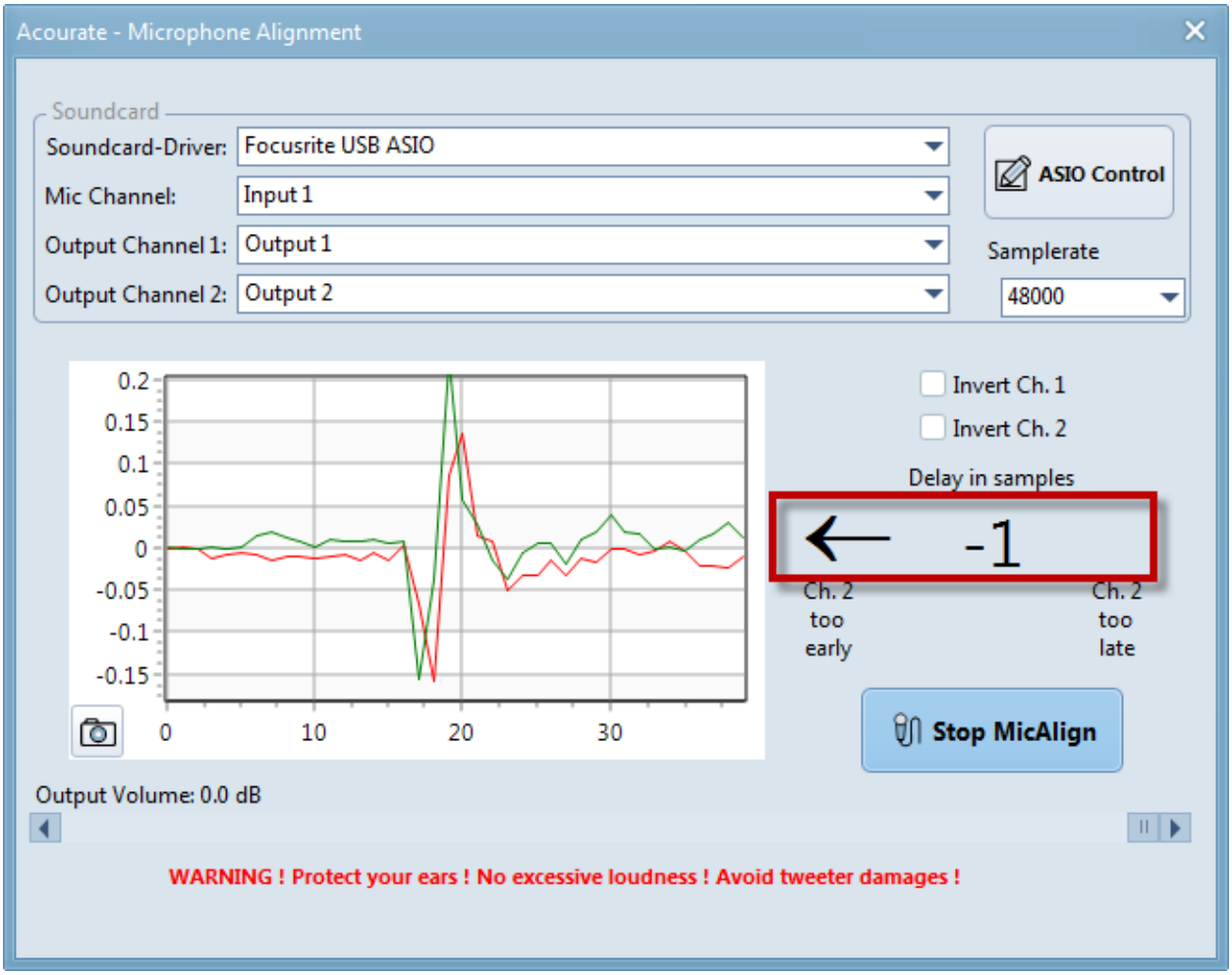


Start MicAlign

Watch the arrow. It will tell you which way you need to move your microphone.

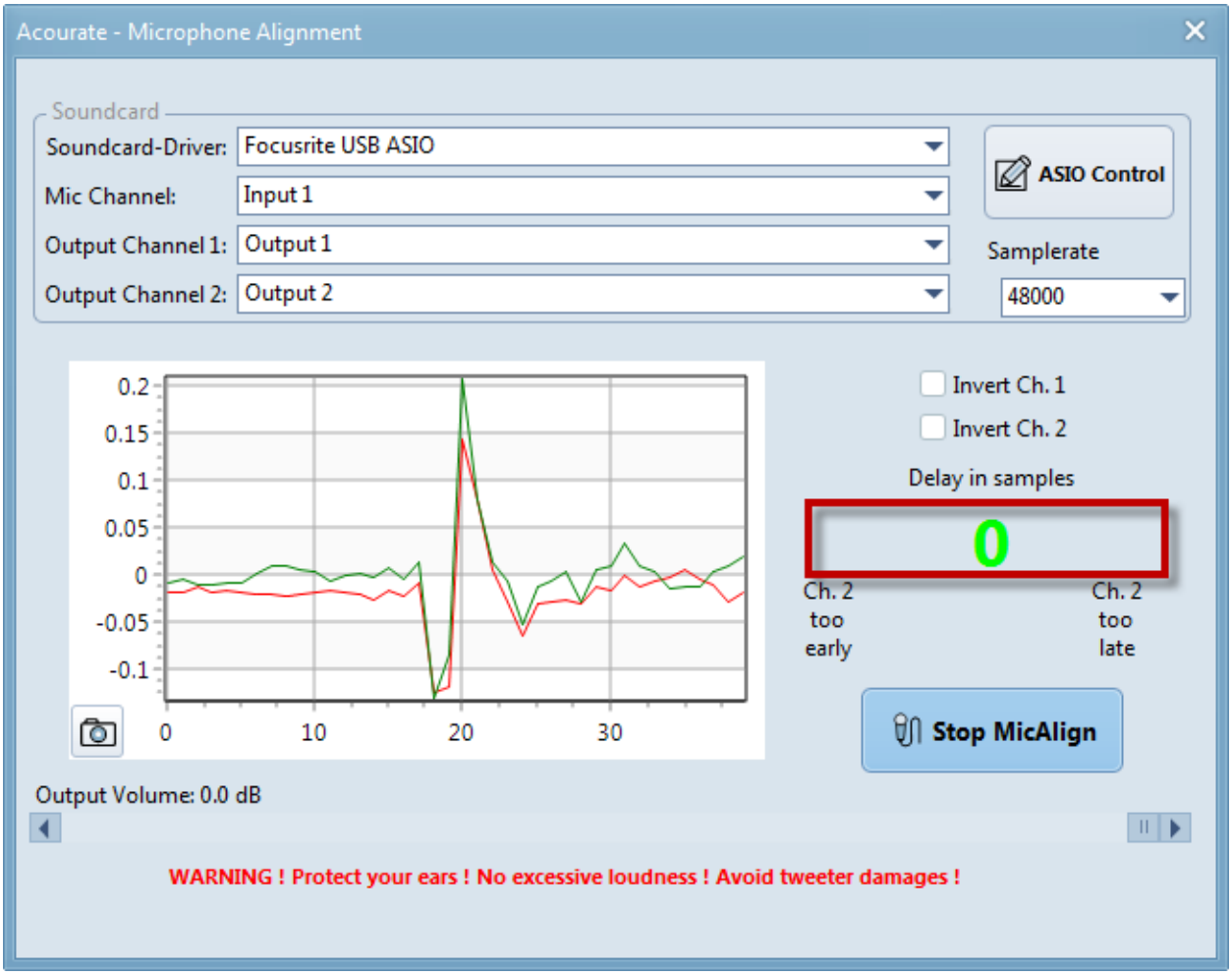


Move the Microphone a bit to the right.



Move the Microphone a bit to the Left

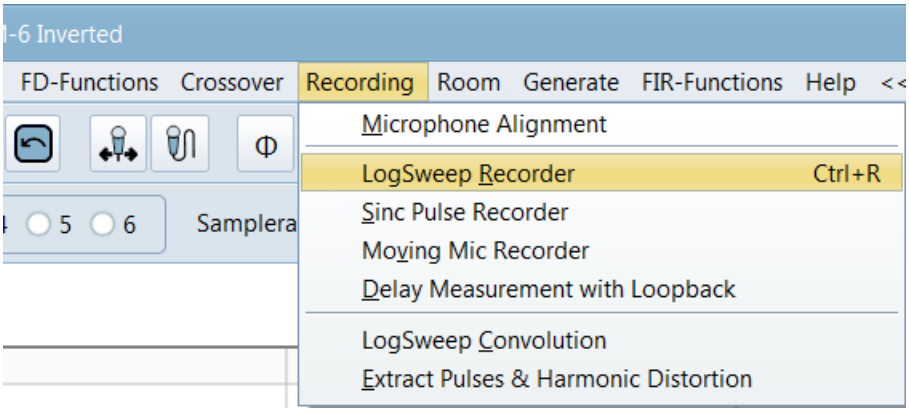
Your Microphone will be perfectly aligned when the reading shows a green zero.

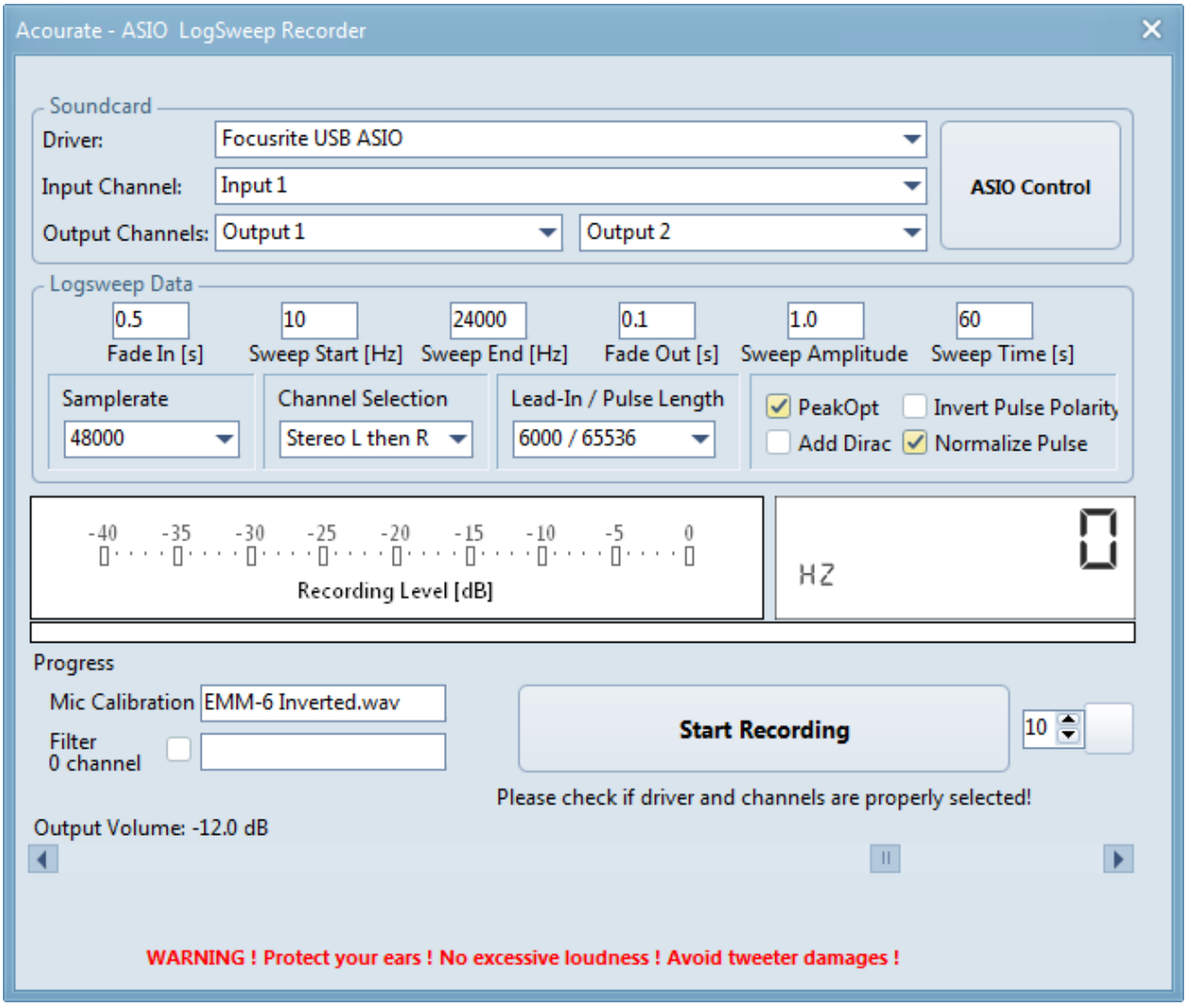


Stop MicAlign

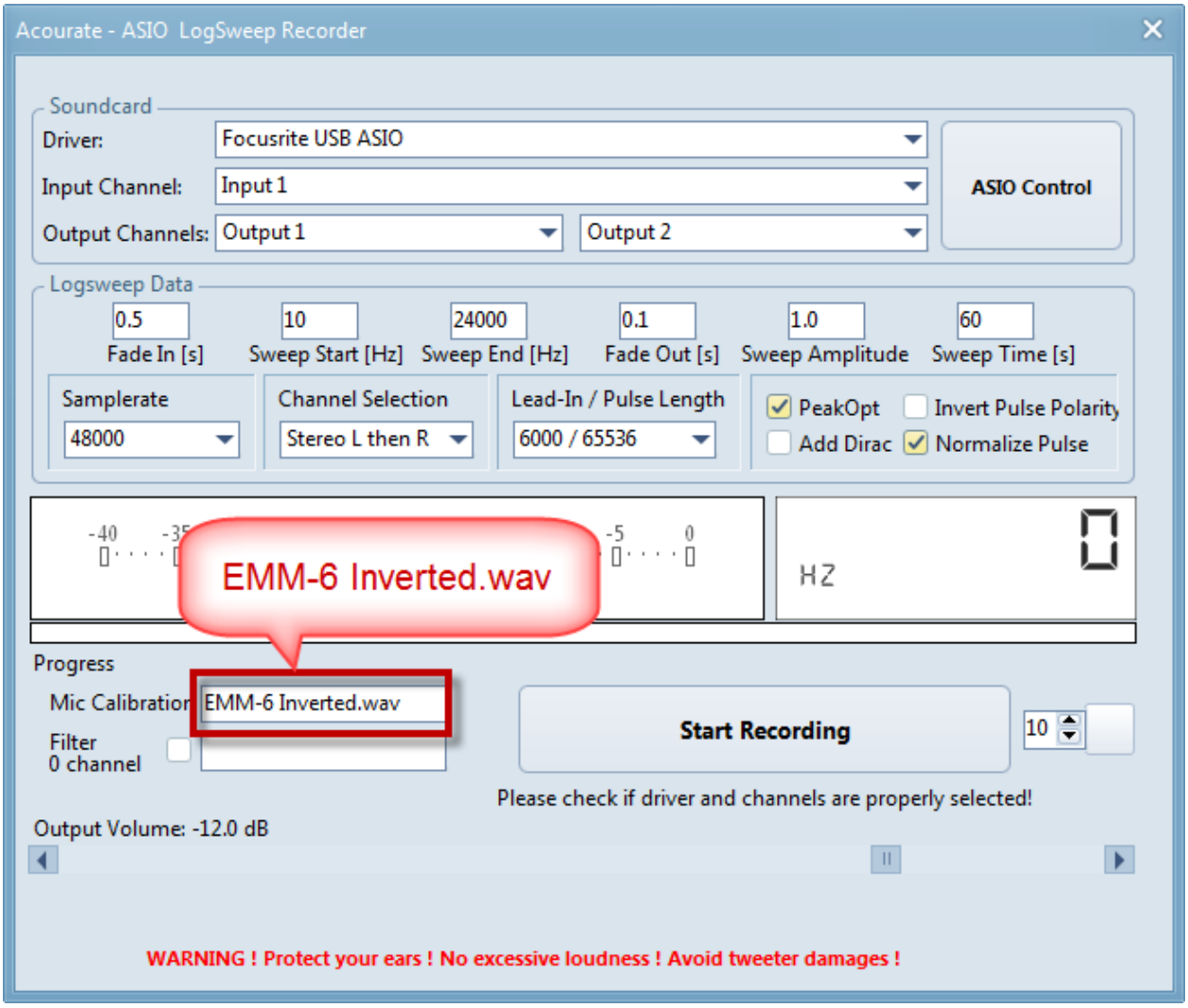
LogSweep Recorder

Recording > LogSweep Recorder

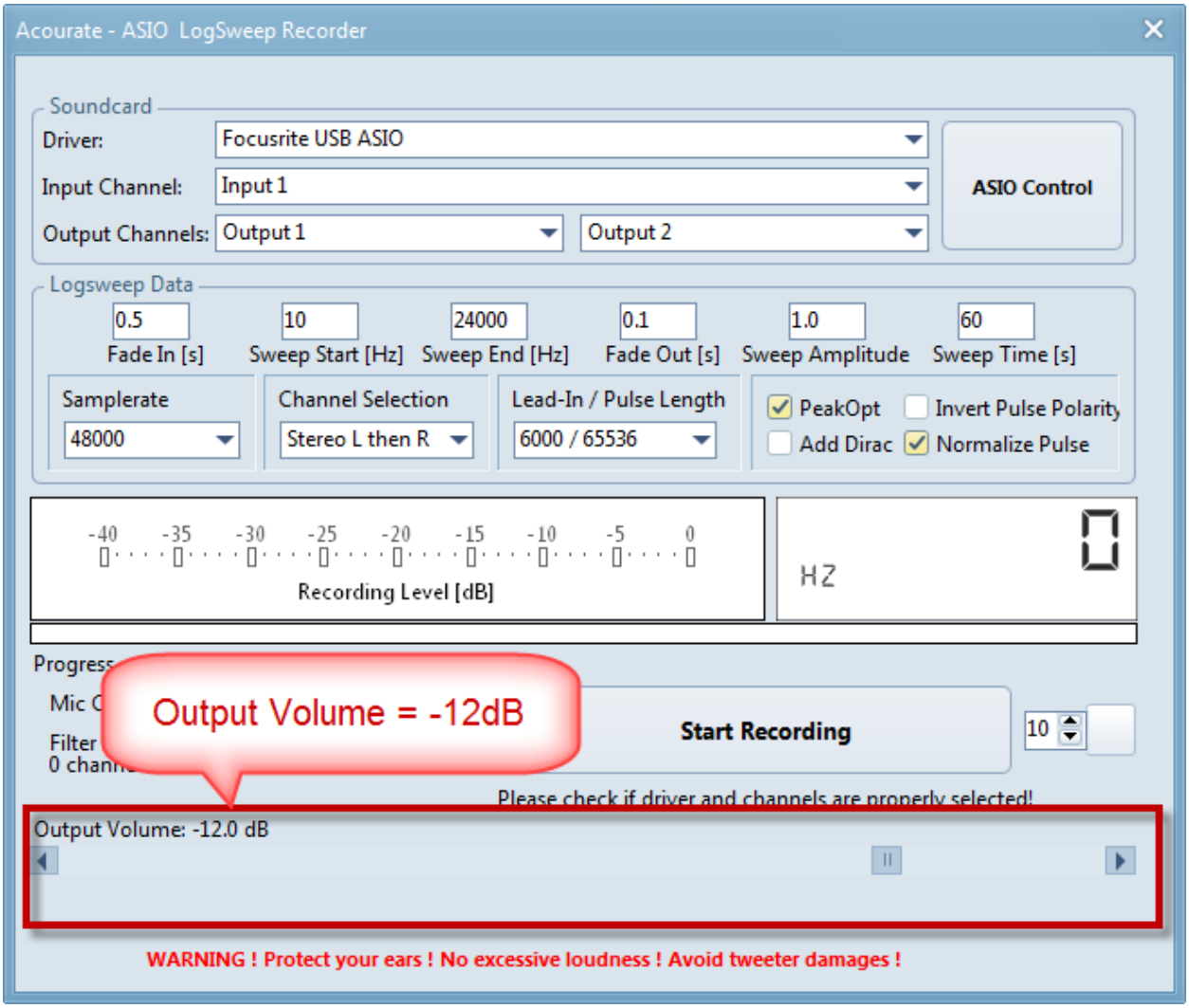




Select Mic Calibration = **EMM-6 Inverted.wav**

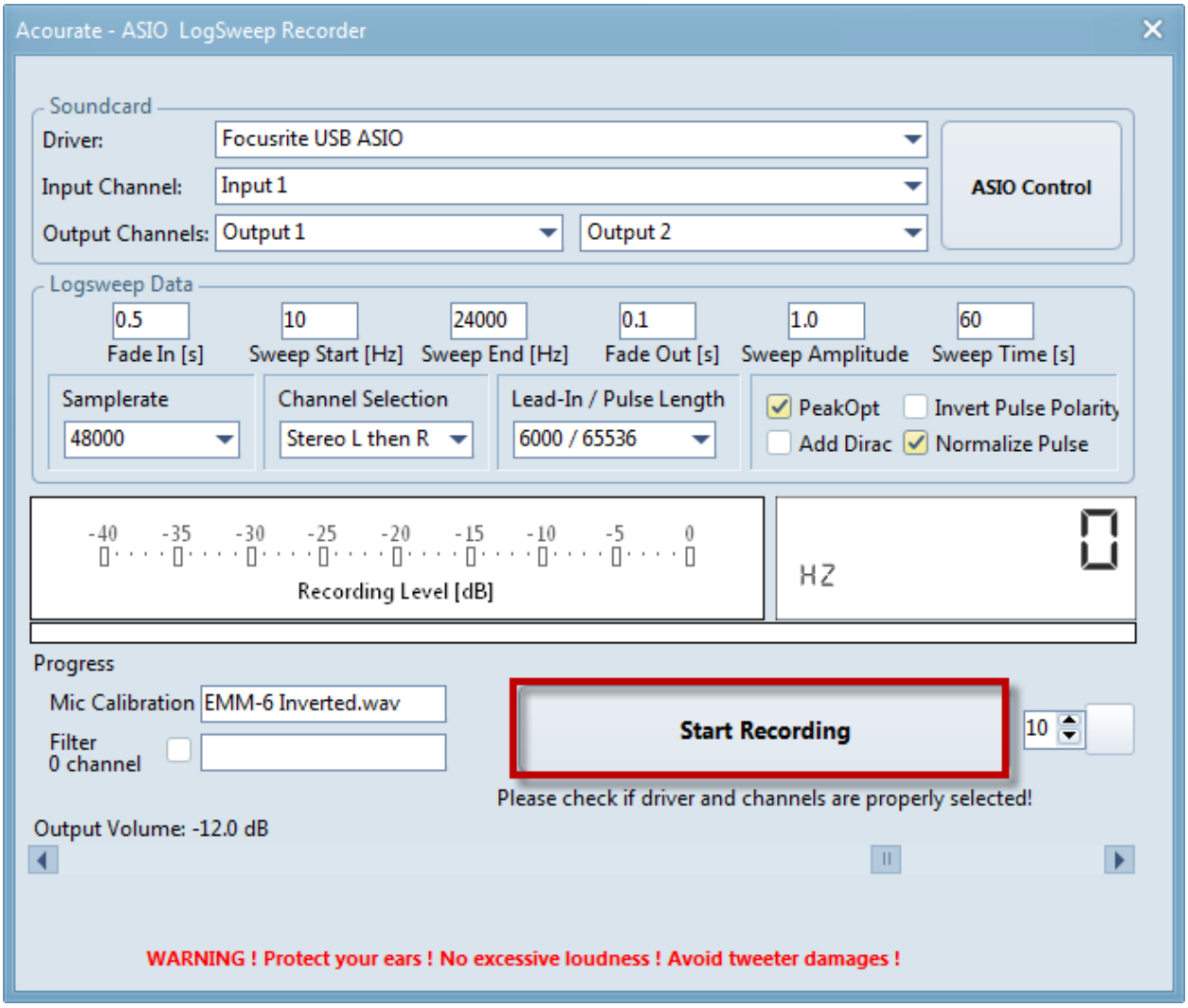


Reduce the Output Volume from 0dB (Default) to -12dB.
This matches the default Output Volume in REW.



Note: It is a good idea to play the LogSweep at roughly the same level you use for music playback for example around 80dB.

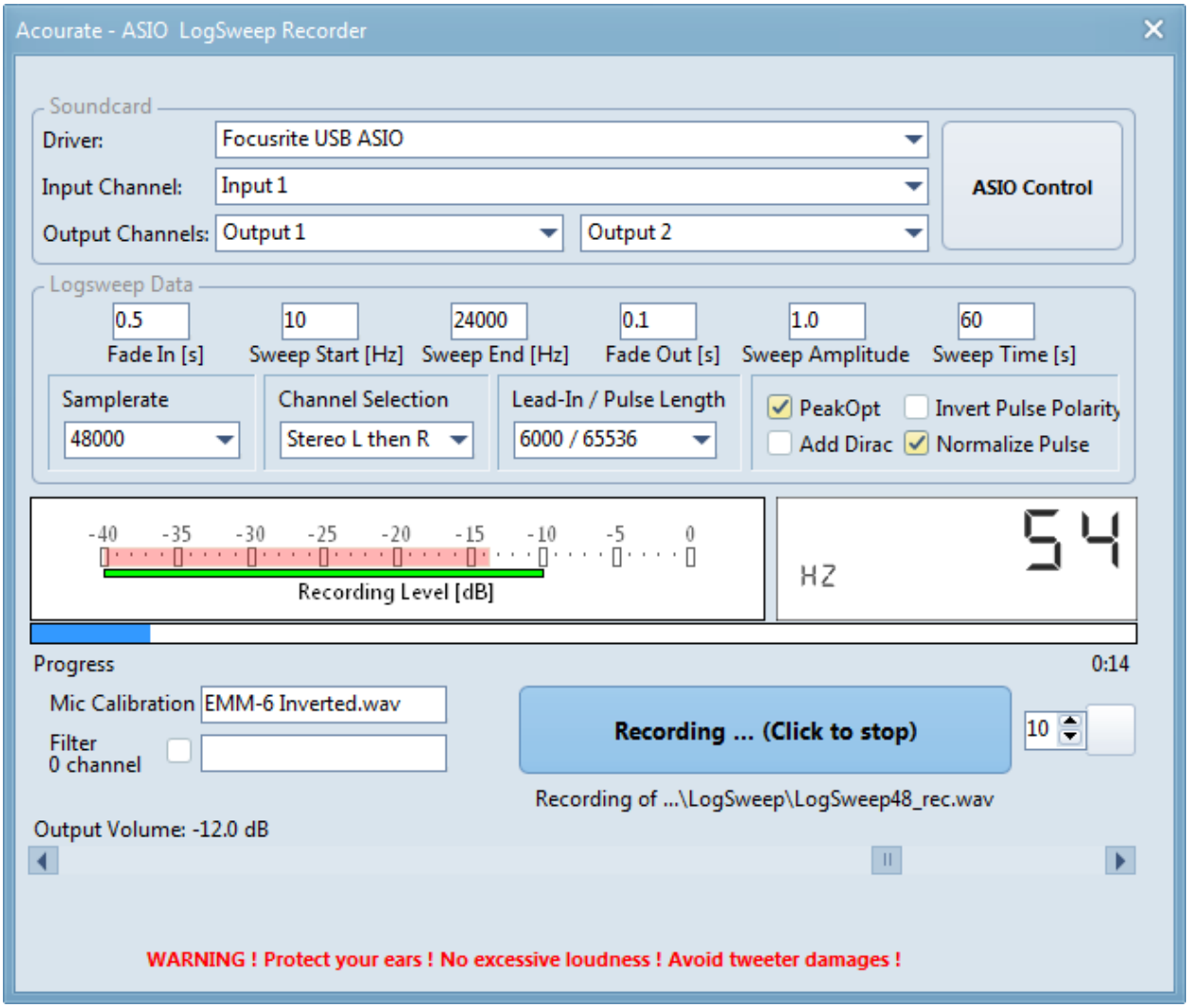
Start Recording



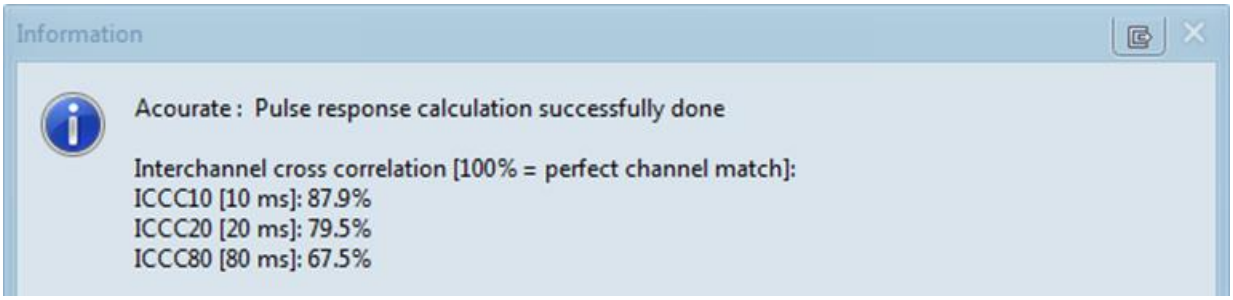
You need to stay absolutely quiet as it sweeps the Left Channel followed by the Right Channel.

Turn off the Air Conditioner.
Turn off anything that may be creating any external noise.

Recording in progress.

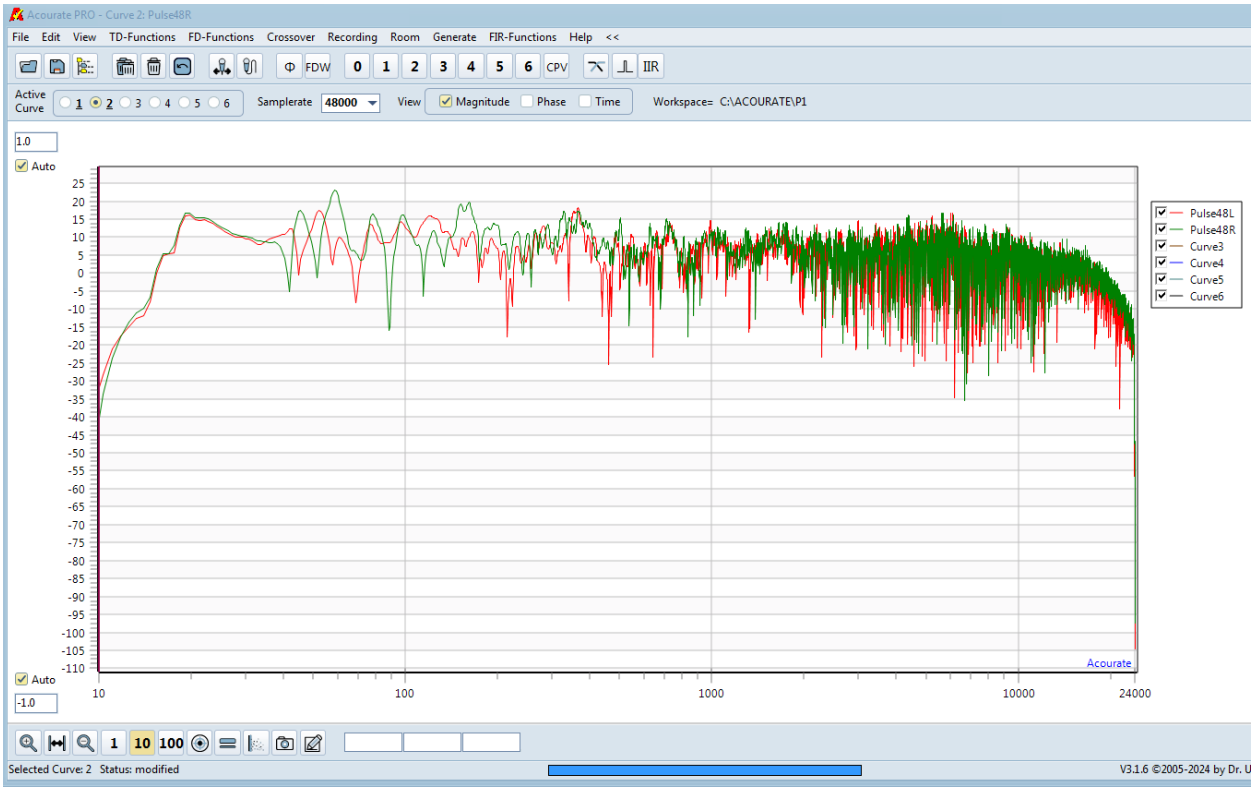


An Information screen will appear at the end showing how good your Interchannel Cross Correlation is.

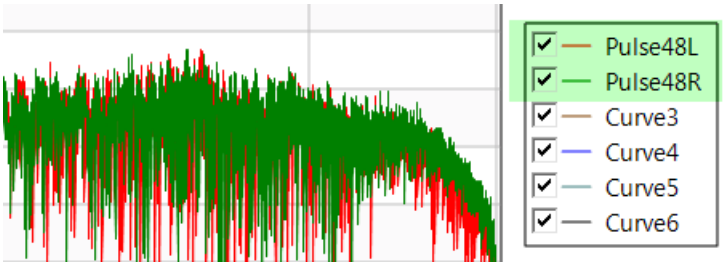


Press OK

Two new curves will appear.



Examine the Legend



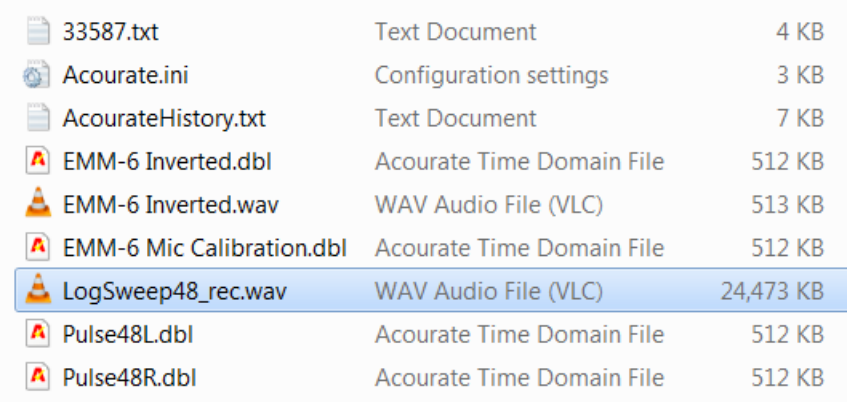
Curve 1 = Pulse48L = Measured Impulse Response of the LEFT Channel shown in red.

Curve 2 = Pulse48R = Measured Impulse Response of the RIGHT Channel shown in green.

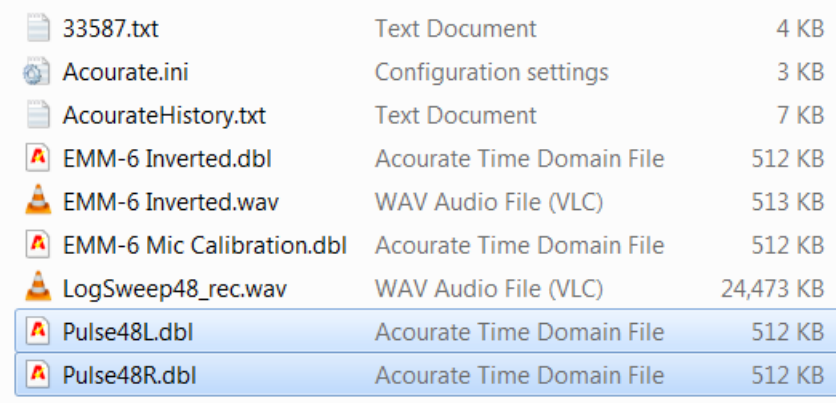
View the contents of the Project Workspace P1

C:\ACOURATE\P1

You will find the LogSweep Recording of the Left and Right Channels in WAV format.



You will find the Measured Impulse Response of the Left and Right Channels.

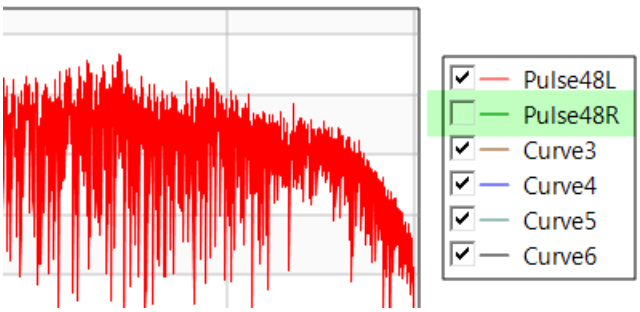


Before you proceed to apply any digital corrections, let's examine the problem areas in your Measured Impulse Response curves.

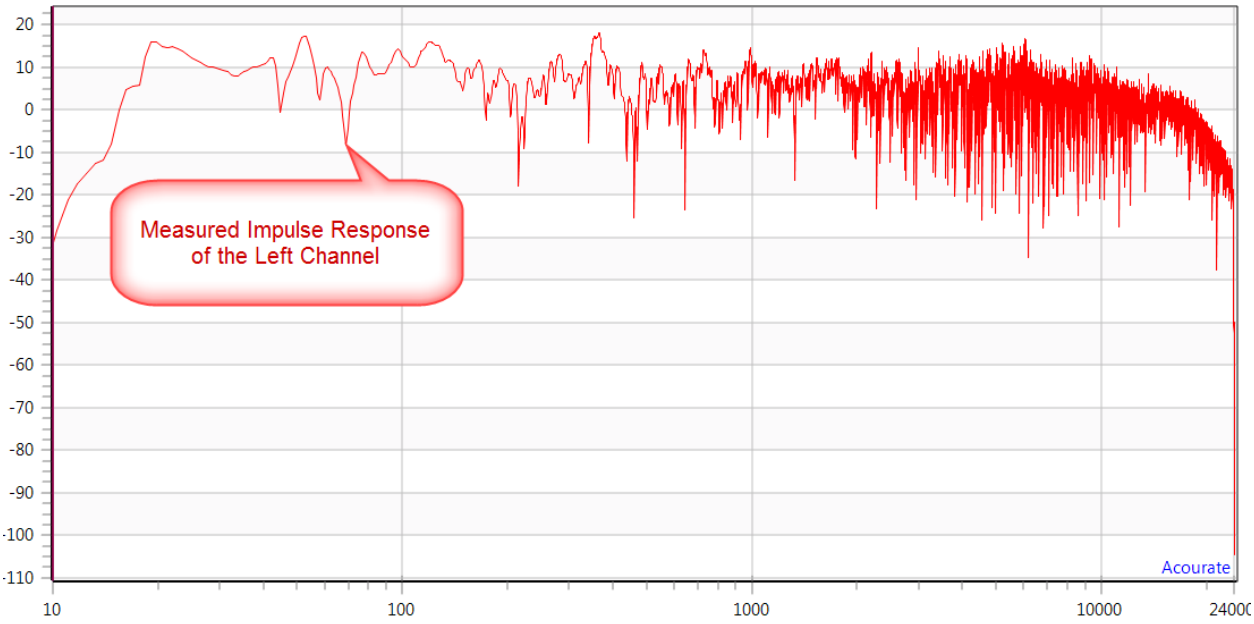
Examine the Measured Impulse Response curves

First, you will examine the Left Channel.

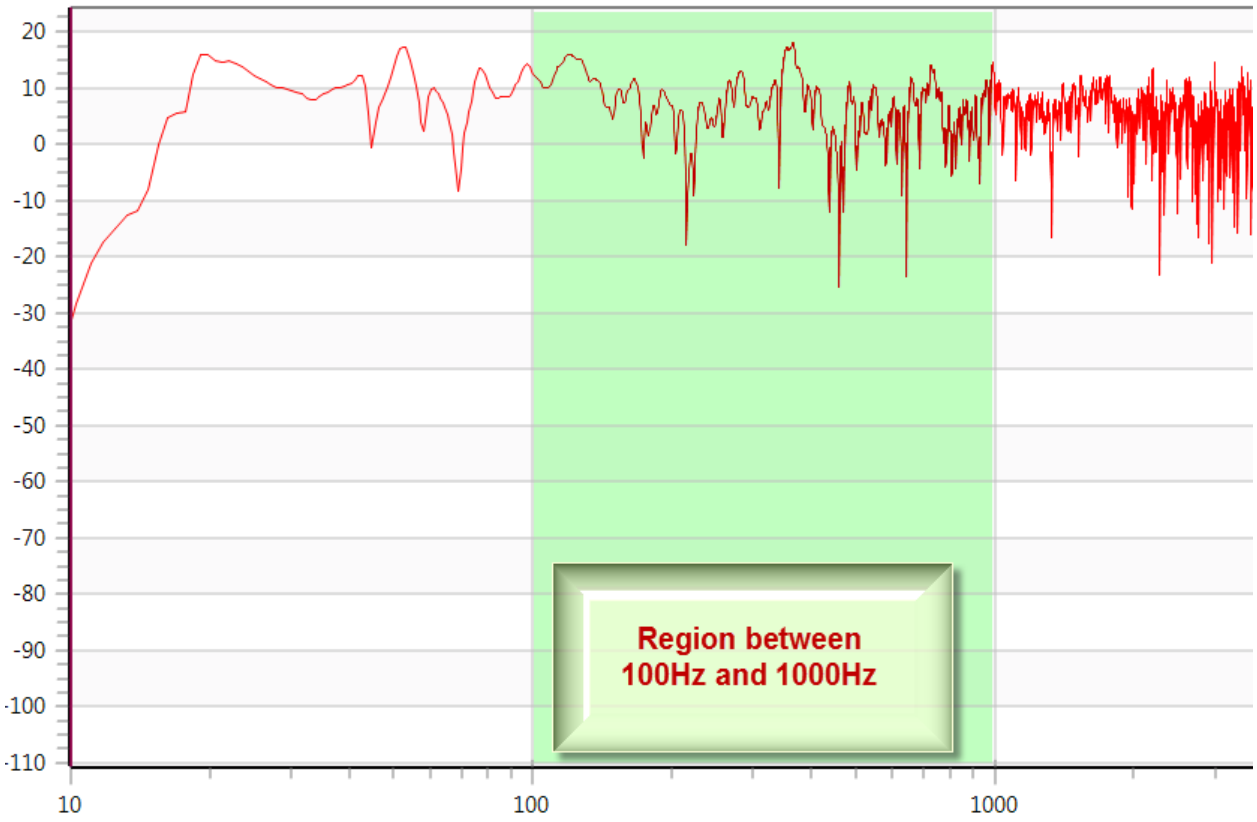
Uncheck Pulse48R in the Legend



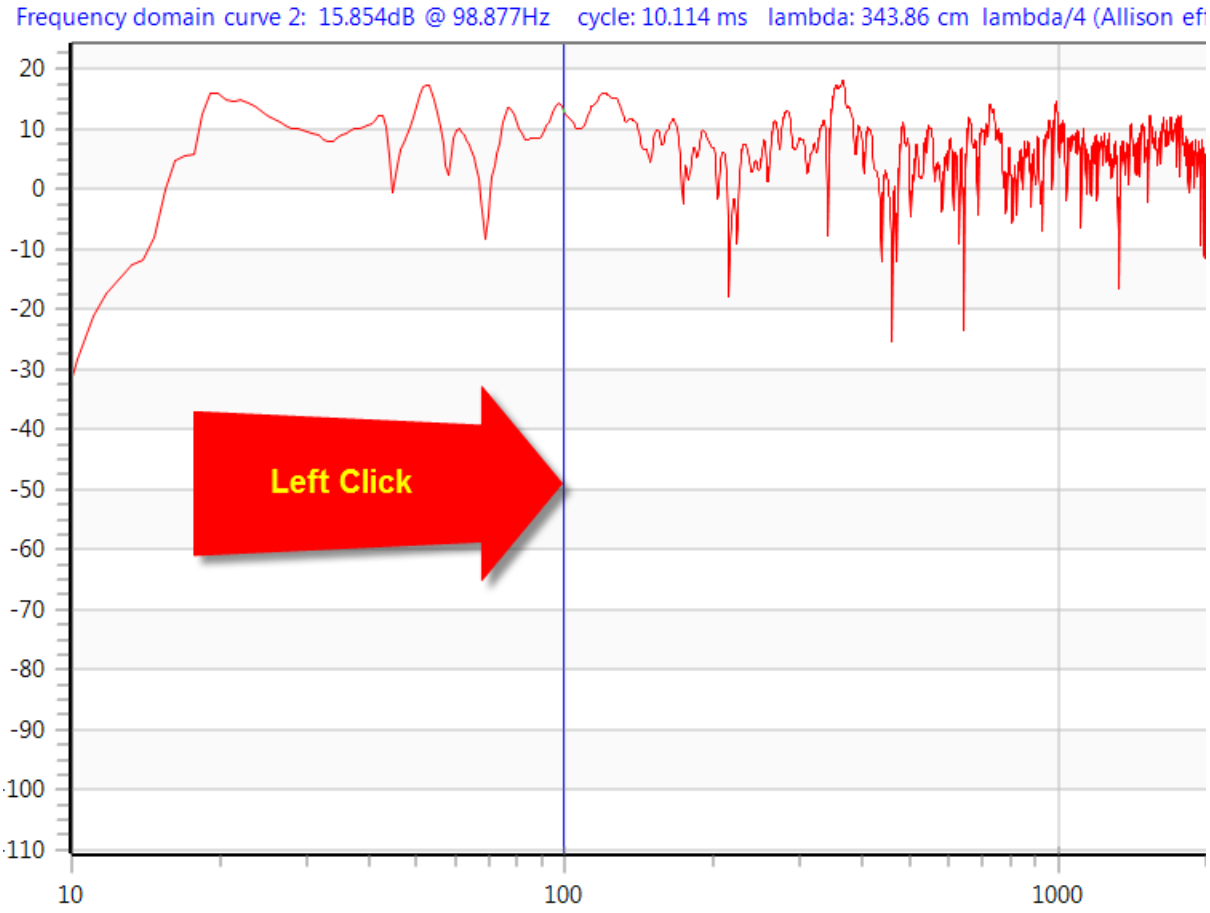
You are viewing the Measured Impulse Response of the Left Channel in red.



Let’s say you want examine the Region between 100Hz and 1000Hz.



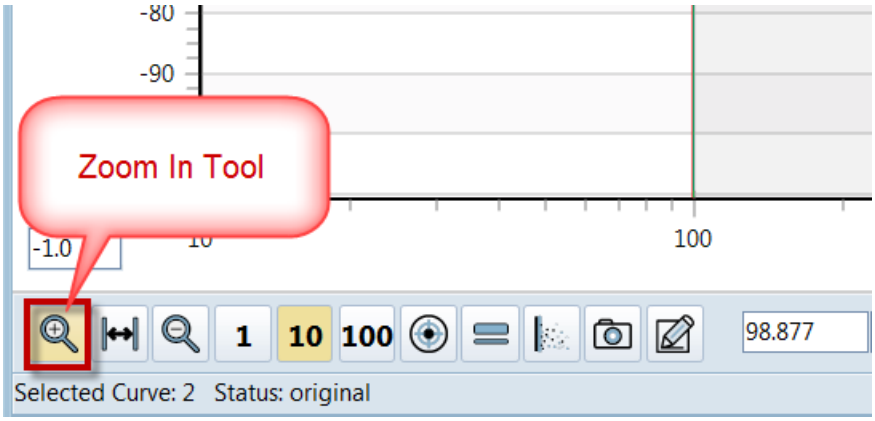
Left Click on the Left Boundary of your Region.



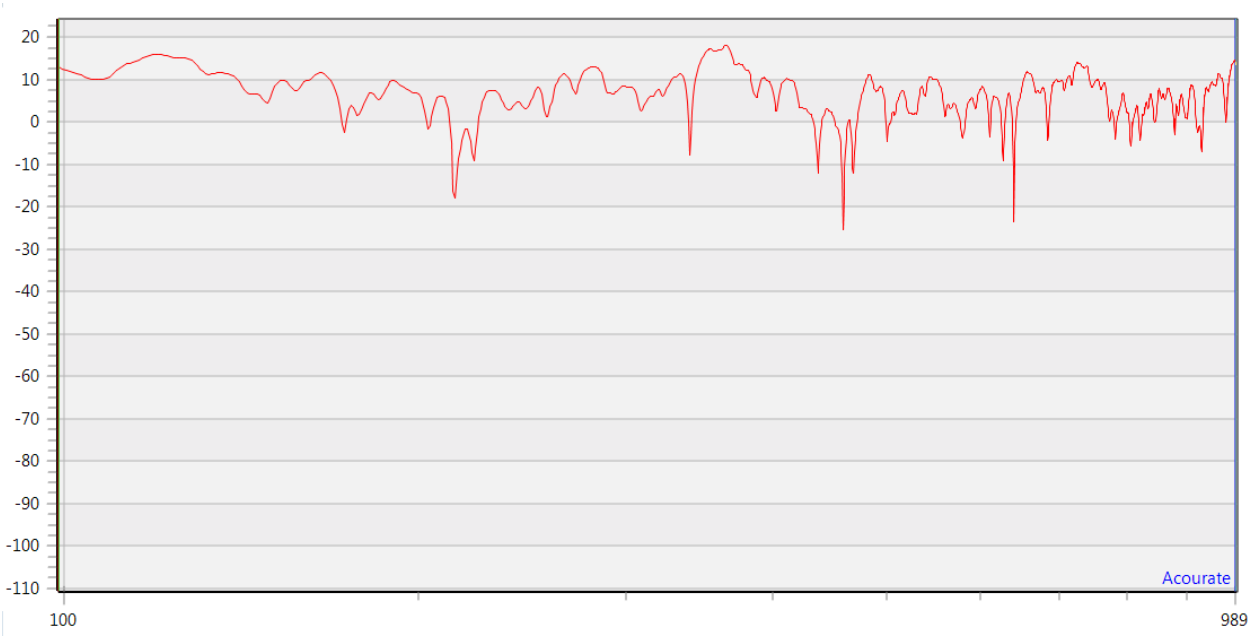
Right Click on the Right Boundary of your Region.

Your Region is now defined.

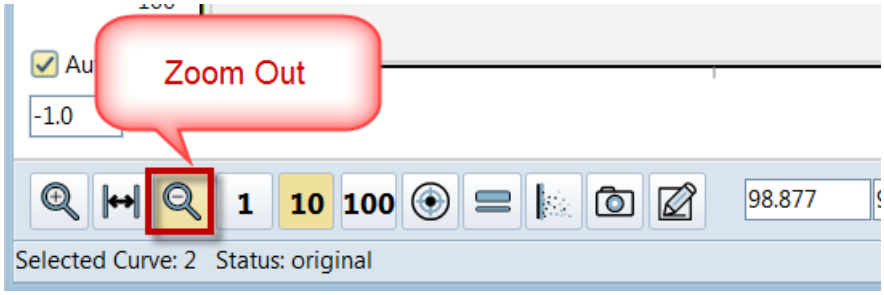
Click on the **Zoom In** Tool



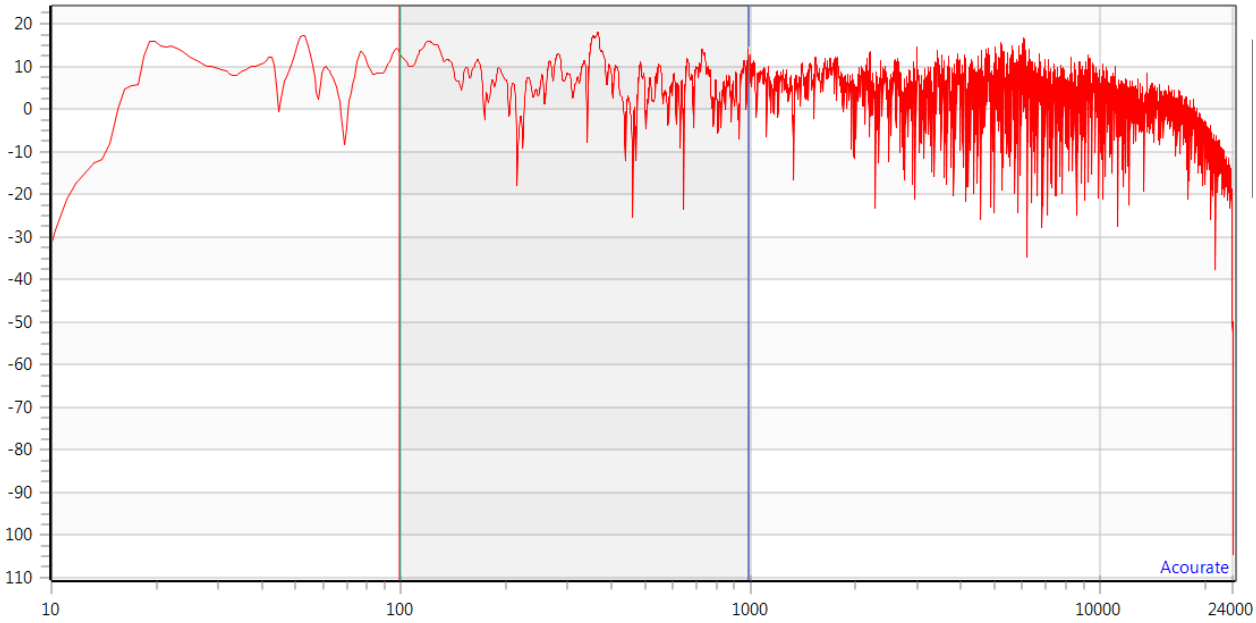
This is your Measured Impulse Response of your Left Channel between 100Hz and 1000Hz.



To go back to the full scale view, click on the **Zoom Out** Tool.

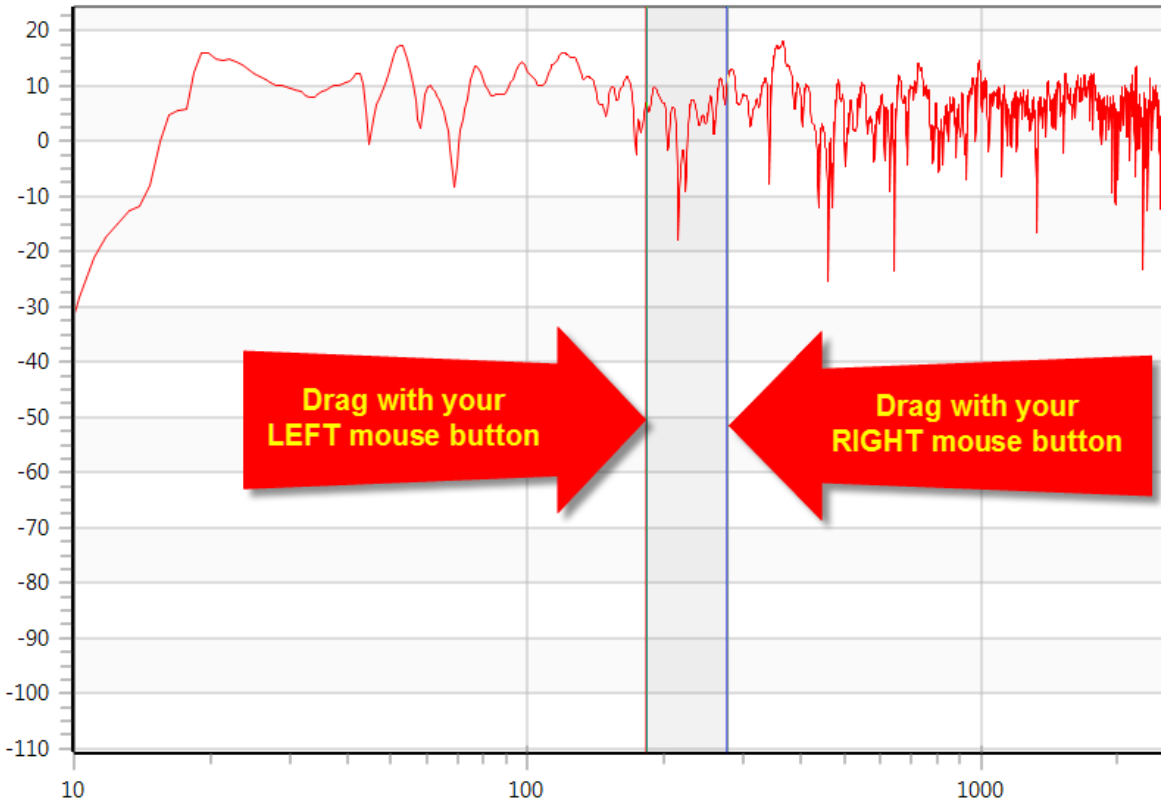


This is your full scale view.

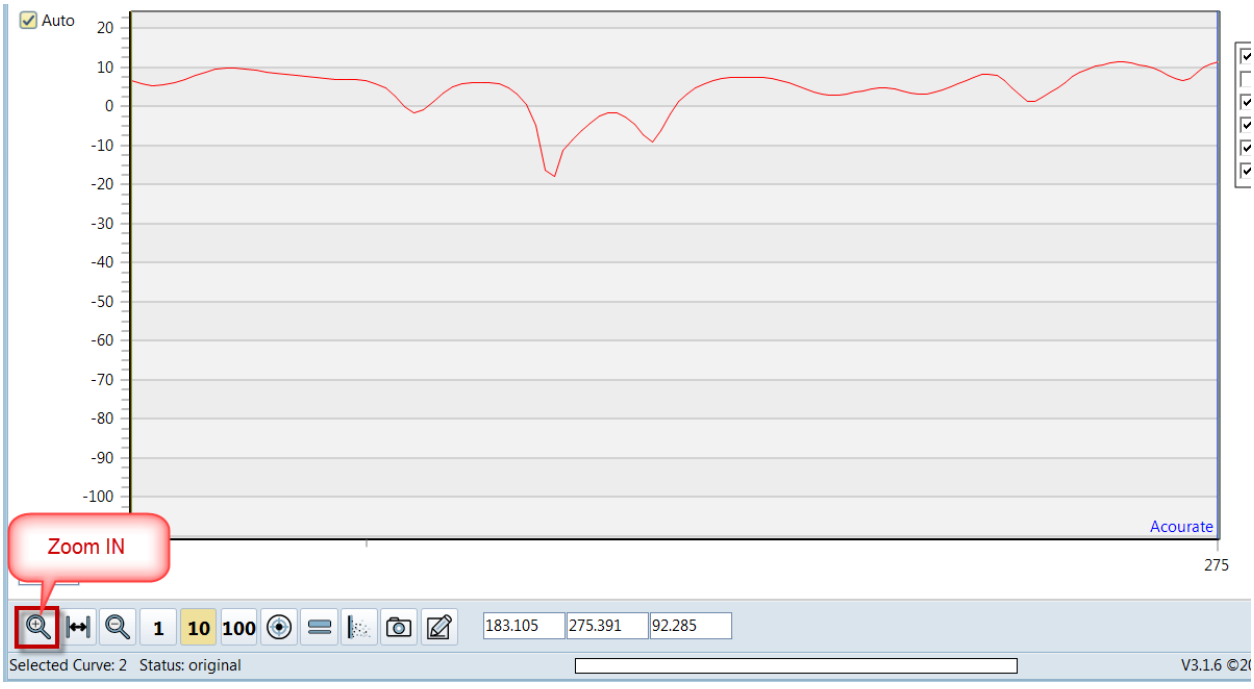


You can define any Region with your Left and Right mouse clicks and zoom in using the Zoom In Tool.

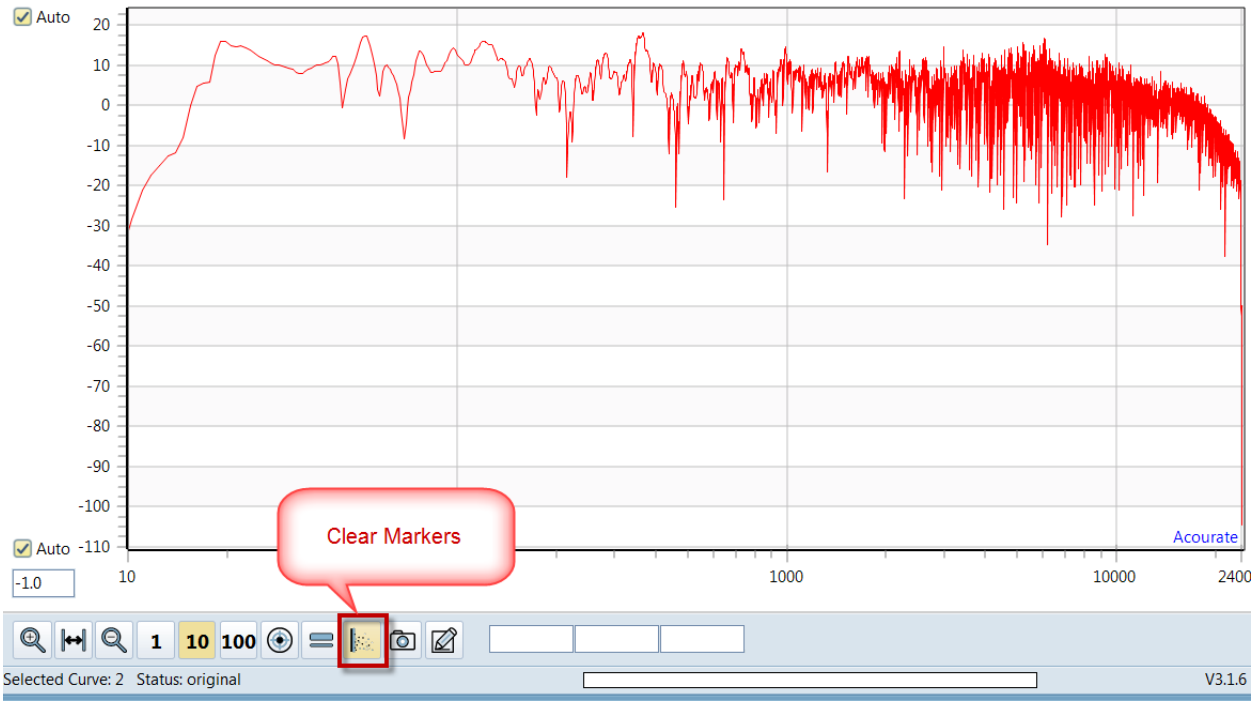
You can drag the boundaries to resize an existing Region.



Zoom In

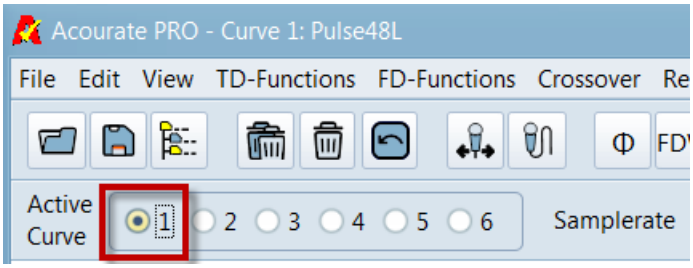


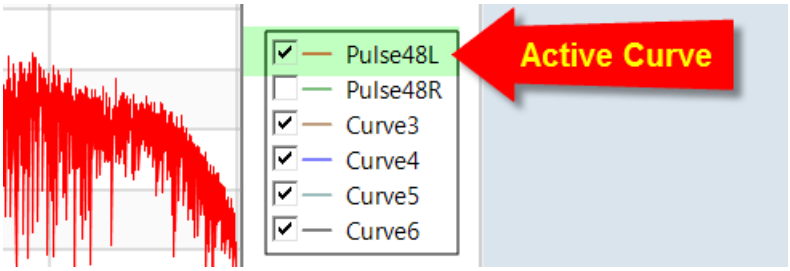
You can remove the Left and Right Markers by clicking on **Clear Markers** Tool.

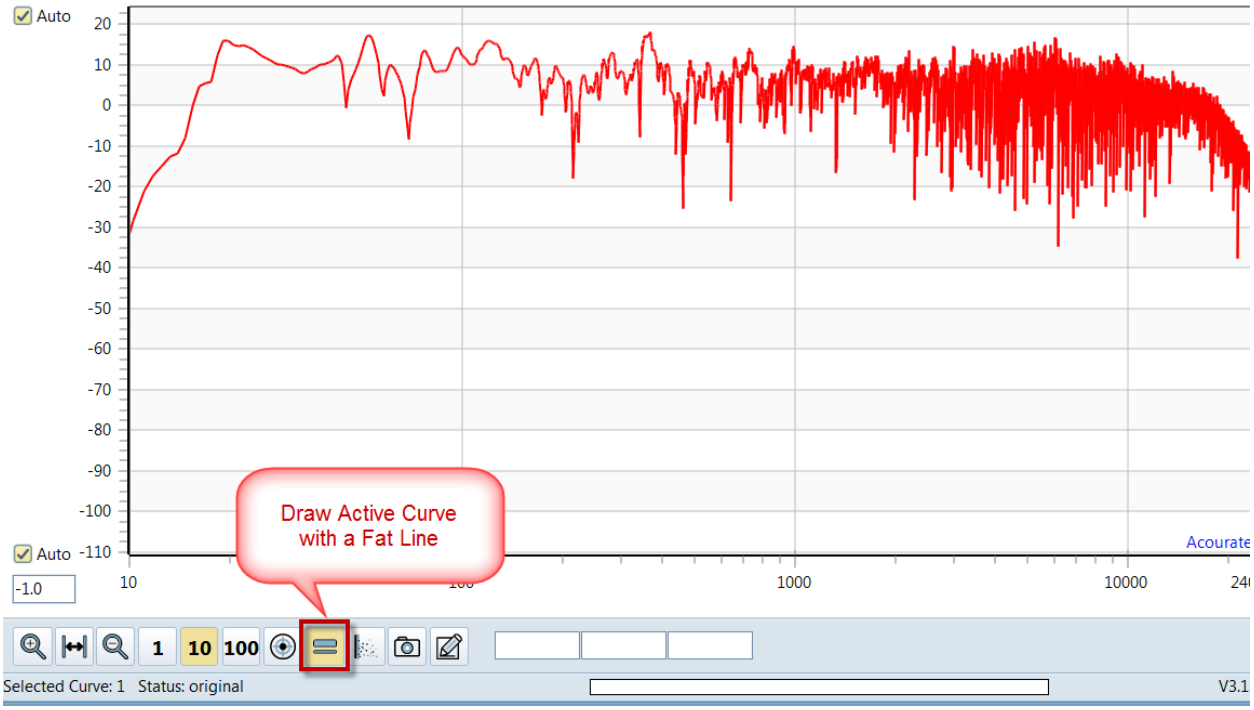


To better visualize what is going on, it is always a good idea to apply some smoothing.

Select Curve 1 = Pulse48L as the Active Curve.



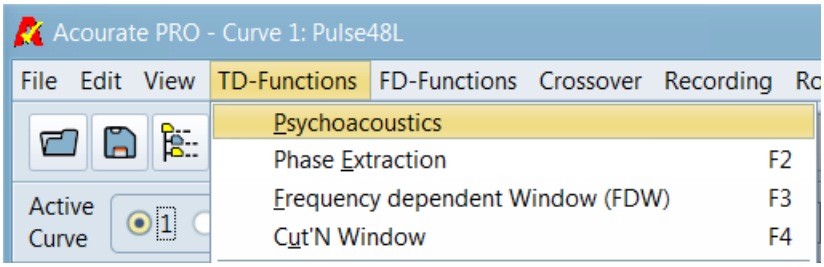




Click on the **Draw Active Curve with a Fat Line** Tool.

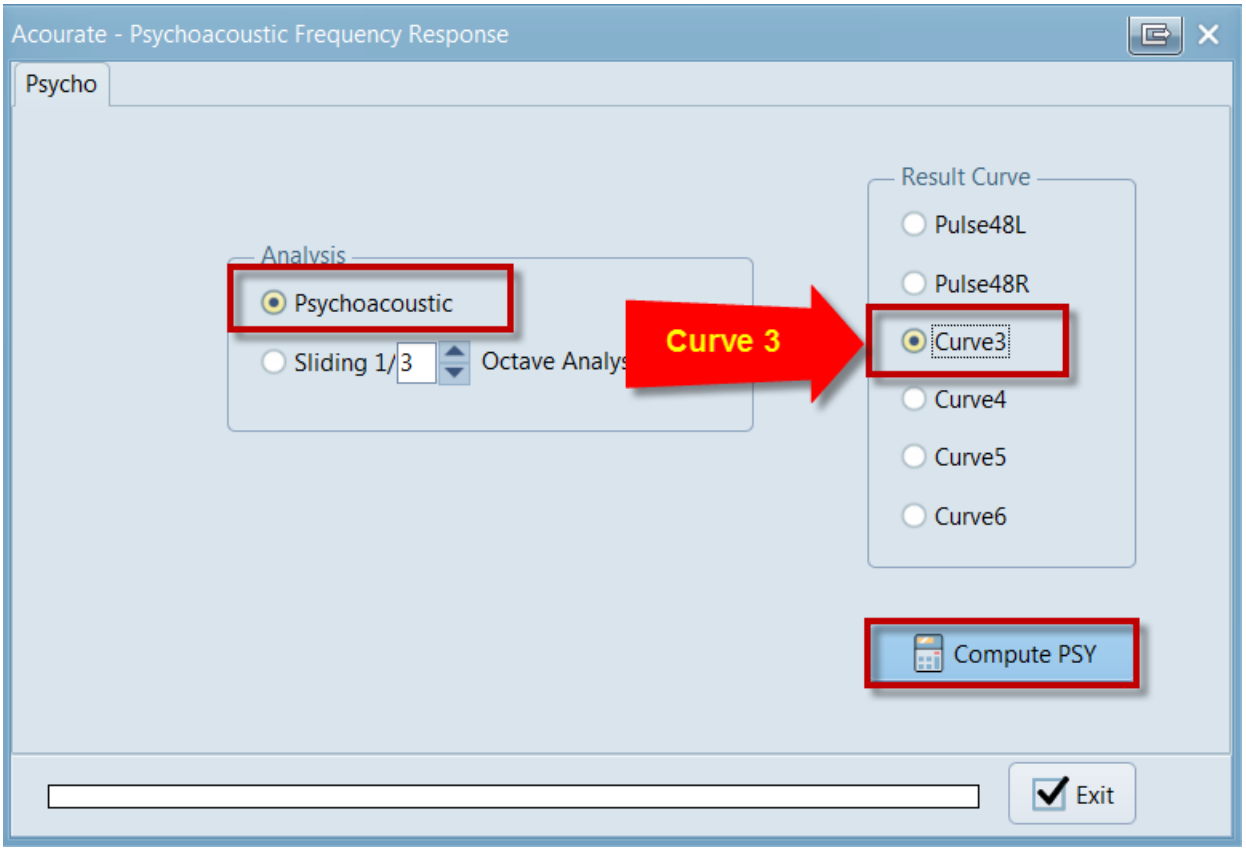
This is another way to visually verify which curve is currently Active.

TD-Functions > Psychoacoustics



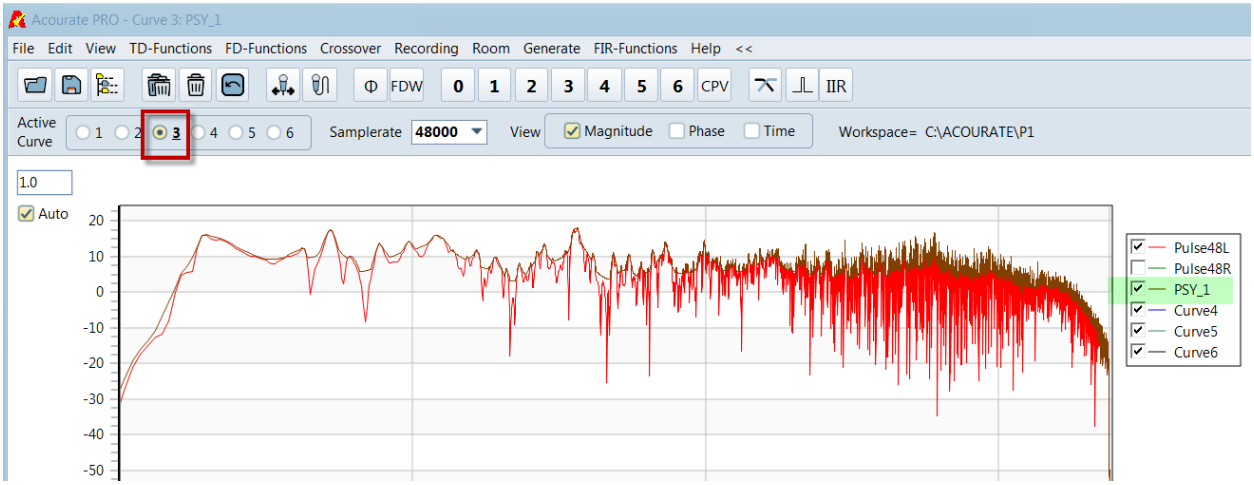
You are going to apply a Psychoacoustic Smoothing to Curve 1 and place the results of the smoothing into Curve 3.

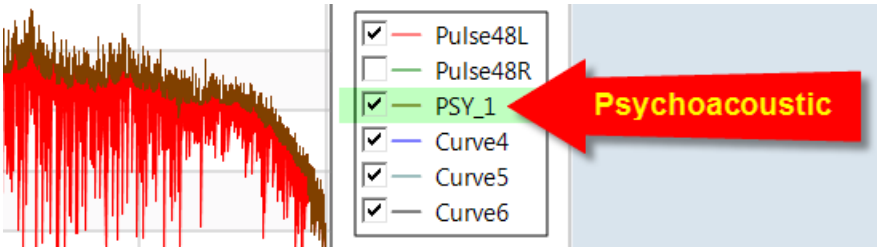
Select Psychoacoustic
Select Curve 3



Compute PSY

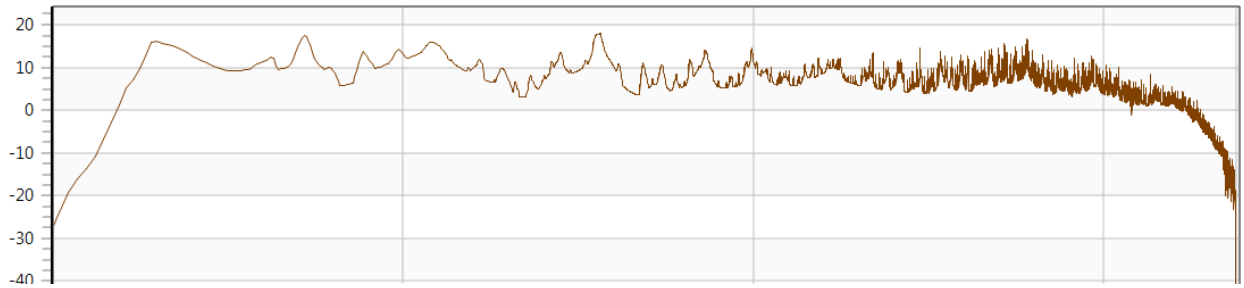
The brown curve is the result of applying Psychoacoustic smoothing to Curve 1.



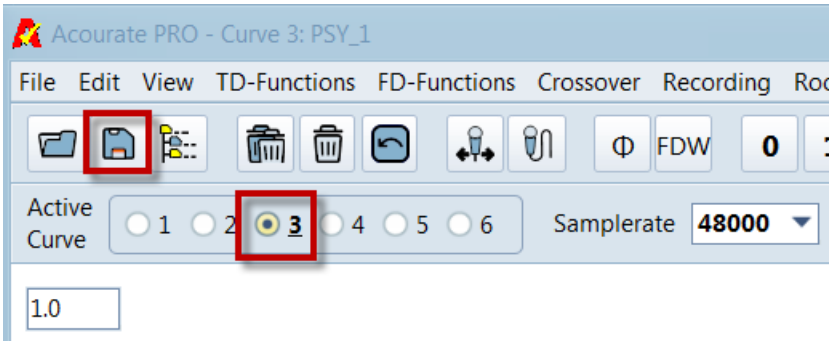


Uncheck Pulse48L

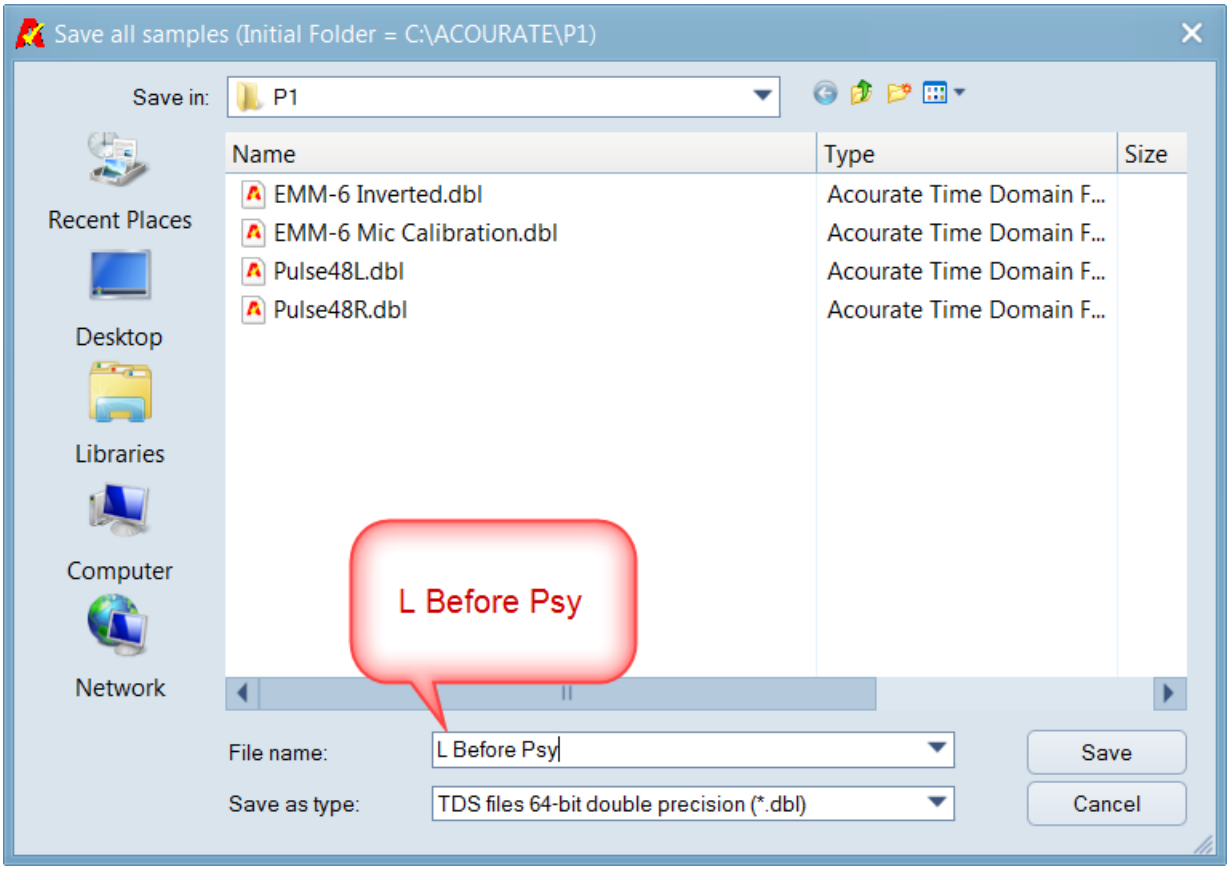
This gives you a better picture of the Measured Impulse Response of the Left Channel.

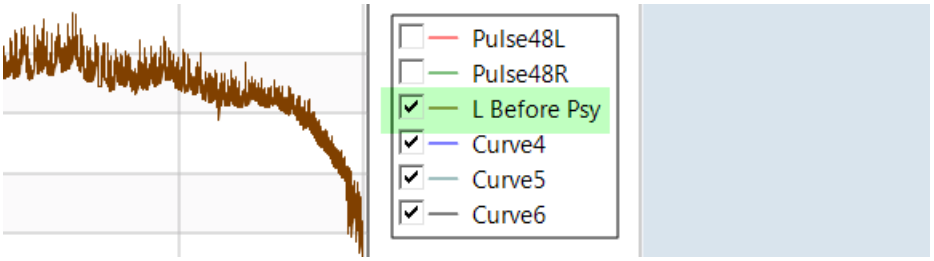


Save this curve.



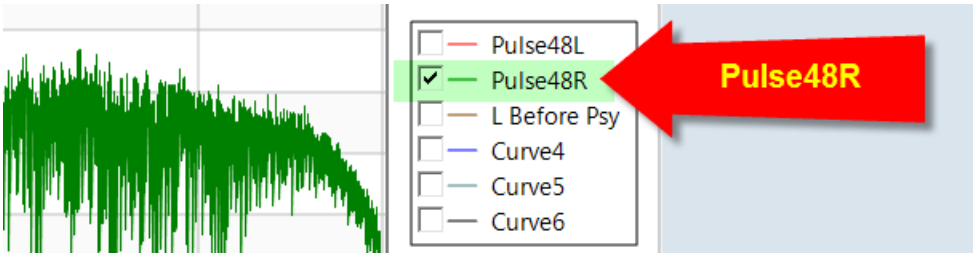
Name the File **L Before Psy** and **Save**



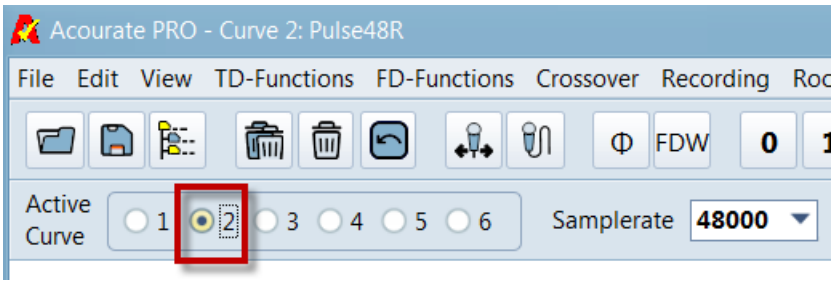


Repeat the same steps for the Right Channel.

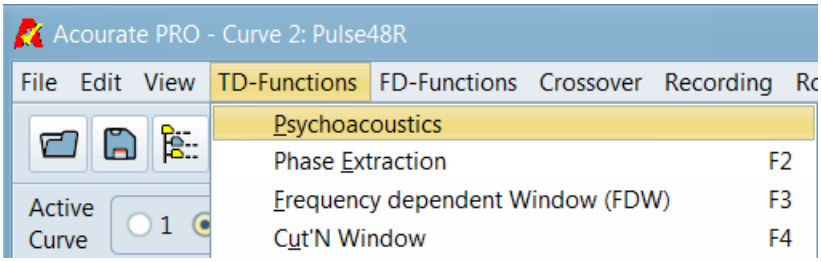
Show Curve 2 = Pulse48R
Hide all others



Make Curve 2 Active

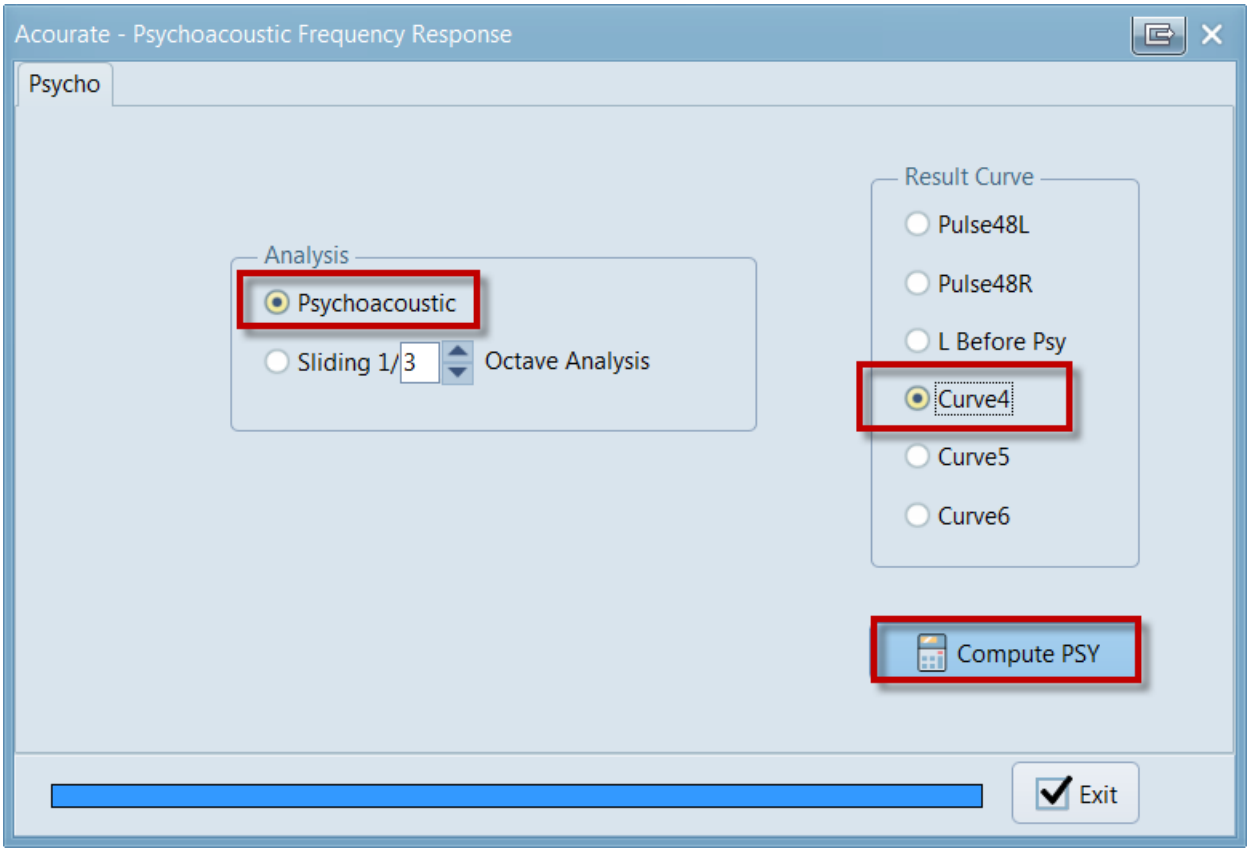


TD-Functions > Psychoacoustics

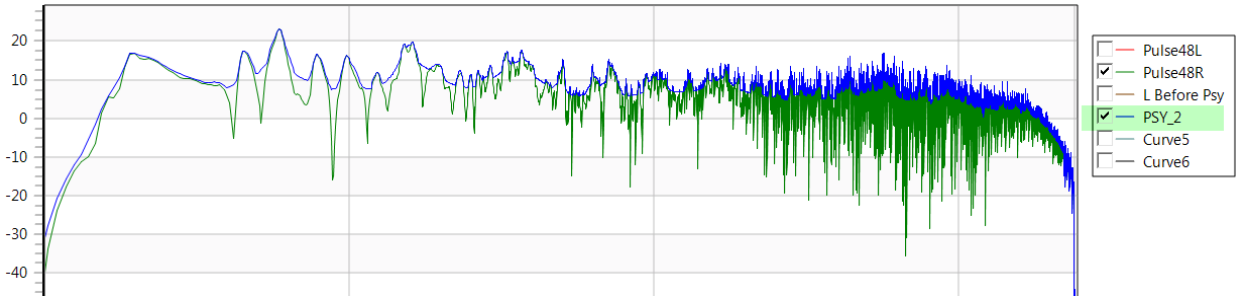


Select Psychoacoustics

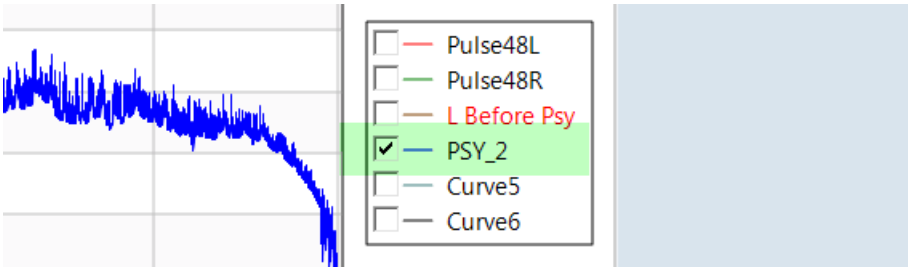
Place the Results in Curve 4



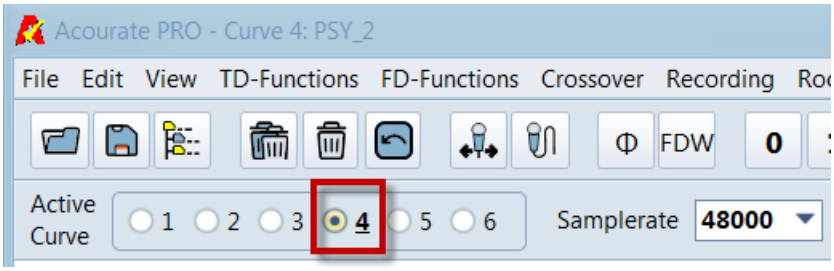
Compute PSY



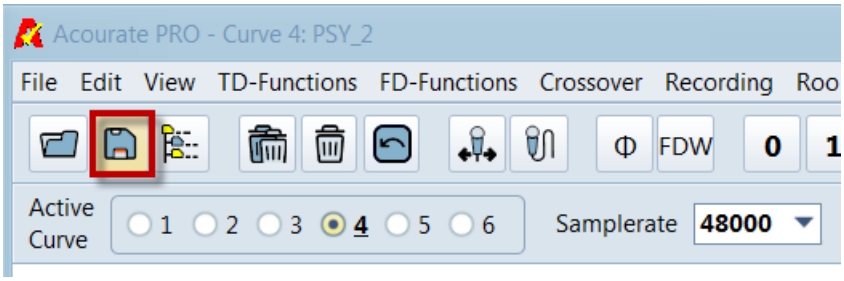
Show Curve 4
Hide everything else.



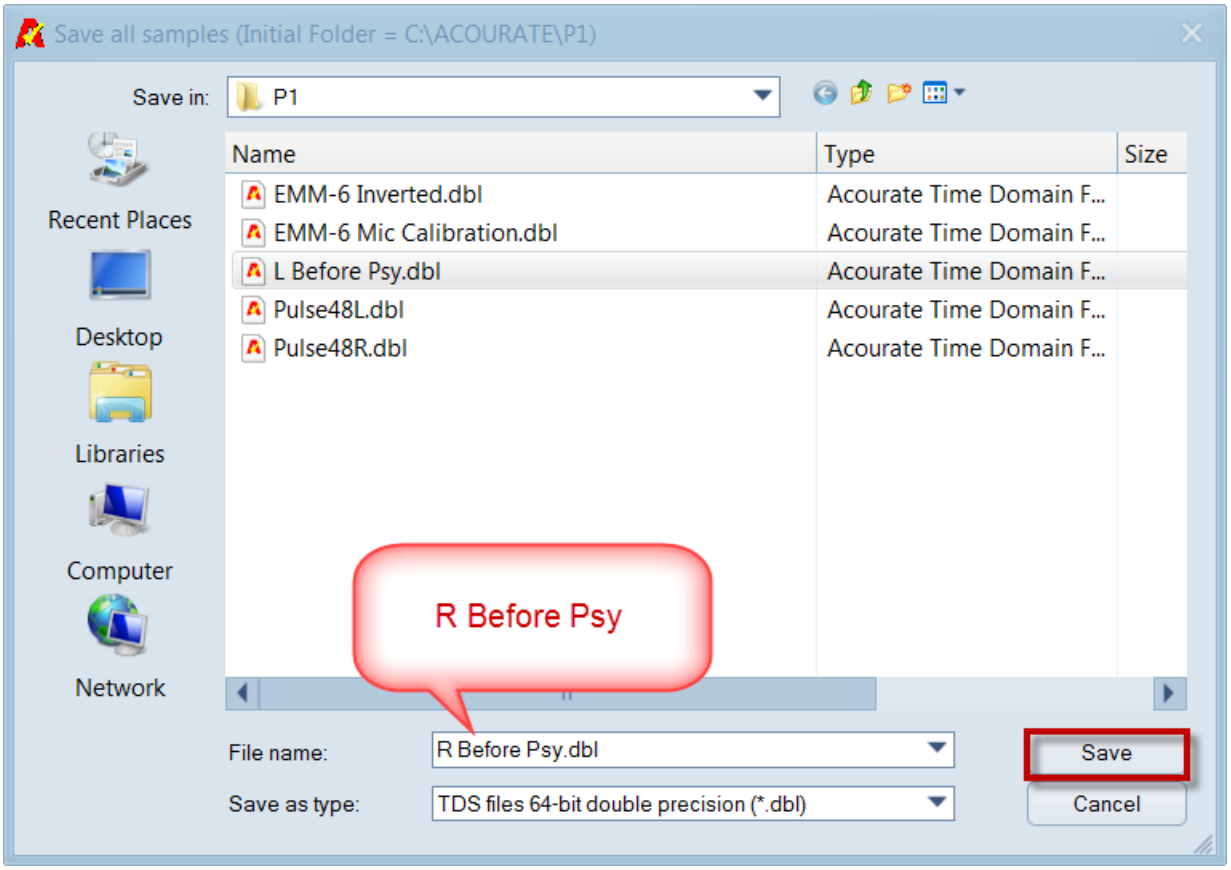
Make sure Curve 4 is Active

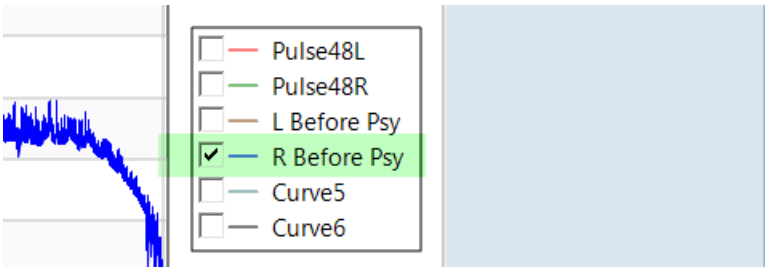


Save this Curve

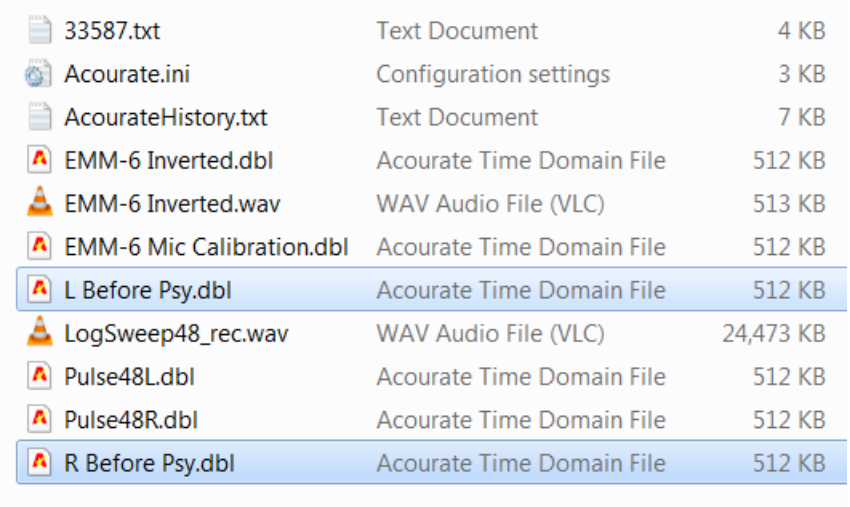


Name the File **R Before Psy** and **Save**





View the contents of your Project Workspace P1



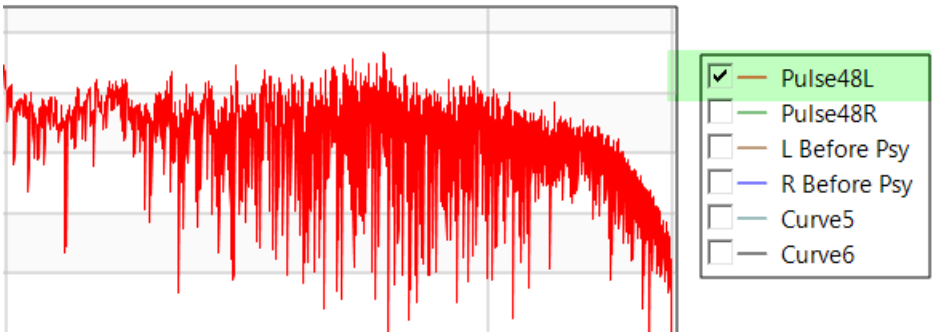
You will find the two new files you just created:

L Before Psy.dbl
R Before Psy.dbl

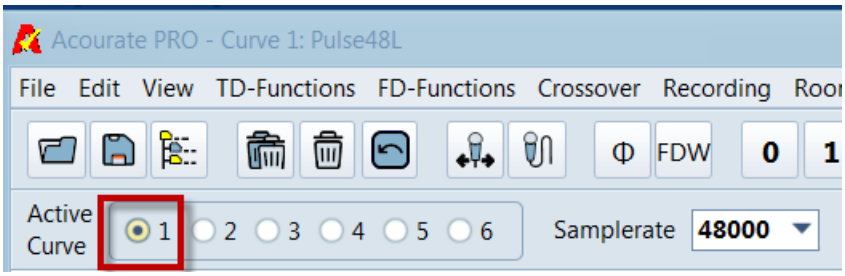
These are the results of apply Psychoacoustics smoothing to the Measured Impulse Response of the Left and Right Channels.

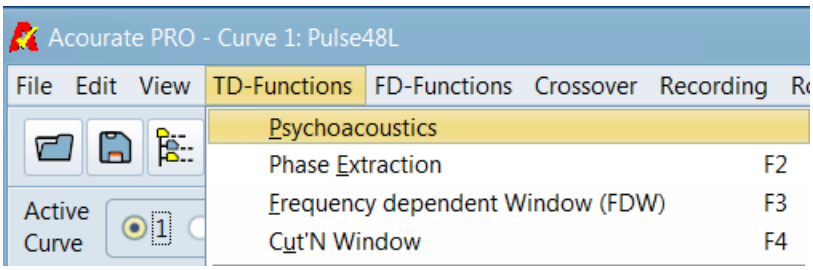
Next, you are going to apply a **1/6th Octave Smoothing** to Pulse48L and Pulse48R.

Show Curve 1 = Pulse48L



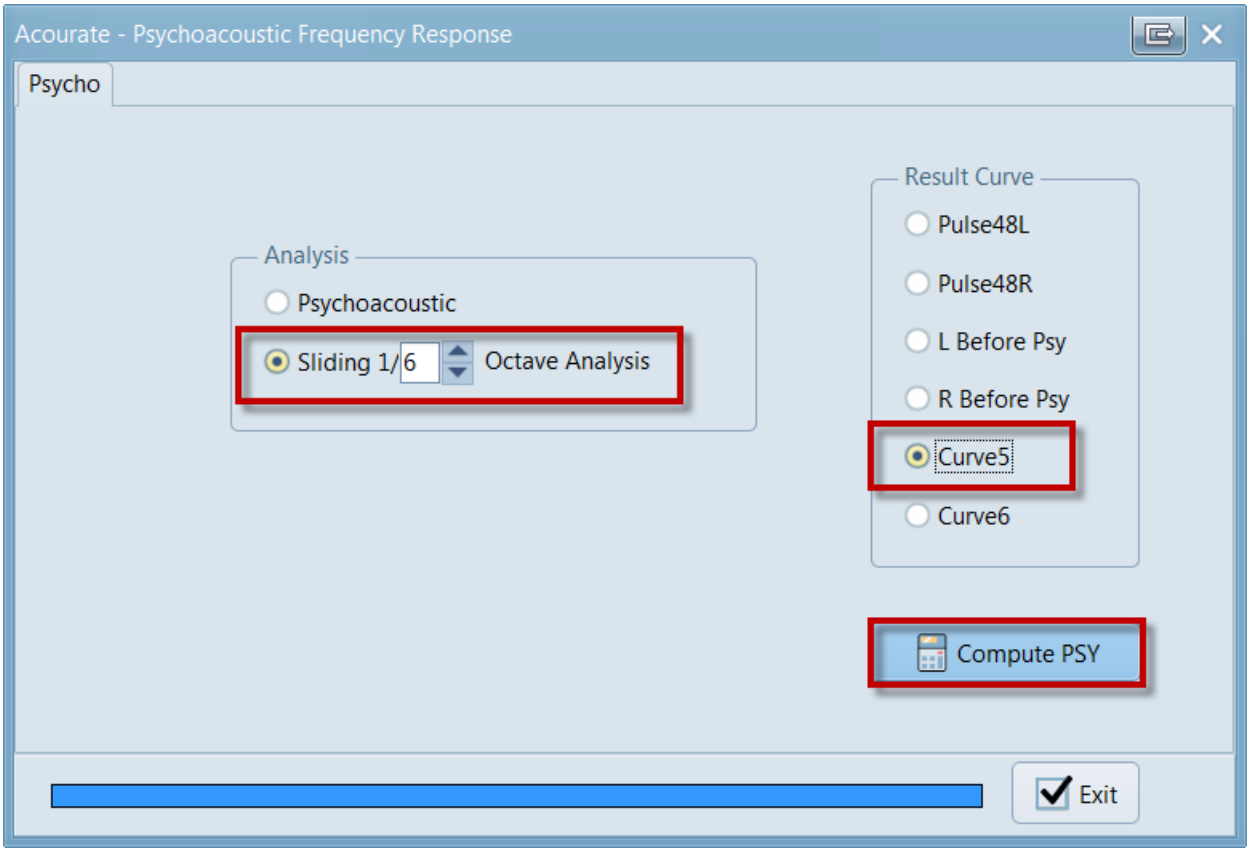
Make Curve 1 Active



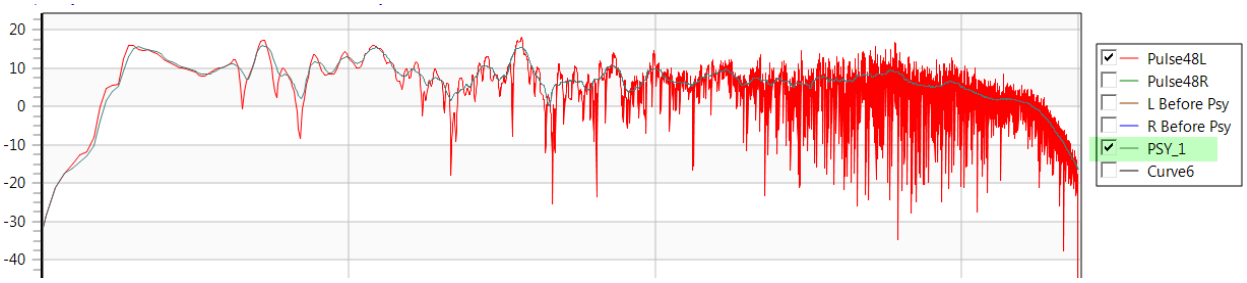


Select **1/6 Octave Analysis**

Place the results in Curve 5

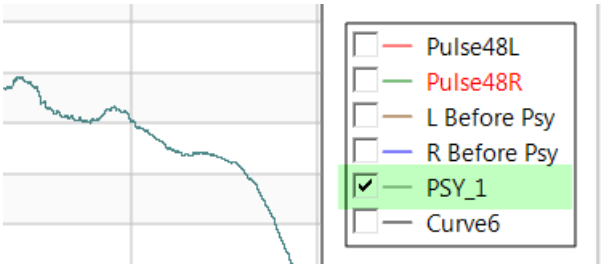


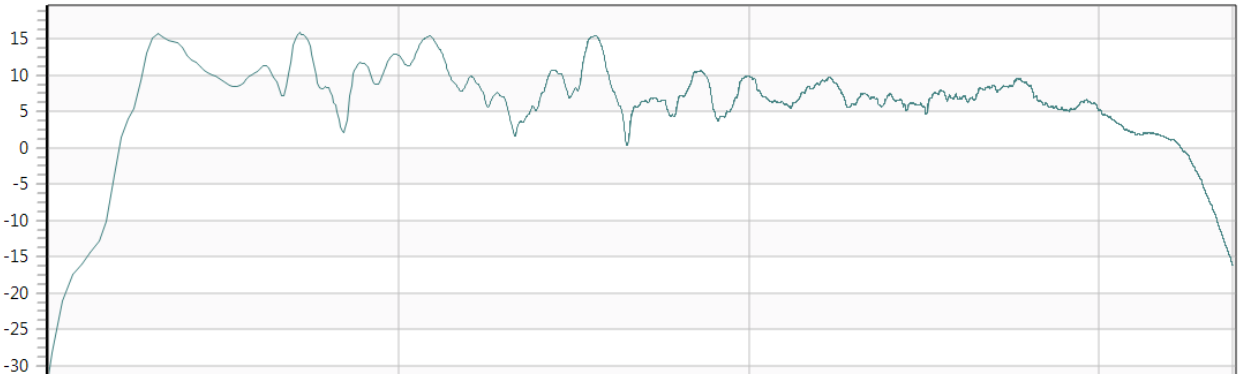
Compute PSY



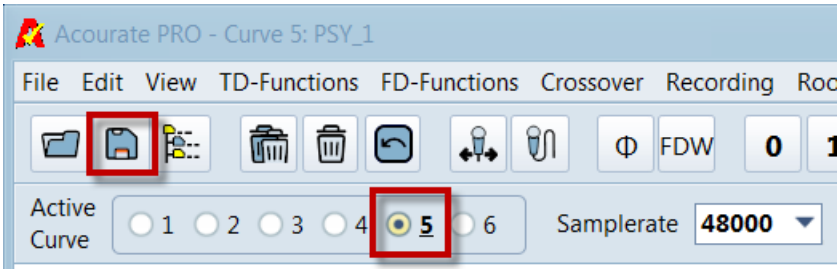
Hide Pulse48L

Make sure only Curve 5 is turned on.



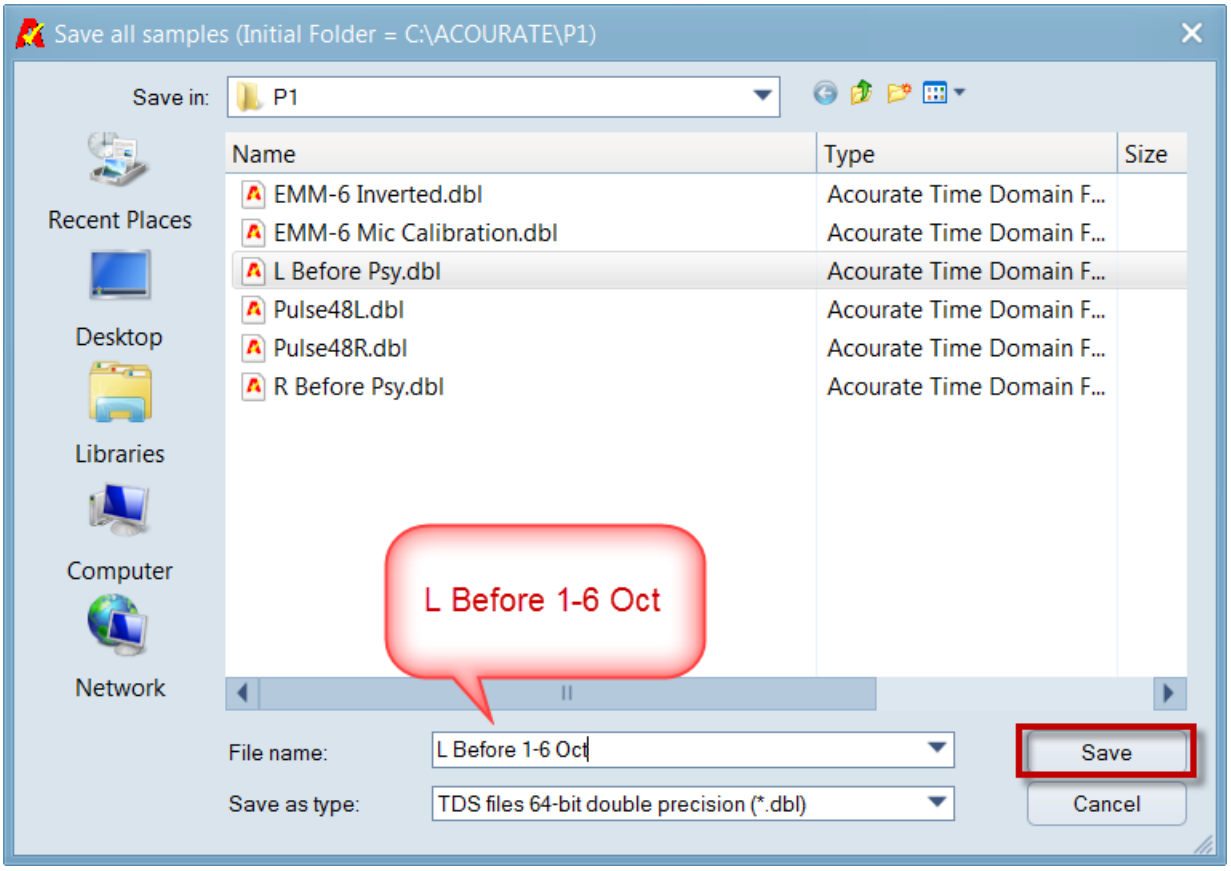


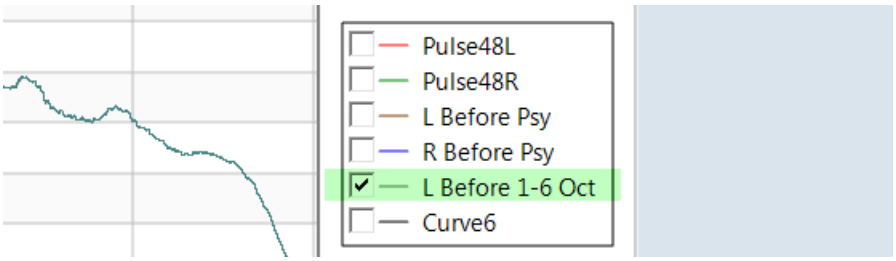
Make sure Curve 5 is Active



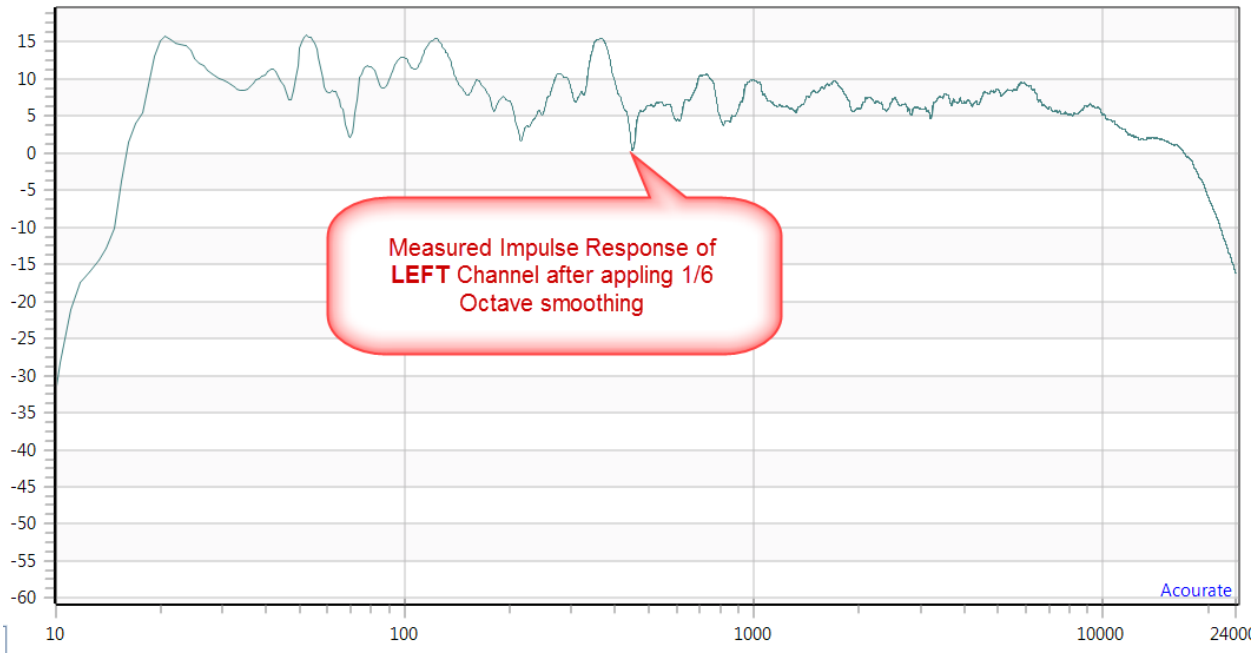
Save this Curve

Name the File **L Before 1-6 Oct** and Save



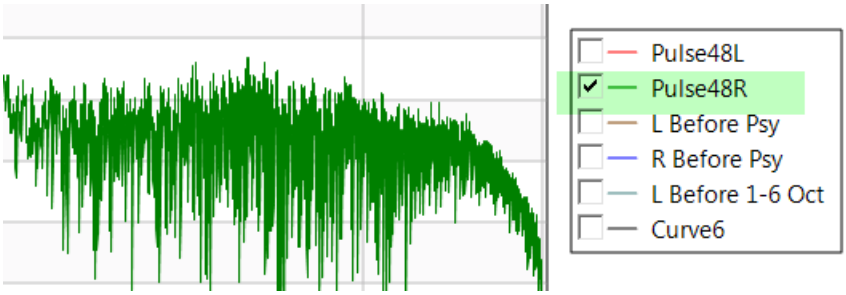


This is the measured impulse response of the LEFT Channel after applying 1/6th Octave smoothing.

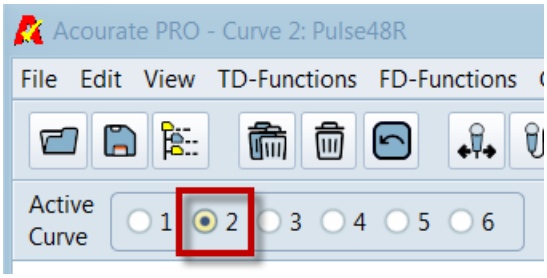


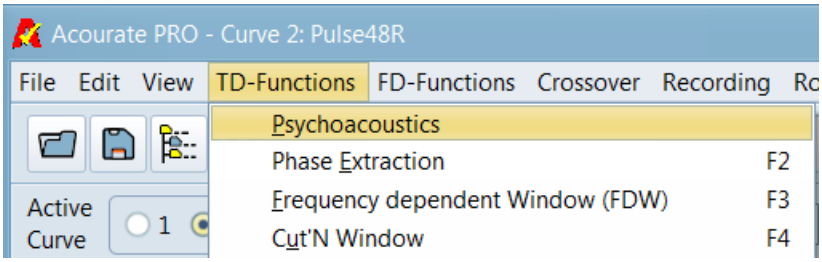
This should be similar to what you get in REW when you take the initial measurements and apply a 1/6th Octave smoothing to the LEFT Channel.

Repeat the same steps for the Right Channel.

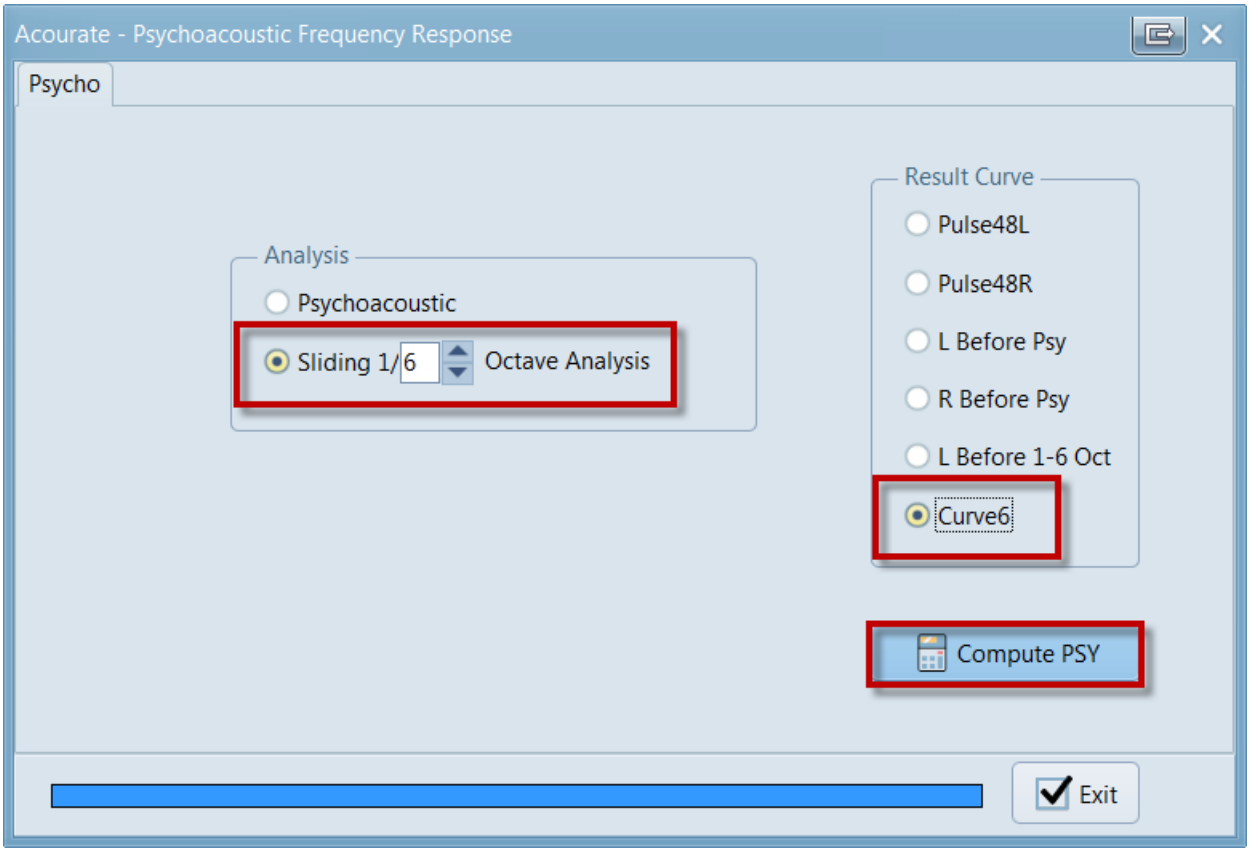


Make Curve 2 Active

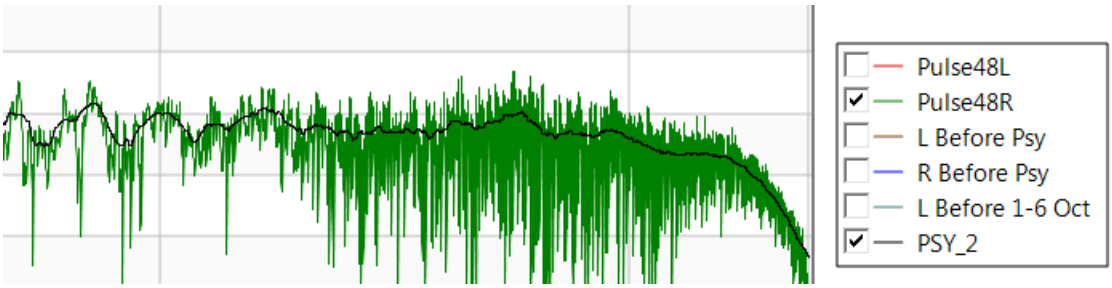




Select 1/6 Octave.
Place the results in Curve 6

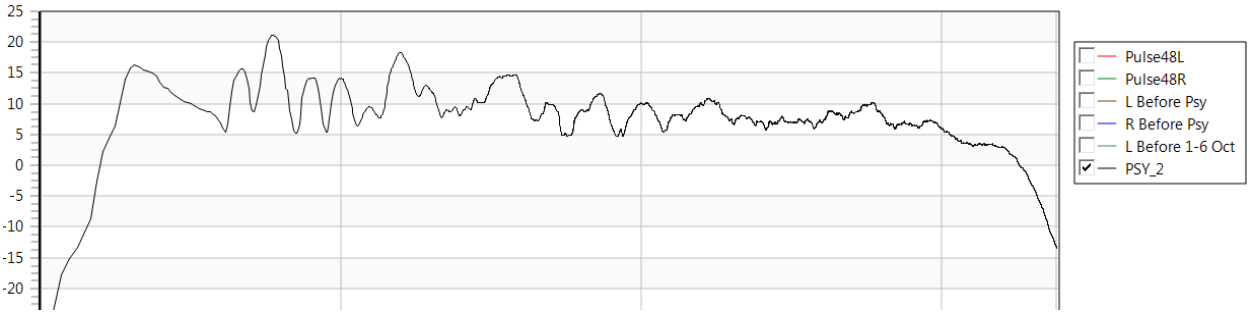


Compute PSY

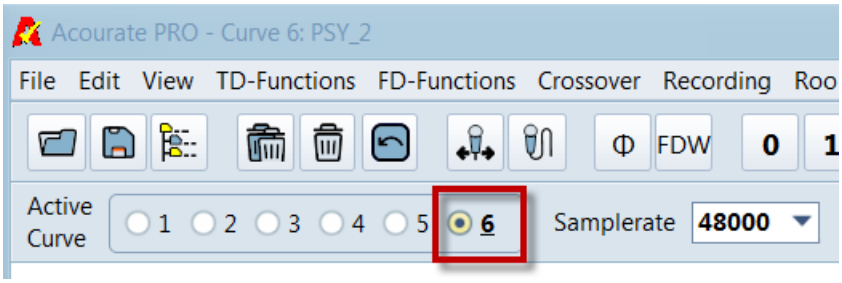


Uncheck Pulse48R

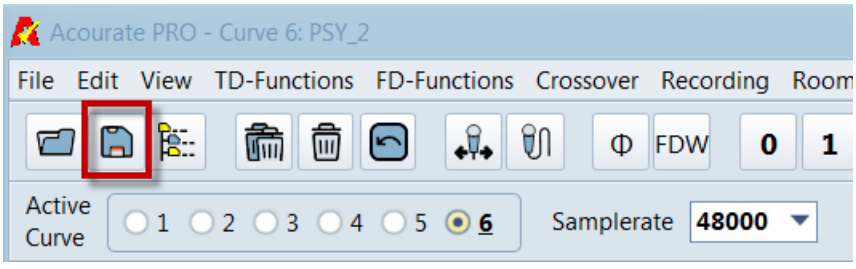
This is the result of 1/6th Octave smoothing to the Right channel.



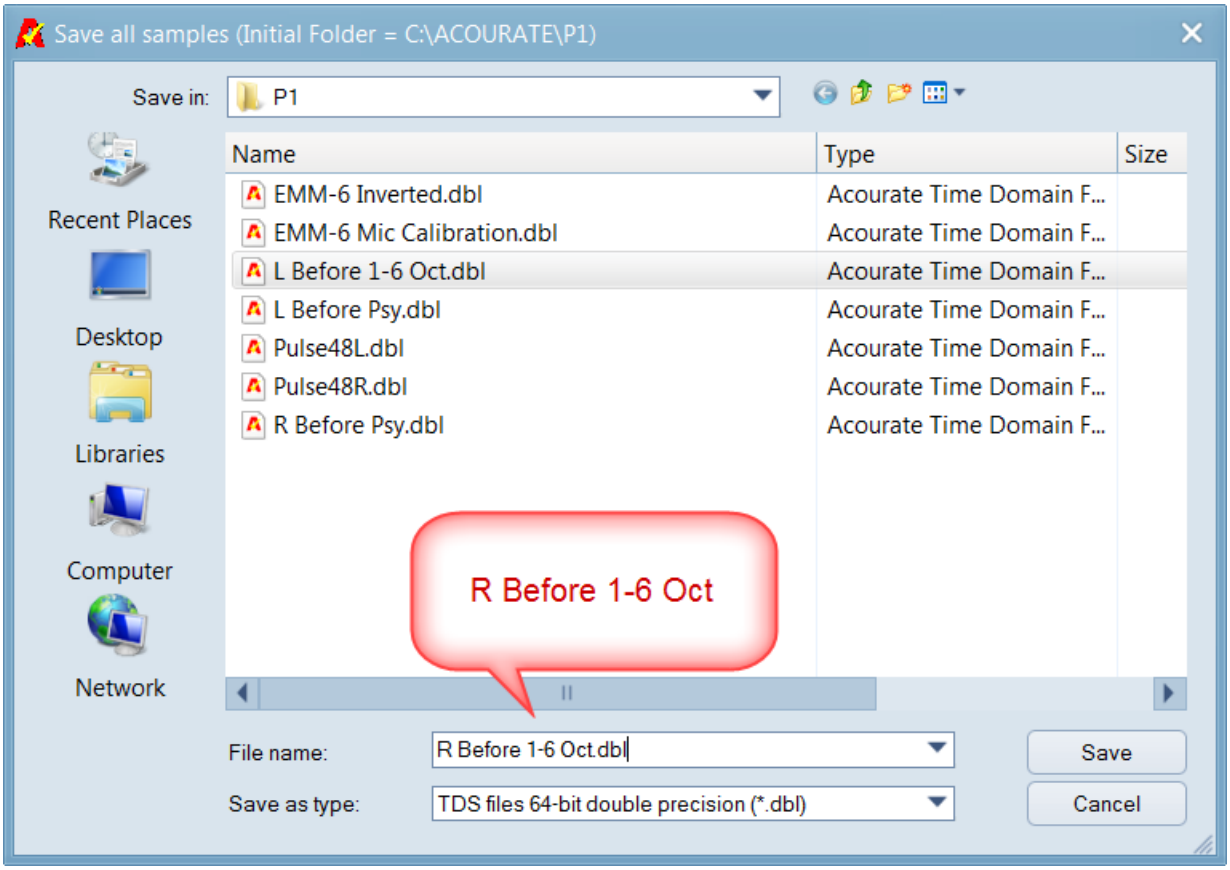
Make sure Curve 6 is Active

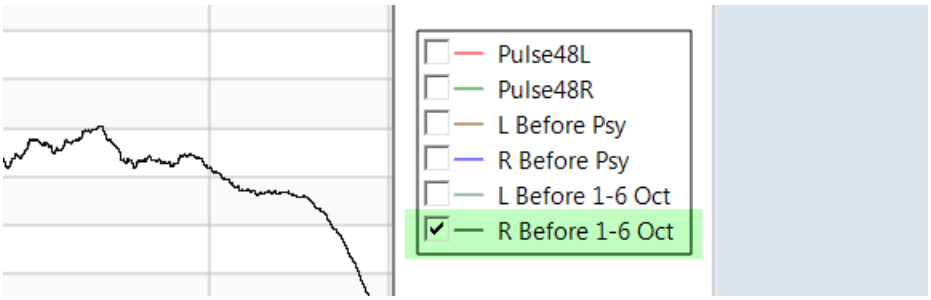


Save this Curve



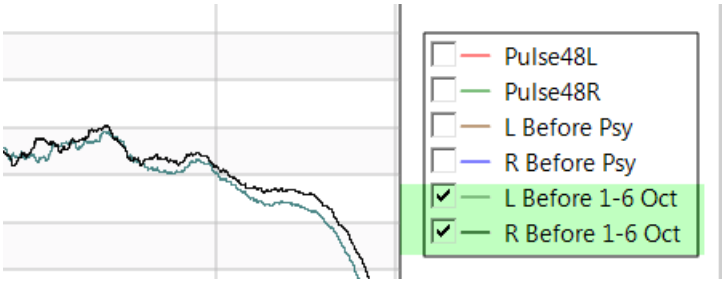
Name this file **R Before 1-6 Oct** and Save

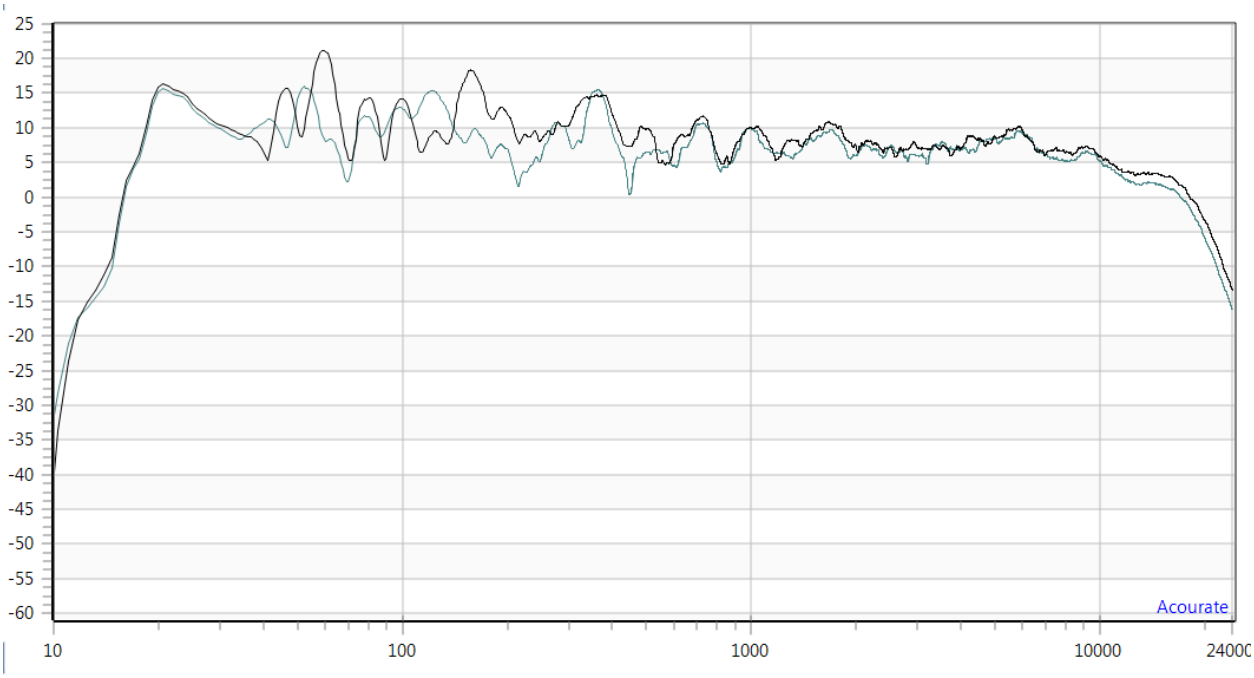




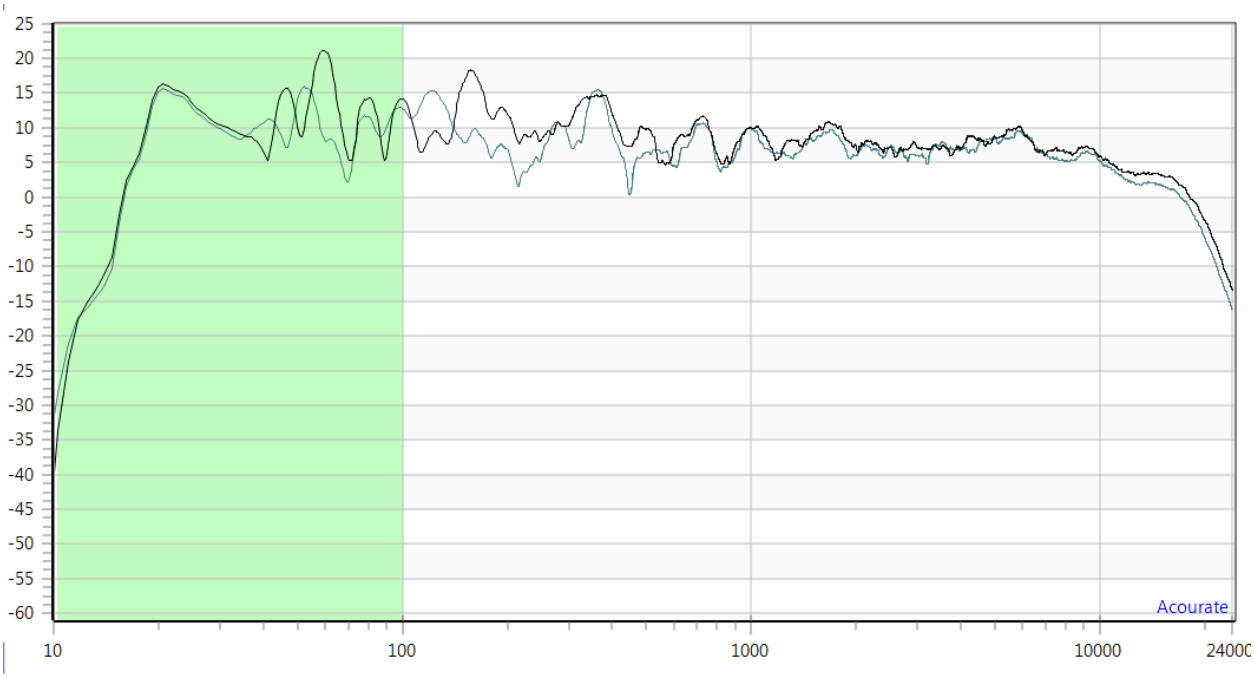
Turn on these two curves.

L Before 1-6 Oct
R Before 1-6 Oct



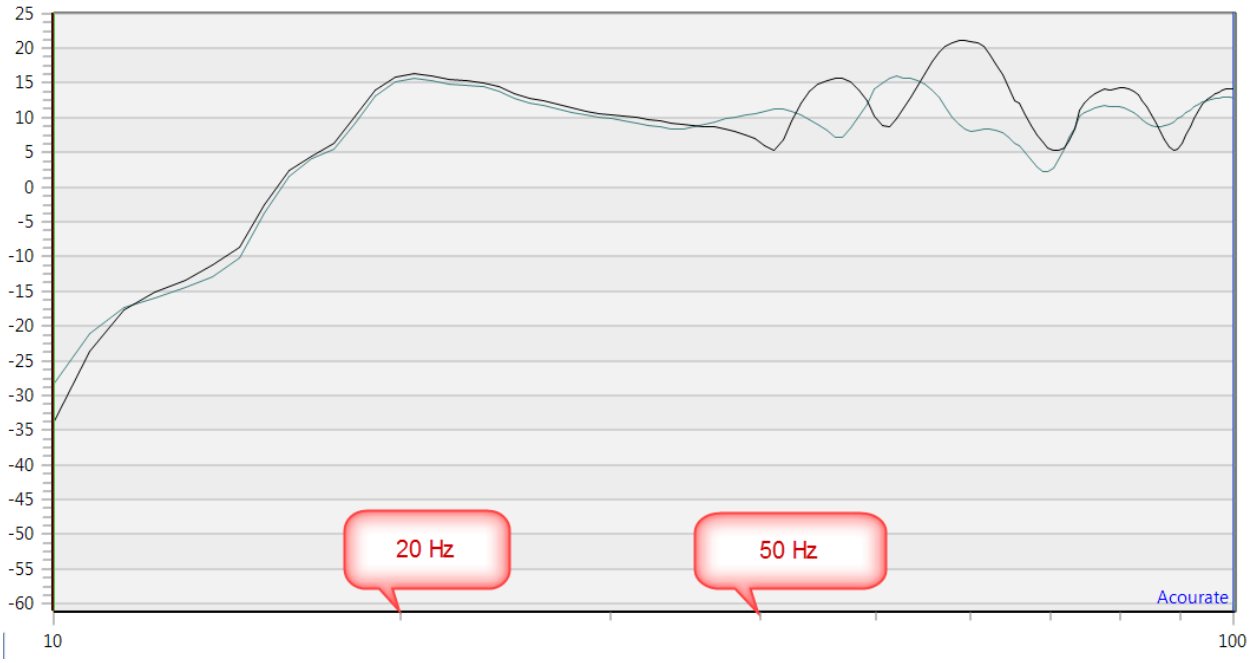


Zoom into the Region between 10Hz and 100Hz



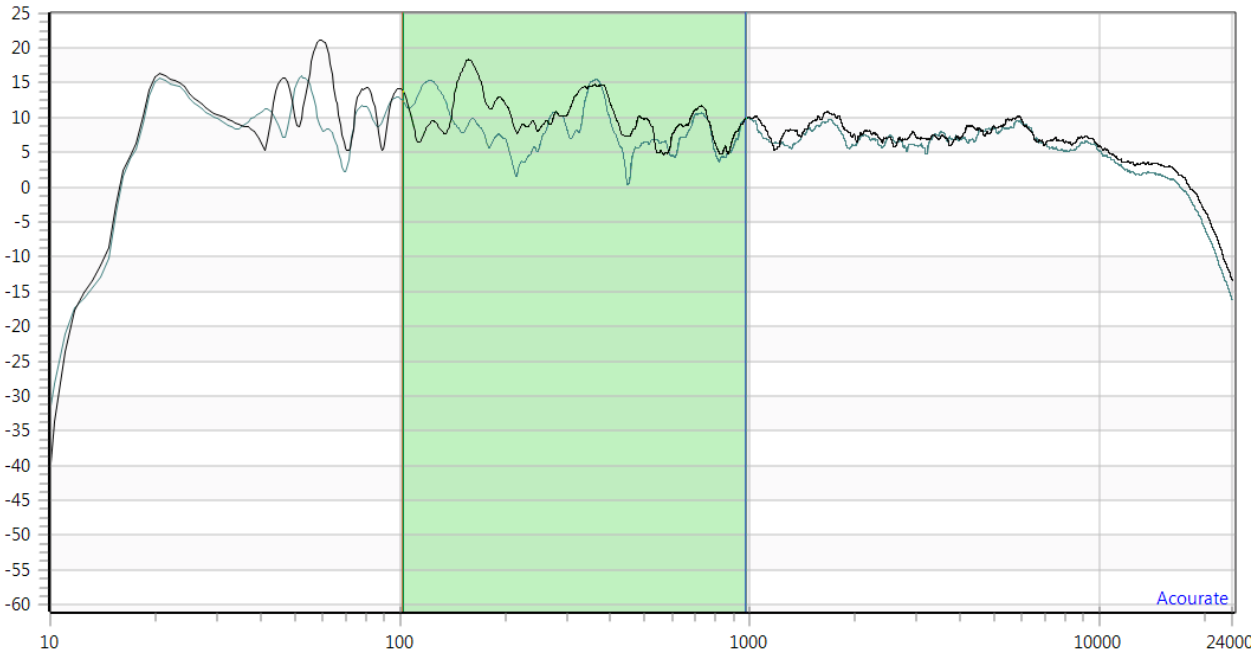
The bass rolls off below 20Hz.

The bass response is uneven between 50Hz and 100Hz.

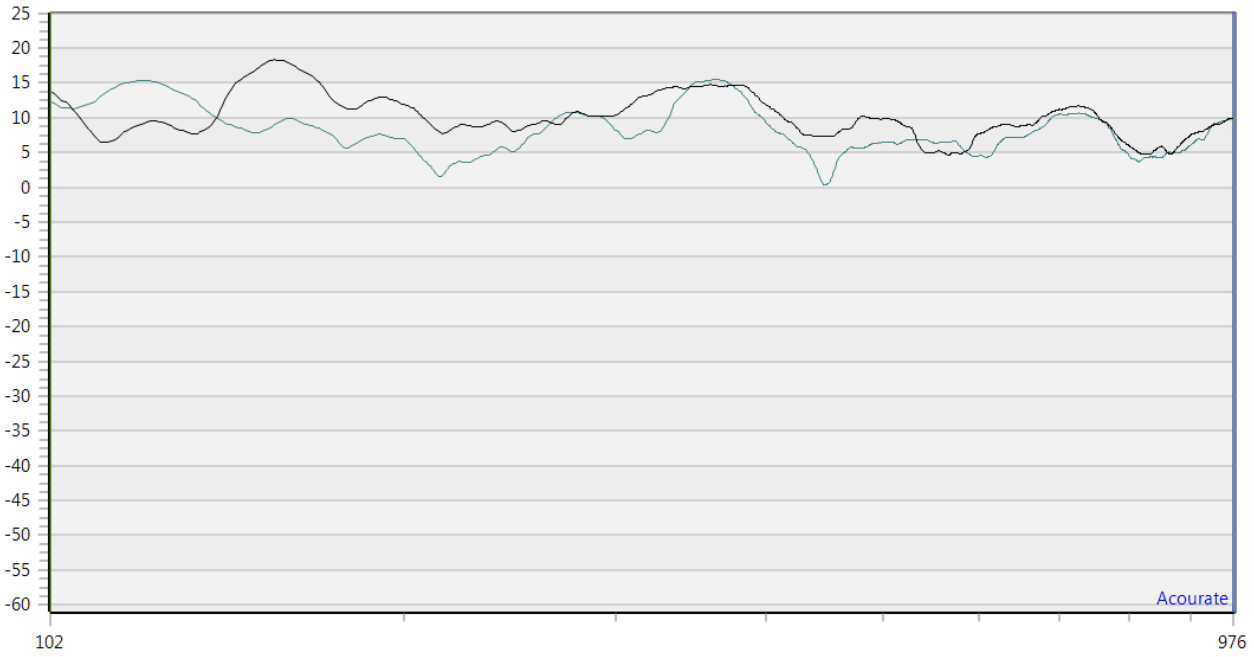


This can be easily corrected by Acurate.

Select the Region between 100Hz and 1000Hz

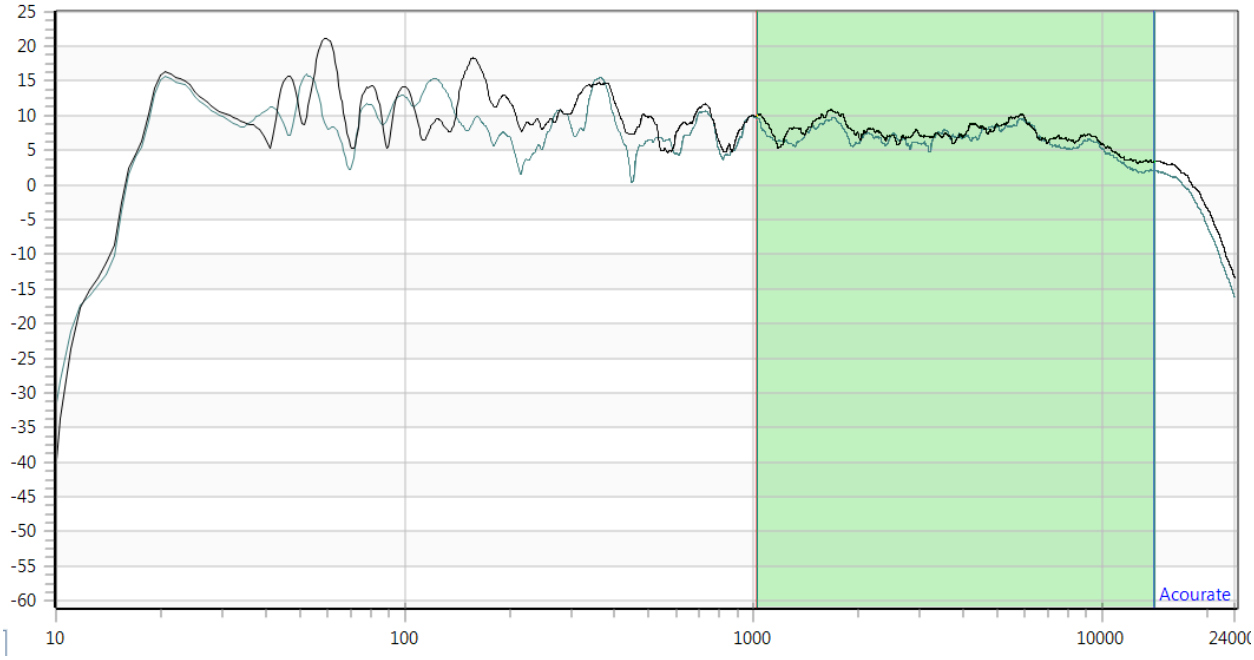


Zoom In

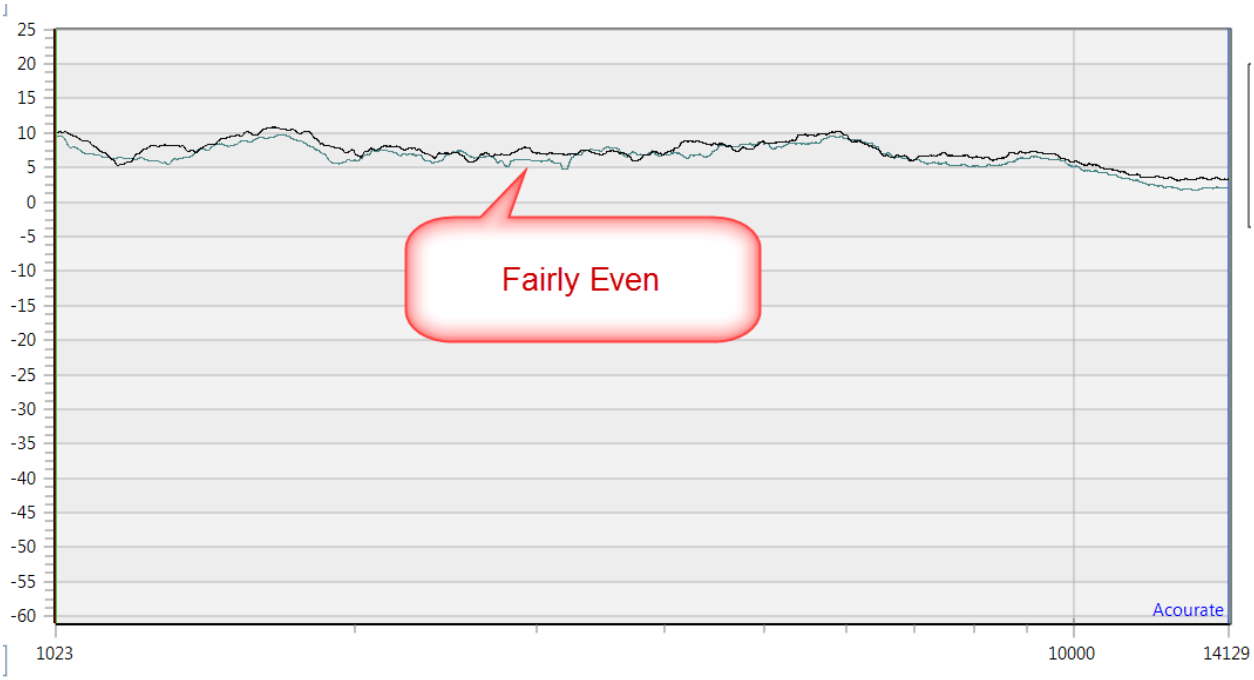


This needs to be smoothened out.

Select the Region between 1000Hz and 14000Hz



Zoom In

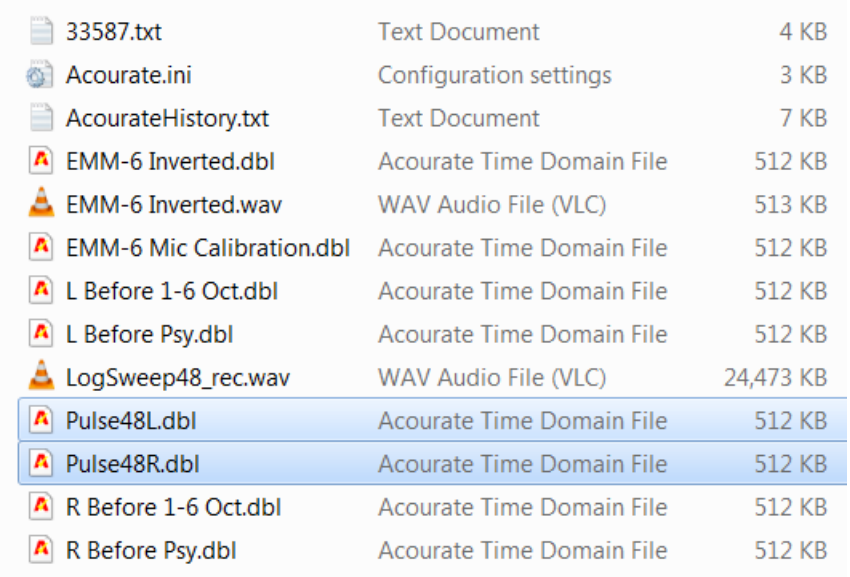


The measured impulse response of the Left and Right channels above 1kHz is fairly even fluctuating within a narrow band of 5dB. You may forego any Digital Correction above 1kHz.

Now that you have a fairly good picture of what needs to get addressed, let's move on the Analysis Part.

View the contents of your Project Workspace P1

C:\ACOURATE\P1

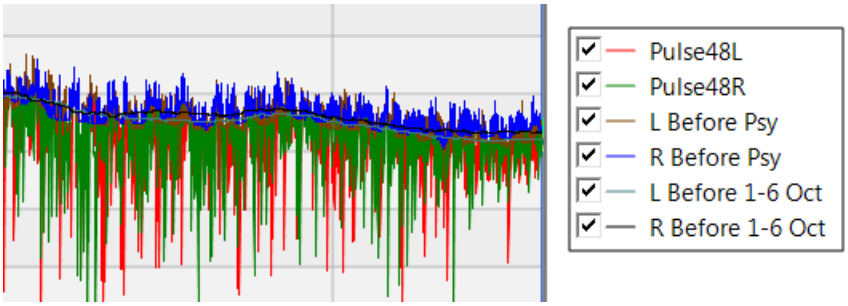


You will run all your analysis on the Measured Impulse Response of the Left and Right Channels.

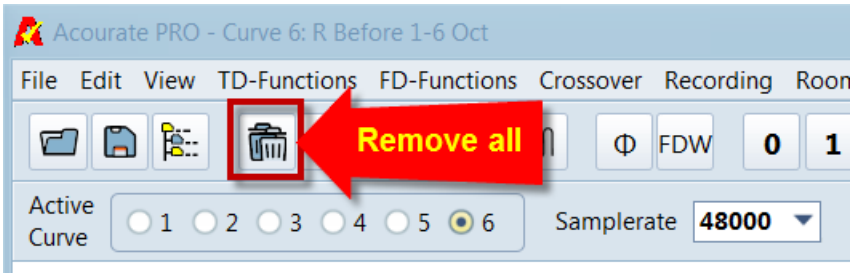
- Pulse48L
- Pulse48R

Start your Analysis with a clean slate

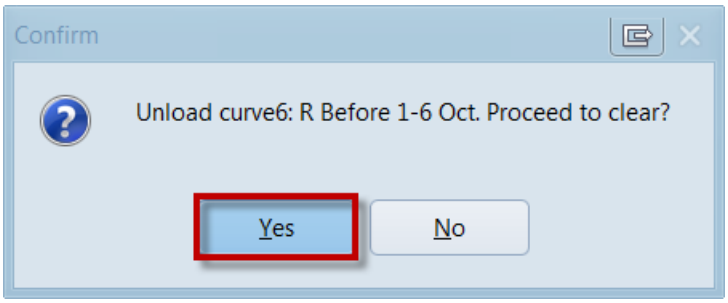
At the moment you have 6 curves loaded into Acourate.

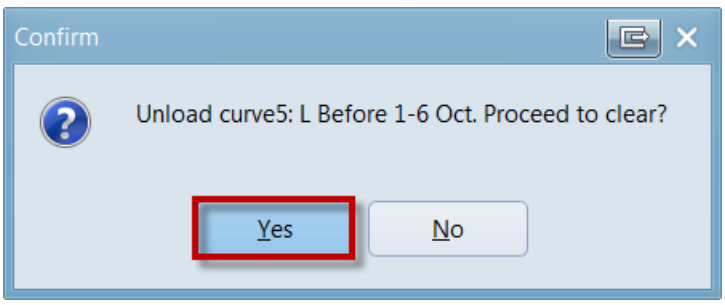


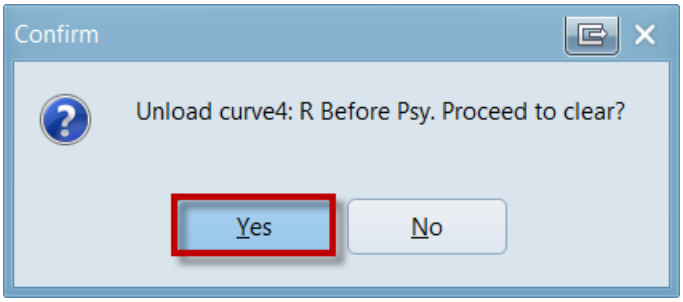
Click on the **Remove All** button.

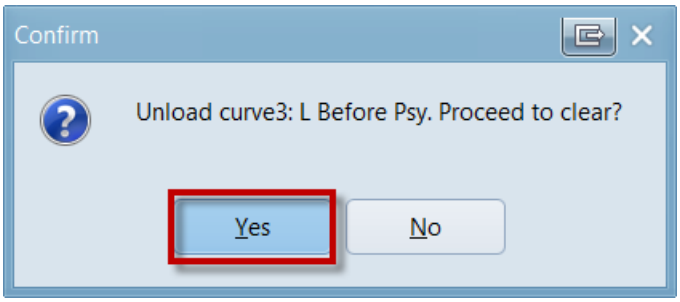


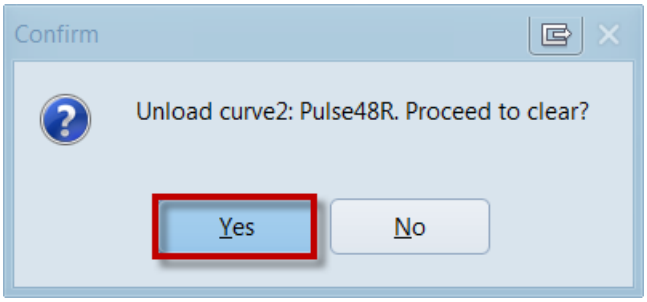
You will be asked to confirm every time Acourate removes a curve.

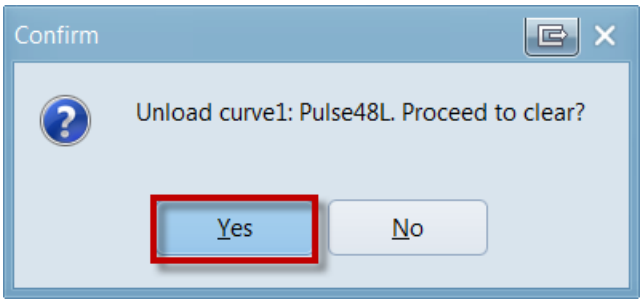




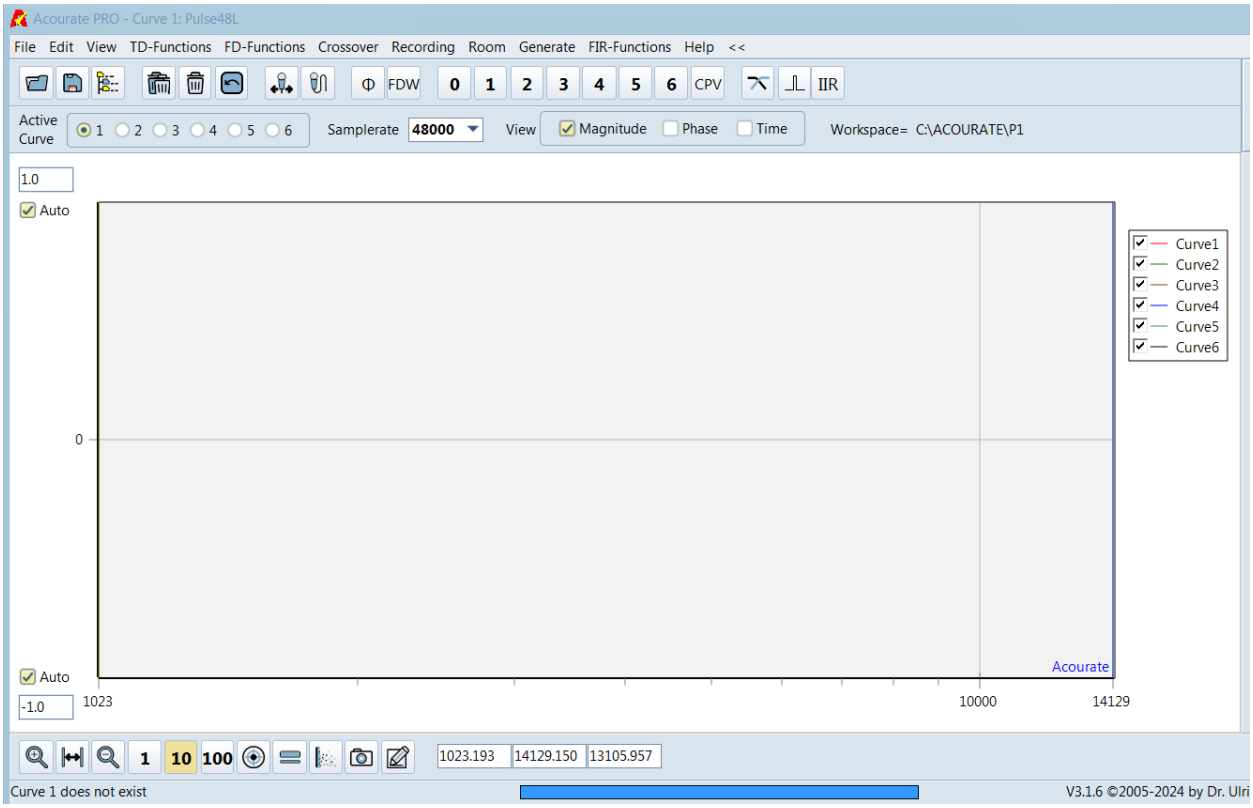

Confirm
Unload curve4: R Before Psy. Proceed to clear?
Yes
No


Confirm
Unload curve3: L Before Psy. Proceed to clear?
Yes
No


Confirm
Unload curve2: Pulse48R. Proceed to clear?
Yes
No

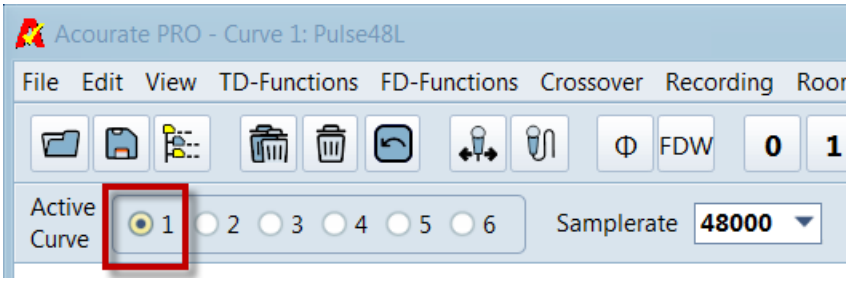

Confirm
Unload curve1: Pulse48L. Proceed to clear?
Yes
No

Now you have a blank canvas.

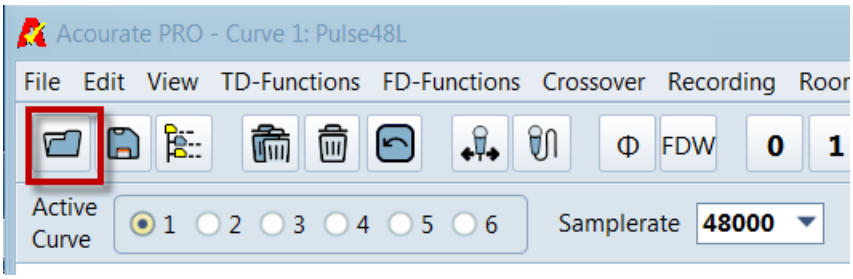


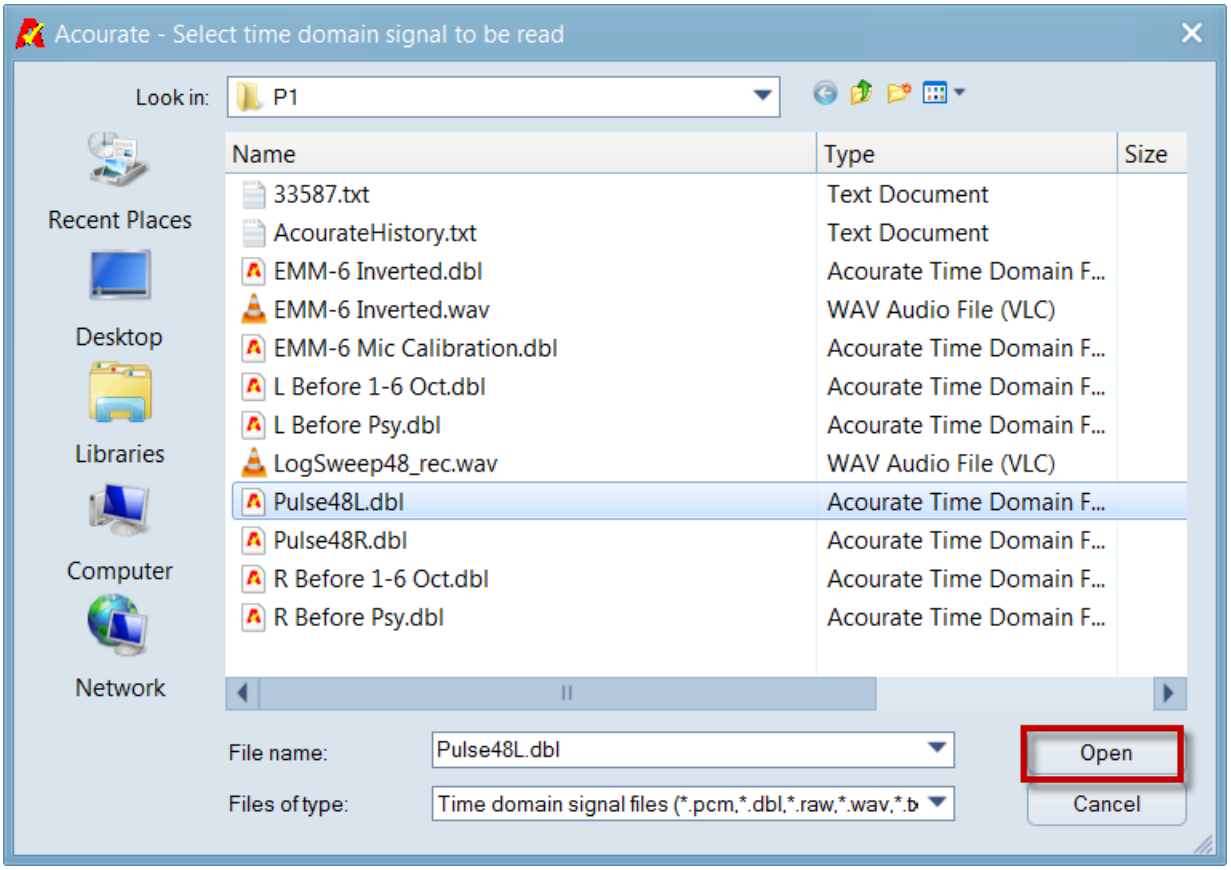
All 6 Curves are empty

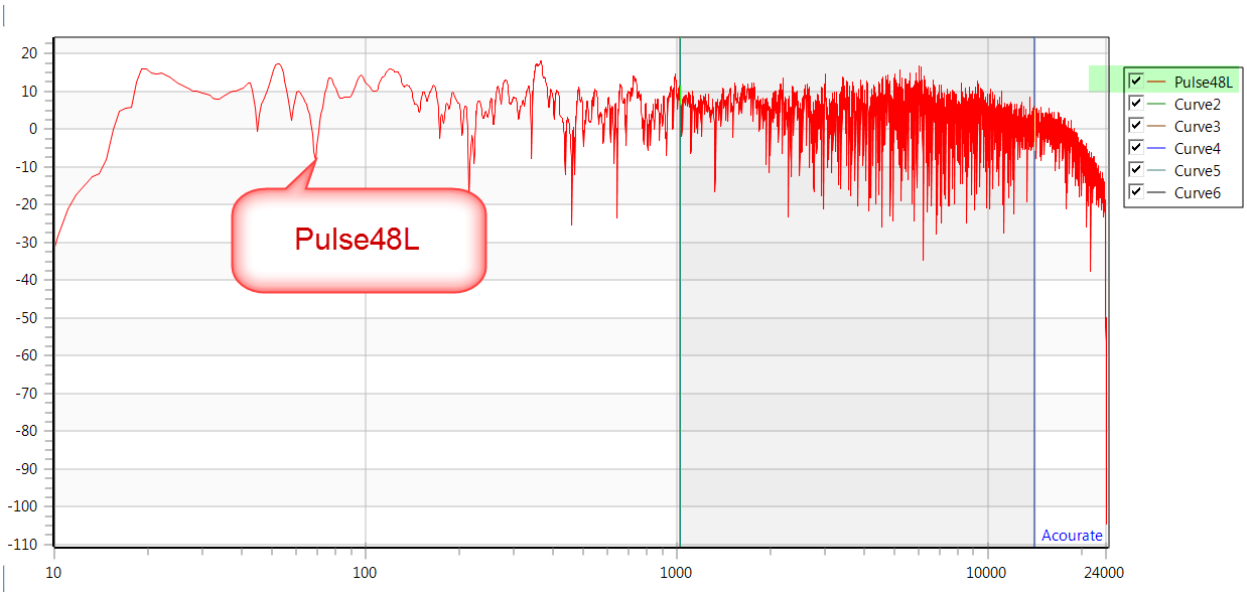
Select Curve 1 to make it Active



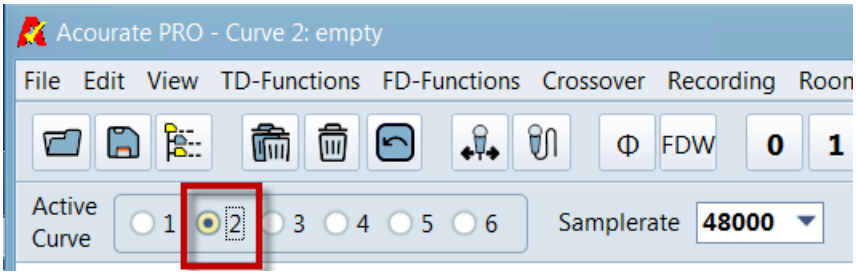
Load Pulse48L into Curve 1.



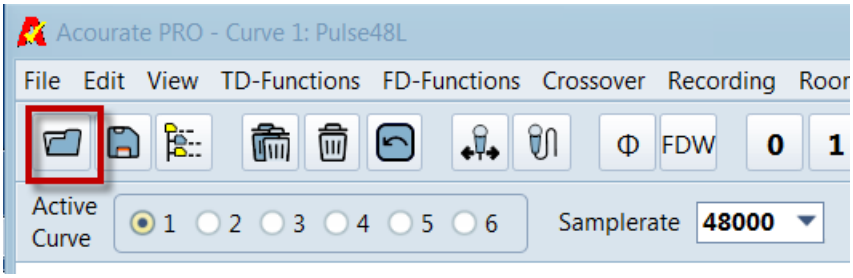


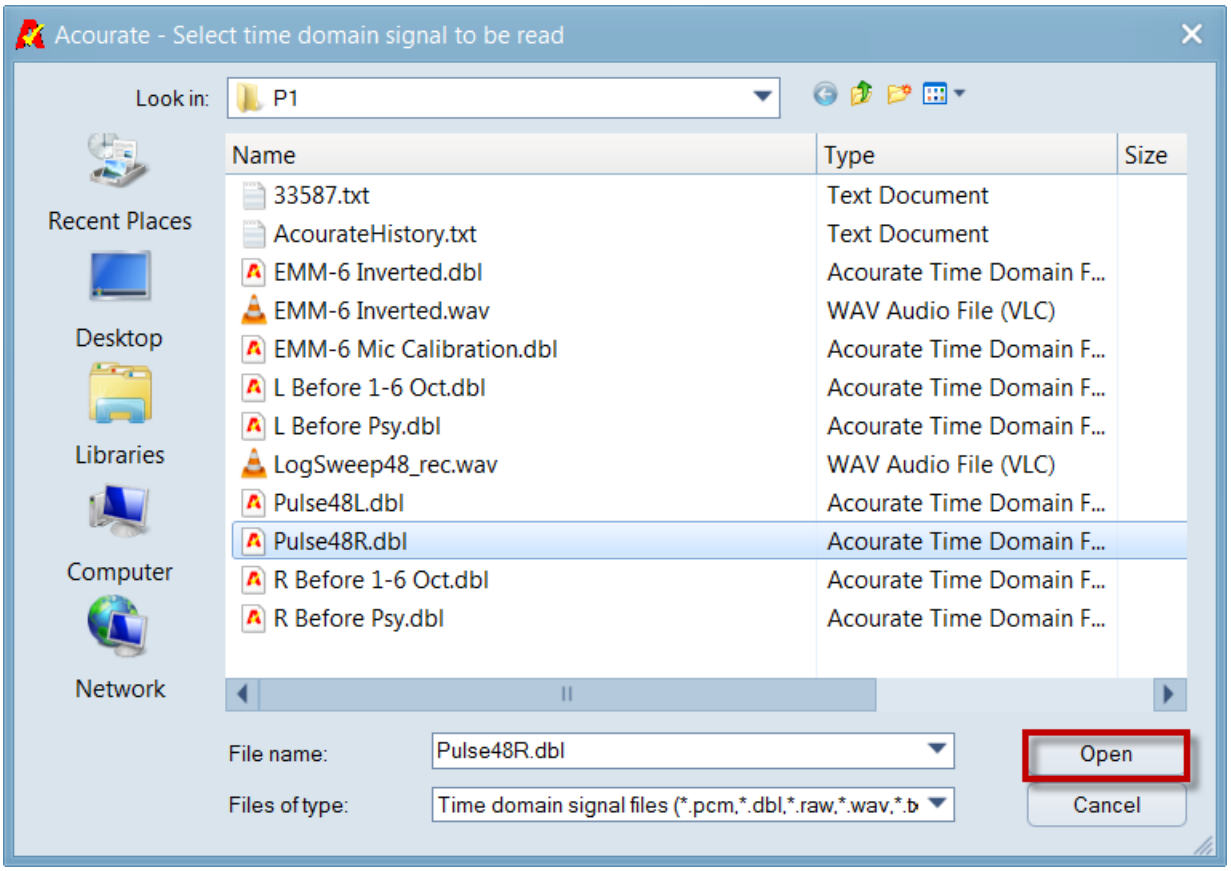


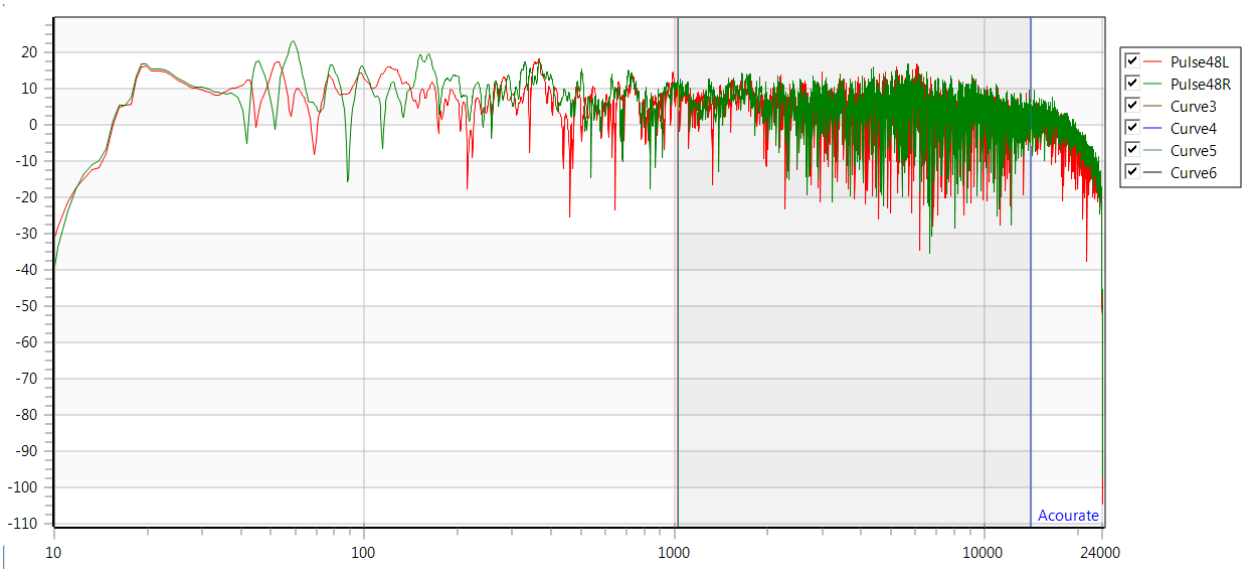
Select Curve 2 to make it Active

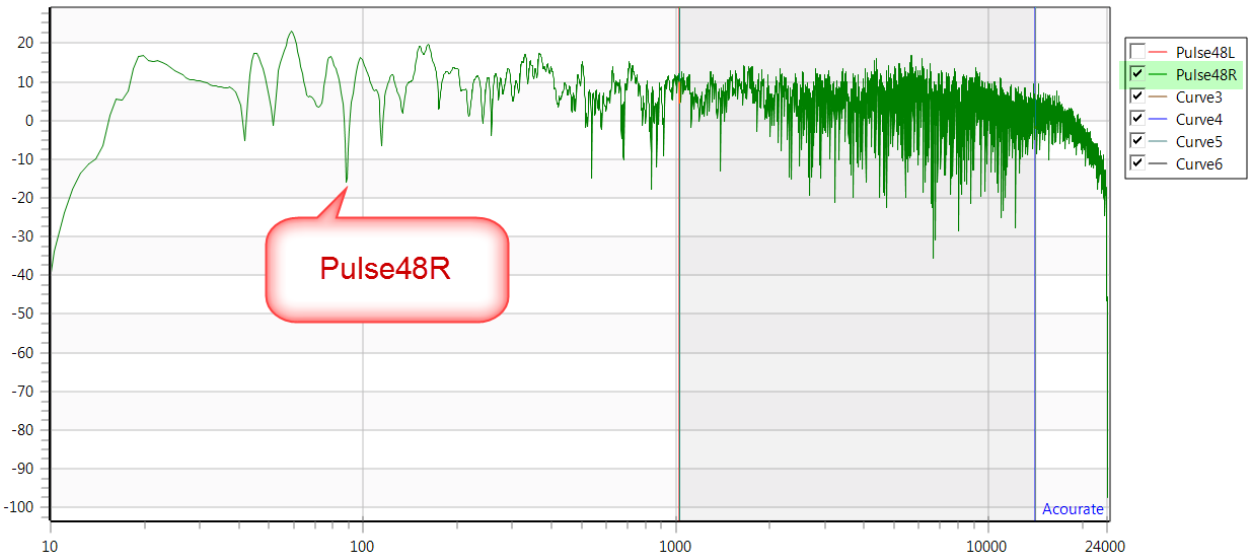


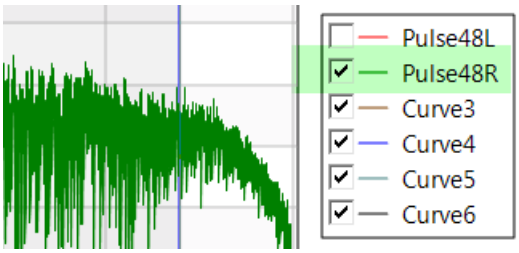
Load Pulse48R into Curve 2.




Acourate - Select time domain signal to be read
Look in:
P1
Recent Places
Desktop
Libraries
Computer
Network
Name
Type
Size
33587.txt
Text Document
AcourateHistory.txt
Text Document
EMM-6 Inverted.dbl
Acourate Time Domain F...
EMM-6 Inverted.wav
WAV Audio File (VLC)
EMM-6 Mic Calibration.dbl
Acourate Time Domain F...
L Before 1-6 Oct.dbl
Acourate Time Domain F...
L Before Psy.dbl
Acourate Time Domain F...
LogSweep48_rec.wav
WAV Audio File (VLC)
Pulse48L.dbl
Acourate Time Domain F...
Pulse48R.dbl
Acourate Time Domain F...
R Before 1-6 Oct.dbl
Acourate Time Domain F...
R Before Psy.dbl
Acourate Time Domain F...
File name:
Pulse48R.dbl
Files of type:
Time domain signal files (*.pcm,*.dbl,*.raw,*.wav,*.b
Open
Cancel


20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
10
100
1000
10000
24000
Acourate
Pulse48L
Pulse48R
Curve3
Curve4
Curve5
Curve6

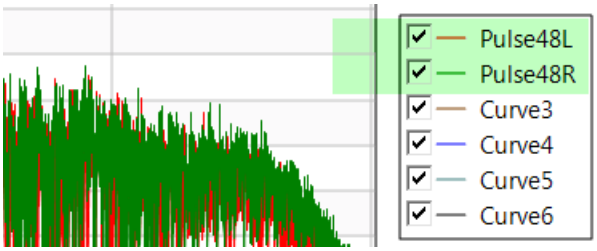


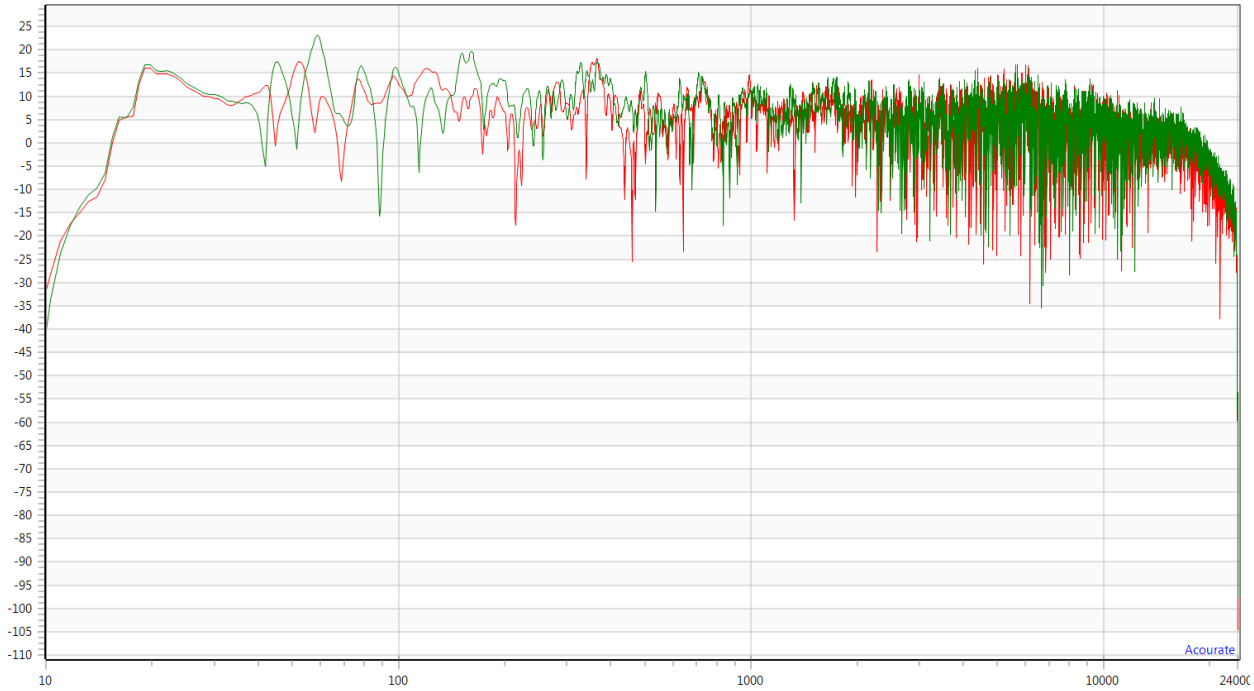


These are the only 2 Curves you need to start your Analysis.

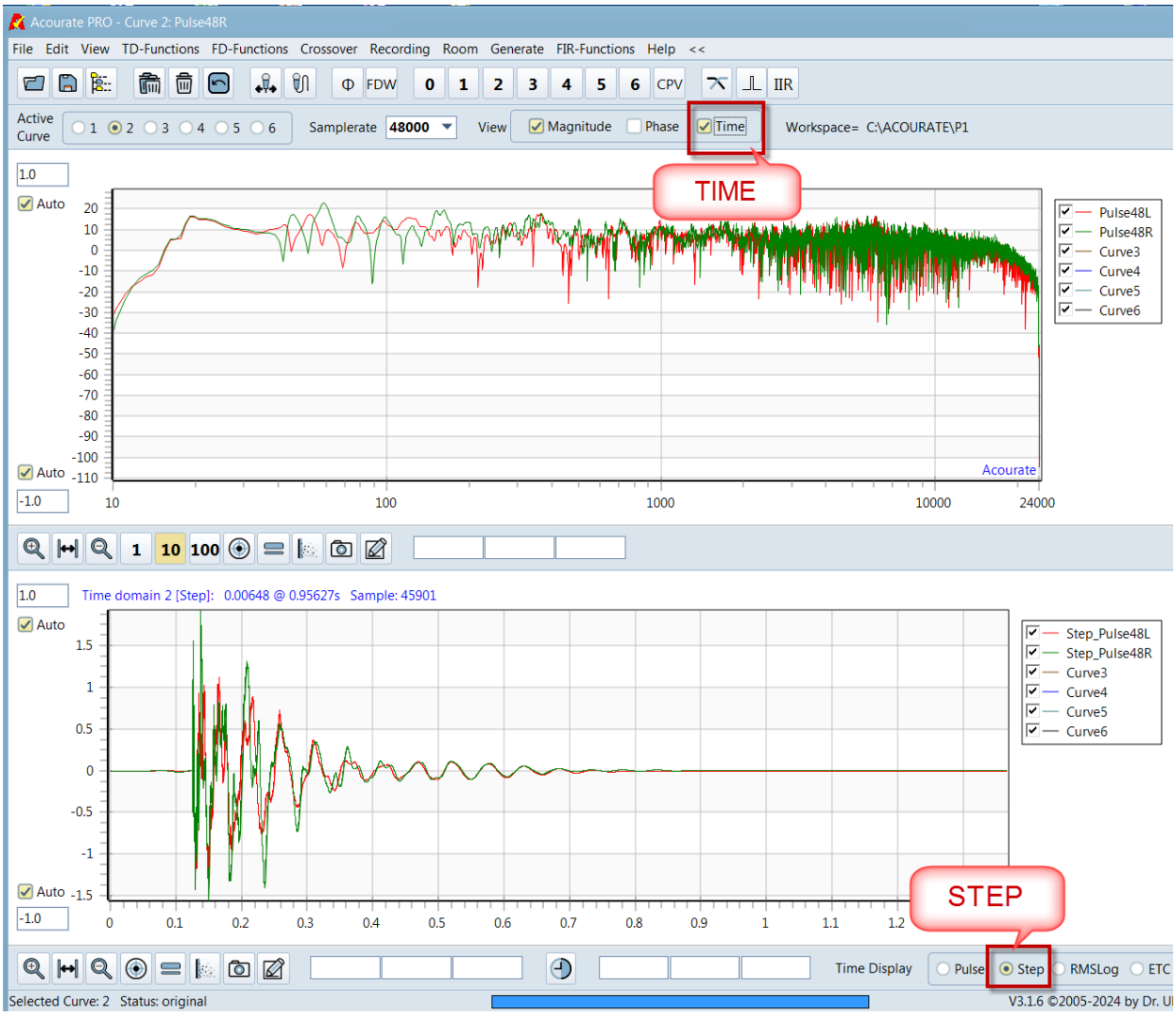
Turn on both curves:

Pulse48L
Pulse48R



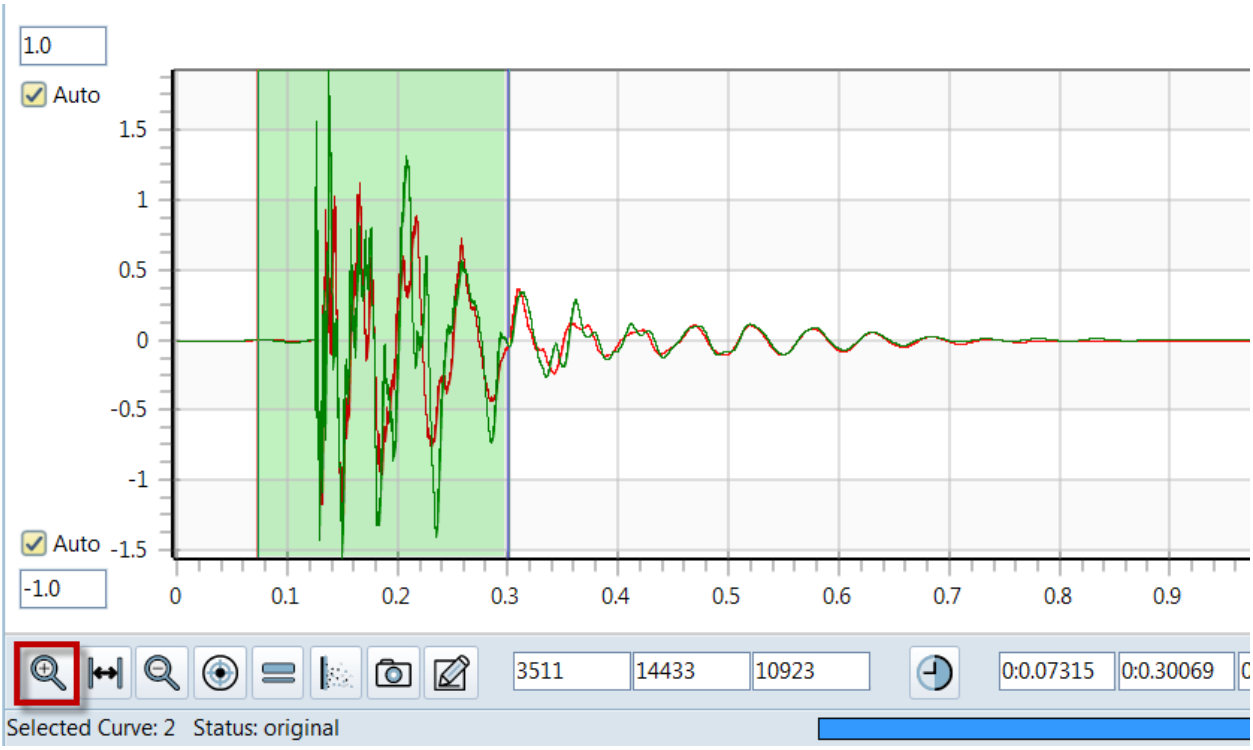


Check the TIME Chart.

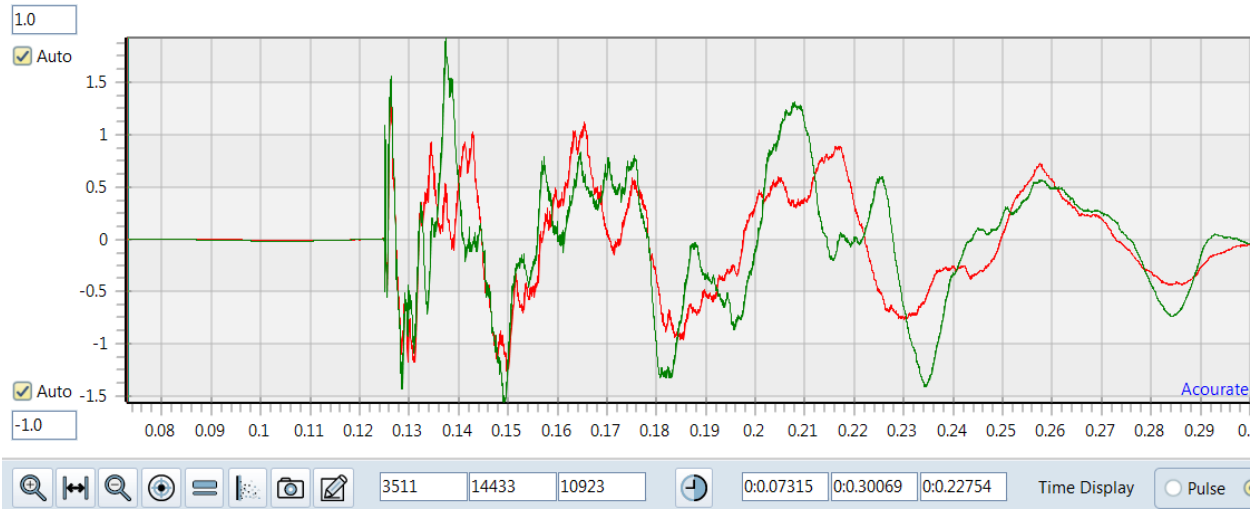


Select the STEP Response

Zoom into this Region



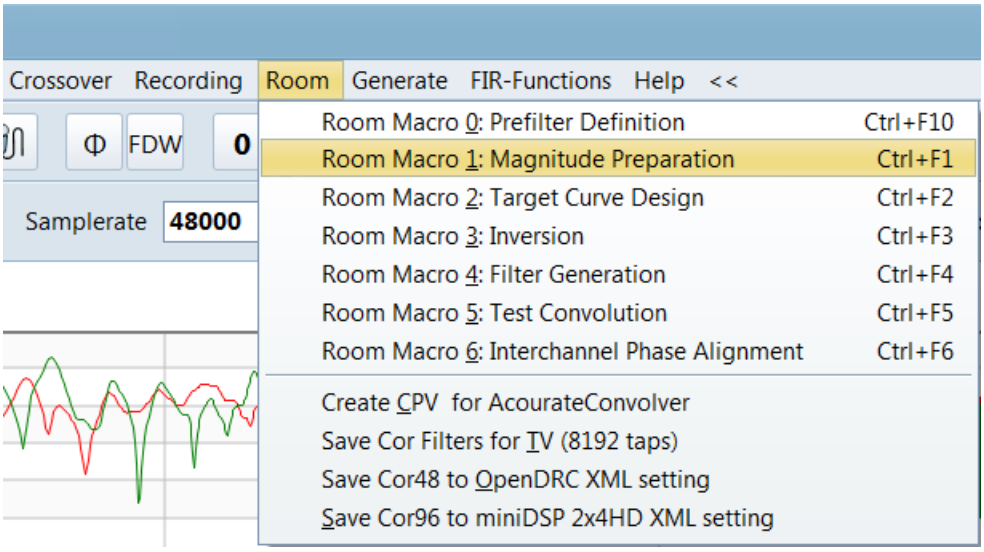
Ideally you would want the Step Response of the Left and Right Channels to be coincident. They are not.

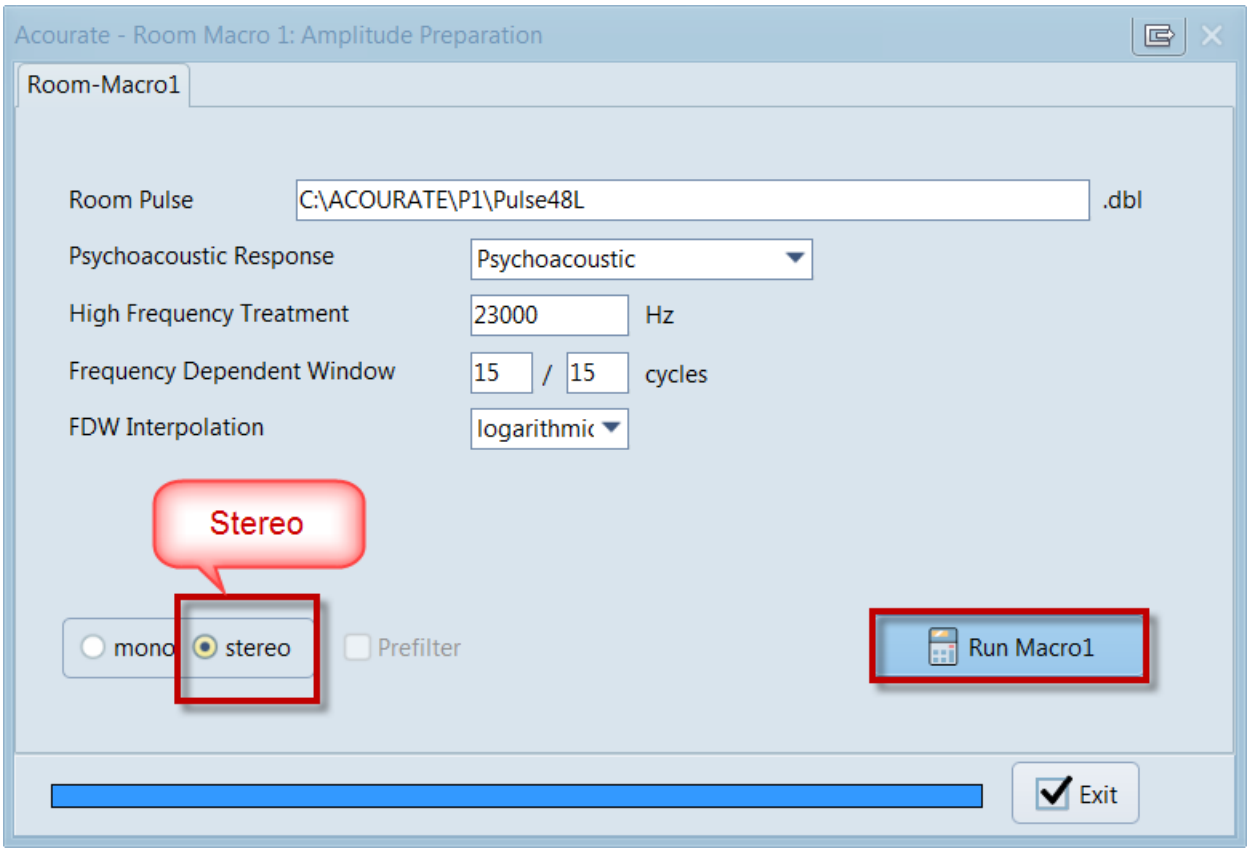


Acourate can fix this.

Room Macro 1: Magnitude Preparation

Room > Room Macro 1: Magnitude Preparation



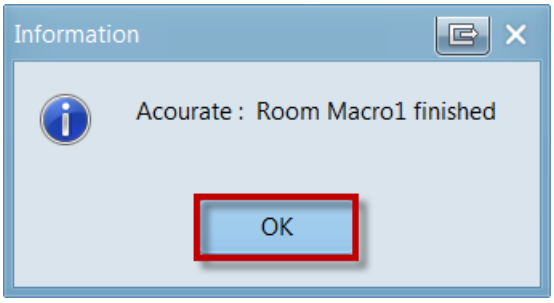


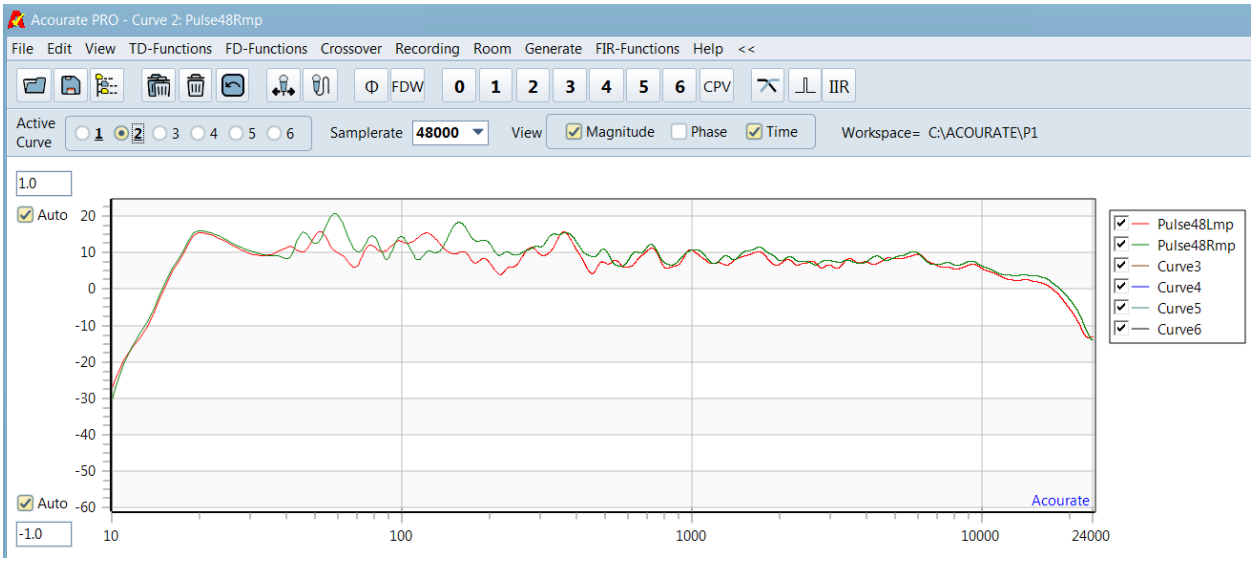
Accept all the default values in Room Macro 1.

Your objective is to extract the Minimum Phase Response for the Left and Right Channels.

You are applying a Frequency Dependent Window:
15 cycles at the Low Frequency
15 cycles at the High Frequency

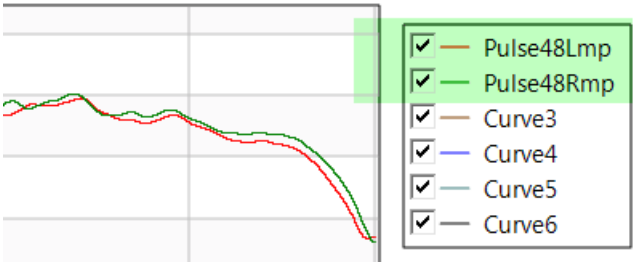
Run Macro 1





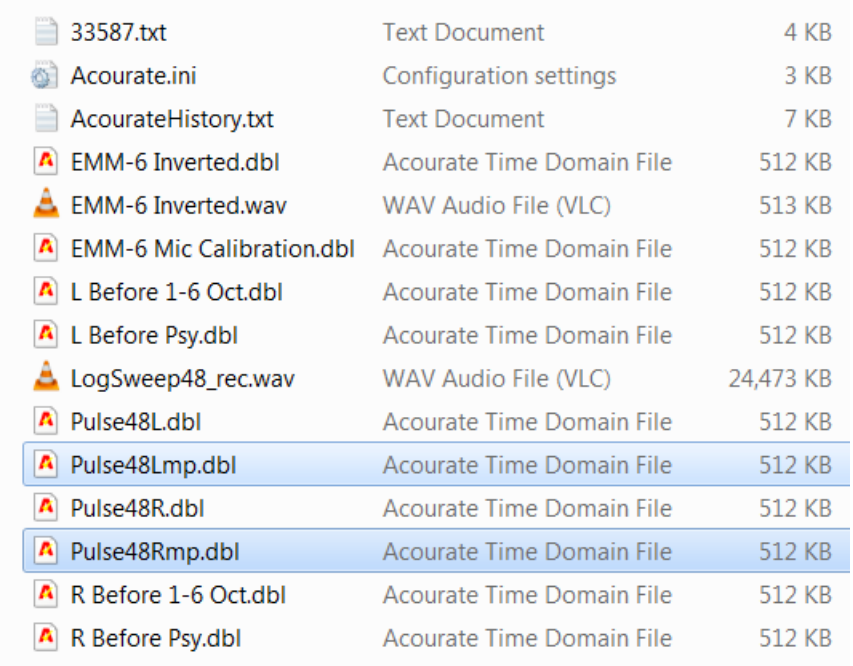
Curve 1 = Pulse48L Minimum Phase Response

Curve 2 = Pulse48R Minimum Phase Response



View the contents of Project Workspace P1

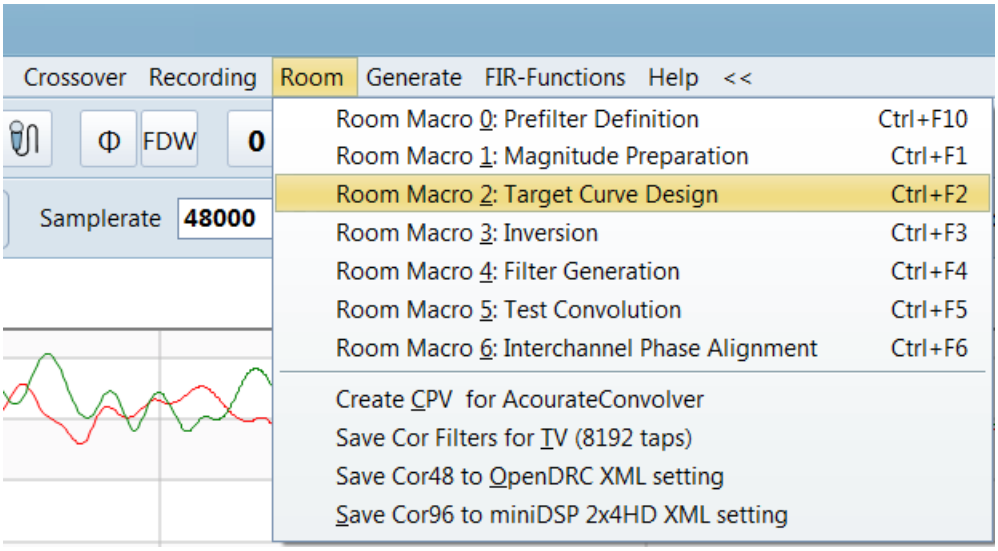
C:\ACOURATE\P1

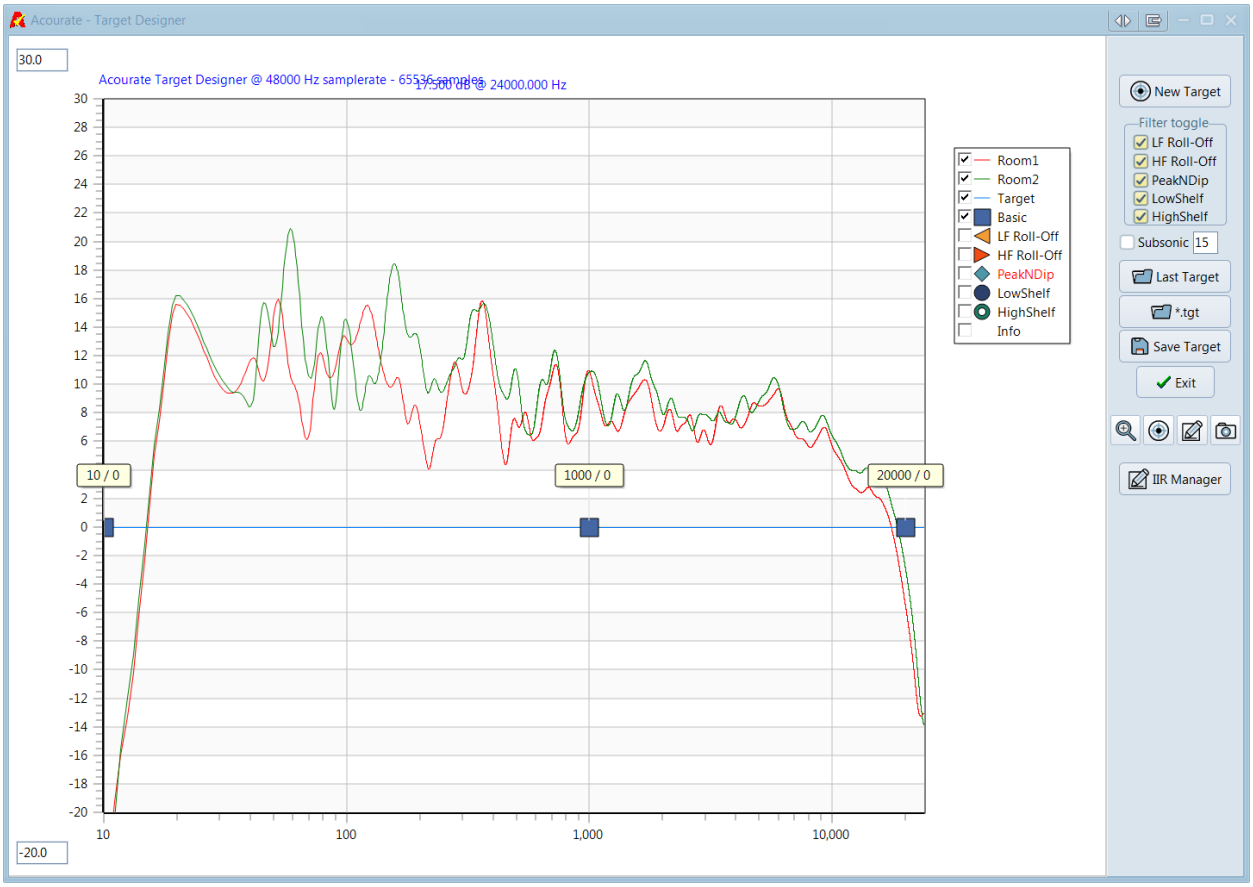


Acourate has created two new Minimum Phase Response files:

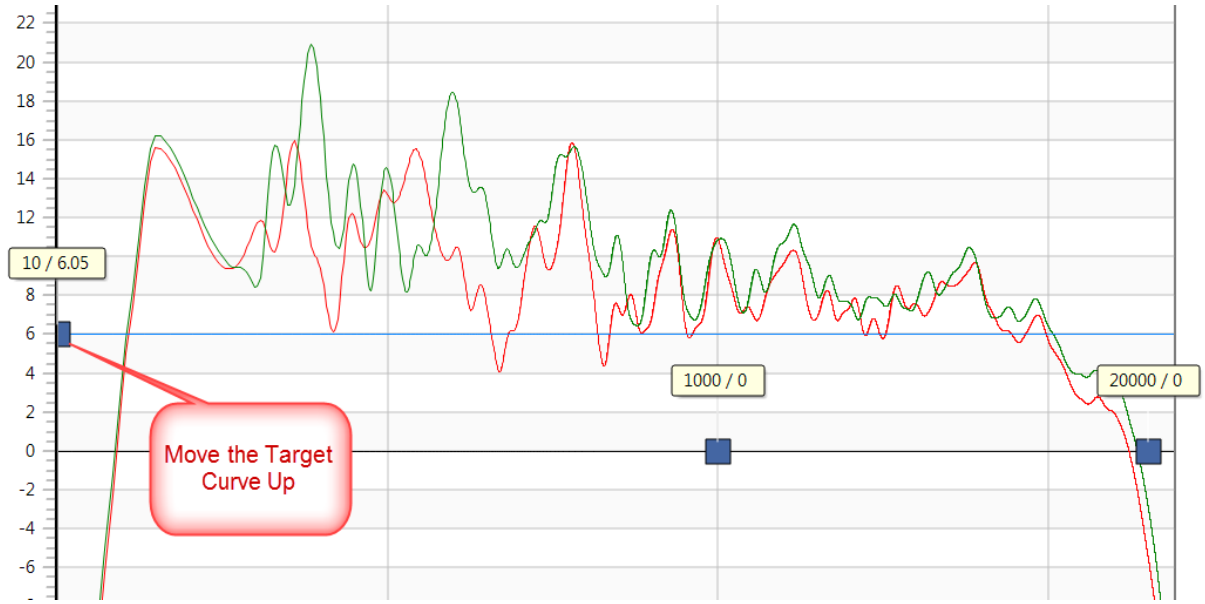
- Pulse48Lmp
- Pulse48Rmp

Room Macro 2: Target Curve Design

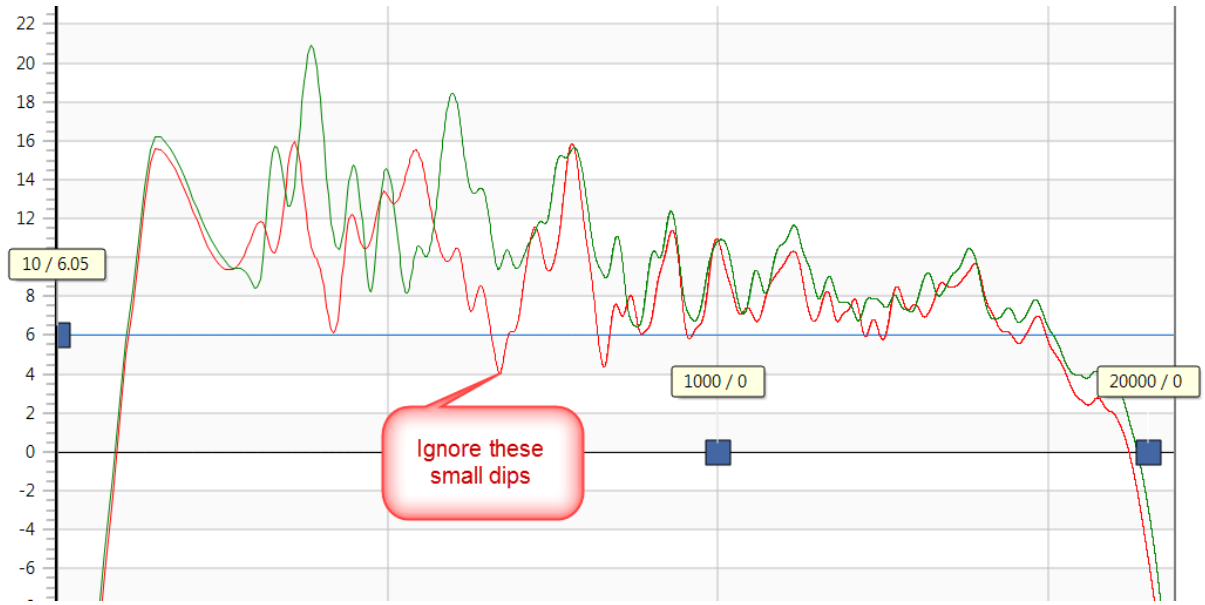




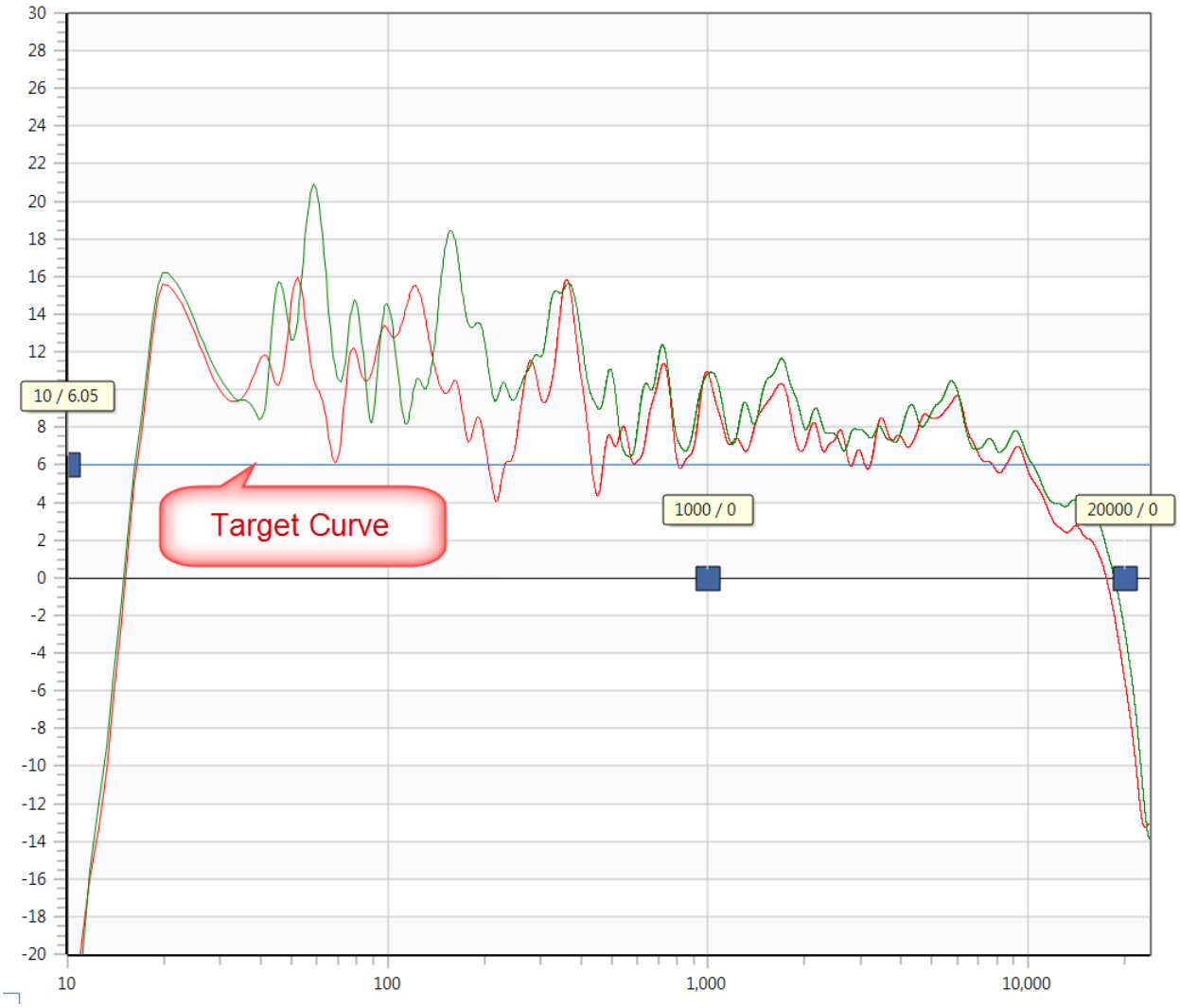
Move the Blue Target Curve up by dragging the blue handle.



Ignore a few small dips.

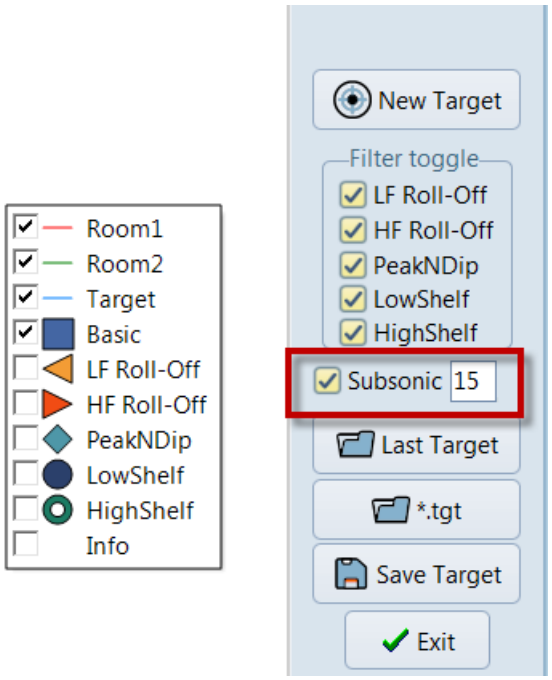


You want the blue line to be your Target Curve.



Digital Correction will be applied only to those frequencies that fall above the Target Curve.

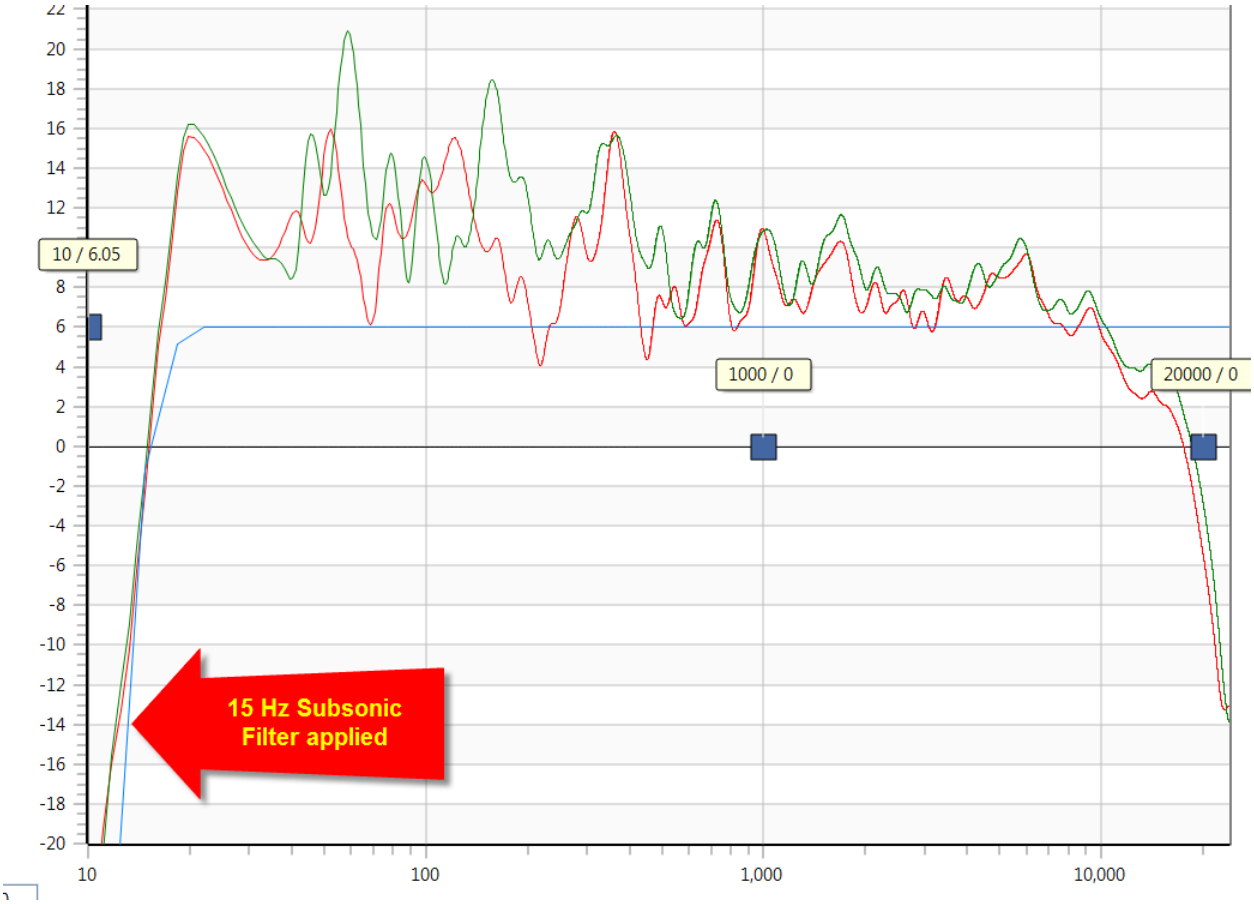
Turn on the Subsonic Filter at 15 Hz.



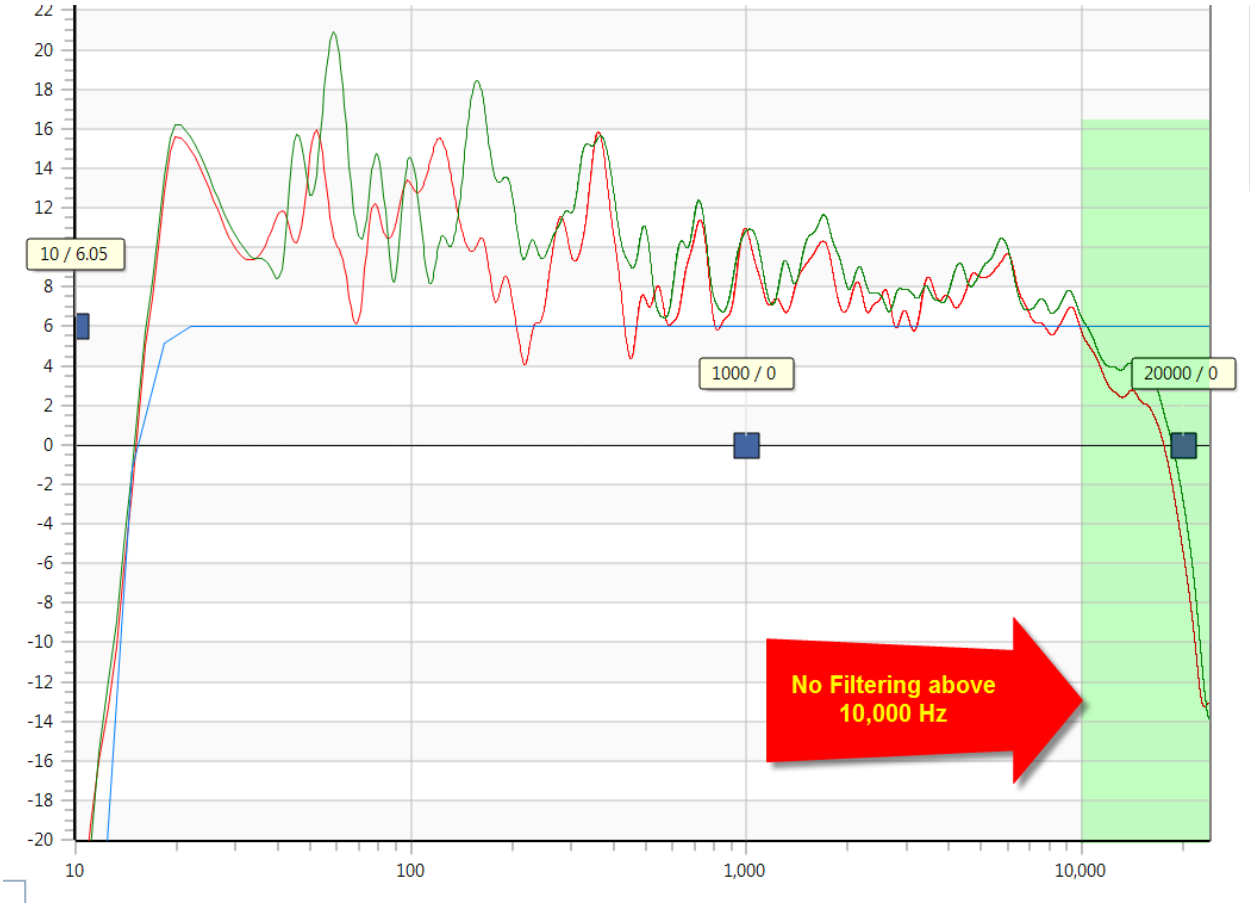
This will eliminate all frequencies below 15 Hz.

This modifies the Target Curve.

The blue Target Curve slopes down sharply at 15 Hz as a result of applying the Subsonic filter.



You will not be applying any filtering above 10,000 Hz.



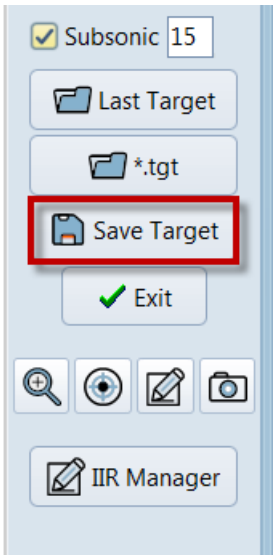
This will protect your tweeters.

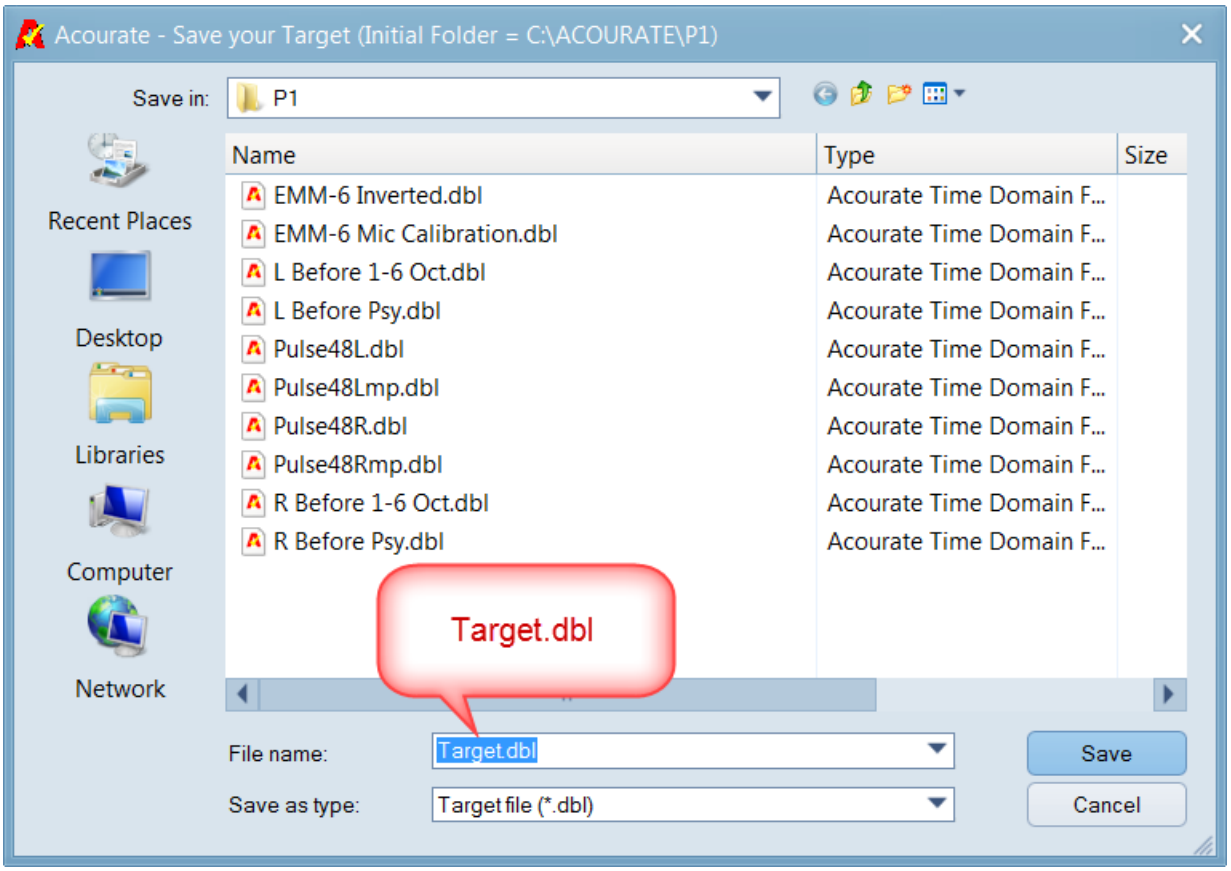
It is never a good idea to boost your tweeters. You can potentially destroy them.

You should let your tweeters naturally roll off.

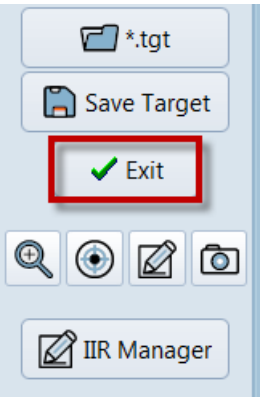
Note: You will be setting the High Frequency Limits for the Left and Right Channels when you enter the parameters for Room Macro 3. You will do this later on Page 145.

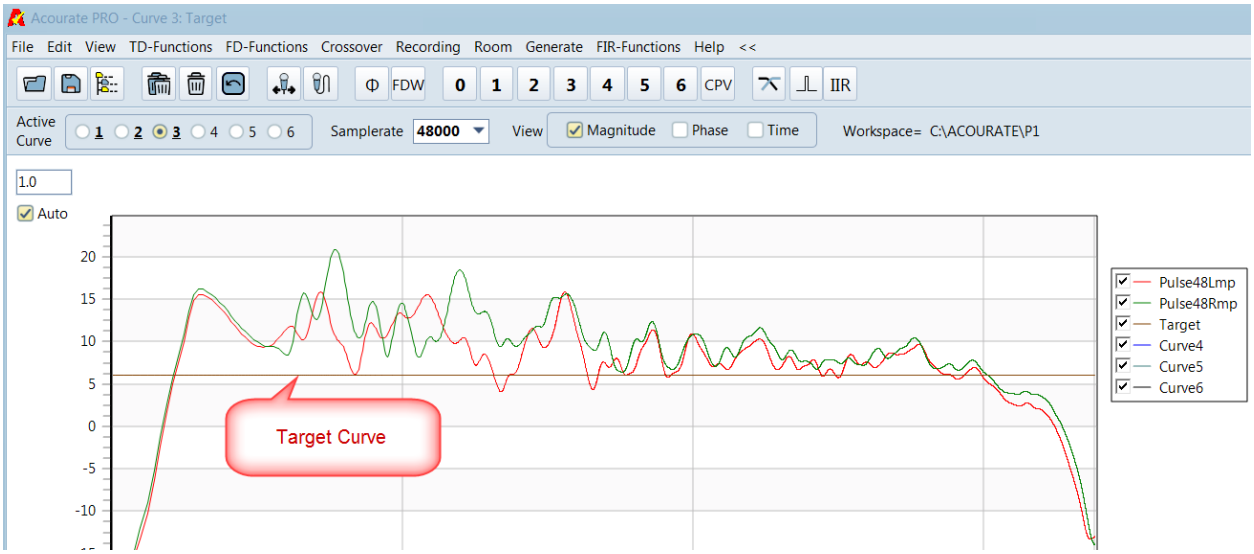
Save Target

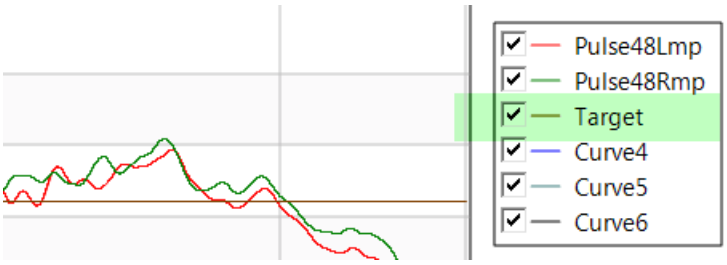

Subsonic 15
Last Target
*.tgt
Save Target
Exit
IIR Manager


Acurate - Save your Target (Initial Folder = C:\ACOURATE\P1)
Save in: P1
Recent Places
Desktop
Libraries
Computer
Network
Name
Type
Size
EMM-6 Inverted.dbl
EMM-6 Mic Calibration.dbl
L Before 1-6 Oct.dbl
L Before Psy.dbl
Pulse48L.dbl
Pulse48Lmp.dbl
Pulse48R.dbl
Pulse48Rmp.dbl
R Before 1-6 Oct.dbl
R Before Psy.dbl
Acurate Time Domain F...
Target.dbl
File name: Target.dbl
Save as type: Target file (*.dbl)
Save
Cancel

Exit







Next, you will create Pre Filters for the Left and Right Channels.

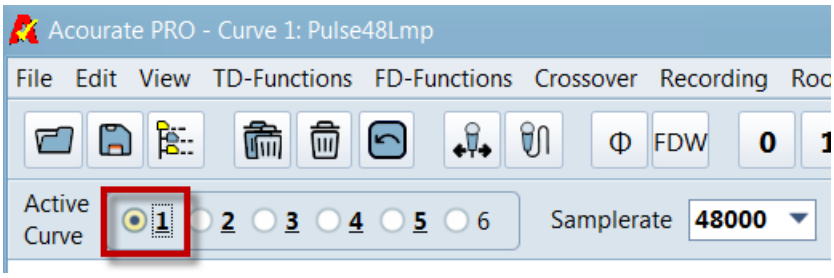
At the moment you have 3 Curves loaded:

Curve 1 = Pulse48Lmp (Minimum Phase)
Curve 2 = Pulse48Rmp (Minimum Phase)
Curve 3 = Target Curve

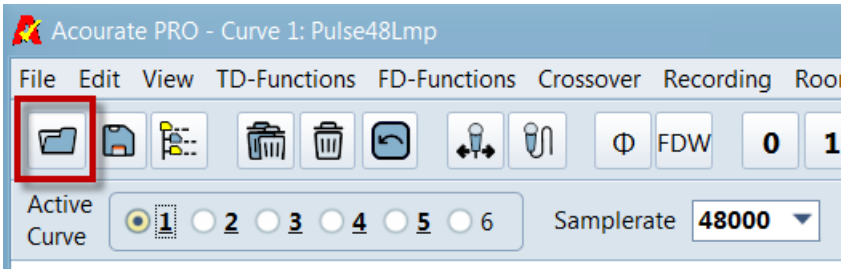
You are going to replace Curve 1 and 2 with the Measured Impulse Response curves:

Pulse48L
Pulse48R

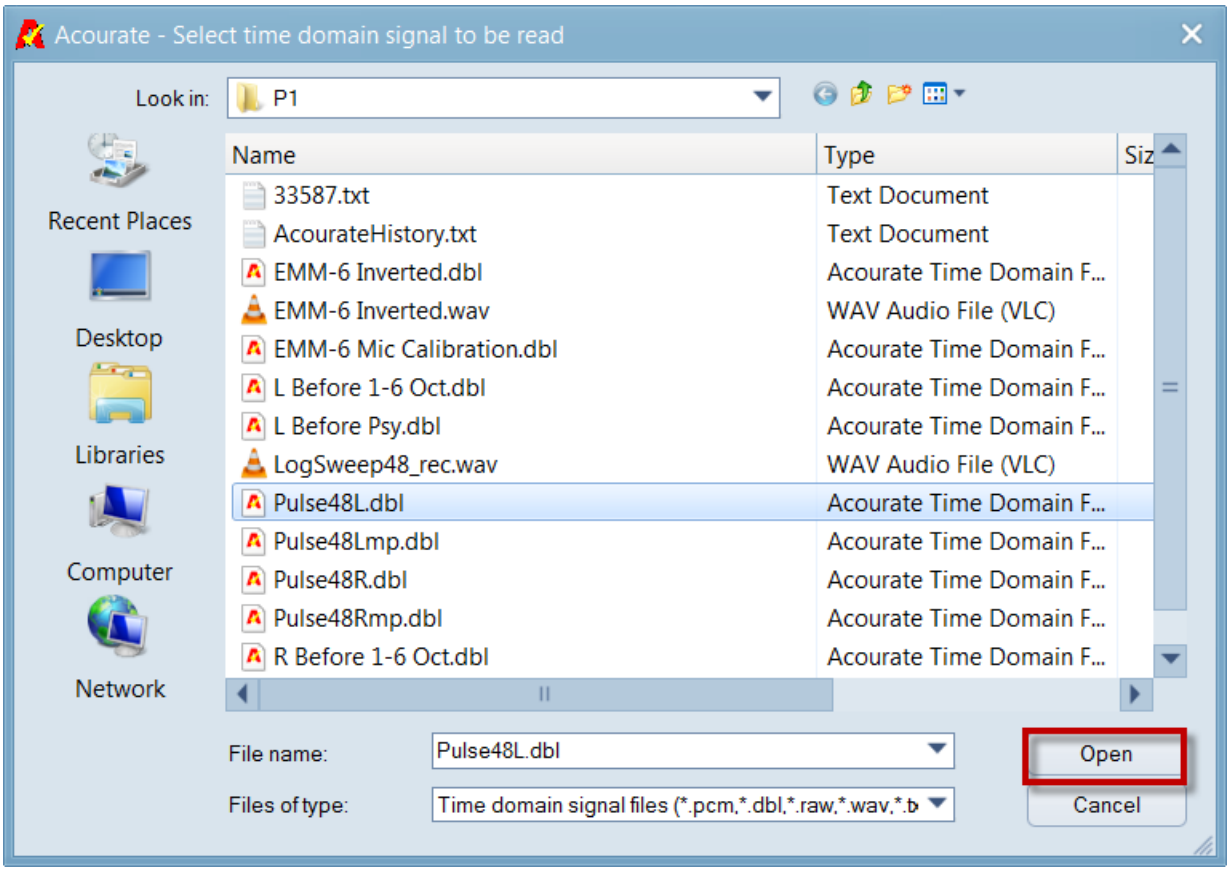
Select Curve 1 to make it Active



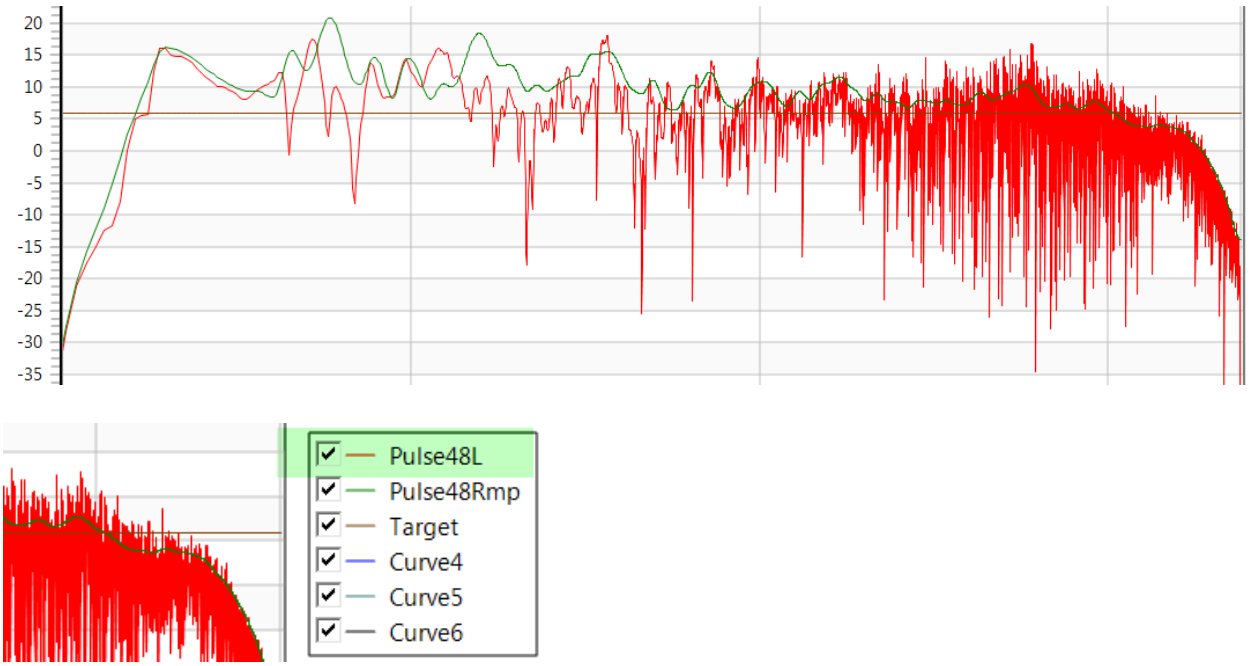
Open File



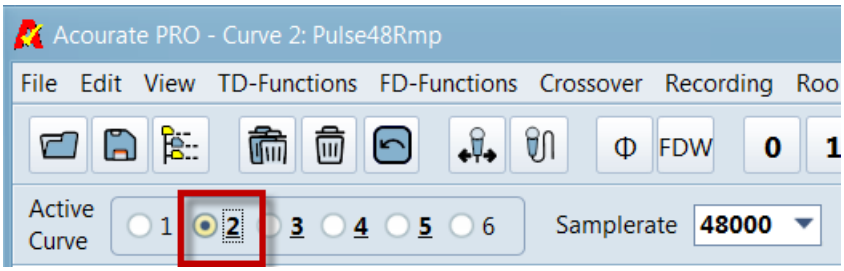
Select Pulse48L.dbl



Open

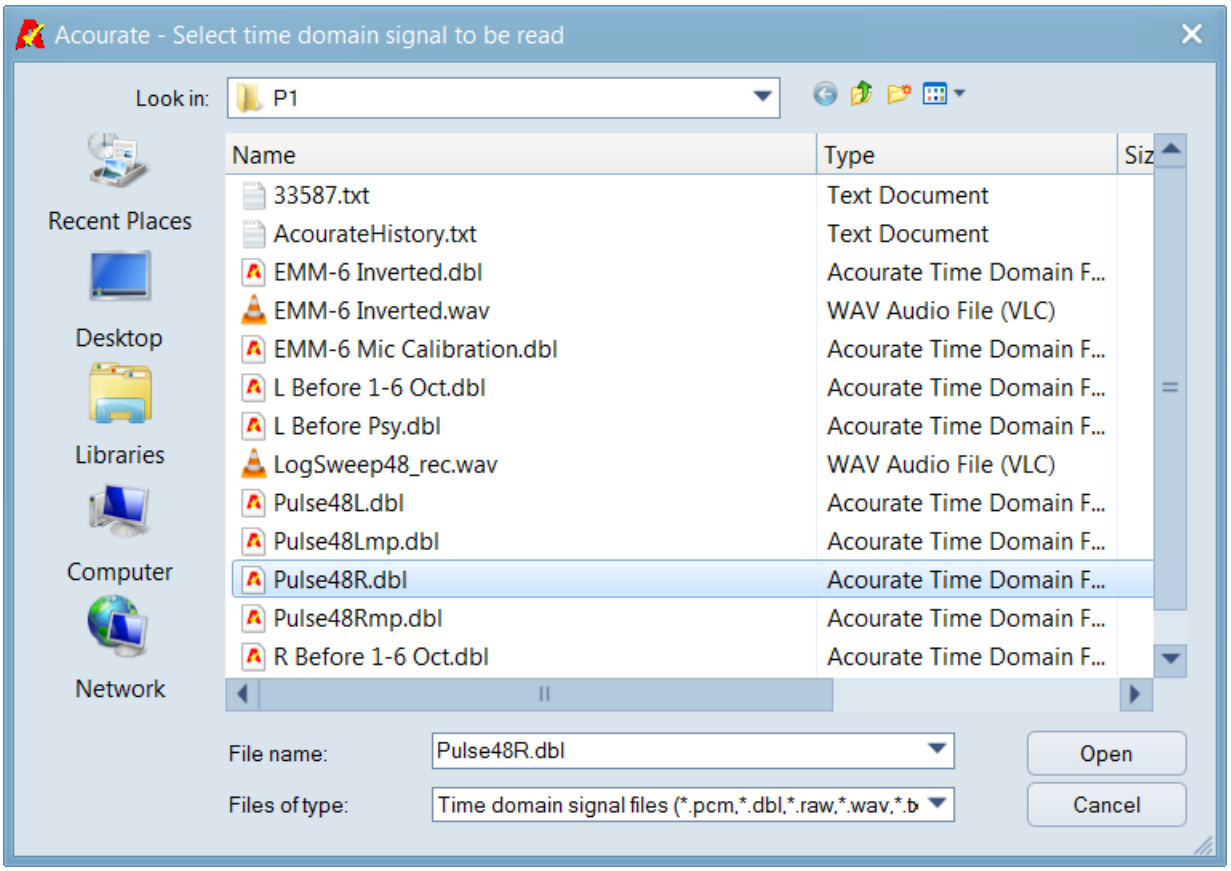


Select Curve 2 to make it Active

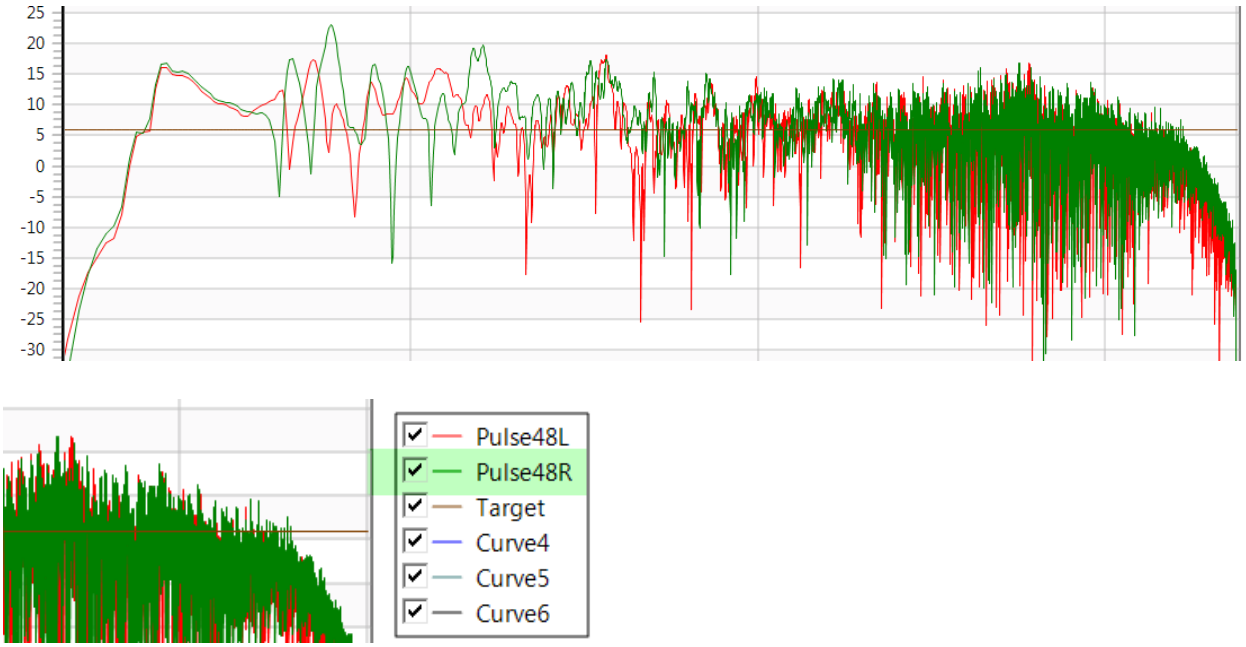


Open File

Select Pulse48R.dbl

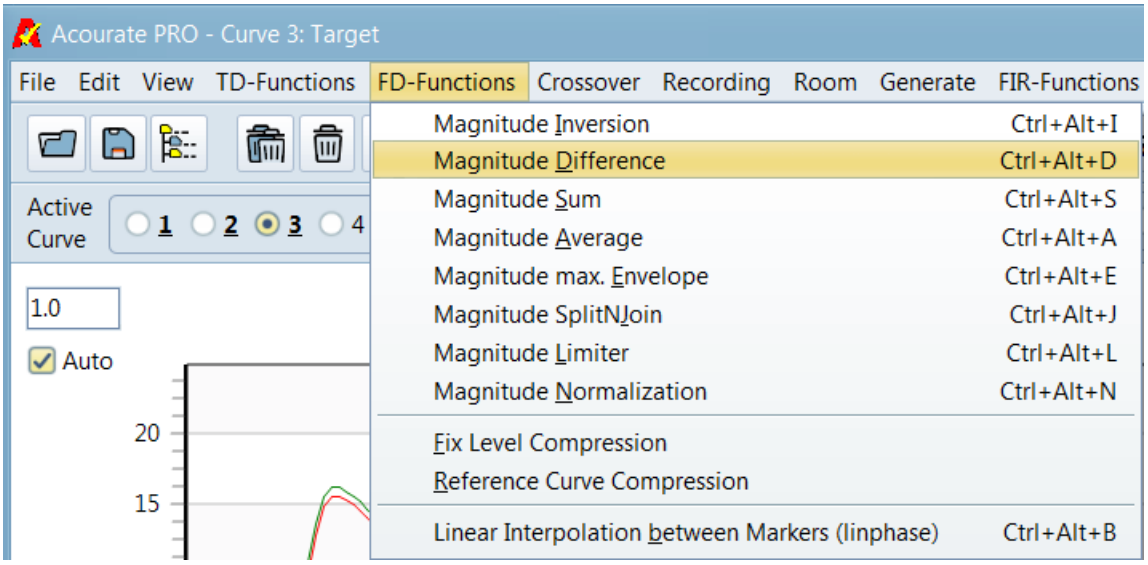


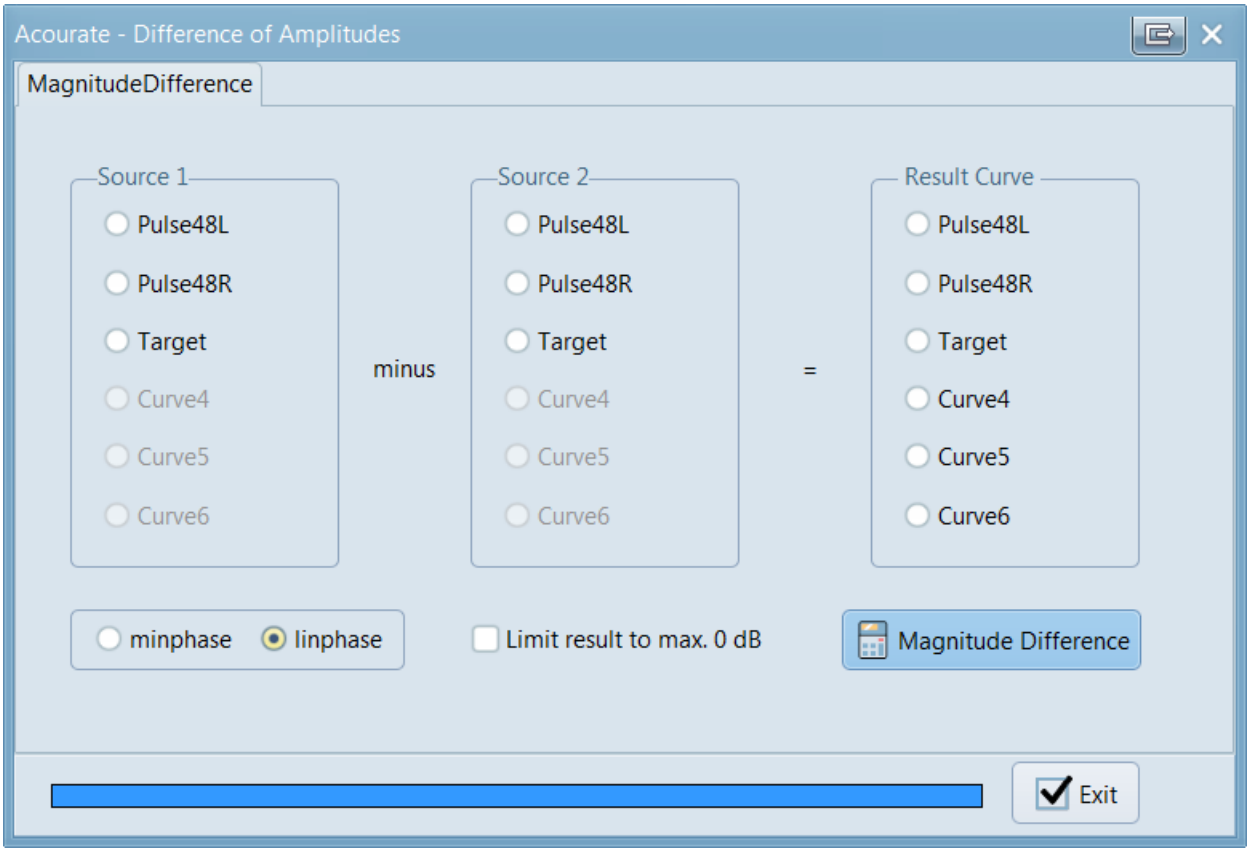
Open


25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
Pulse48L
Pulse48R
Target
Curve4
Curve5
Curve6

Compute Magnitude Difference

FD-Functions > Magnitude Difference



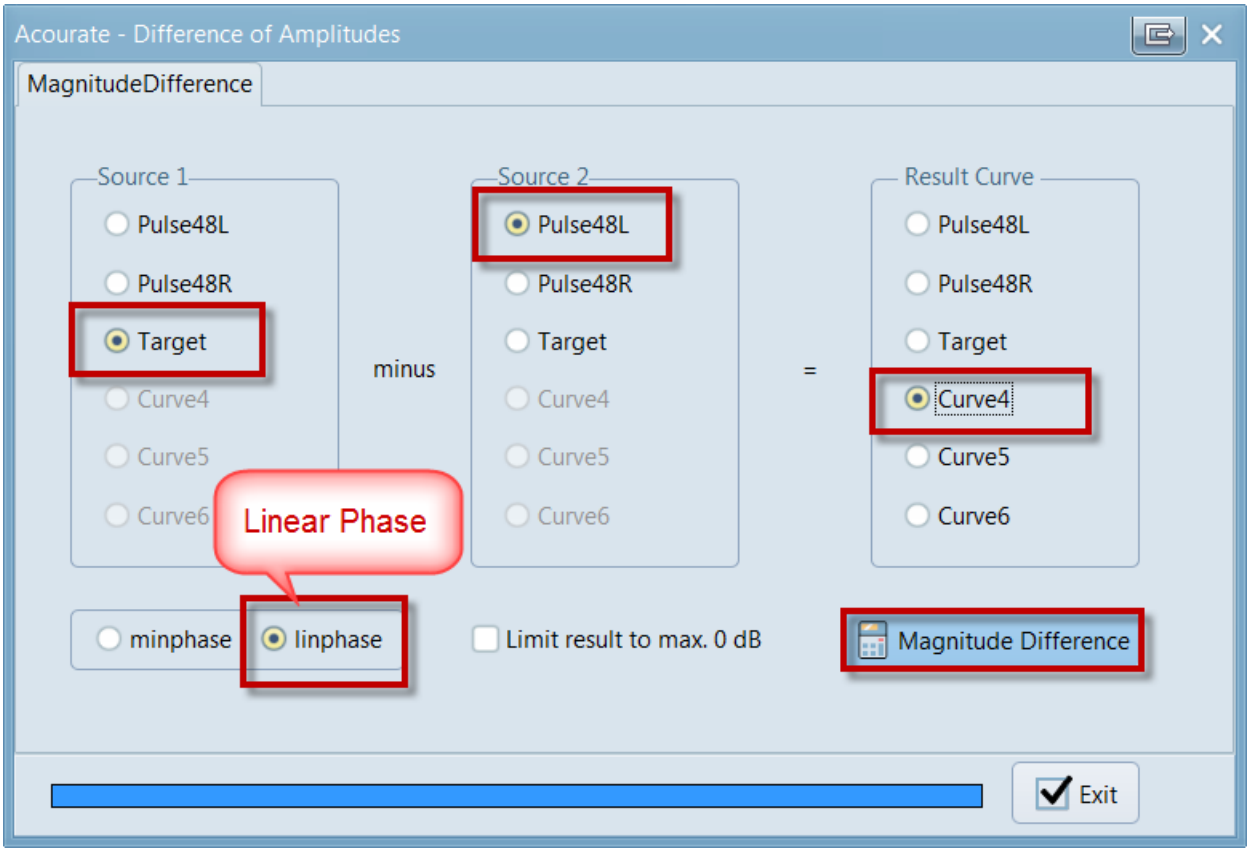


Select Source 1 = **Target**

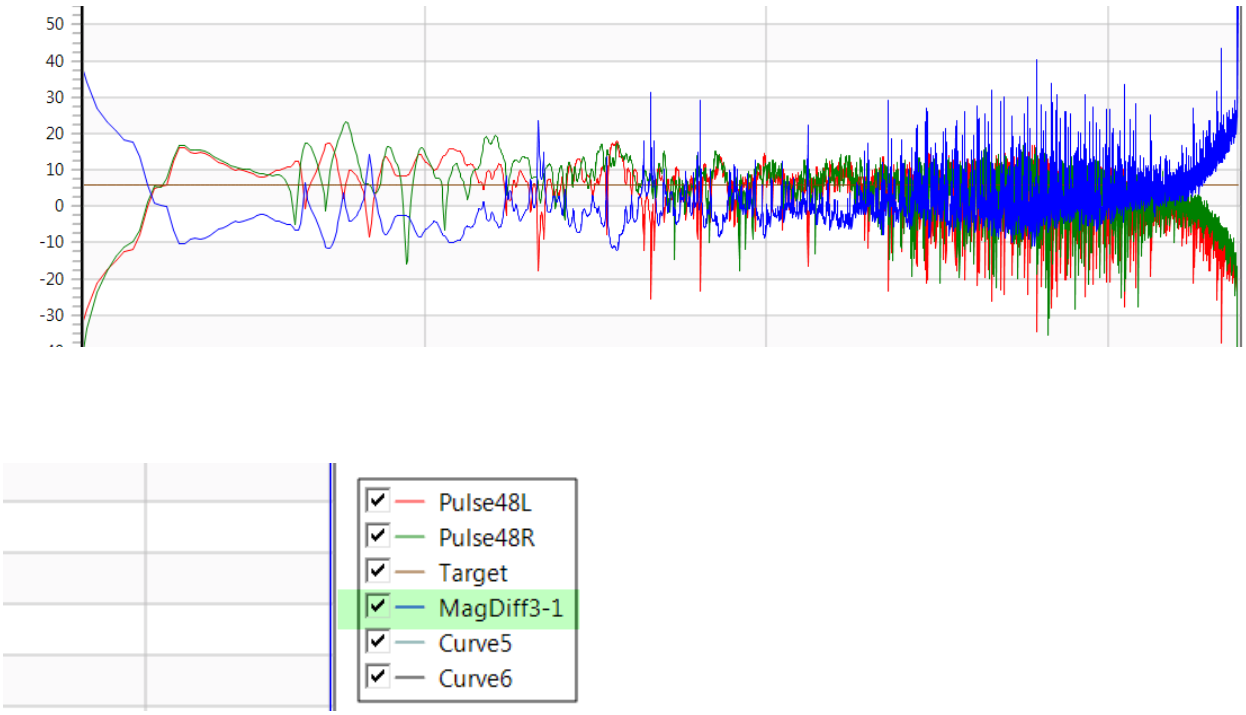
Select **Linear Phase** (Default)

Select Source 2 = **Pulse48L**

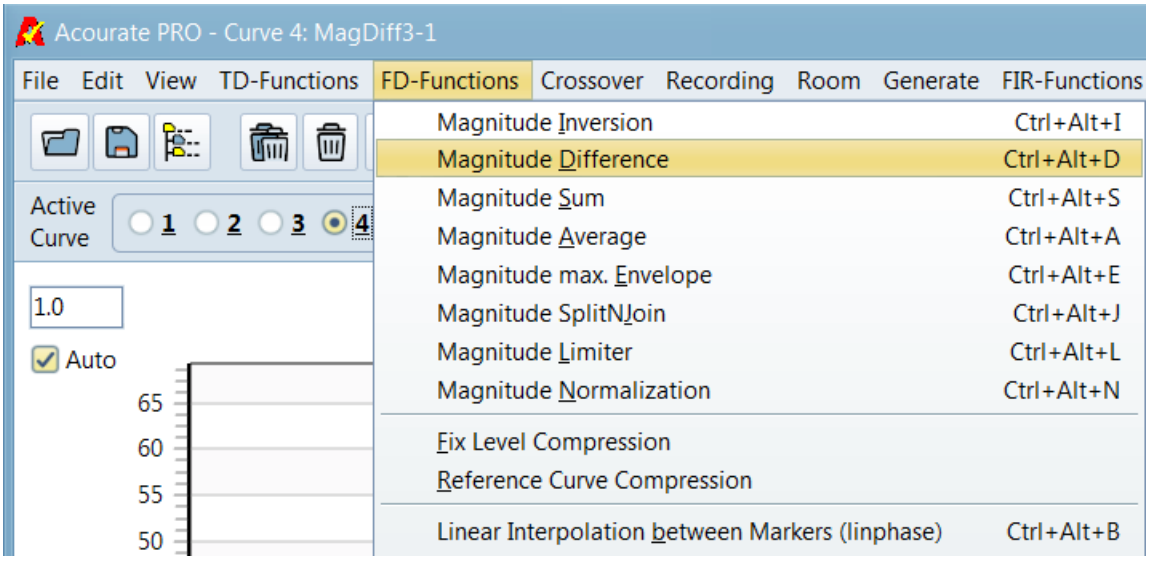
Result Curve = **Curve 4**

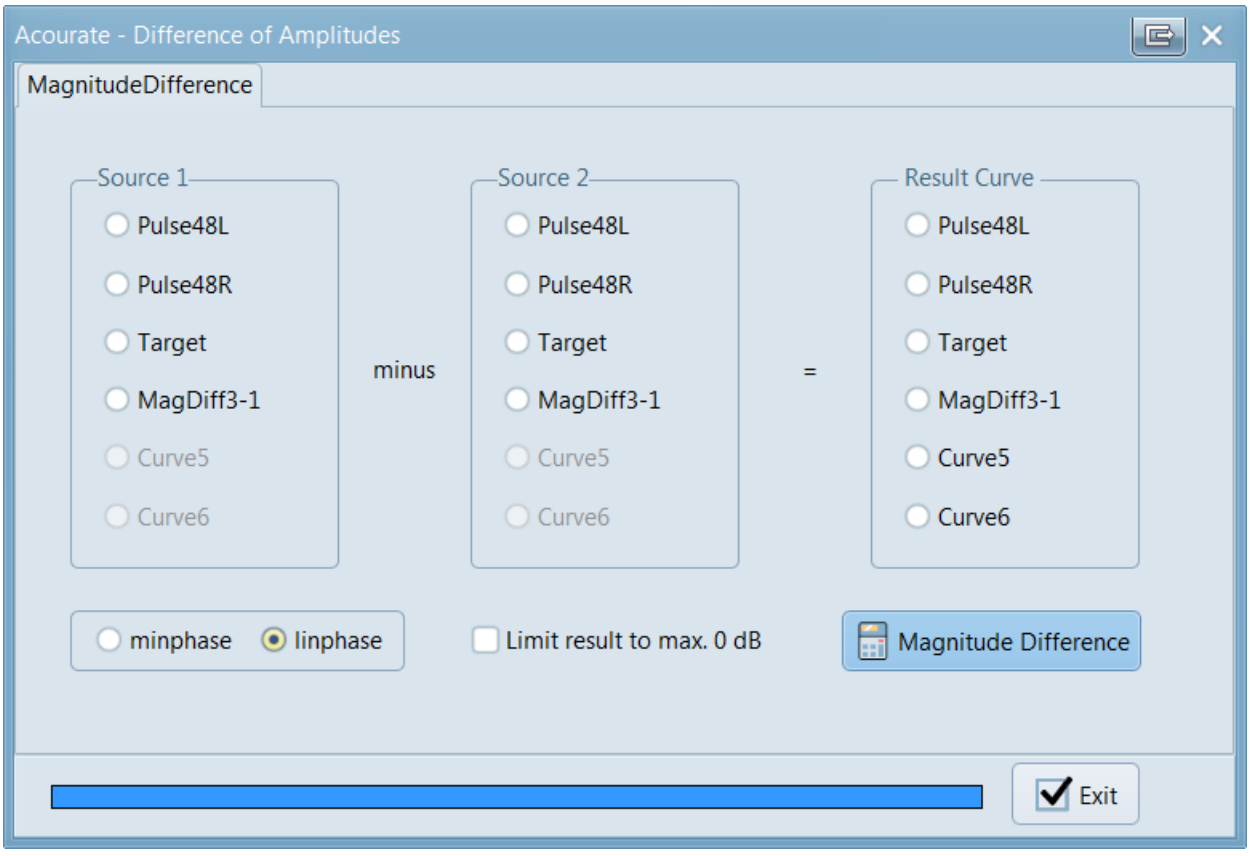


Compute **Magnitude Difference**



Run this operation again for the Right Channel.


Acourate PRO - Curve 4: MagDiff3-1
File Edit View TD-Functions FD-Functions Crossover Recording Room Generate FIR-Functions
Active Curve 1 2 3 4
1.0
Auto
65
60
55
50
Magnitude Inversion Ctrl+Alt+I
Magnitude Difference Ctrl+Alt+D
Magnitude Sum Ctrl+Alt+S
Magnitude Average Ctrl+Alt+A
Magnitude max. Envelope Ctrl+Alt+E
Magnitude SplitNJoin Ctrl+Alt+J
Magnitude Limiter Ctrl+Alt+L
Magnitude Normalization Ctrl+Alt+N
Fix Level Compression
Reference Curve Compression
Linear Interpolation between Markers (linphase) Ctrl+Alt+B

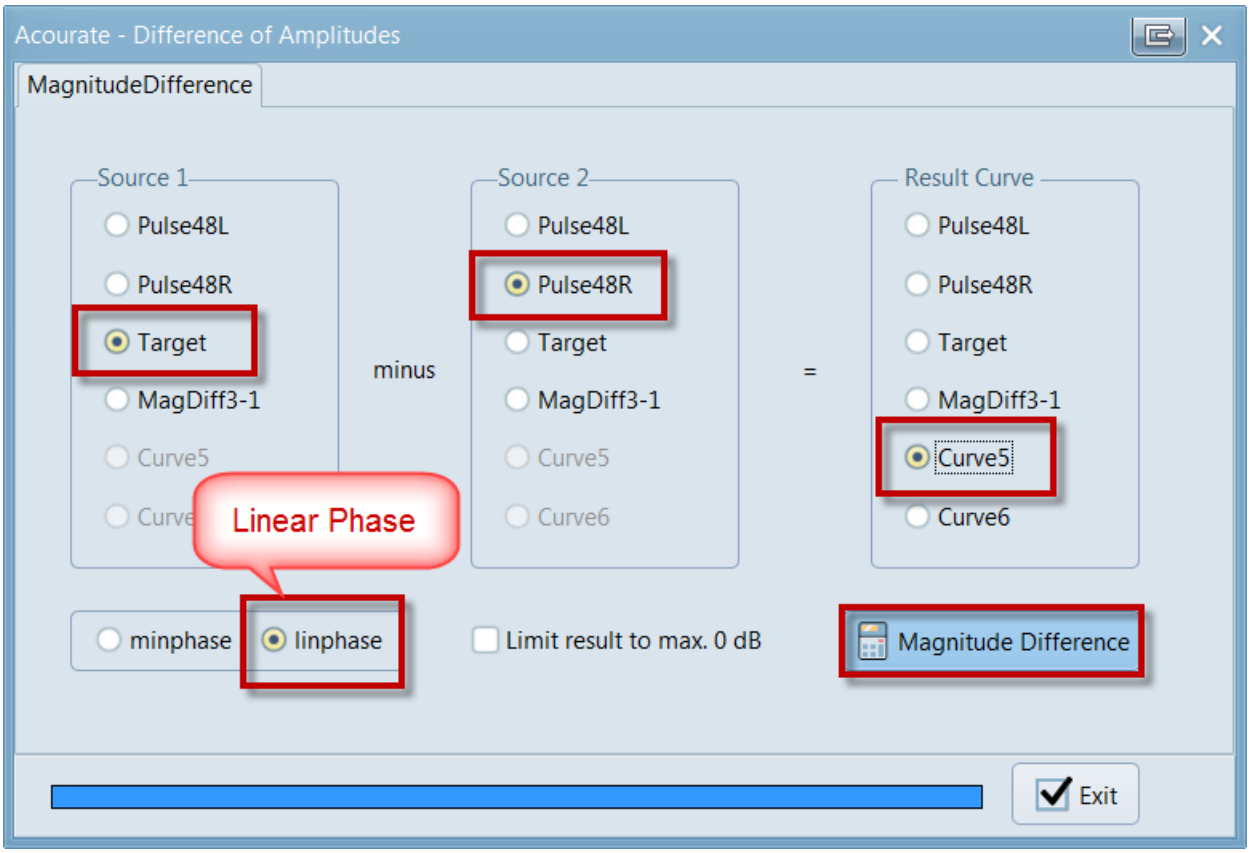

Acourate - Difference of Amplitudes
MagnitudeDifference
Source 1
Pulse48L
Pulse48R
Target
MagDiff3-1
Curve5
Curve6
minus
Source 2
Pulse48L
Pulse48R
Target
MagDiff3-1
Curve5
Curve6
=
Result Curve
Pulse48L
Pulse48R
Target
MagDiff3-1
Curve5
Curve6
minphase
linphase
Limit result to max. 0 dB
Magnitude Difference
Exit

Select Source 1 = **Target**

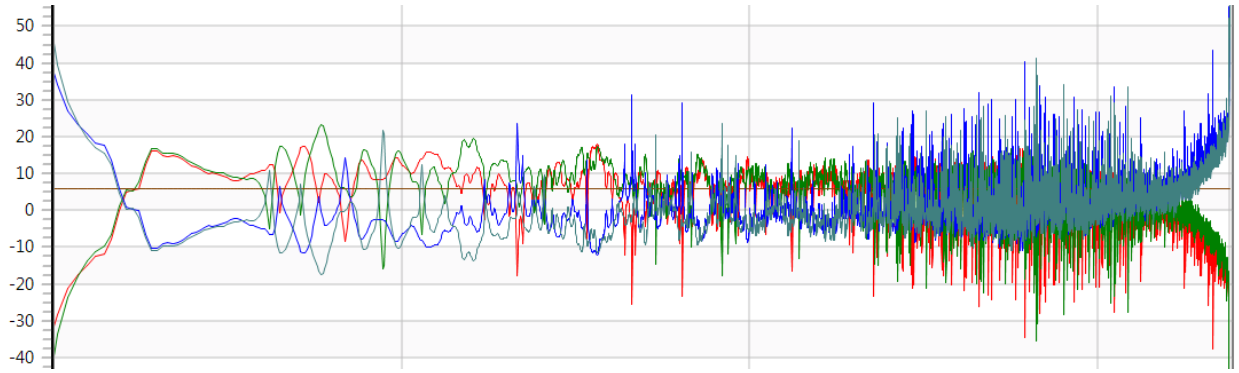
Select **Linear Phase** (Default)

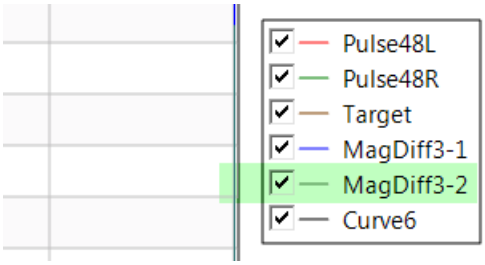
Select Source 2 = **Pulse48R**

Result Curve = **Curve 5**



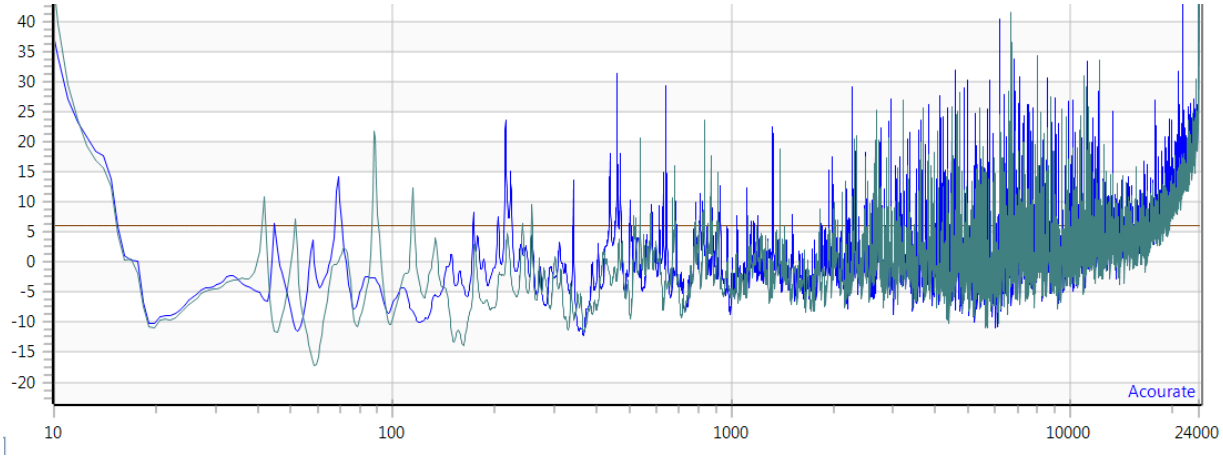
Compute **Magnitude Difference** for the Right Channel.





Turn off Curve 1 = Pulse48L

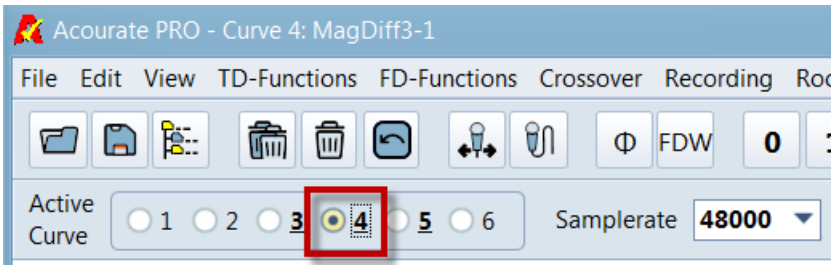
Turn off Curve 2 = Pulse48R



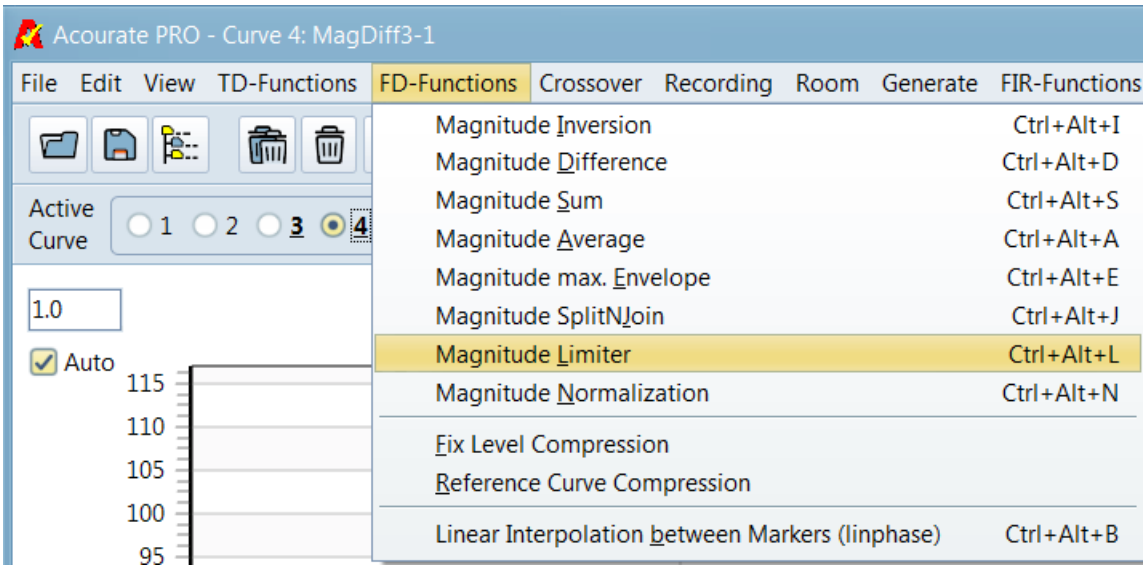
Apply Magnitude Limiter

You want to eliminate everything above 0dB

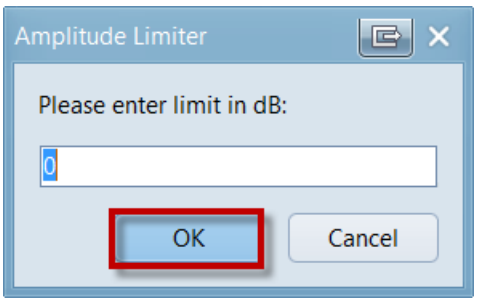
Select Curve 4

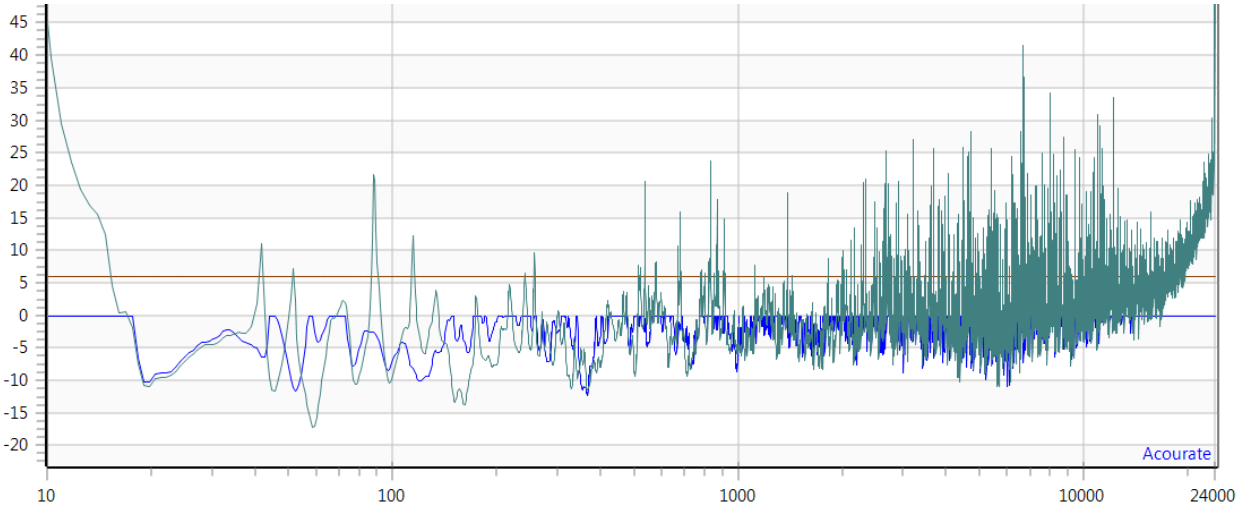


FD-Functions > Magnitude Limiter

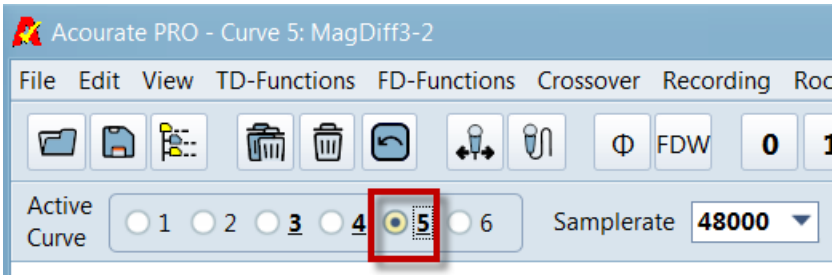


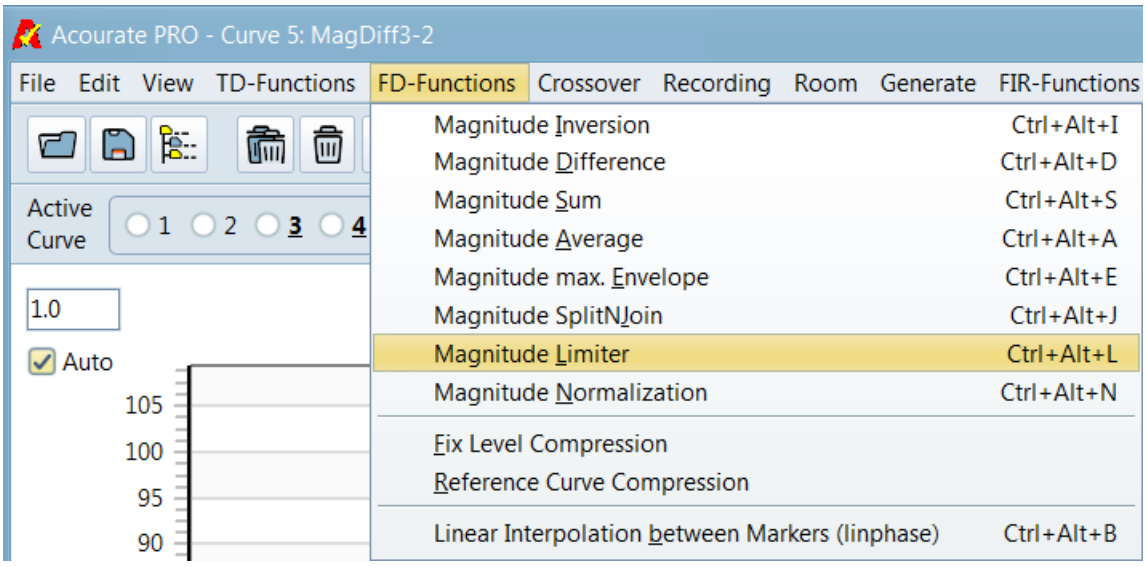
Enter 0dB



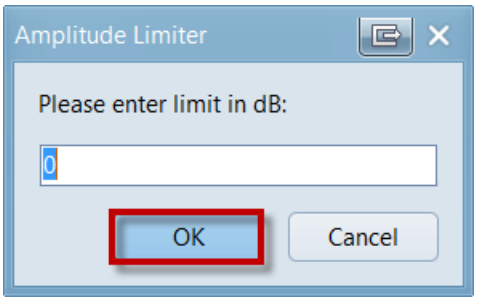


Select Curve 5

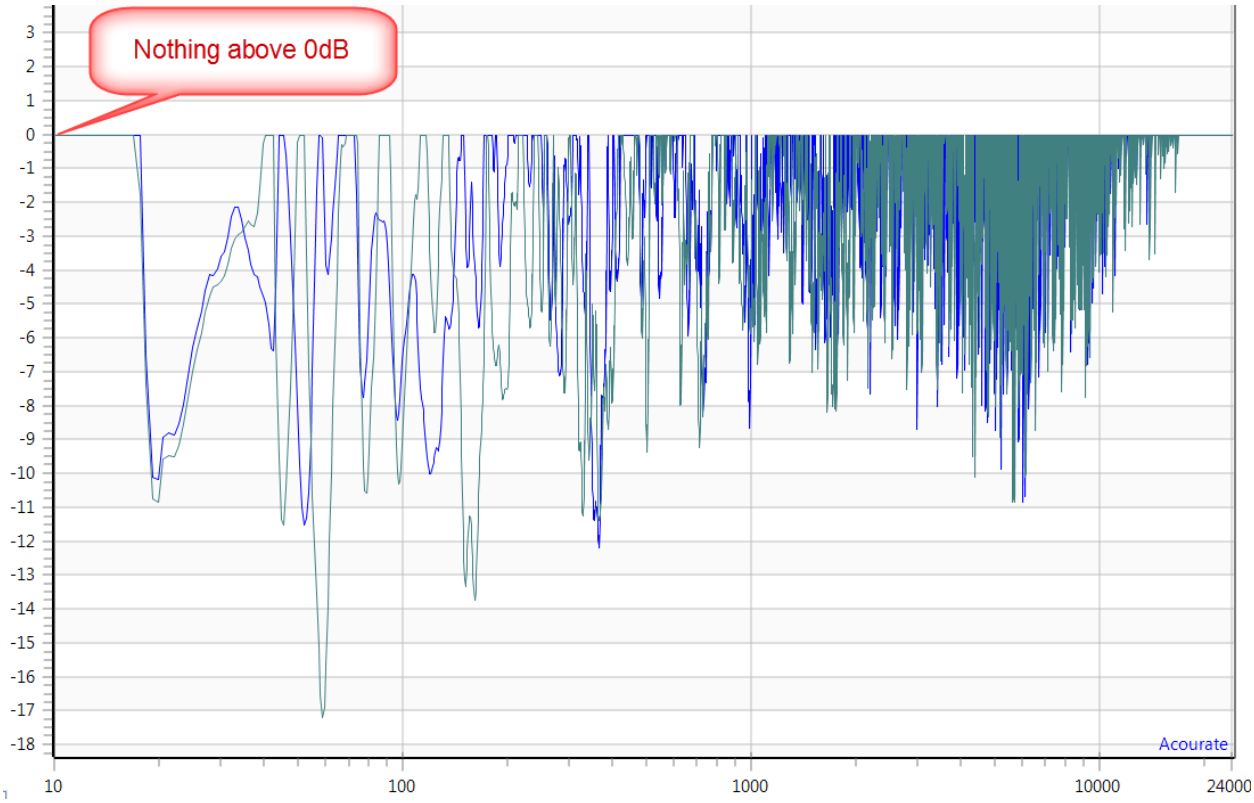




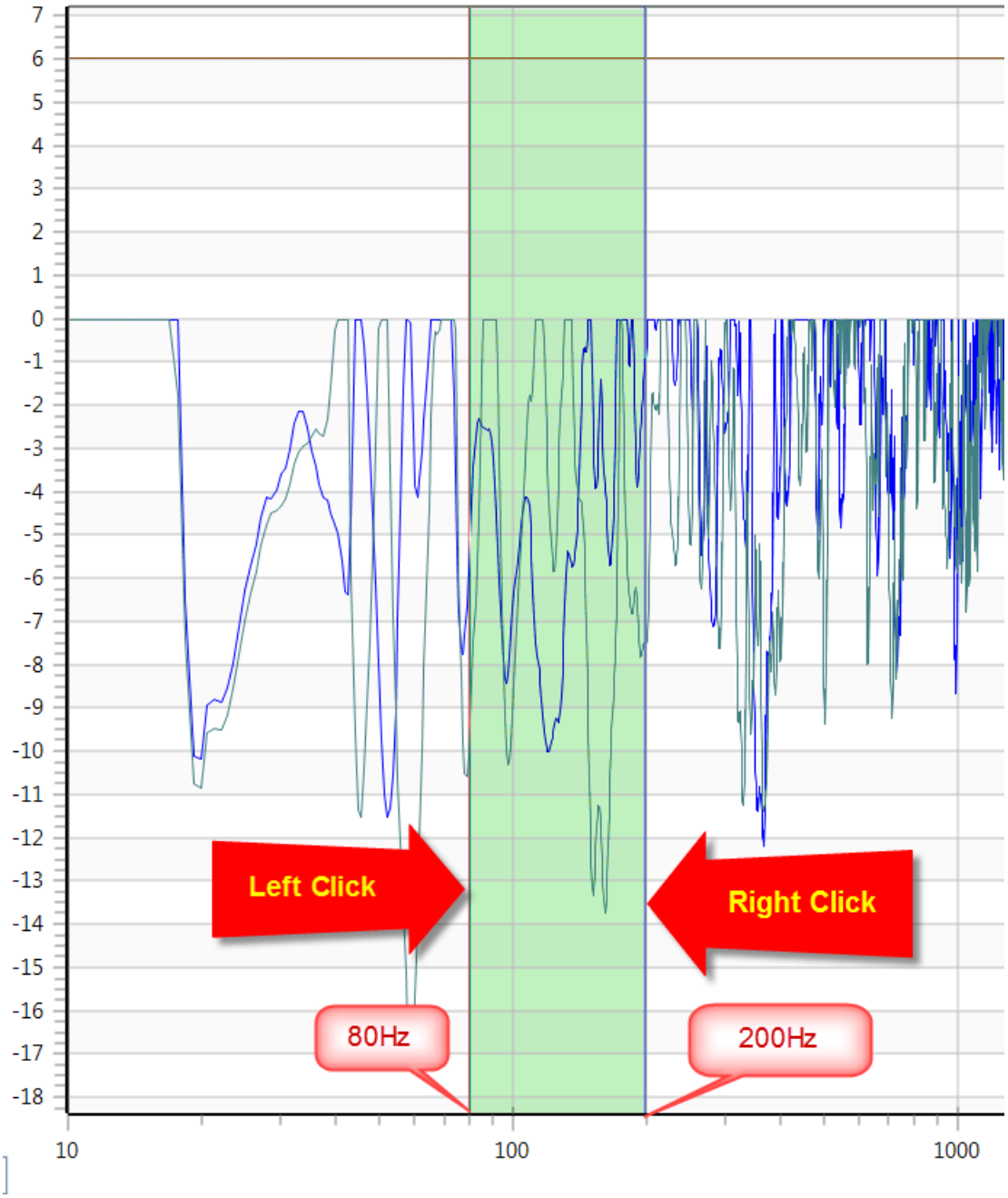
Enter 0dB



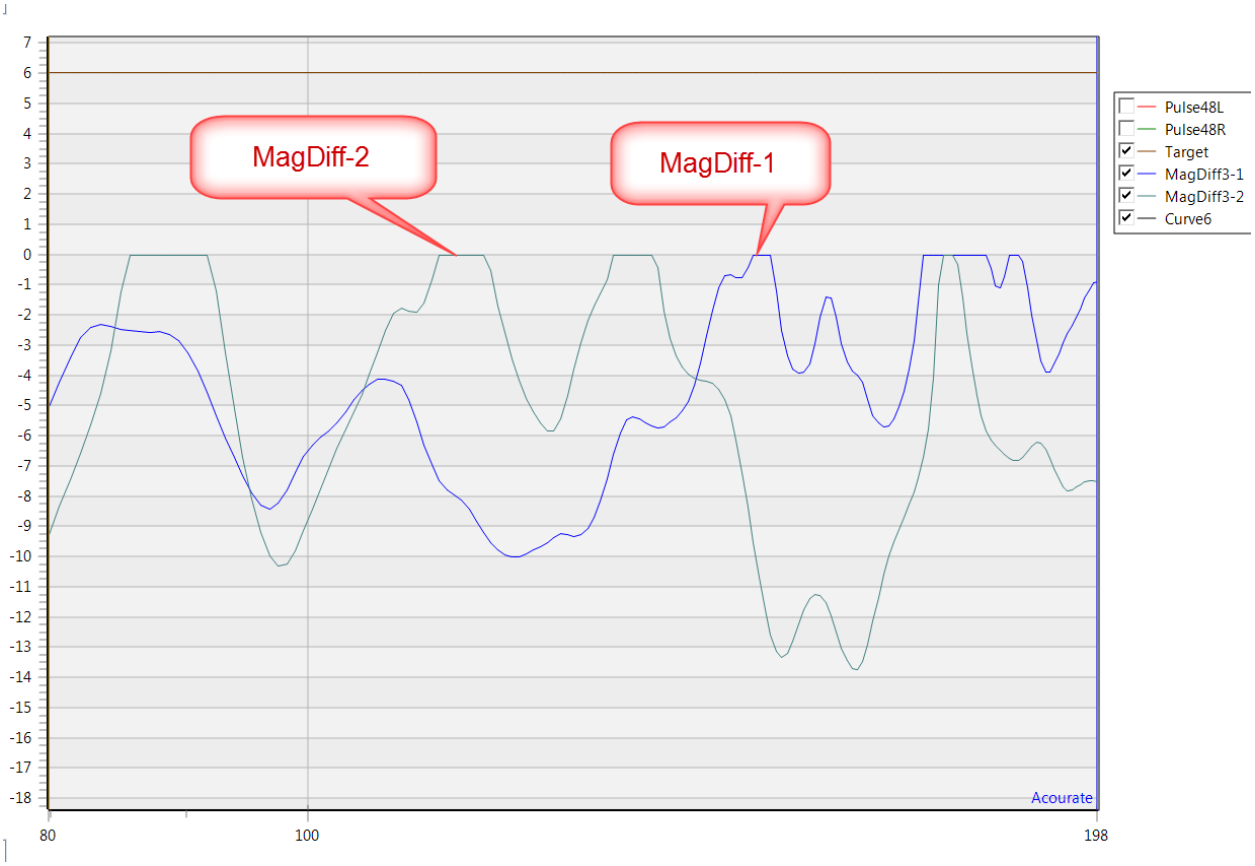
Everything above 0dB has been eliminated.

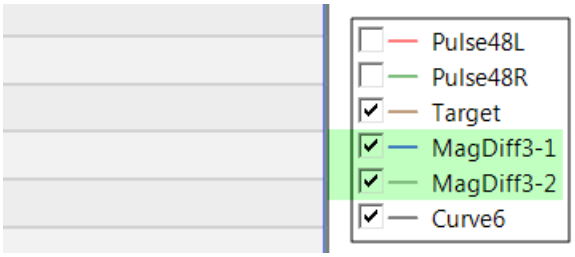


Define a Region spanning between 80Hz and 200Hz by clicking with your Left and Right mouse buttons.



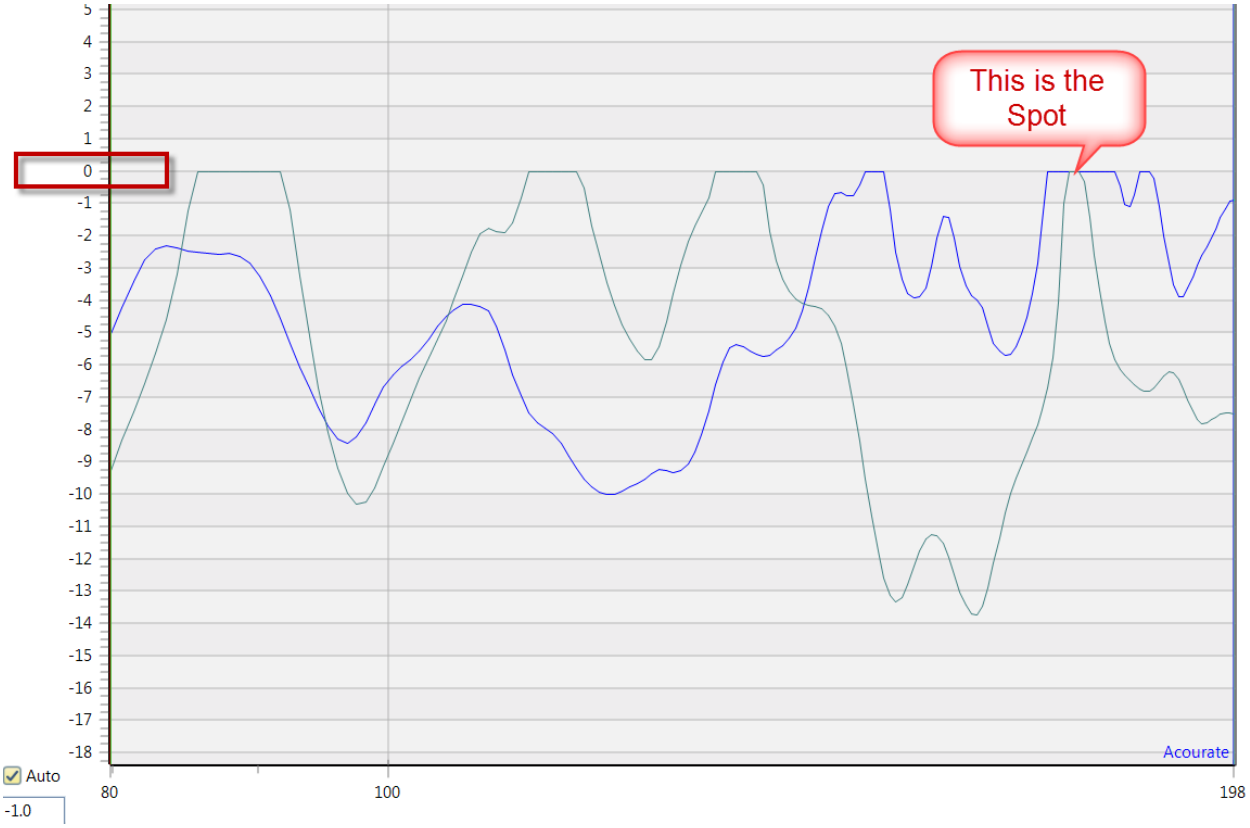
Zoom In to this Region



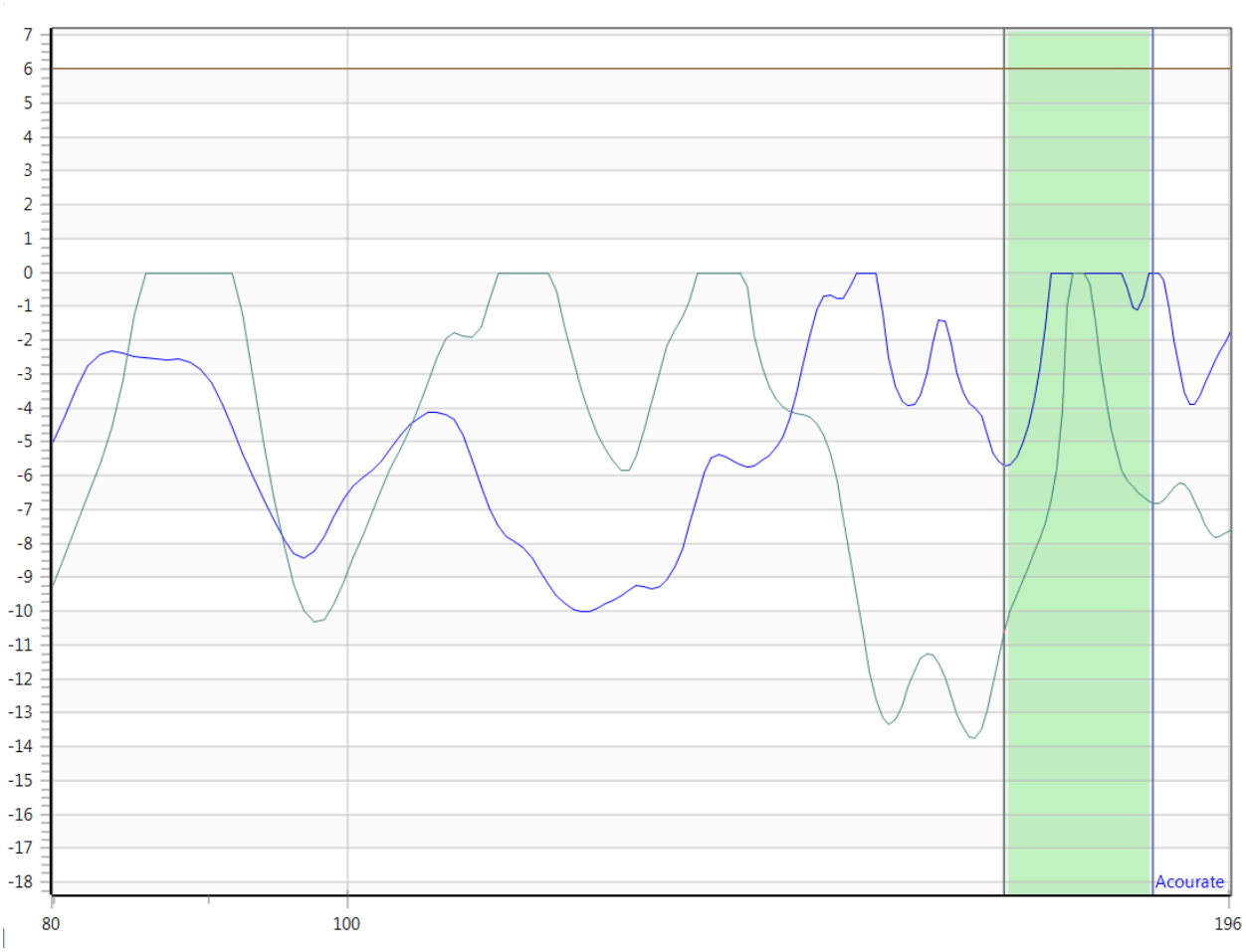


Find a spot where both the Left and Right Magnitude Differences are at 0dB.
Preferably this spot should be below 200Hz if possible.
Higher the frequency, the more likely your Pre Filters will suffer from Pre-Ringing.

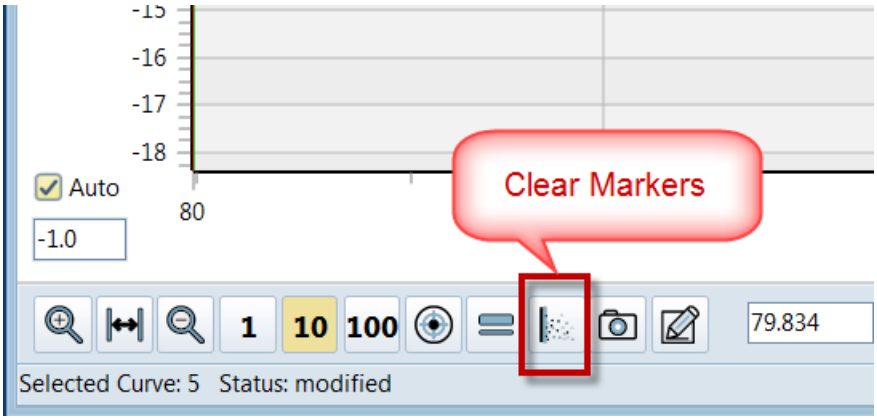
This is the spot under 200Hz where both the Left and Right Magnitude Differences are at 0dB.



Zoom in closer to this spot

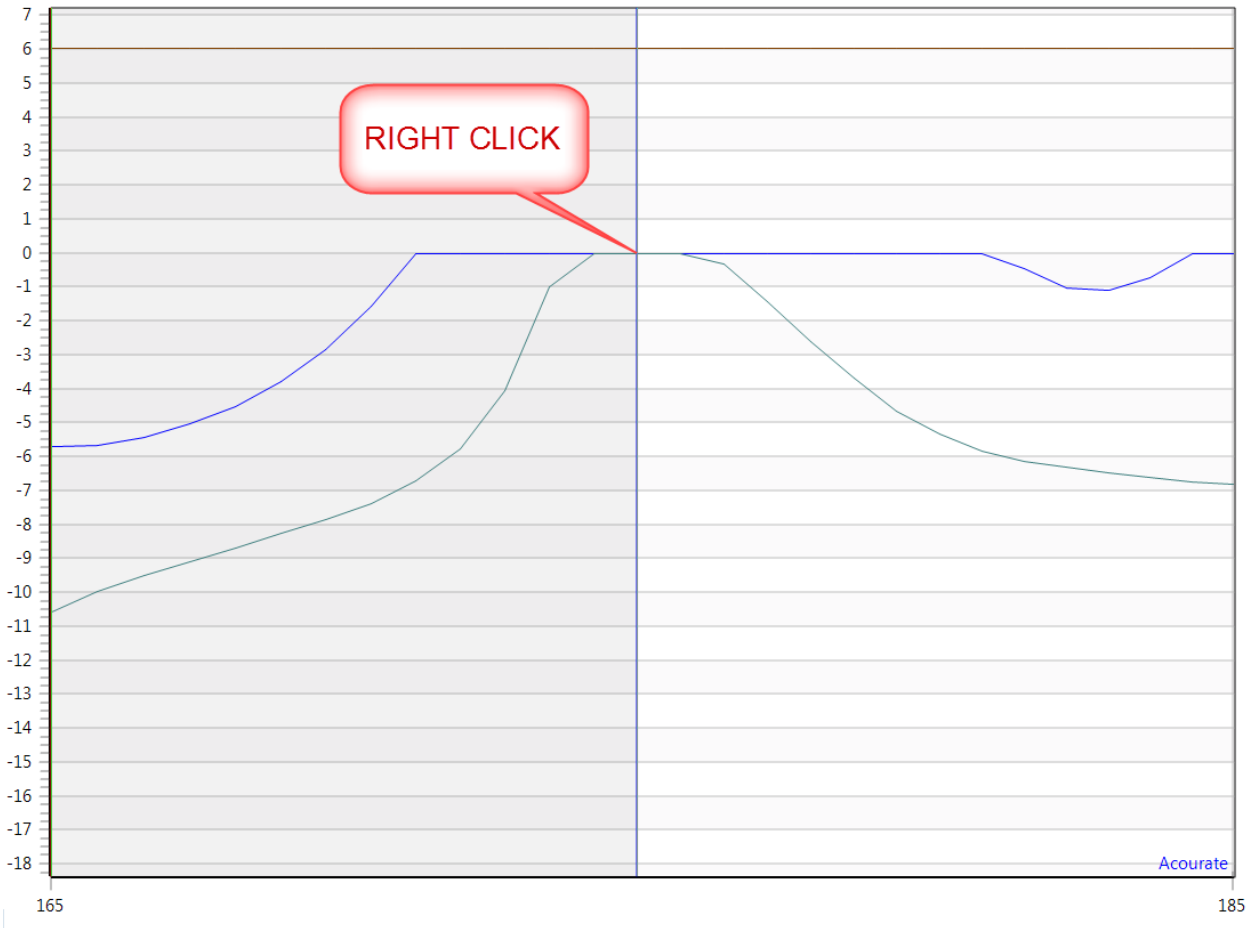


After Zooming In, clear all Markers.

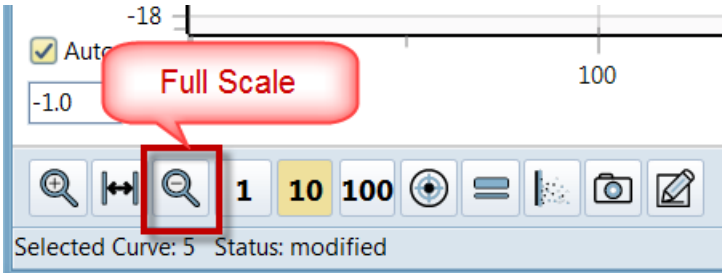


RIGHT CLICK on this spot.

Note: It is important that you use your Right Mouse button. You are defining the Right side of your Region. Do not use your Left Mouse button here.

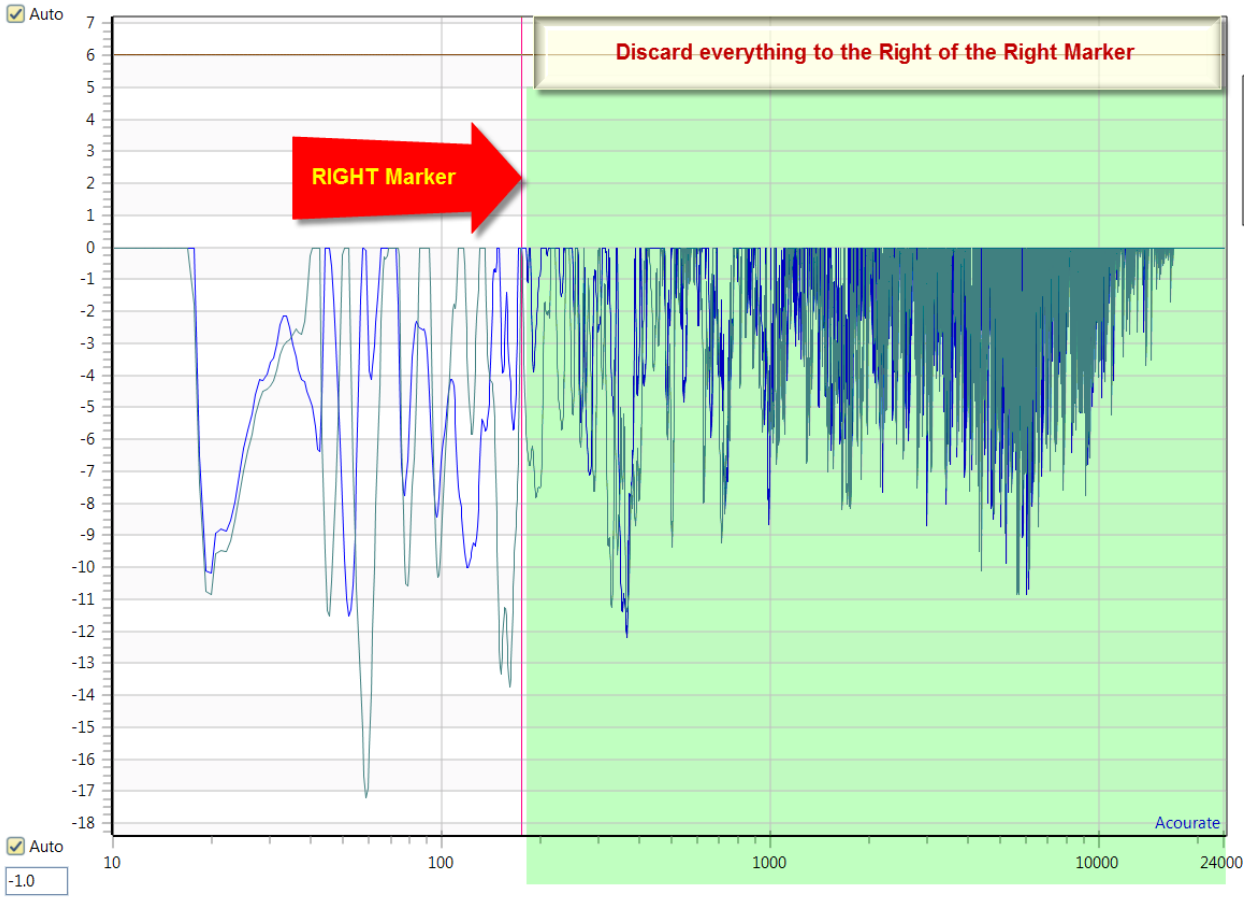


Go back to Full Scale View



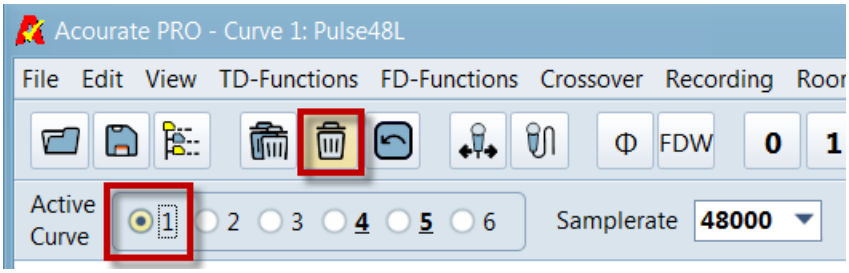
You have placed a RIGHT Marker (RM) at 174Hz.

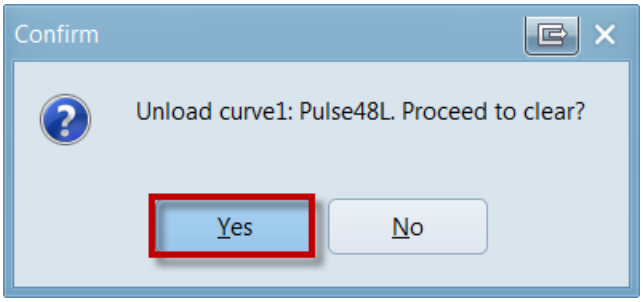
You will be discarding everything to the Right of this marker while defining your Pre Filters.



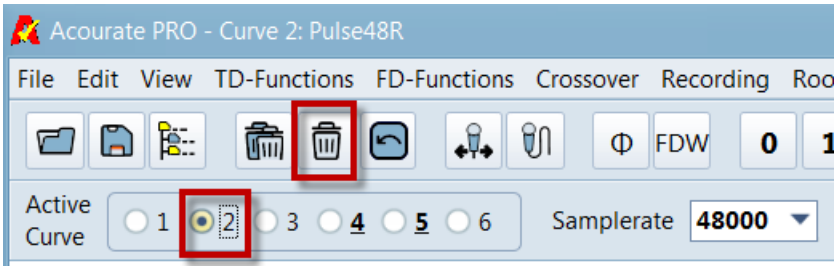
You would apply the Pre Filters to the bass region below 174Hz.

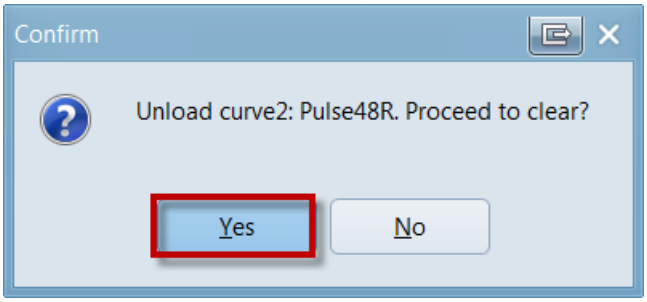
Remove Curve 1 = Pulse48L

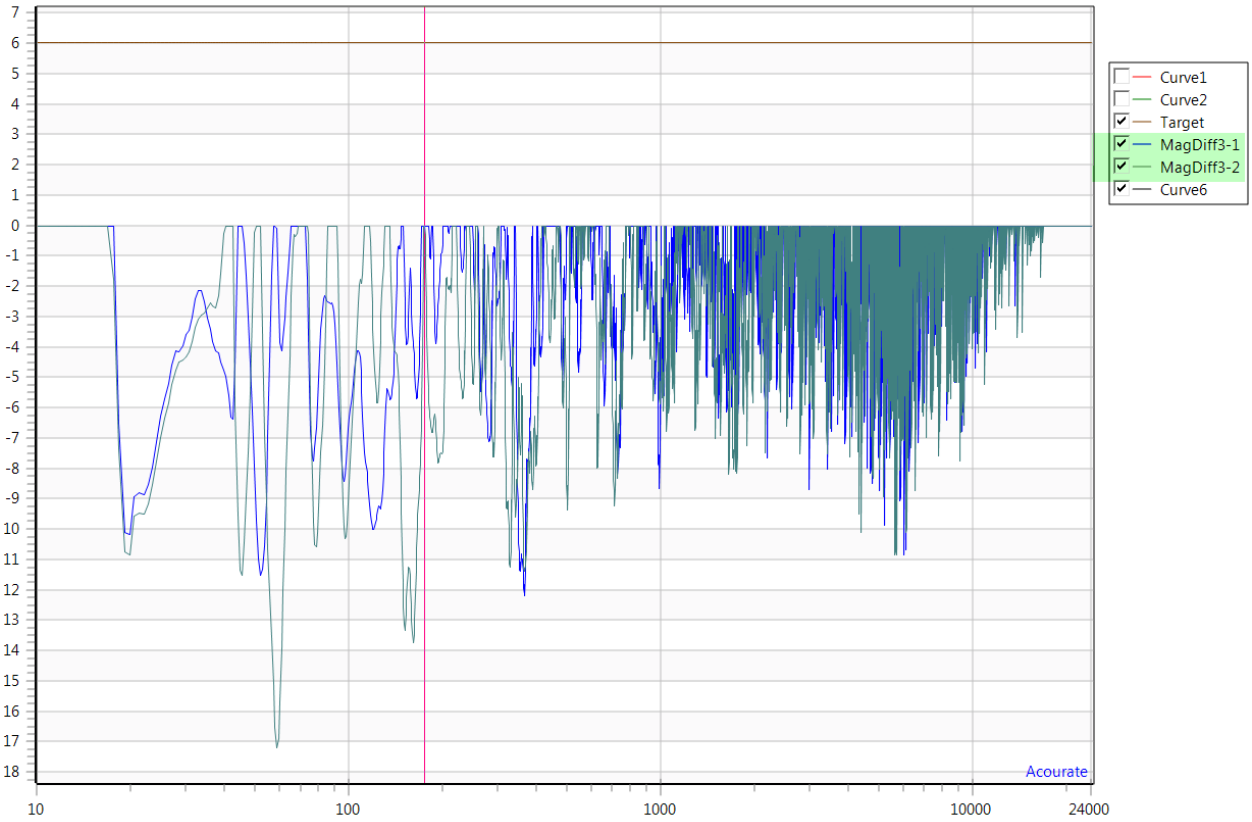


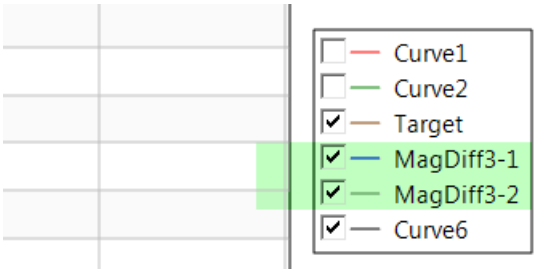


Remove Curve 2 = Pulse48R



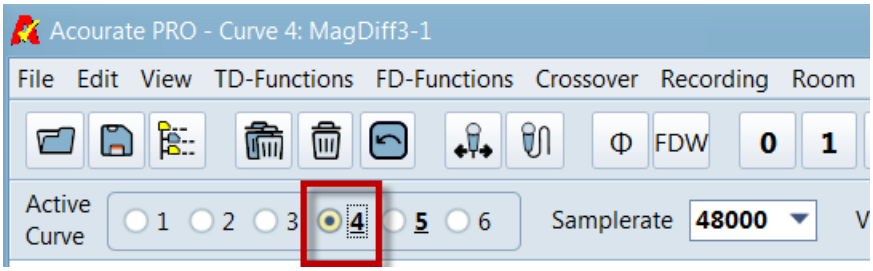



Curve1
Curve2
Target
MagDiff3-1
MagDiff3-2
Curve6
Acourate
10
100
1000
10000
24000

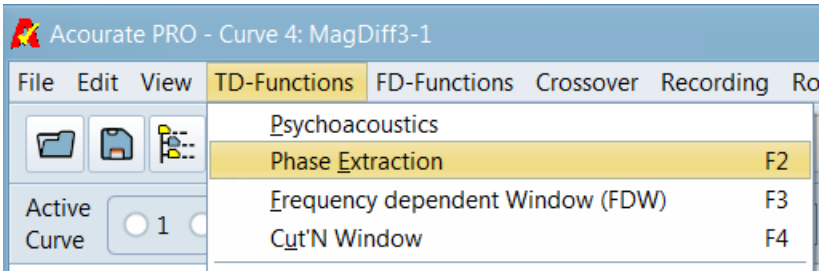

Curve1
Curve2
Target
MagDiff3-1
MagDiff3-2
Curve6

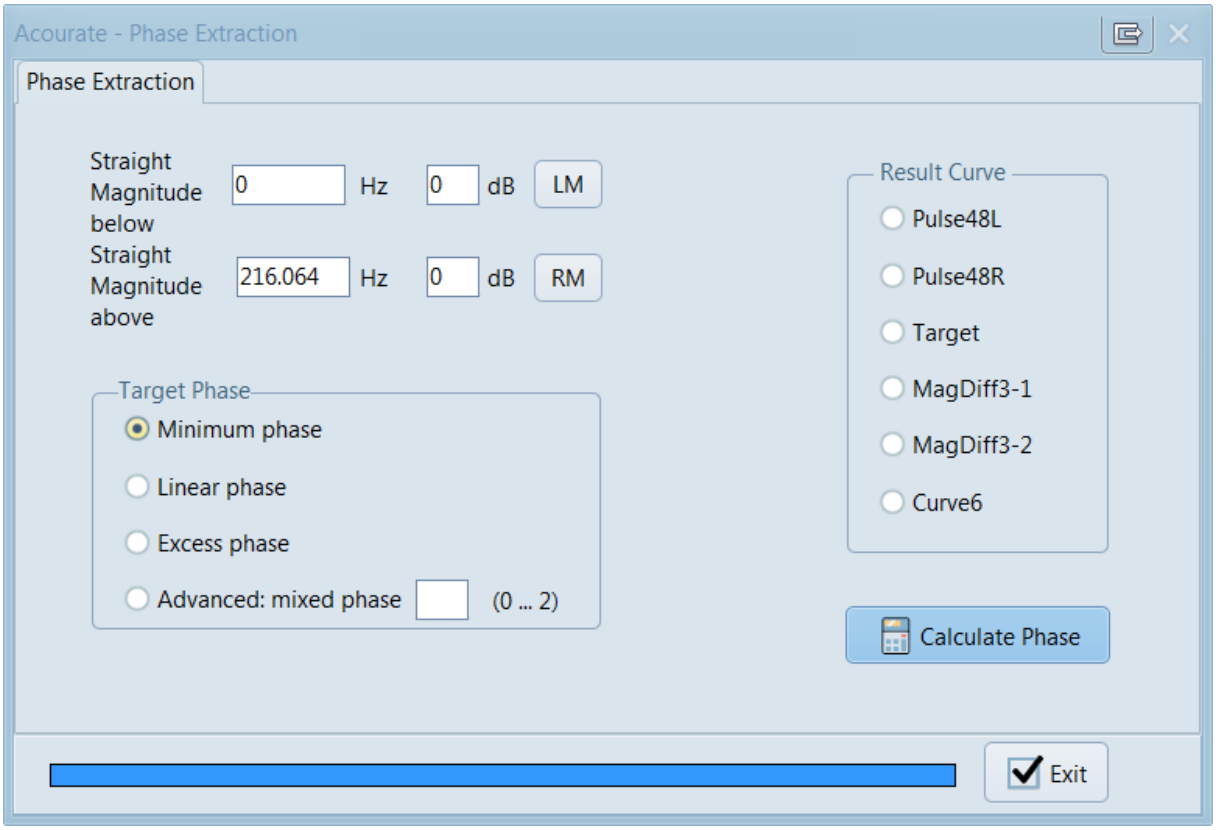
Phase Extraction

Select Curve 4 = MagDiff3-1



TD-Functions > Phase Extraction

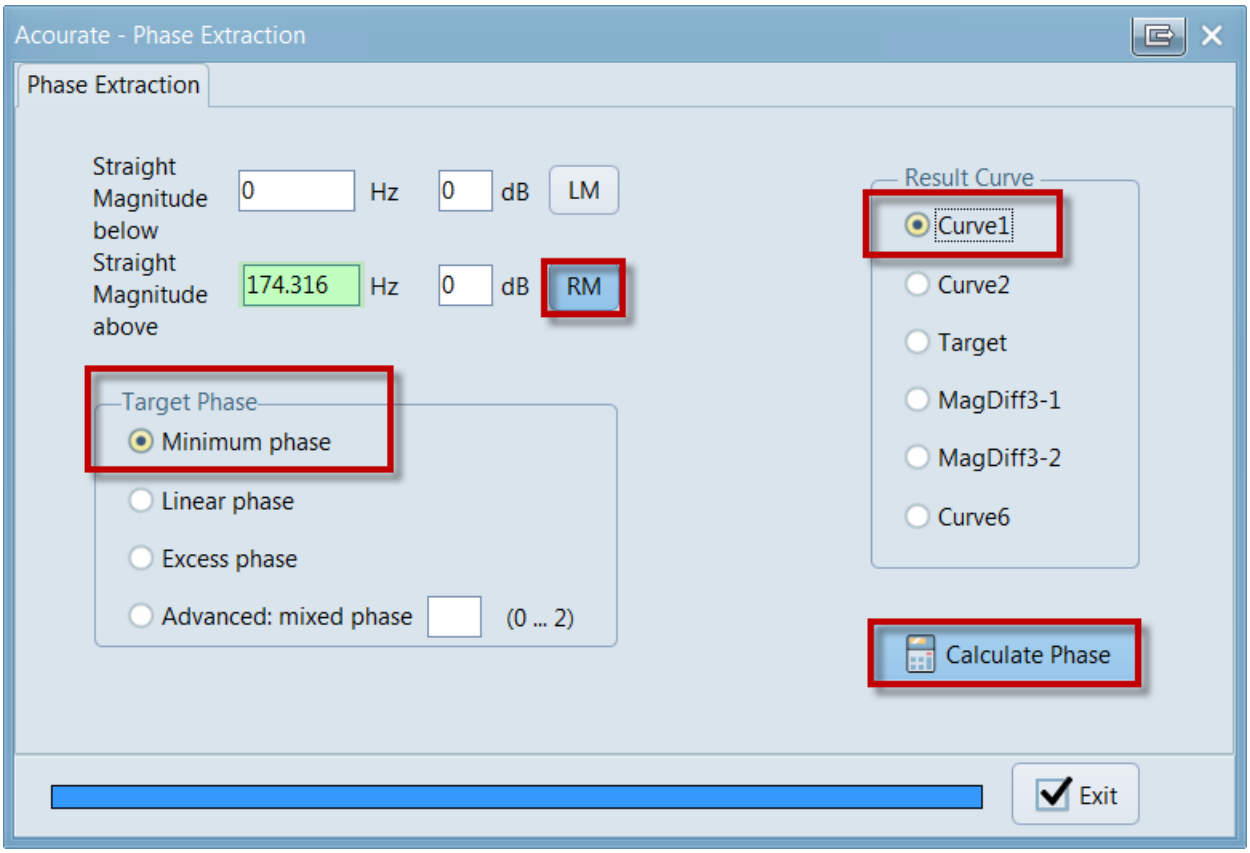




Click on the Right Marker button [RM].
This will populate the Straight Magnitude Above field

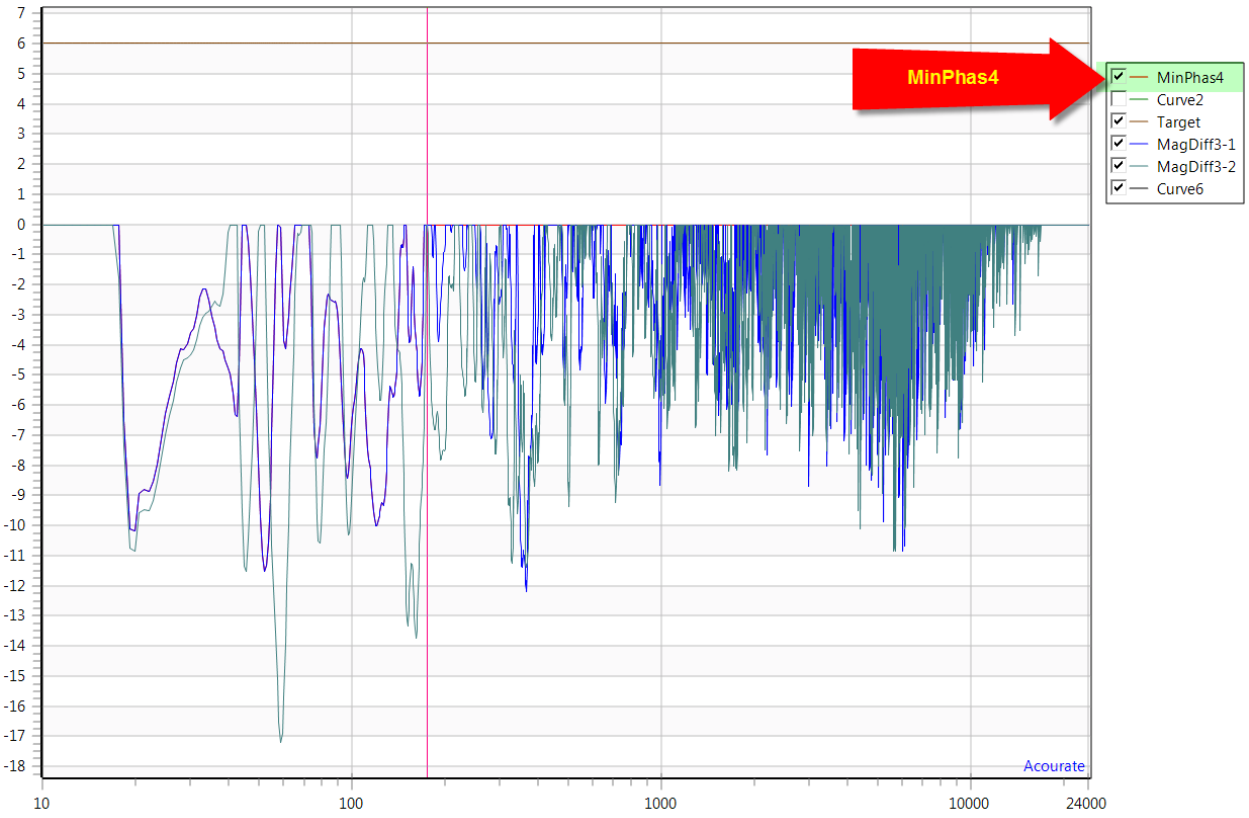
Target Phase = Minimum Phase

Place the Result in Curve 1

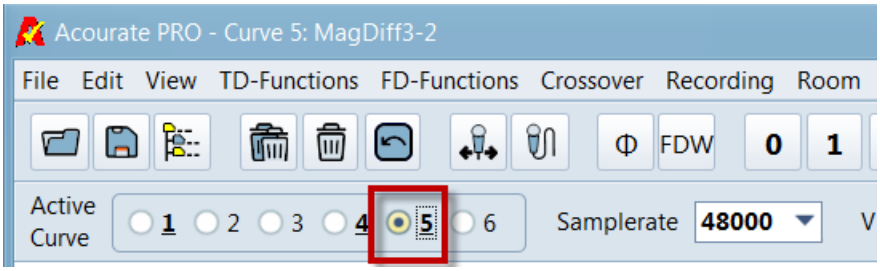


Calculate Phase

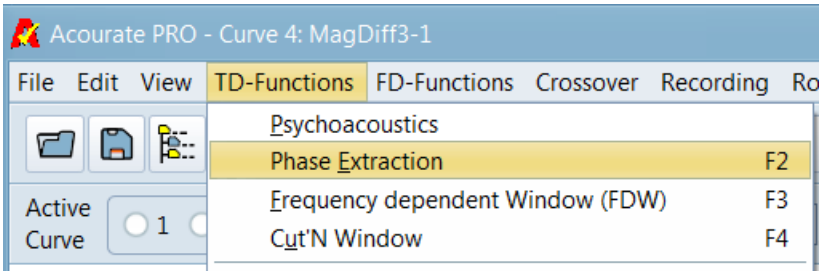
Curve 1 = MinPhas4

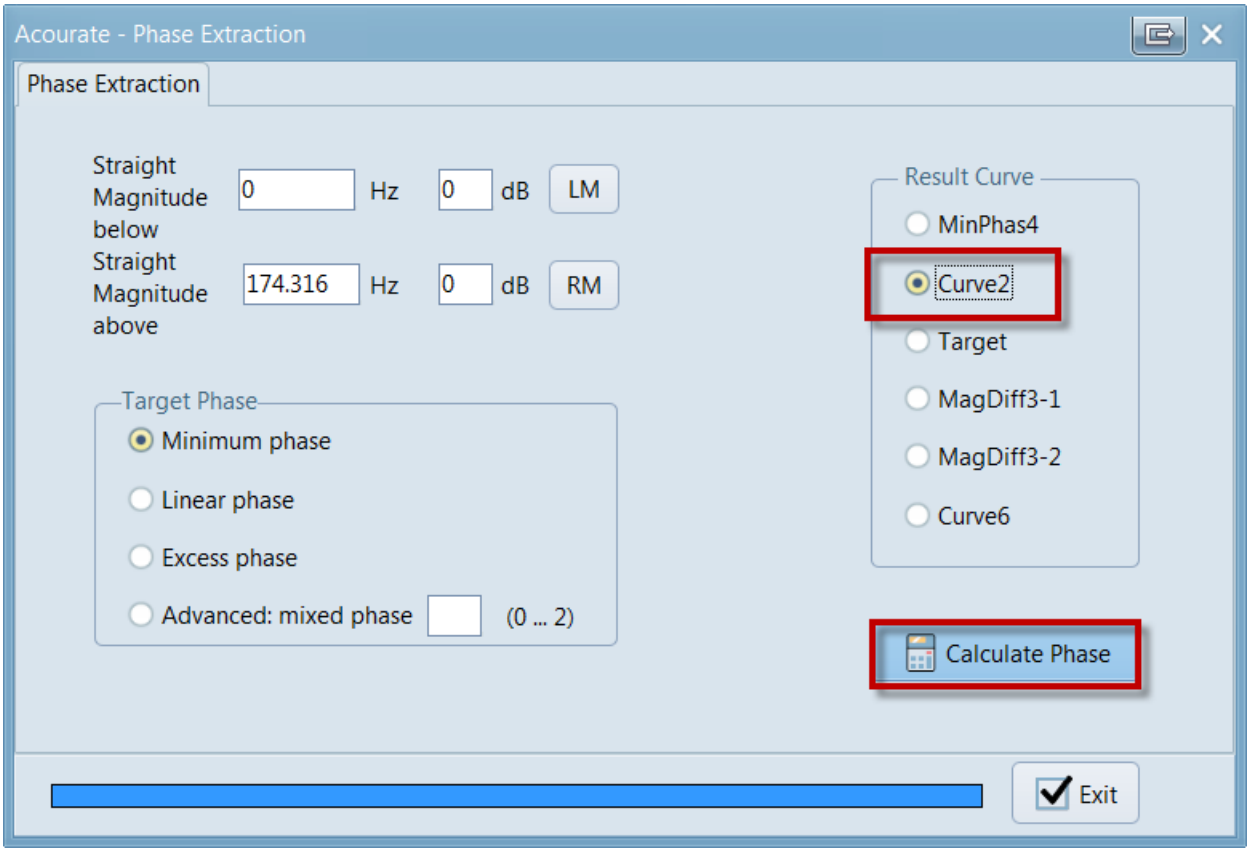


Select Curve 5 = MagDiff3-2

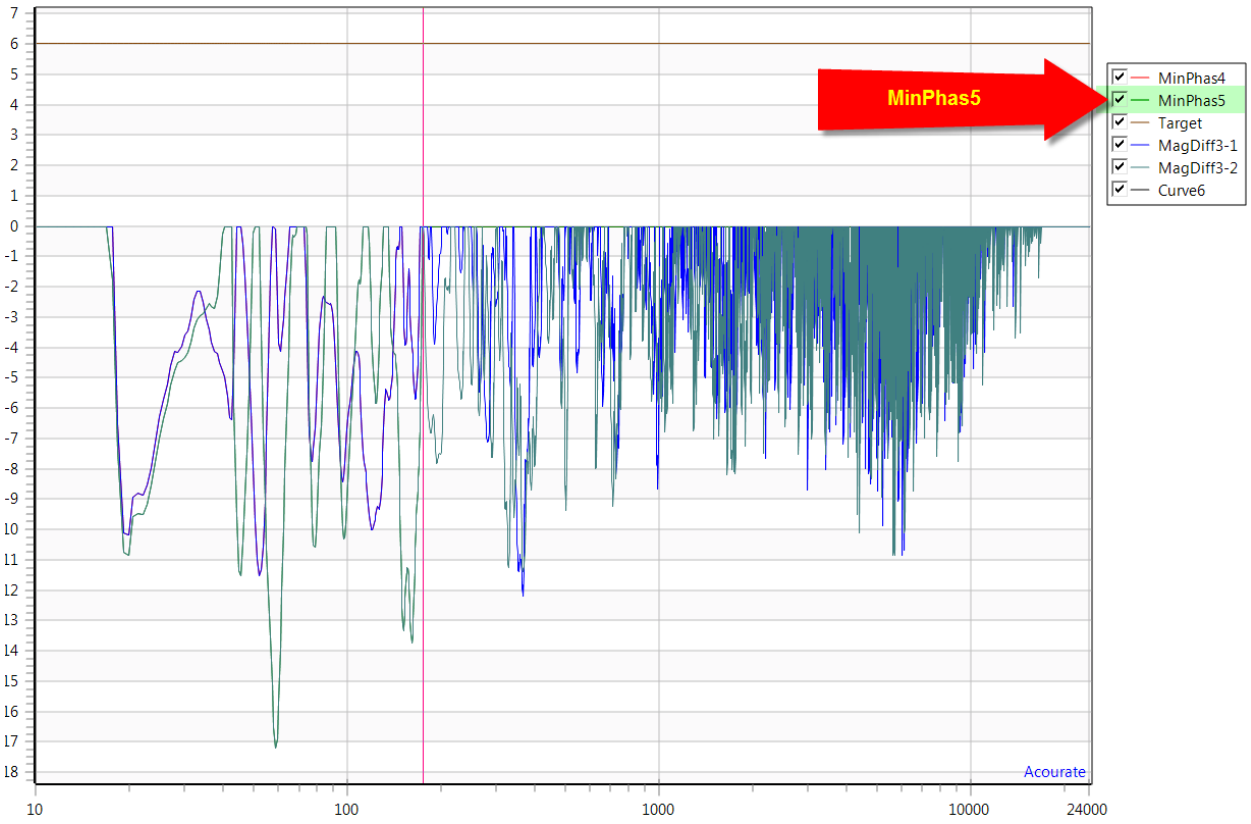


TD-Functions > Phase Extraction

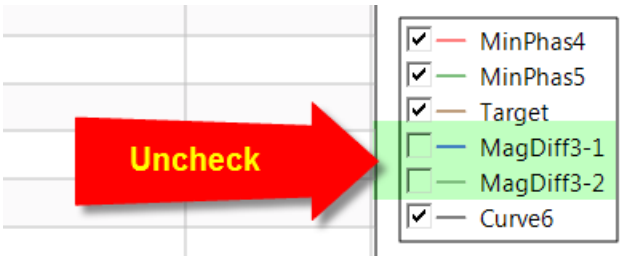


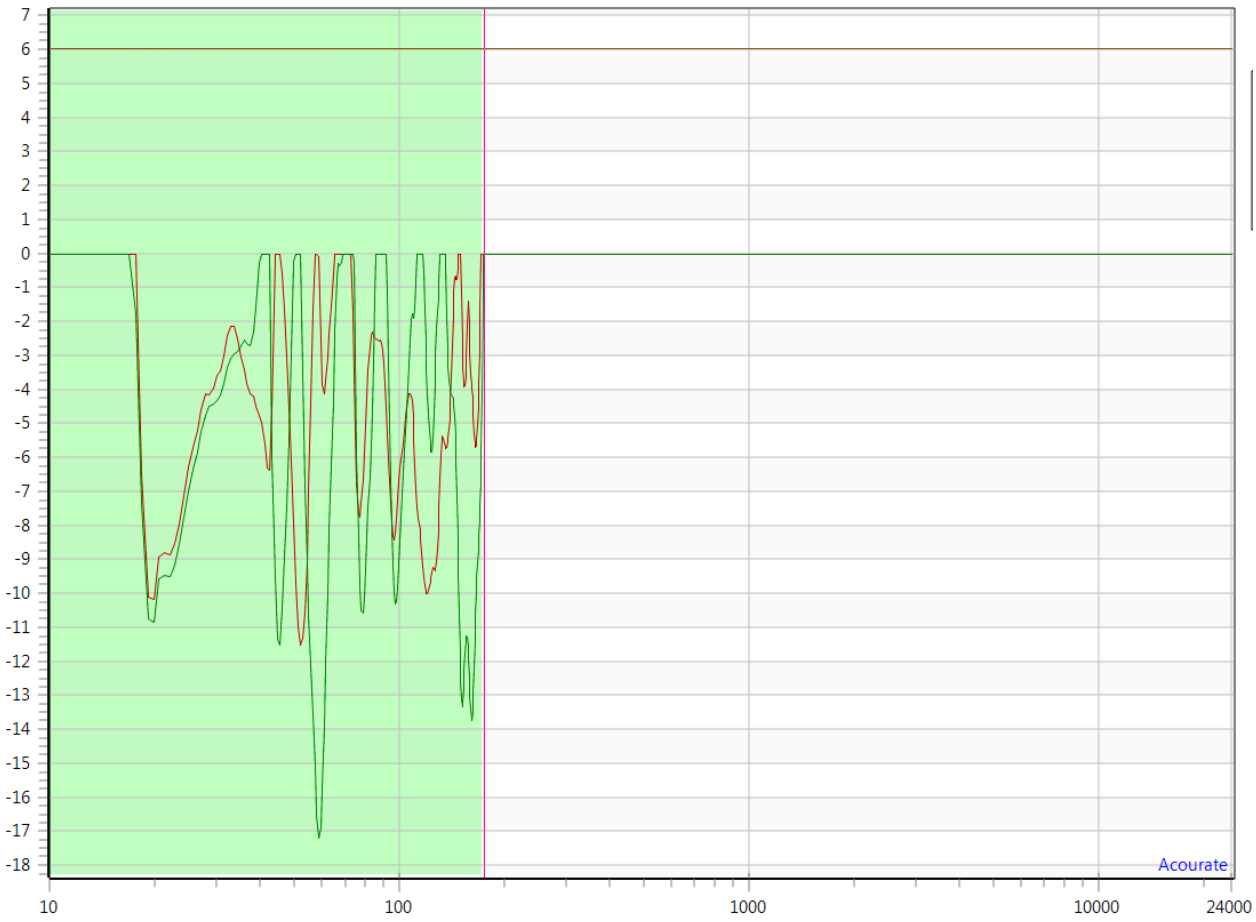


Curve 2 = MinPhas5

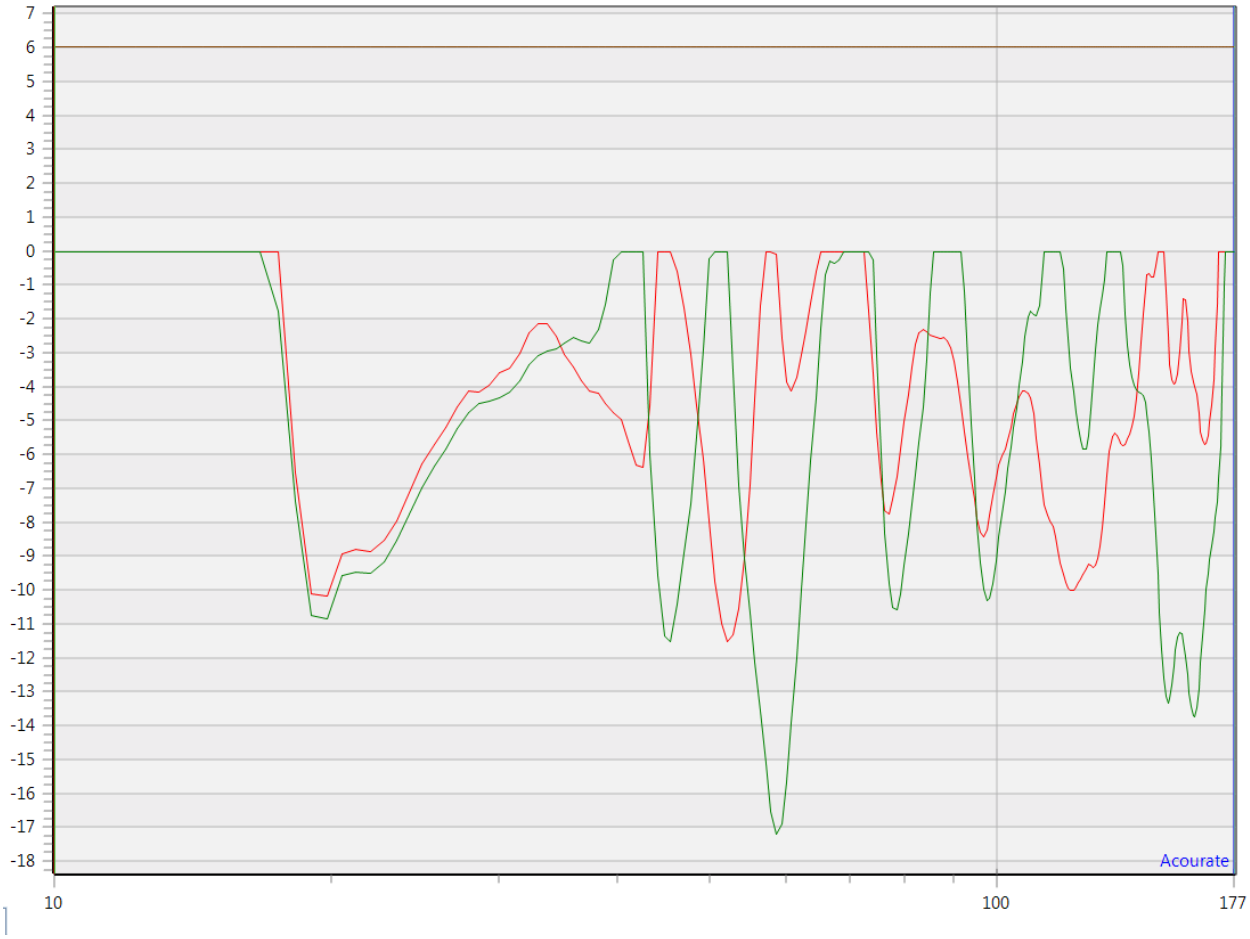


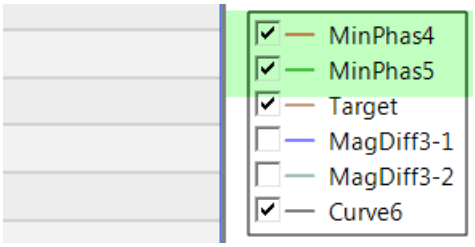
Uncheck Curves 4 and 5



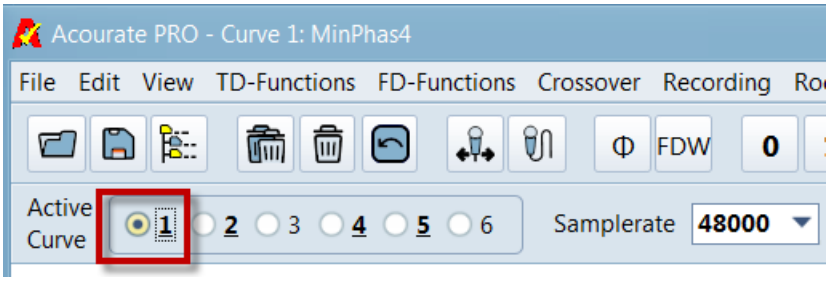


Zoom In to this region between 10Hz and 200Hz

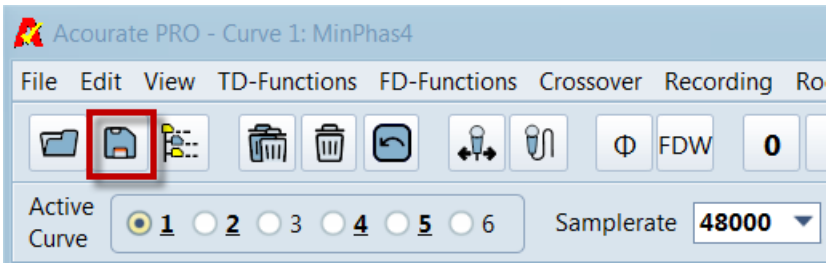

7
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
-13
-14
-15
-16
-17
-18
10
100
177
Acourate

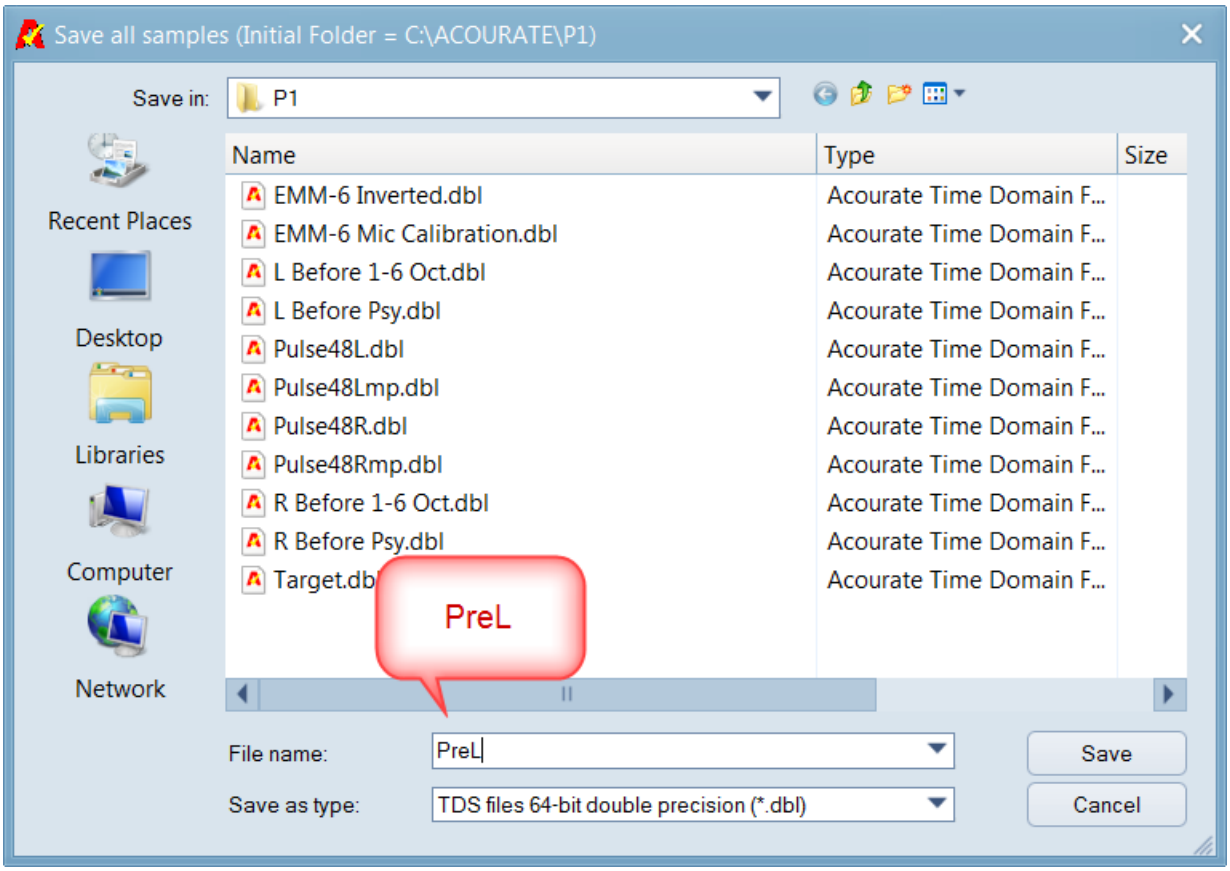

MinPhas4
MinPhas5
Target
MagDiff3-1
MagDiff3-2
Curve6

Select Curve 1 = MinPhas4



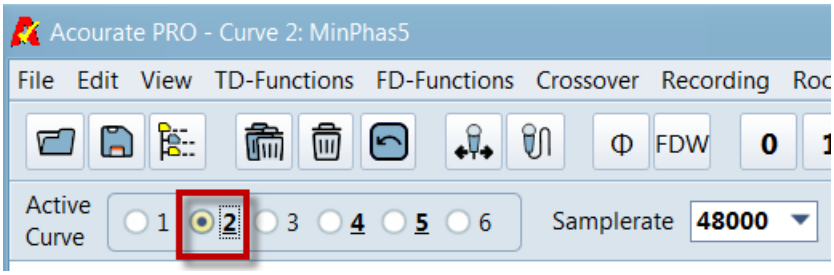
Save this Curve as PreL



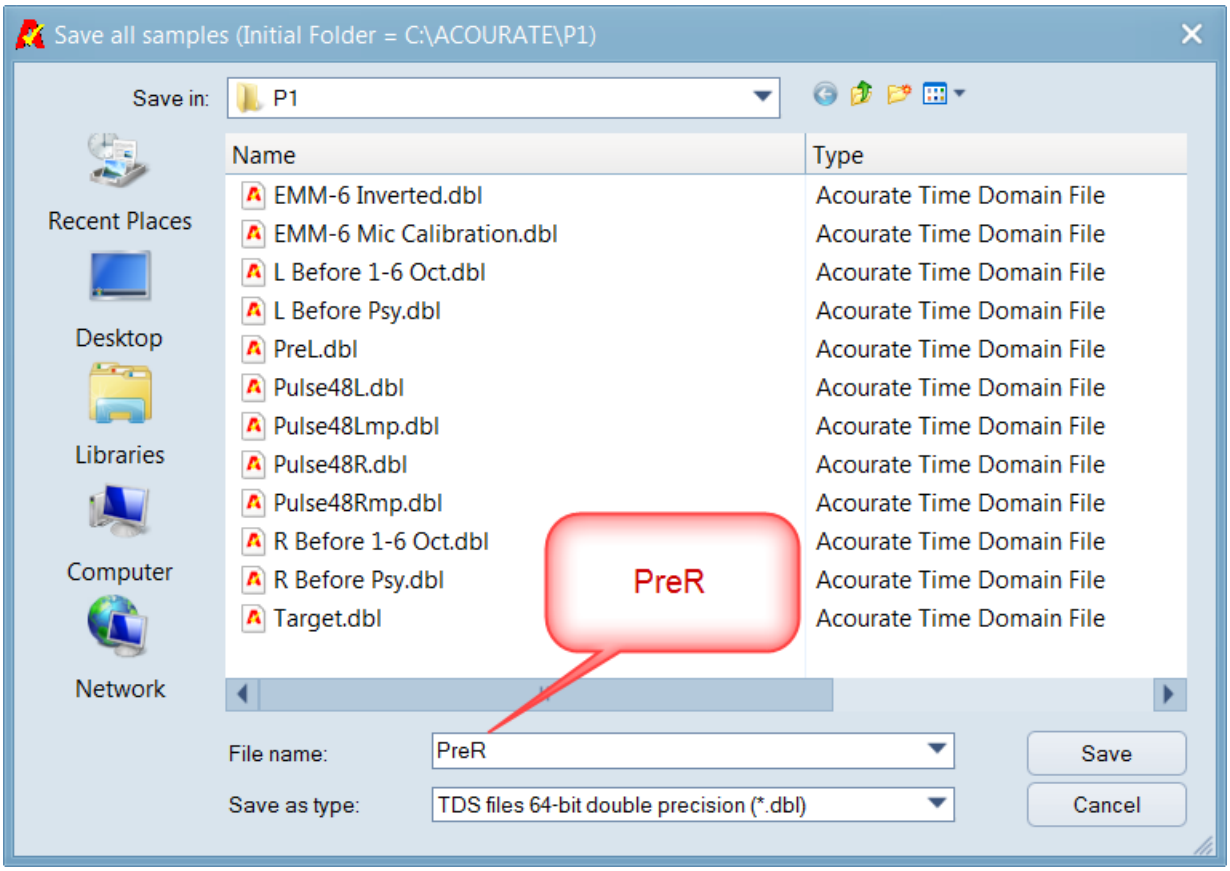


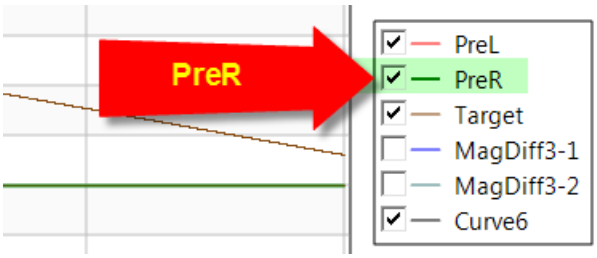
This is your Pre Filter for the LEFT Channel.

Select Curve 2 = MinPhas5



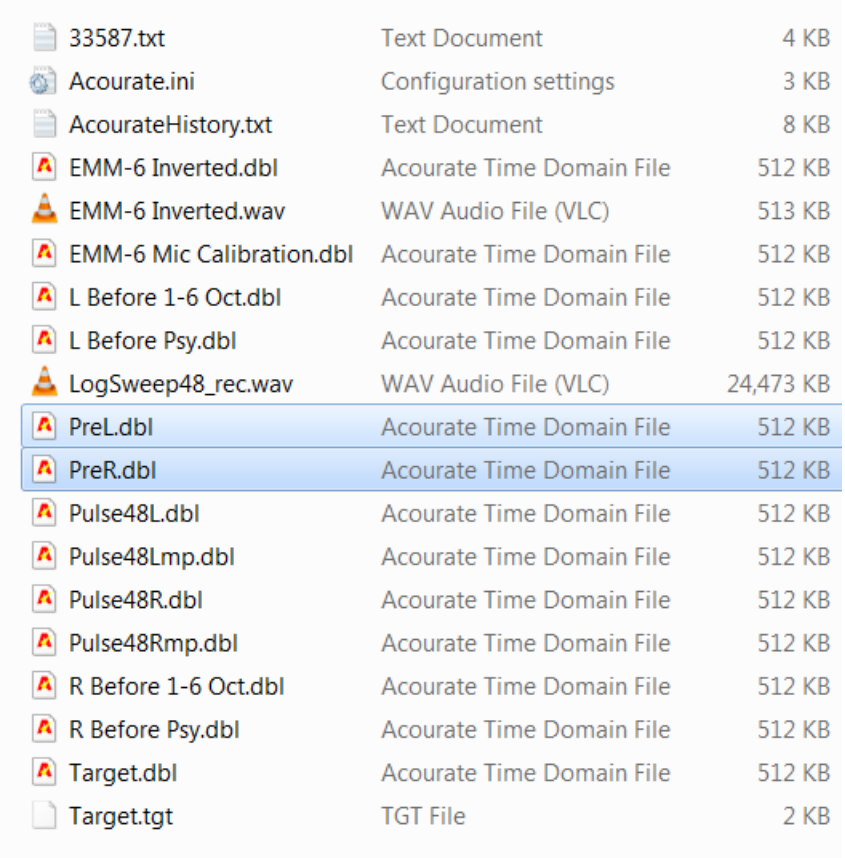
Save this curve as PreR





View the contents of your Project Workspace P1

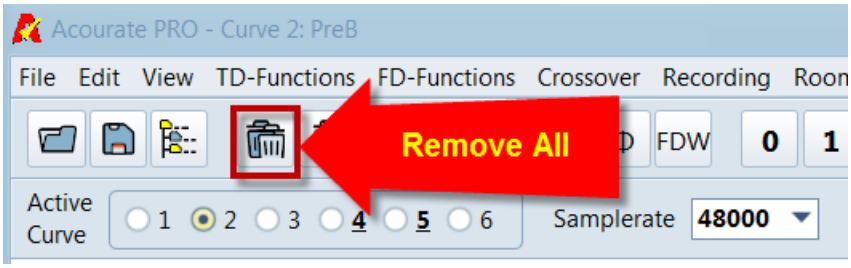
C:\ACOURATE\P1

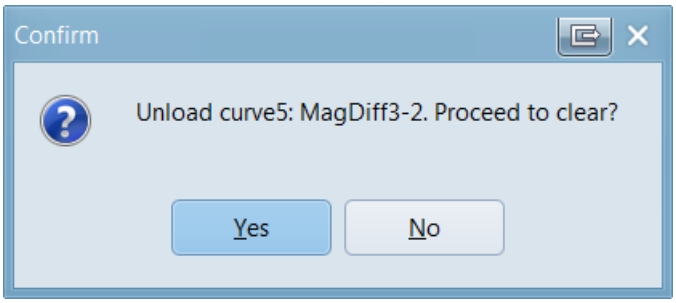


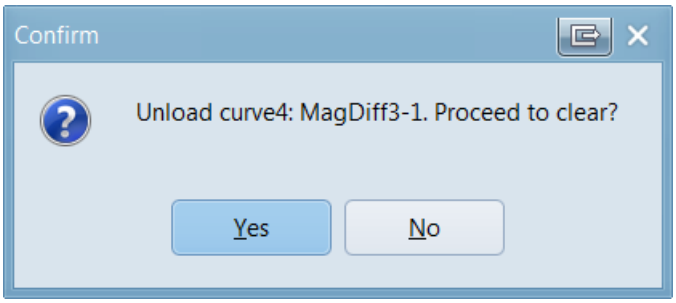
33587.txt	Text Document	4 KB
Acourate.ini	Configuration settings	3 KB
AcourateHistory.txt	Text Document	8 KB
EMM-6 Inverted.dbl	Acourate Time Domain File	512 KB
EMM-6 Inverted.wav	WAV Audio File (VLC)	513 KB
EMM-6 Mic Calibration.dbl	Acourate Time Domain File	512 KB
L Before 1-6 Oct.dbl	Acourate Time Domain File	512 KB
L Before Psy.dbl	Acourate Time Domain File	512 KB
LogSweep48_rec.wav	WAV Audio File (VLC)	24,473 KB
PreL.dbl	Acourate Time Domain File	512 KB
PreR.dbl	Acourate Time Domain File	512 KB
Pulse48L.dbl	Acourate Time Domain File	512 KB
Pulse48Lmp.dbl	Acourate Time Domain File	512 KB
Pulse48R.dbl	Acourate Time Domain File	512 KB
Pulse48Rmp.dbl	Acourate Time Domain File	512 KB
R Before 1-6 Oct.dbl	Acourate Time Domain File	512 KB
R Before Psy.dbl	Acourate Time Domain File	512 KB
Target.dbl	Acourate Time Domain File	512 KB
Target.tgt	TGT File	2 KB

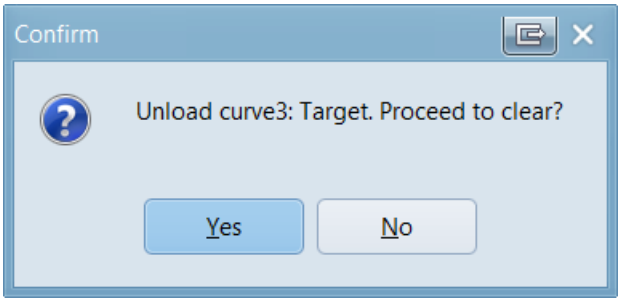
You have created Pre Filters for your Left and Right Channels.

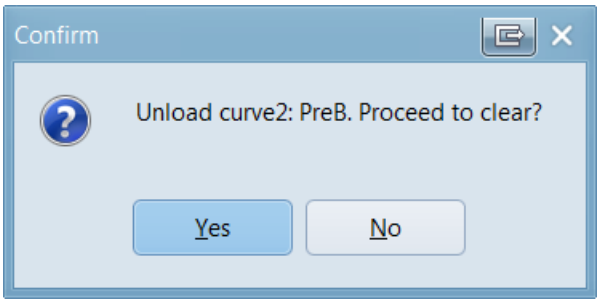
Remove all the Curves and start with a blank slate.

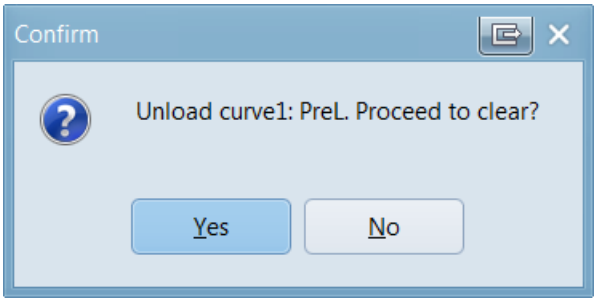


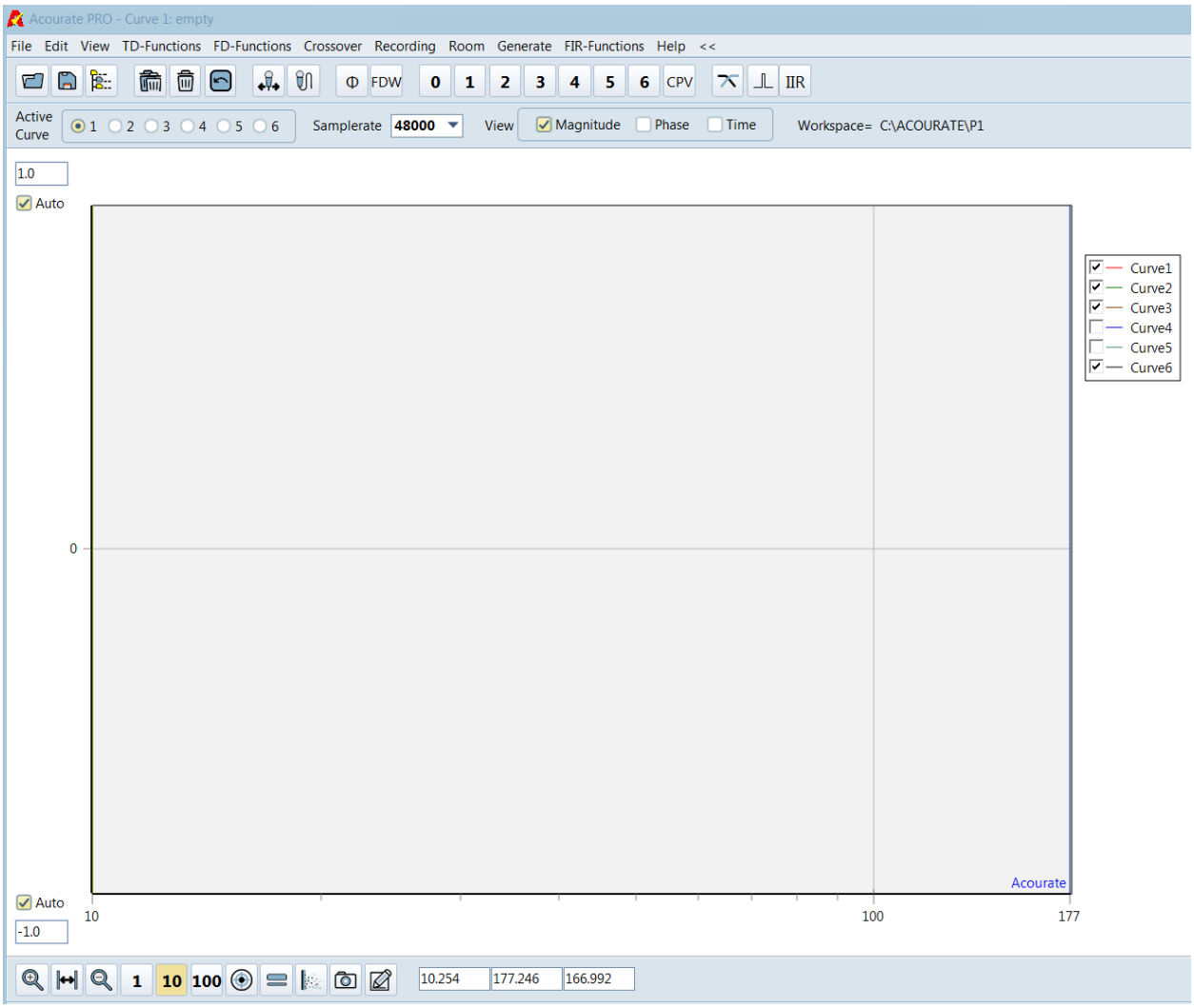






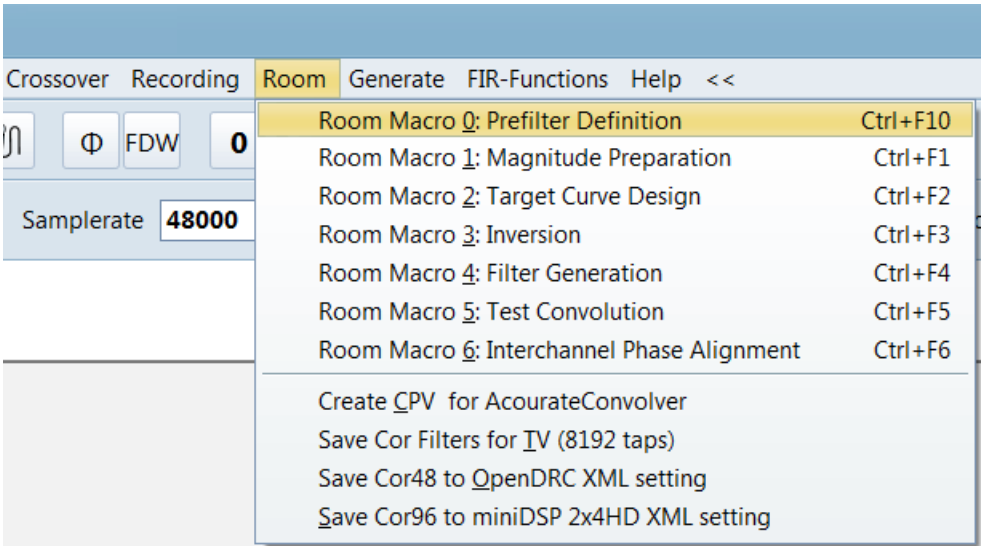




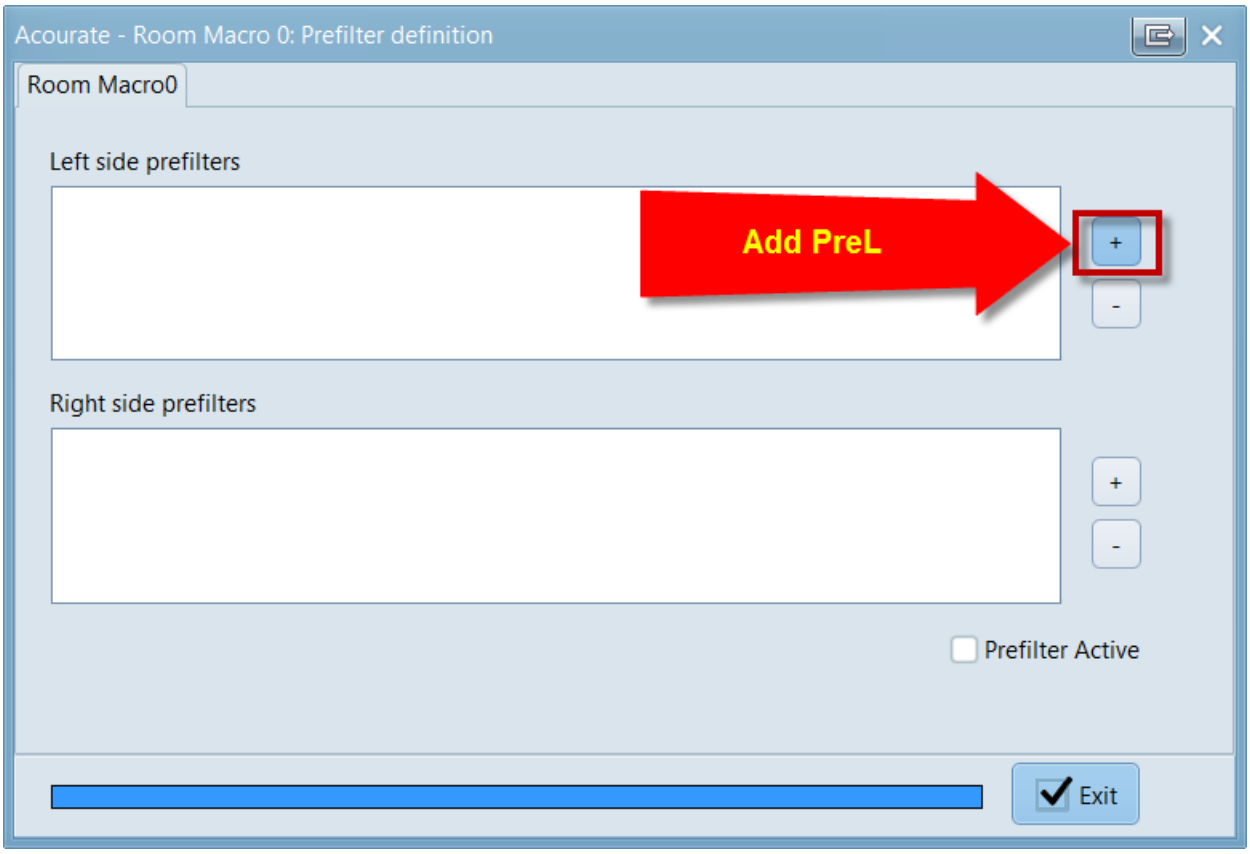


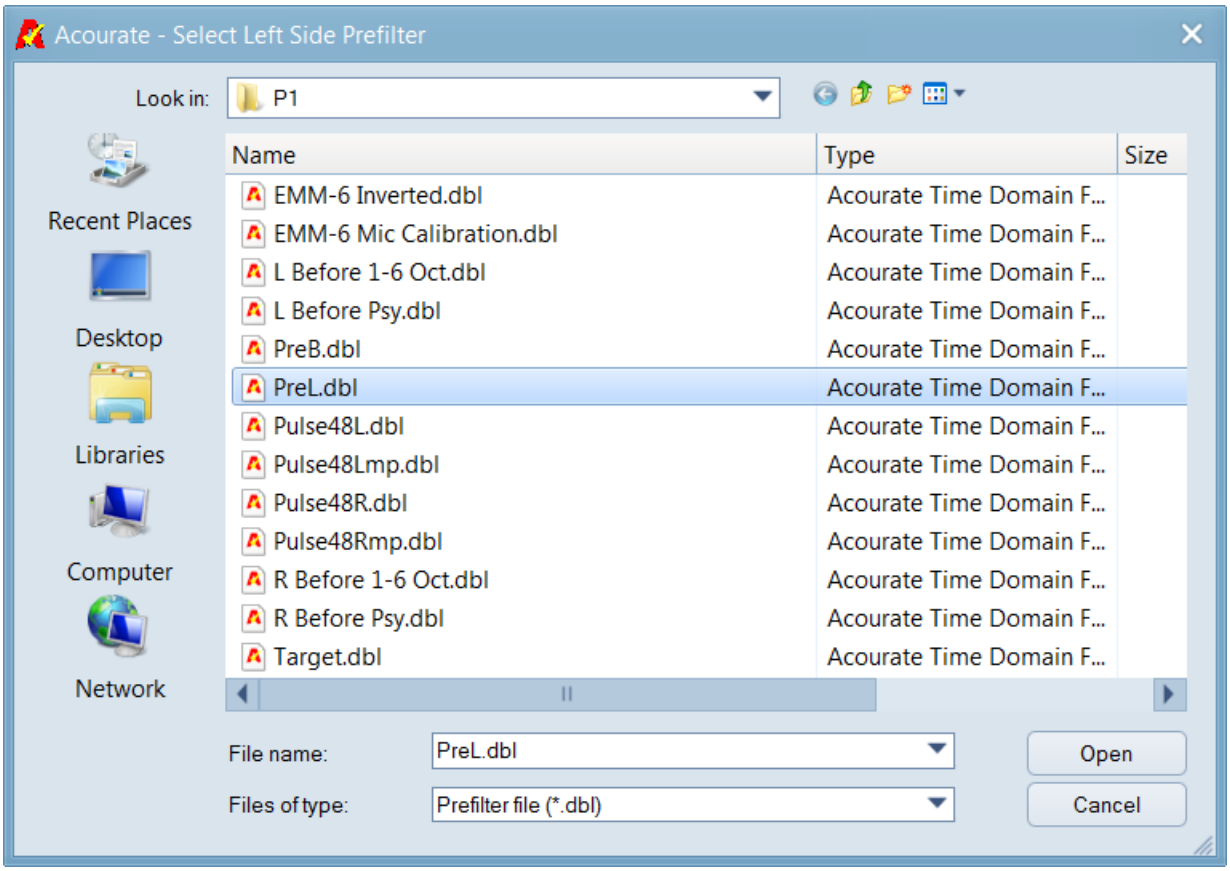
Next, you are going to run through Macros 0 through 5

Room Macro 0: Prefilter Definition

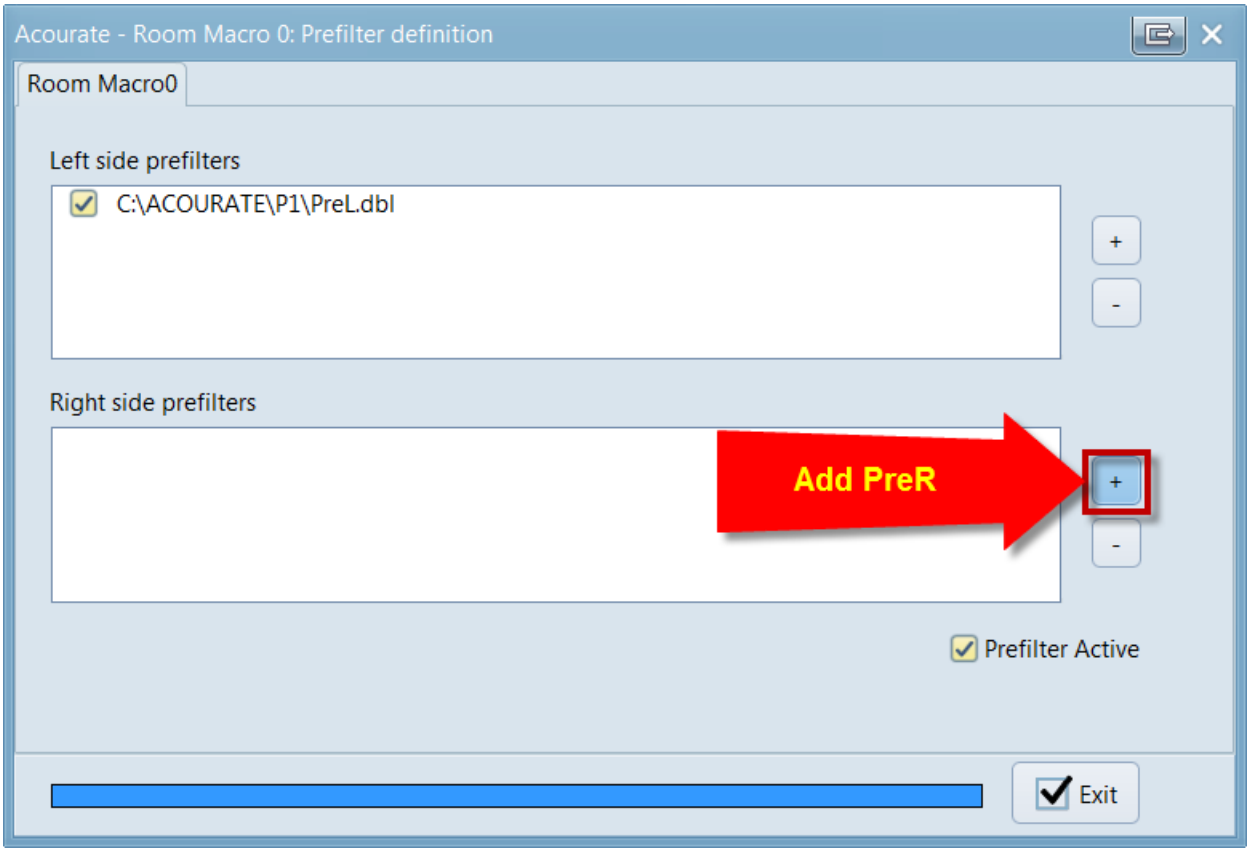


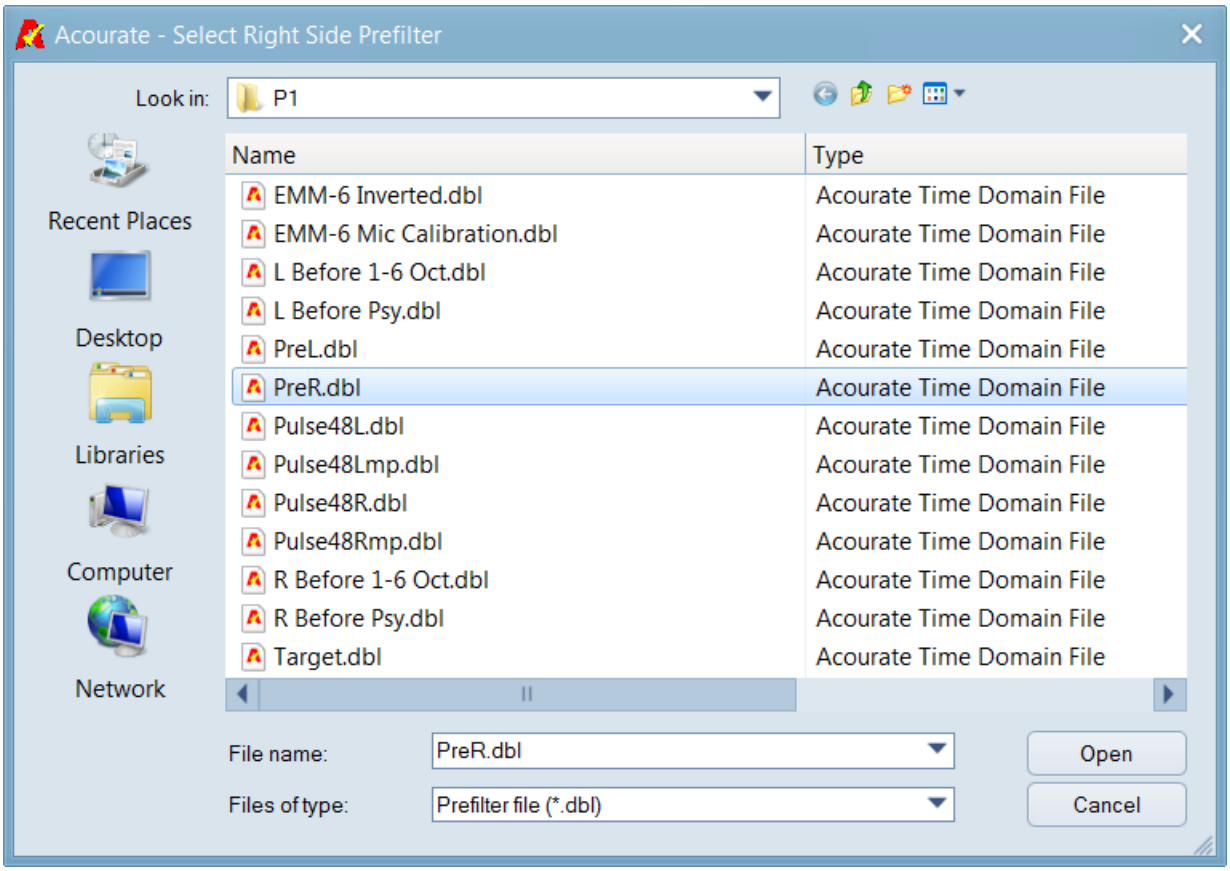
Add your Left Side Pre Filter = PreL



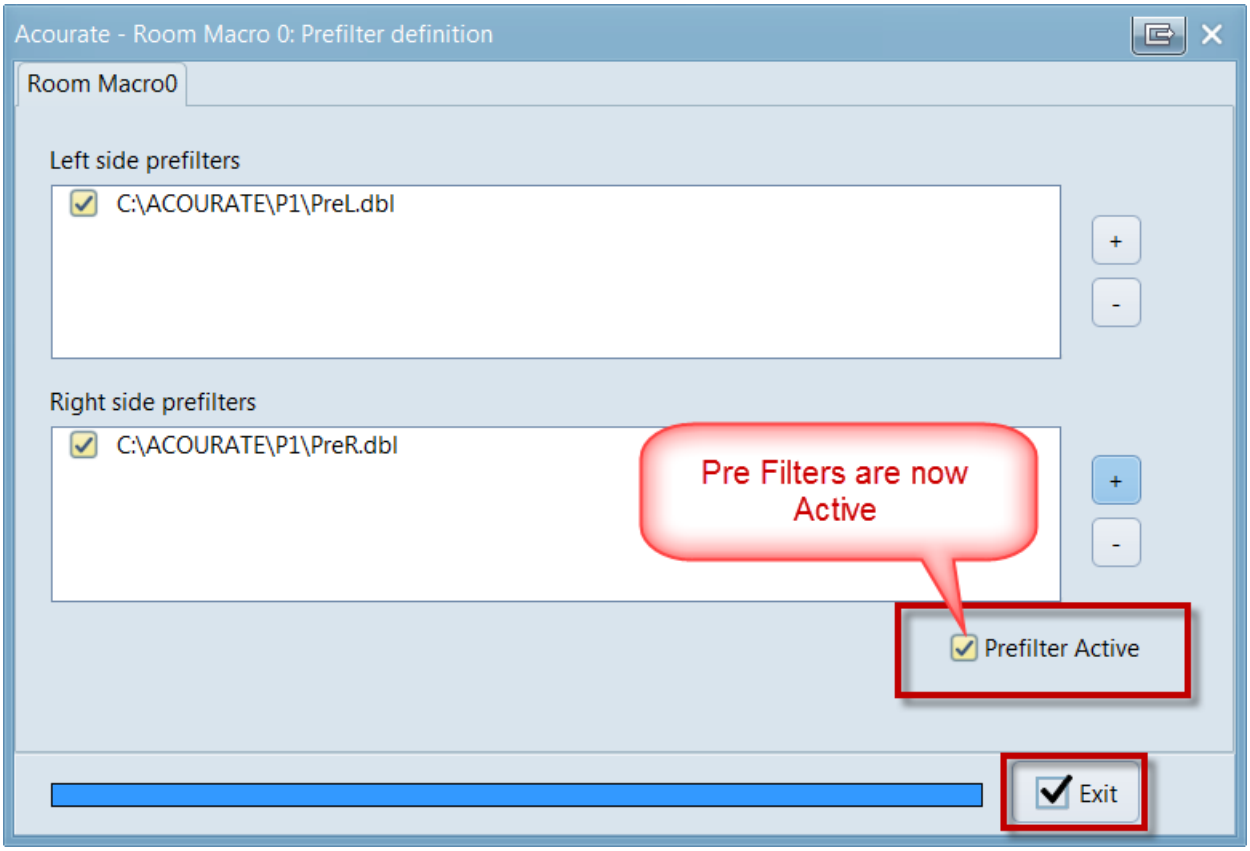

Acurate - Select Left Side Prefilter
Look in:
P1
Recent Places
Desktop
Libraries
Computer
Network
Name
Type
Size
EMM-6 Inverted.dbl
EMM-6 Mic Calibration.dbl
L Before 1-6 Oct.dbl
L Before Psy.dbl
PreB.dbl
PreL.dbl
Pulse48L.dbl
Pulse48Lmp.dbl
Pulse48R.dbl
Pulse48Rmp.dbl
R Before 1-6 Oct.dbl
R Before Psy.dbl
Target.dbl
Acurate Time Domain F...
File name:
PreL.dbl
Files of type:
Prefilter file (*.dbl)
Open
Cancel

Add your Right Side Pre Filter = PreR



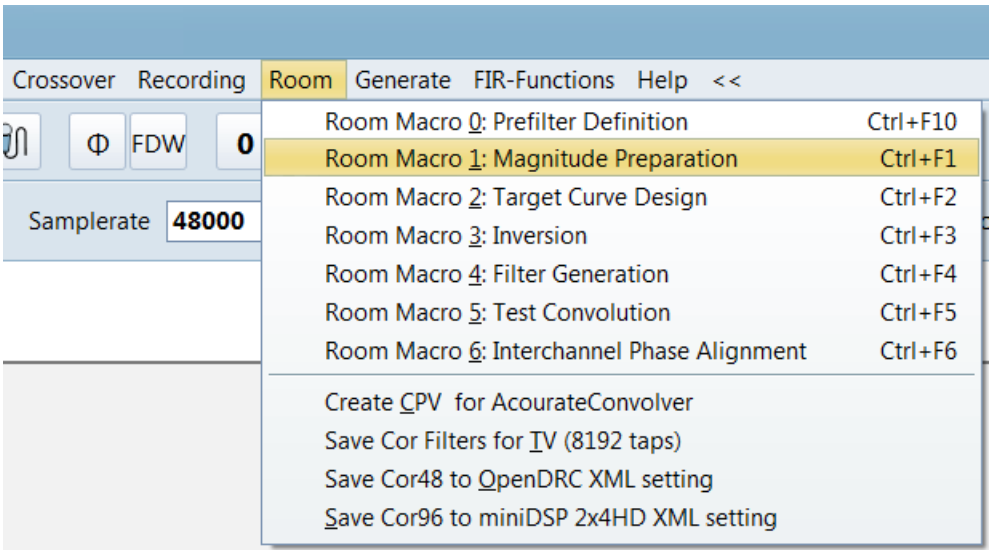

Acurate - Select Right Side Prefilter
Look in:
P1
Recent Places
Desktop
Libraries
Computer
Network
Name
Type
EMM-6 Inverted.dbl
EMM-6 Mic Calibration.dbl
L Before 1-6 Oct.dbl
L Before Psy.dbl
PreL.dbl
PreR.dbl
Pulse48L.dbl
Pulse48Lmp.dbl
Pulse48R.dbl
Pulse48Rmp.dbl
R Before 1-6 Oct.dbl
R Before Psy.dbl
Target.dbl
Acurate Time Domain File
File name:
PreR.dbl
Files of type:
Prefilter file (*.dbl)
Open
Cancel

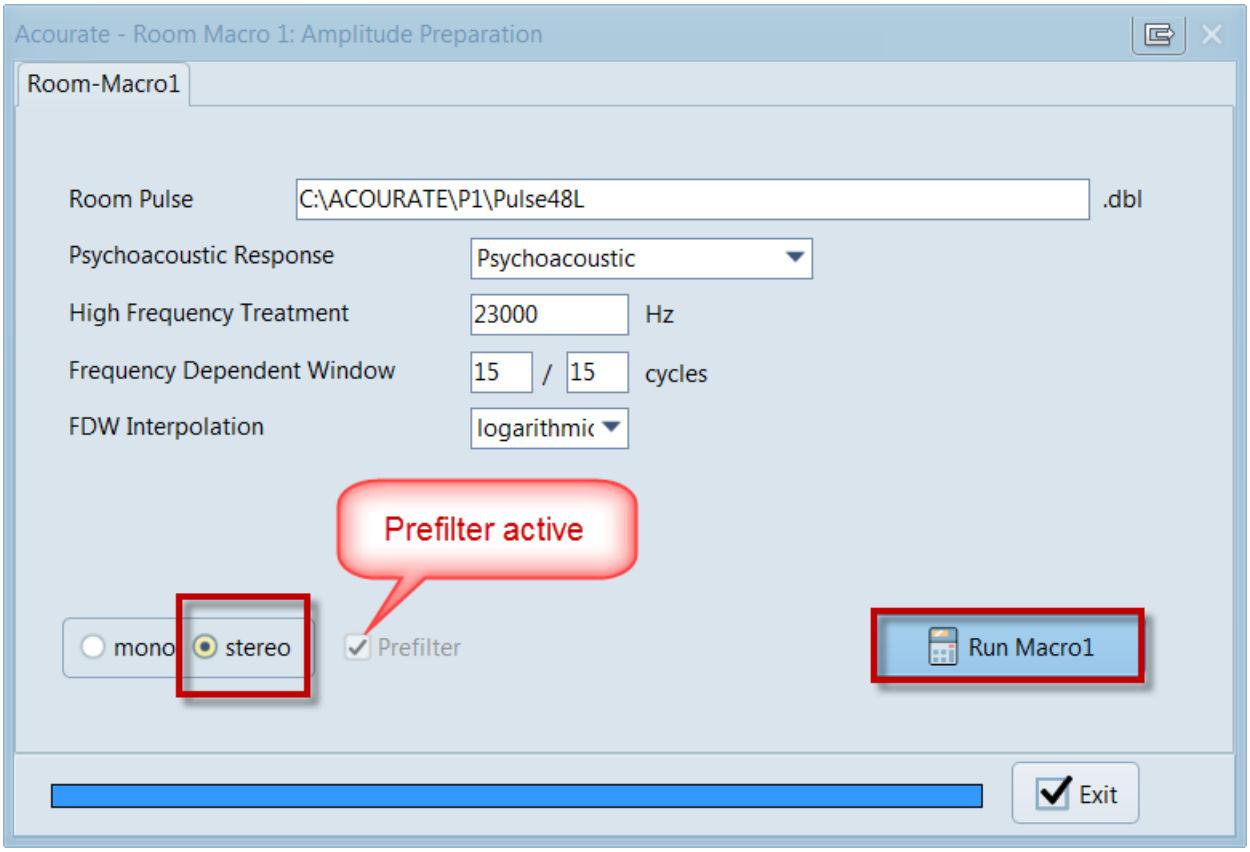
Your Pre Filters are now active.



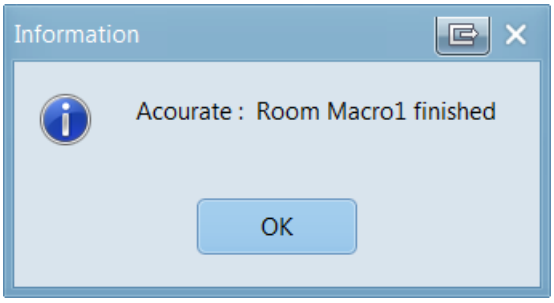
Exit

Room Macro 1: Magnitude Preparation

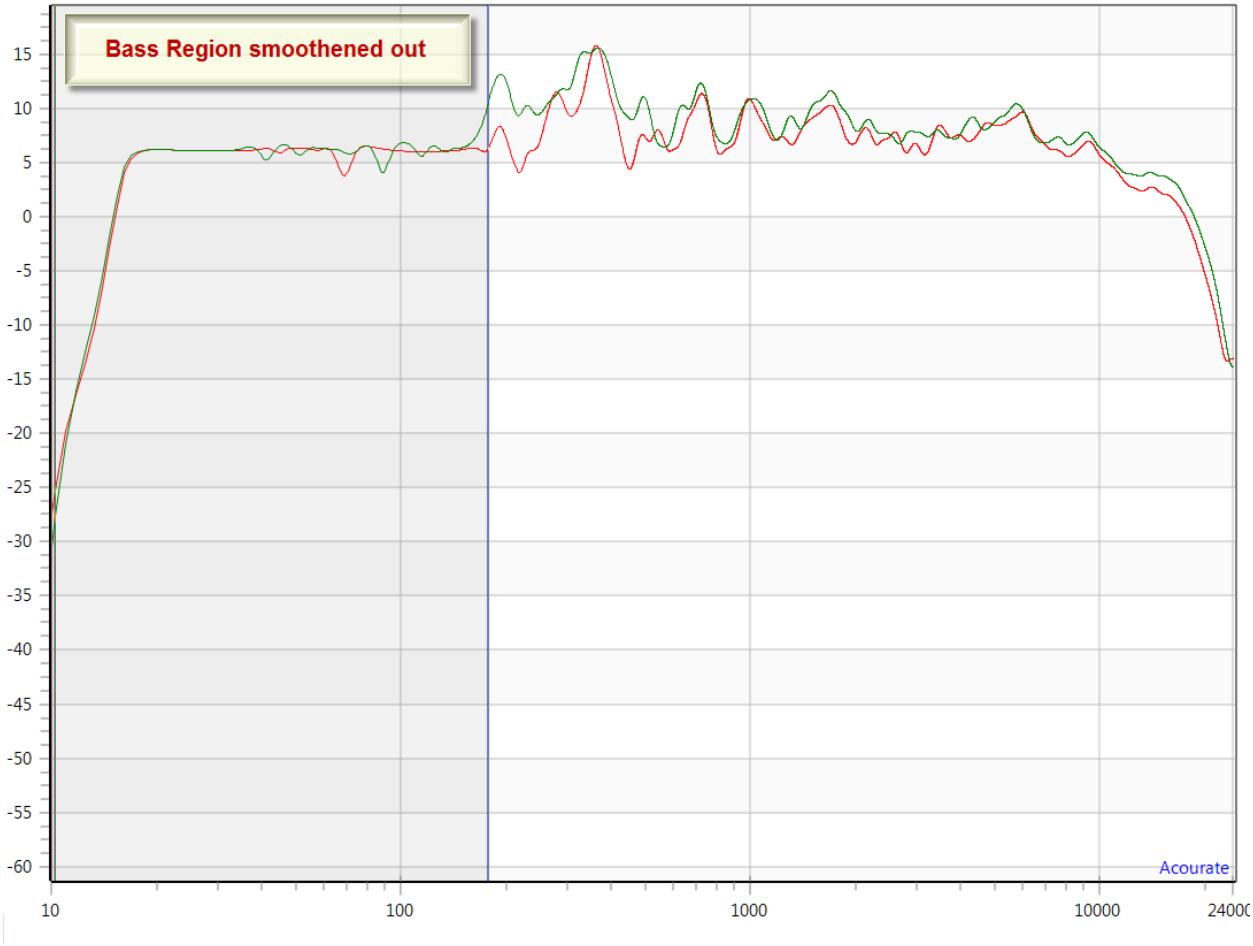




Run Macro1

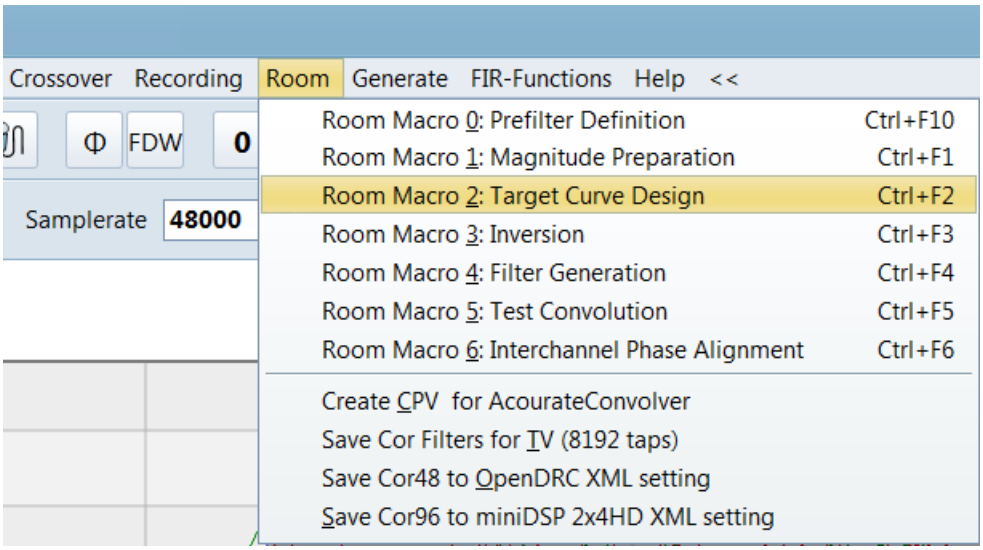


Notice how the Bass Region below 174Hz has been smoothened out.

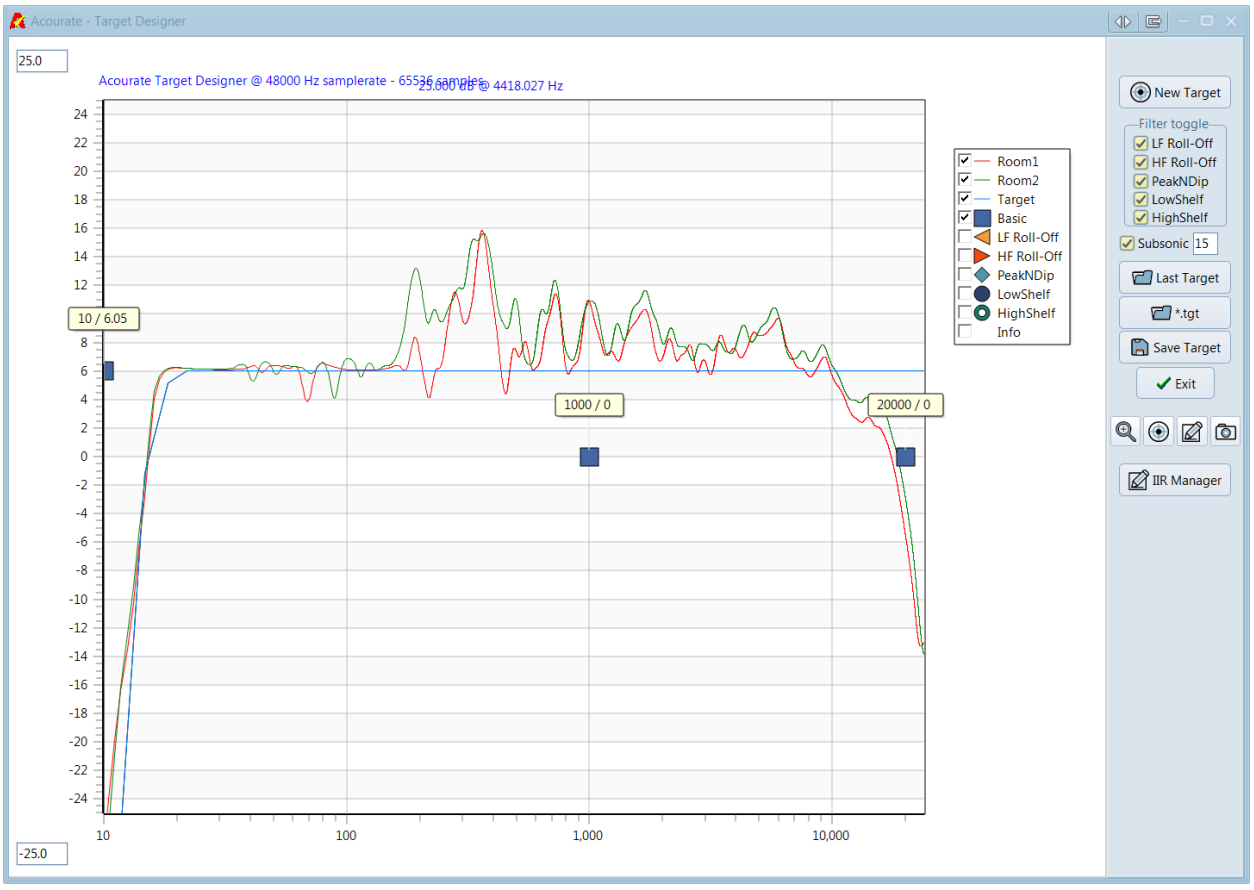


The Pre Filters have done their job!

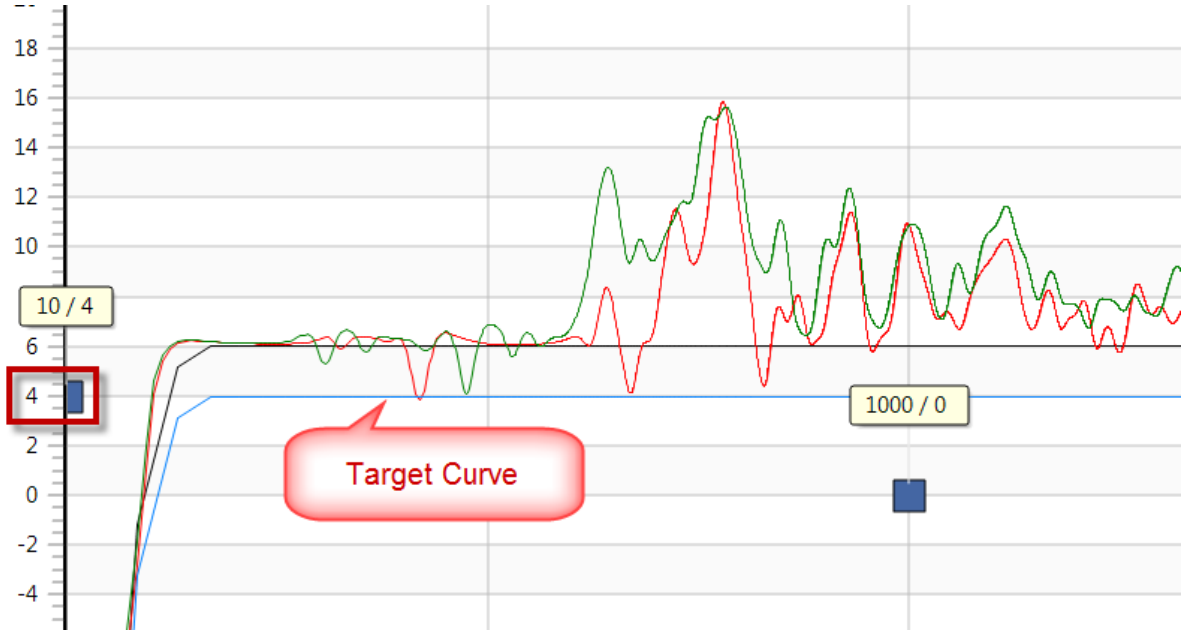
Room Macro 2: Target Curve Design



This is your Target Designer Window

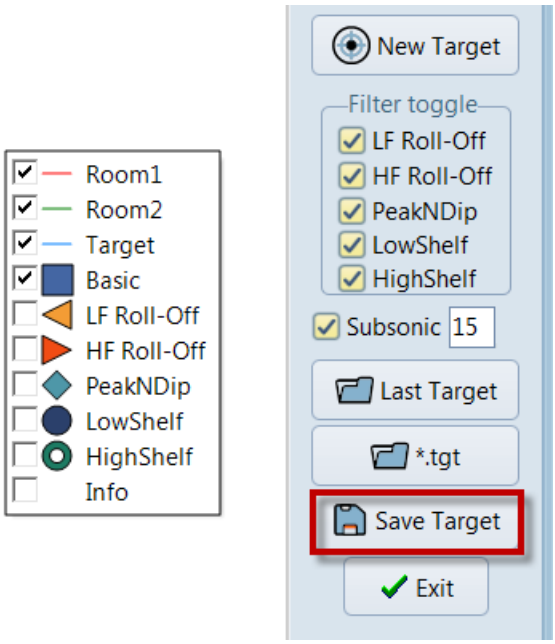


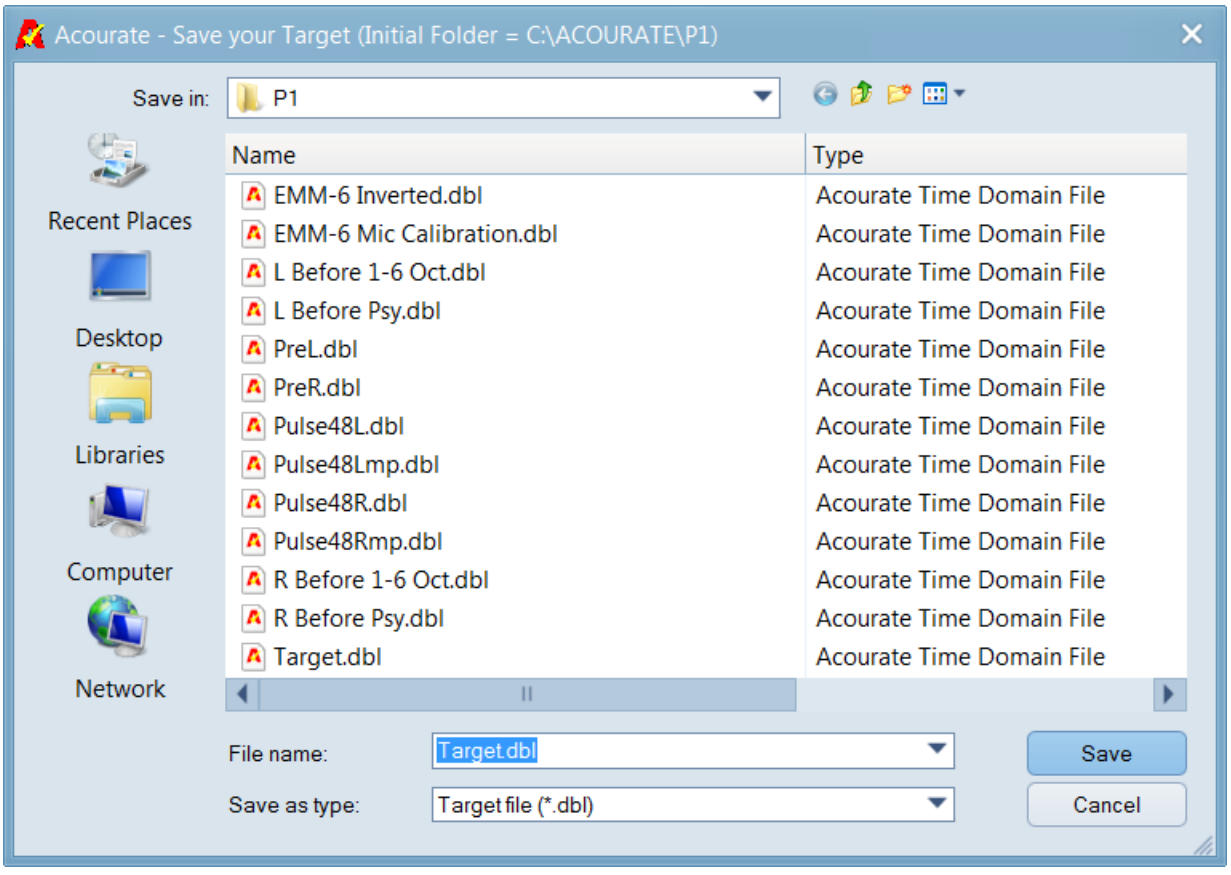
Drag down the Left Drag Handle so that your blue Target Curve falls below the dips.



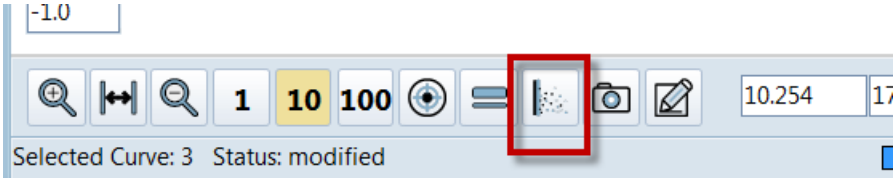
Drag down on the Right Drag Handle to apply a gentle slope above 1000Hz.

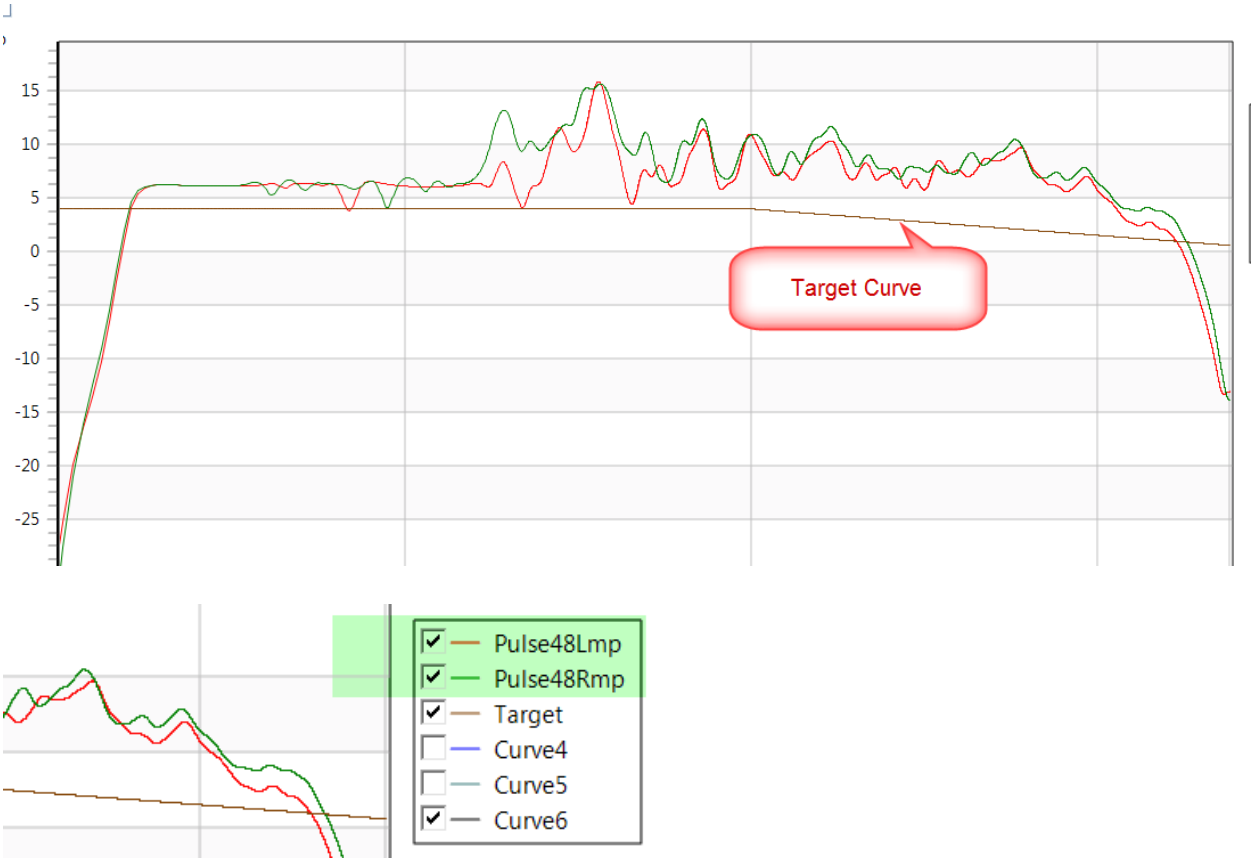
Save this Target Curve and **Exit**





Clear all Markers





Everything above your Target Curve will be corrected.

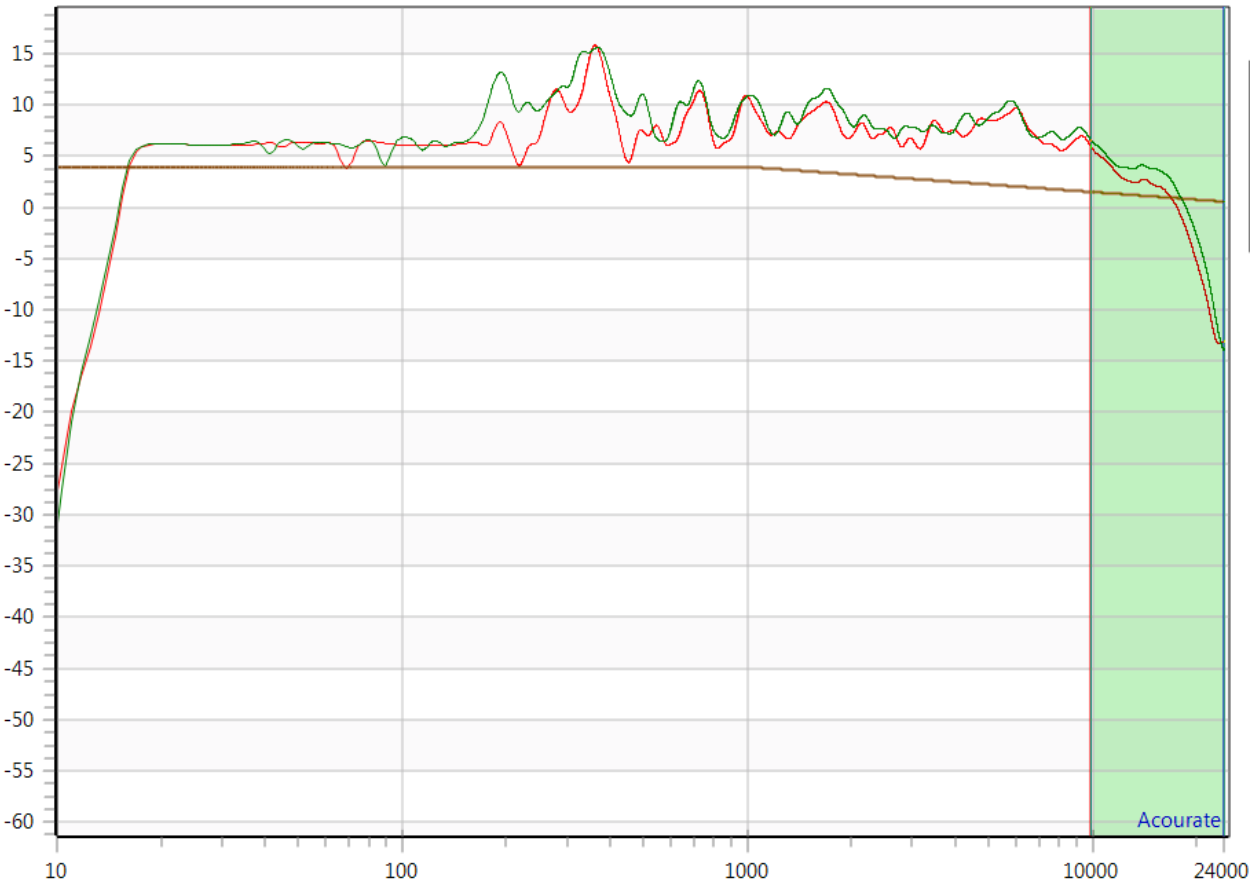
Everything below your Target Curve will be left alone.

Set a High Frequency Limit

Acourate allows you to set a High Frequency Limit to project your Tweeters.
Everything above this High Frequency Limit will be left alone allowing the Tweeters to naturally roll off.

Let's say you want to set a High Frequency Limit at some point above 10,000 Hz.

Use your Left and Right mouse buttons to define a Region between 10,000 Hz and 24,000 Hz.



Zoom in to this Region

Ideally you want to find a spot above 12,000 Hz where the Left and Right channels cross (have the same value).

In this case, the curves almost intersect at **Spot A** but not quite. There is a slight difference in magnitude.

The next best approach is to find **Spot B** and **Spot C** where the Left and Right Channels intersect the brown Target Curve.

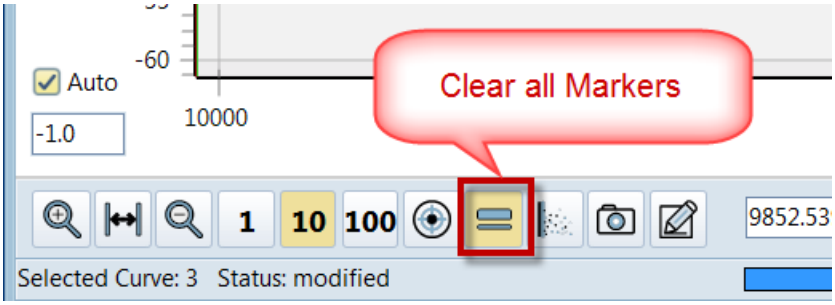
Both Spots B and C have the exact same magnitude, although they are at different frequencies. This is perfectly fine.

You will choose Spot B to set the High Frequency Limit of the Left Channel in red.

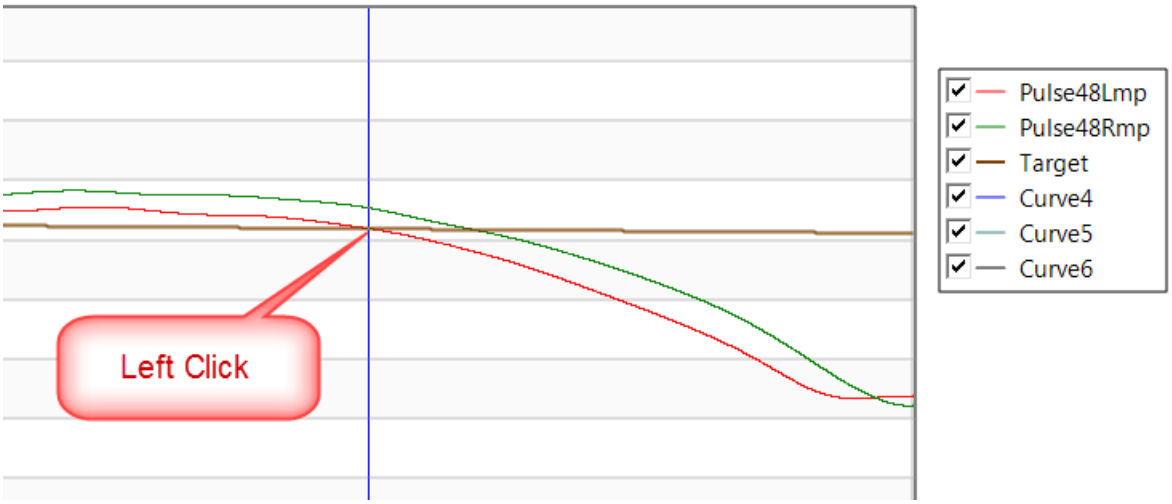
You will choose Spot C to set the High Frequency Limit of the Right Channel in green.

Doing so will ensure the Left and Right correction curves have the same value (no gap between the lines) above the Limit Frequencies.

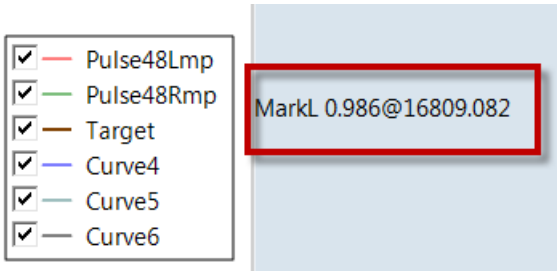
Clear All Markers.



Left Click to place a Left Marker at Spot B.

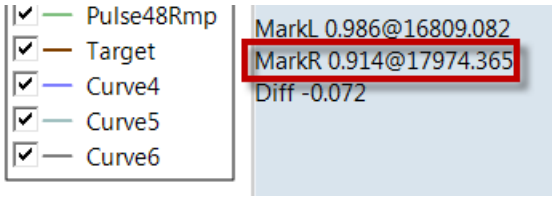


You have created a Left Marker at 16,809 Hz

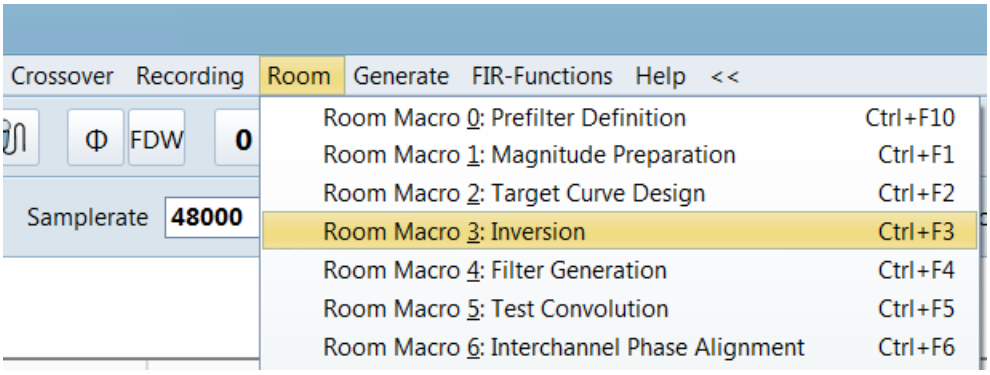


Right Click to place a Right Marker at Spot C.

You have created a Right Marker at 17,974 Hz

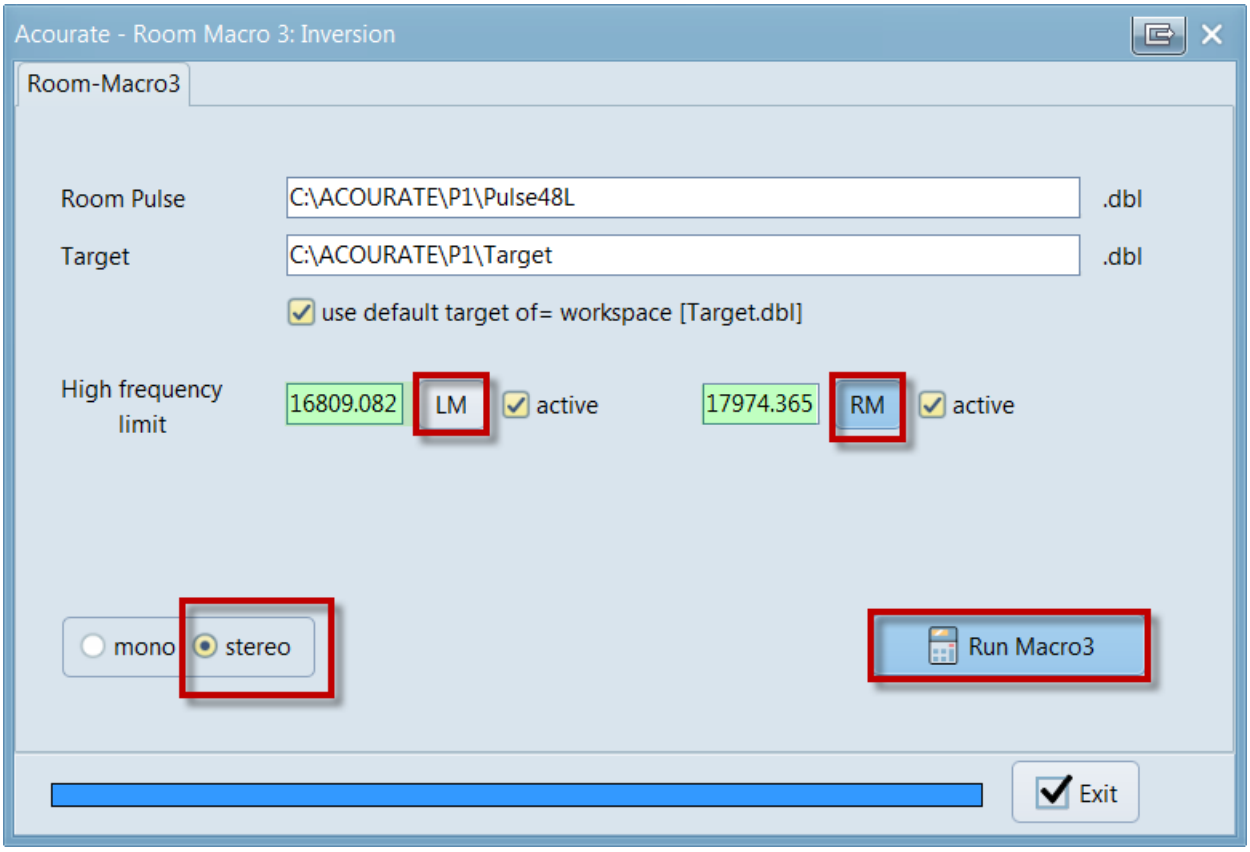


Room Macro 3: Inversion

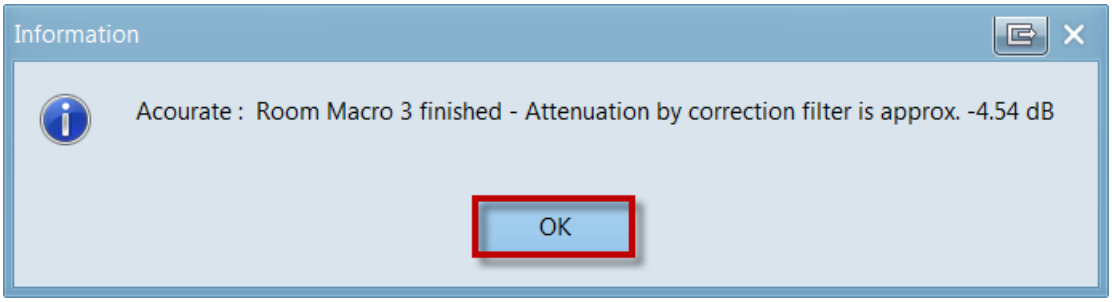


Click on the Left Marker button [LM] and the Right Marker button [RM] to set the High Frequency Limits.

Select Stereo (default)

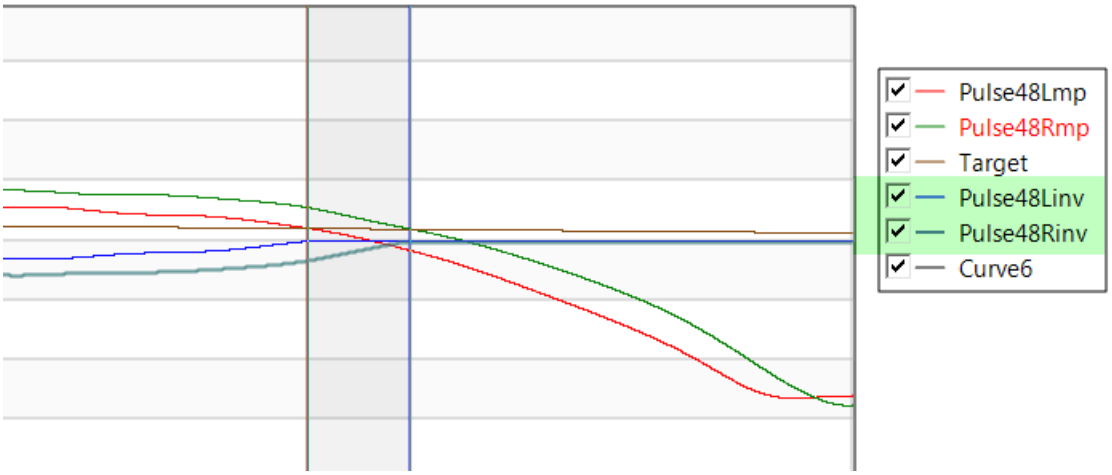


Run Macro3



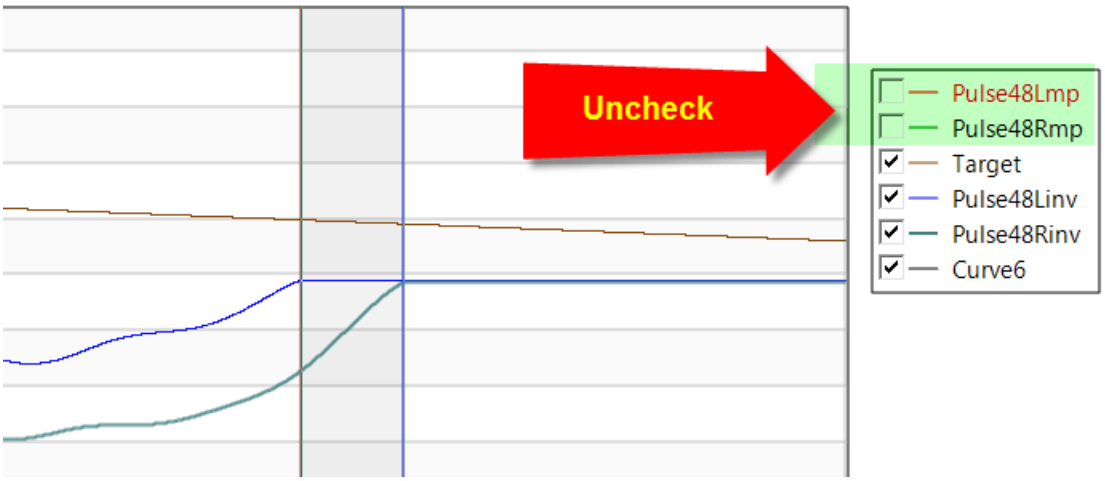
Acourate has created the Inverted Curves.

Pulse48Linv
Pulse48Rinv

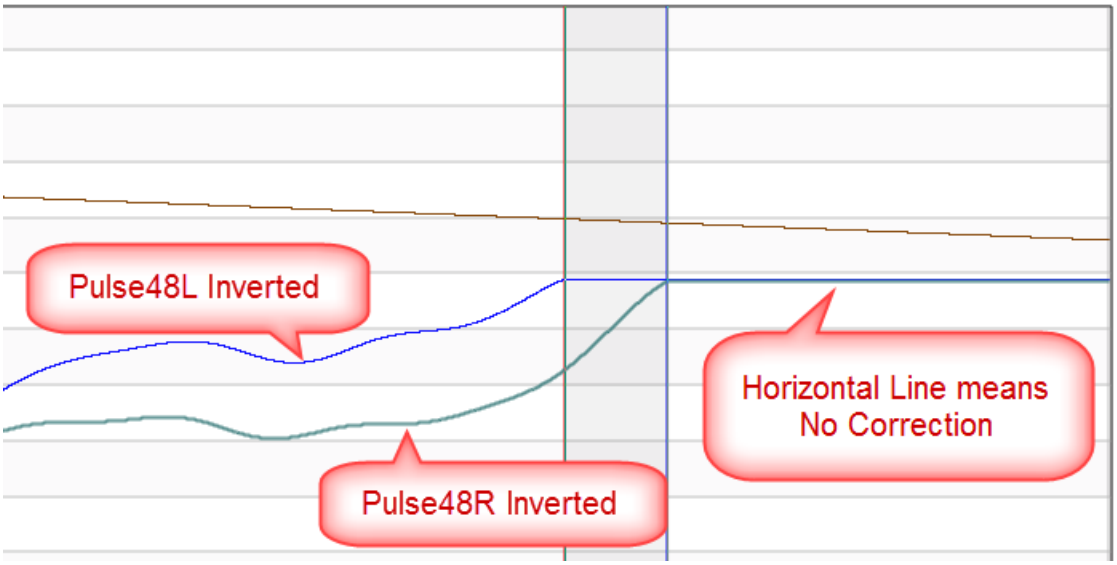


To get a better picture, turn off these two curves:

Pulse48Lmp
Pulse48Rmp



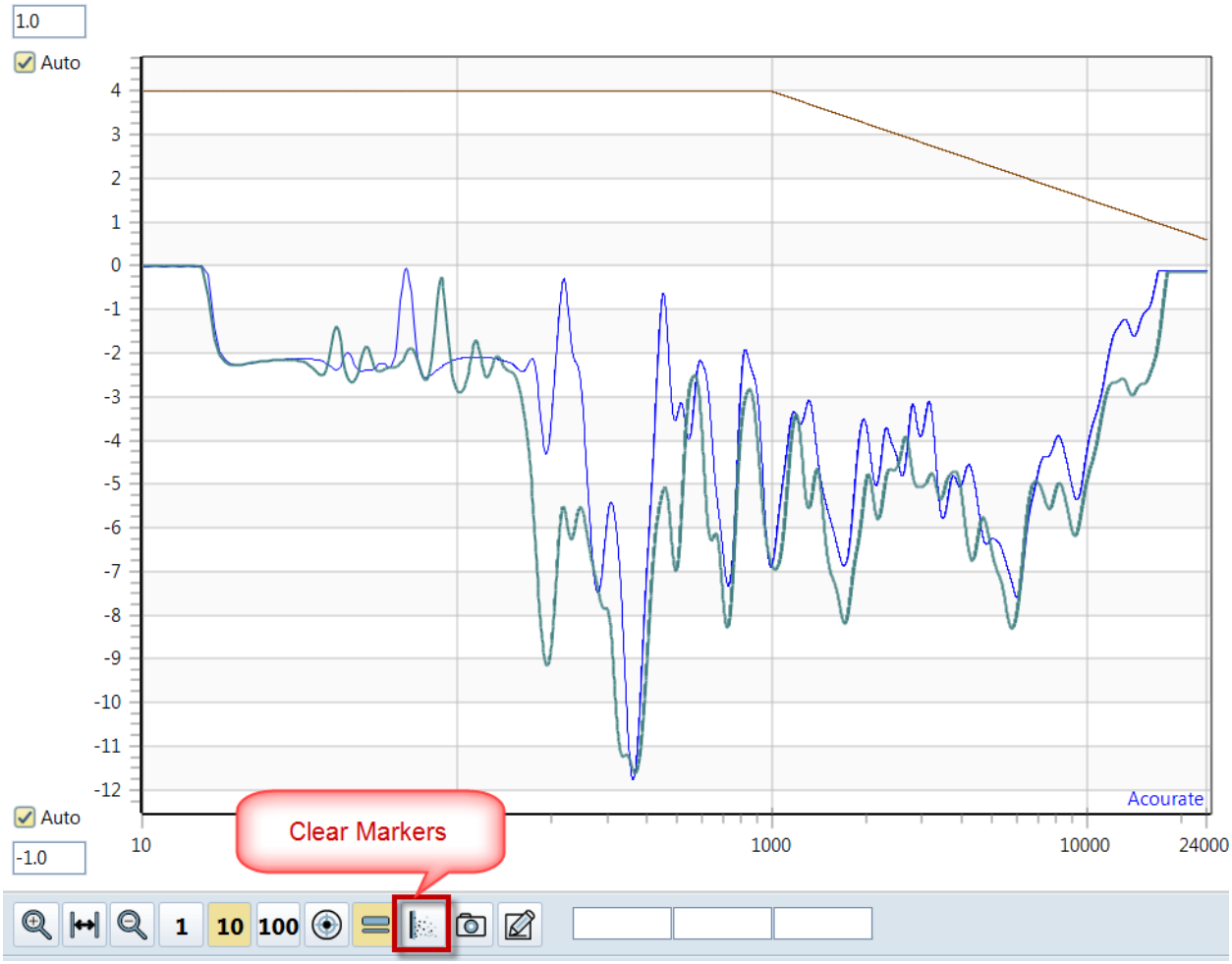
You can now clearly see how the Inverted curves look like.

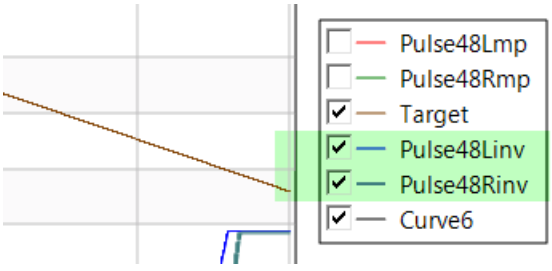


Note: The horizontal section above your High Frequency settings signifies that no correction will be applied above your set limits.

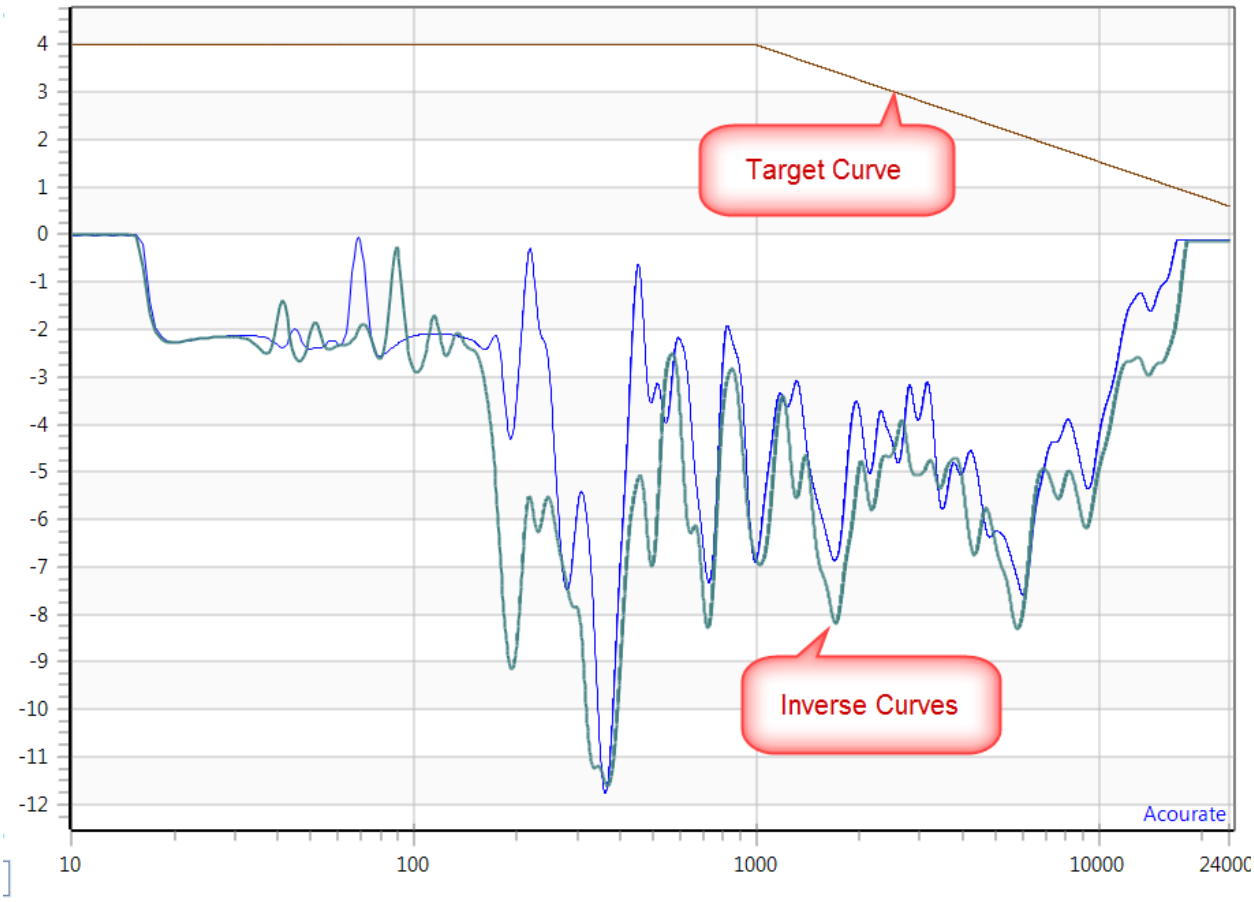
View the Full Scale.

Clear Markers

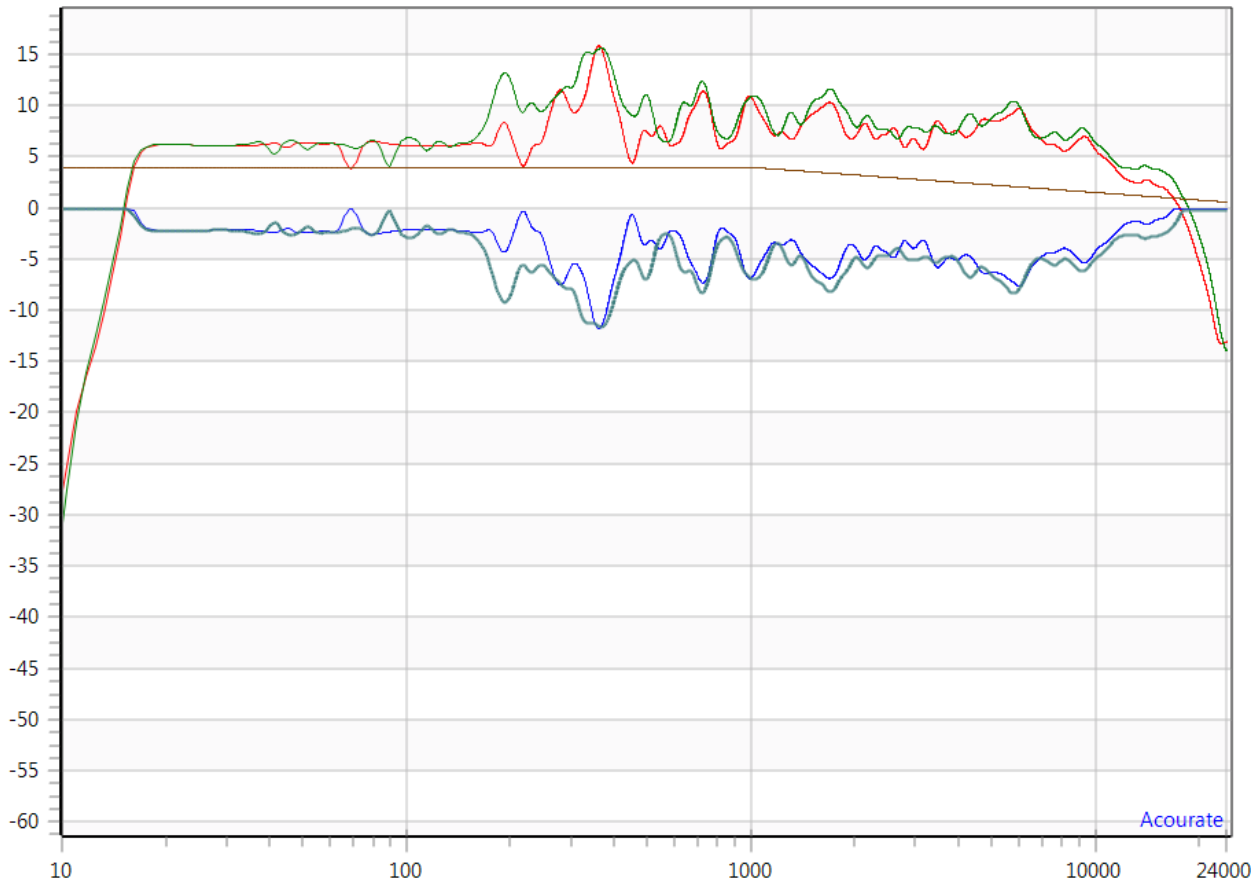


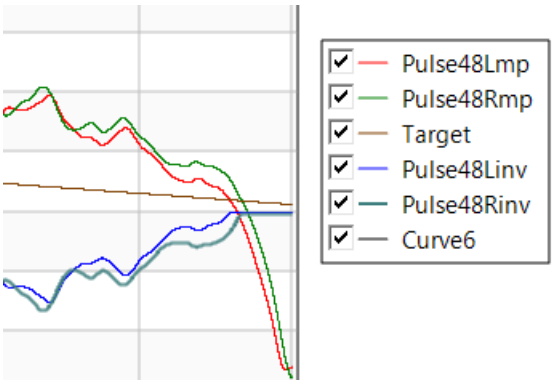


You will apply the Inverse Curves to get as close as possible to your Target Curve.



Turn on all curves to visualize the correlation.



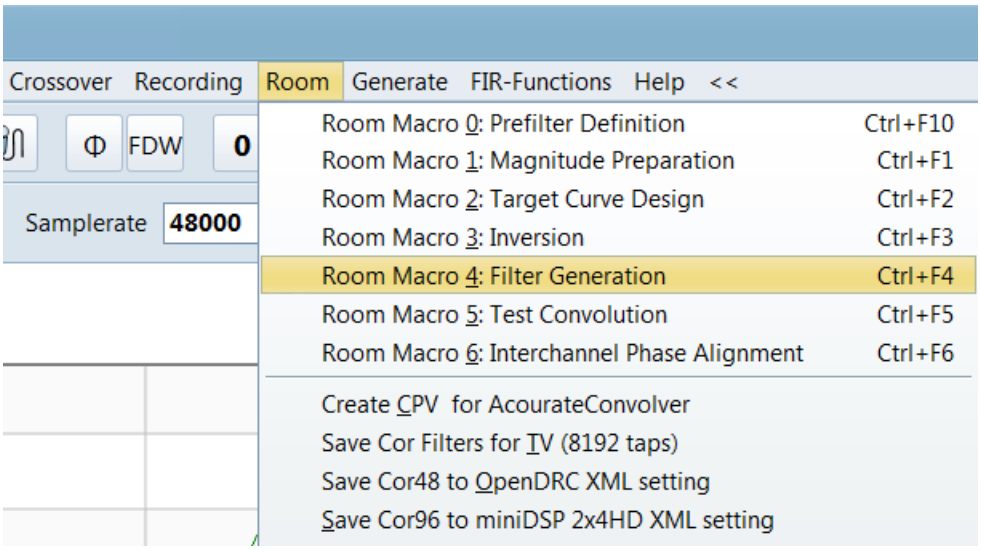


View the contents of your Project Workspace P1

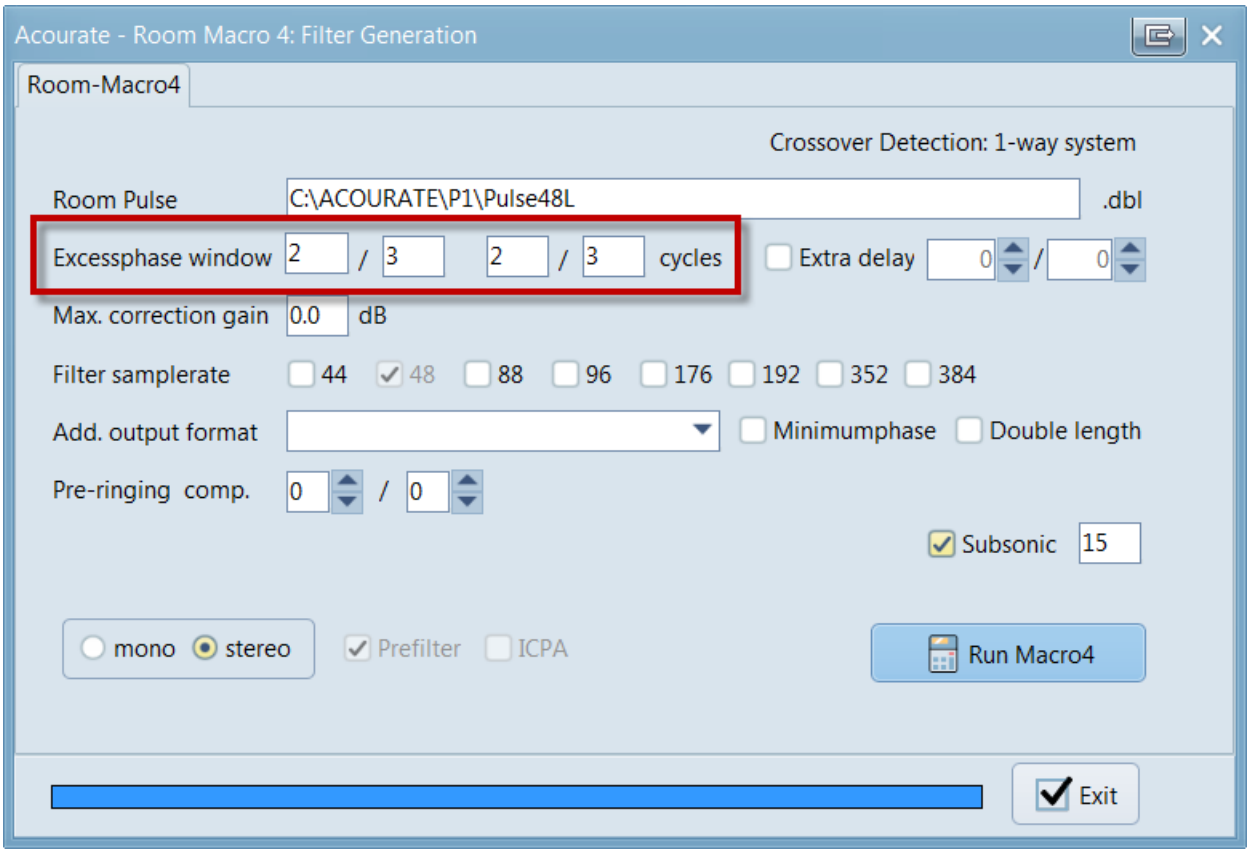
You will find the two new Inverse Curves.

C:\ACOURATE\P1

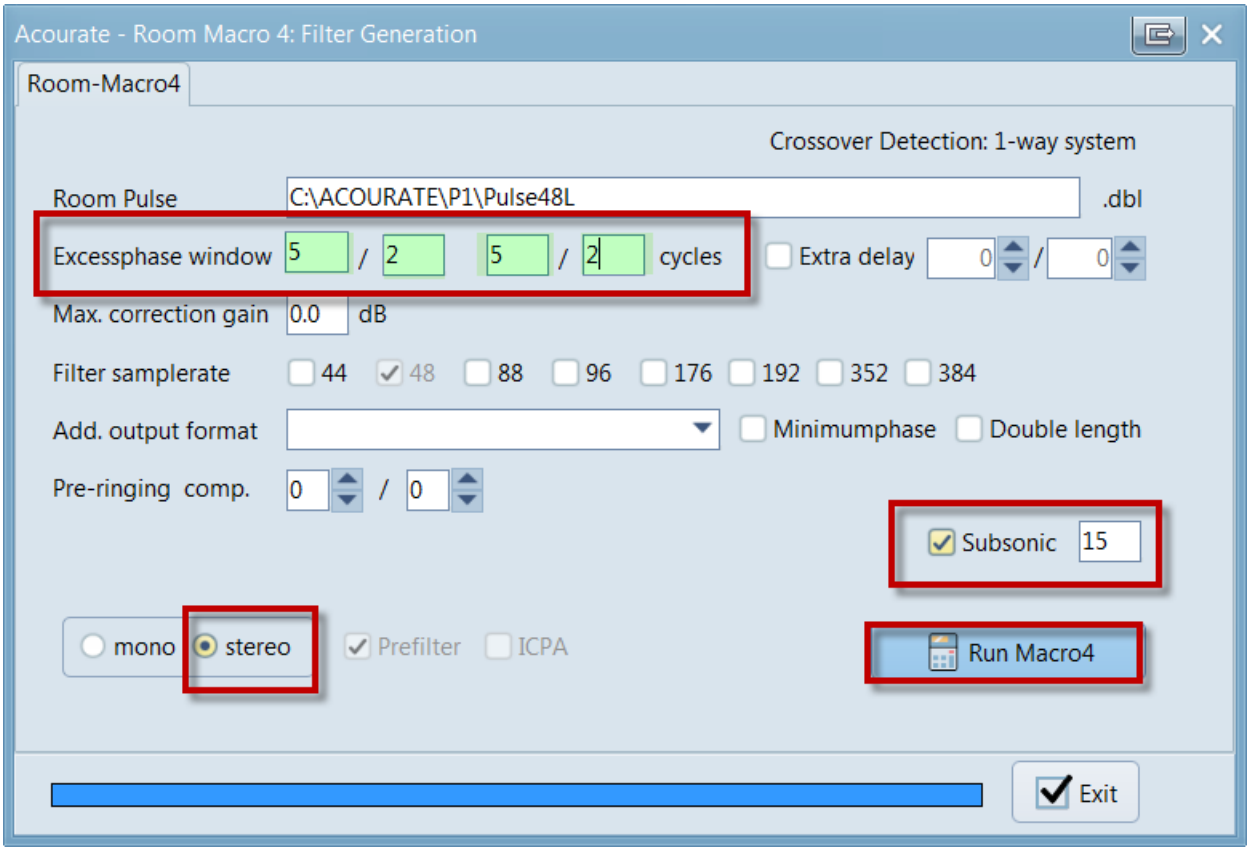
Room Macro 4: Filter Generation



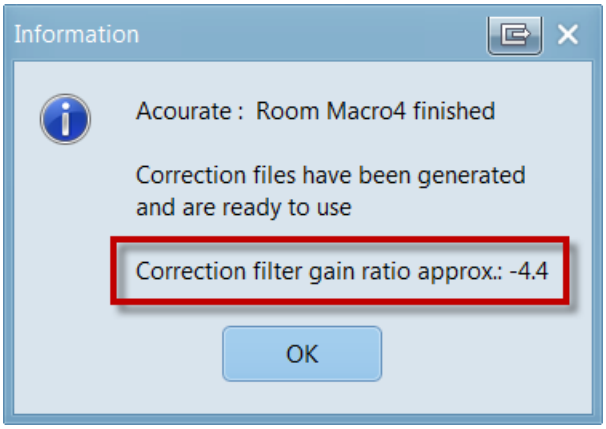
These are the default settings for the ExcessPhase Window.



David recommends these settings for the ExcessPhase Window.



Run Macro4

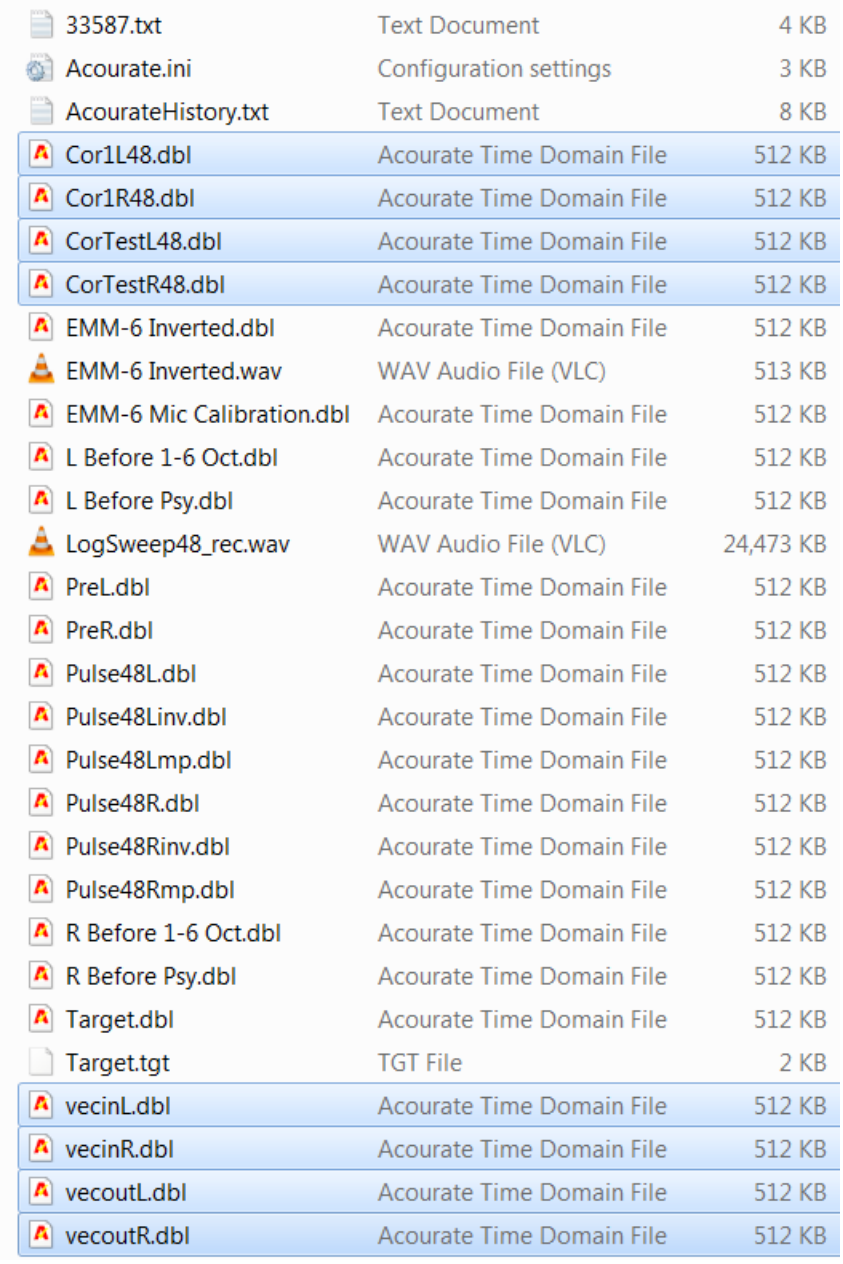


Note: Applying this Filter will results in a Filter Insertion Loss of **-4.4dB**

View the contents of your Project Workspace P1.

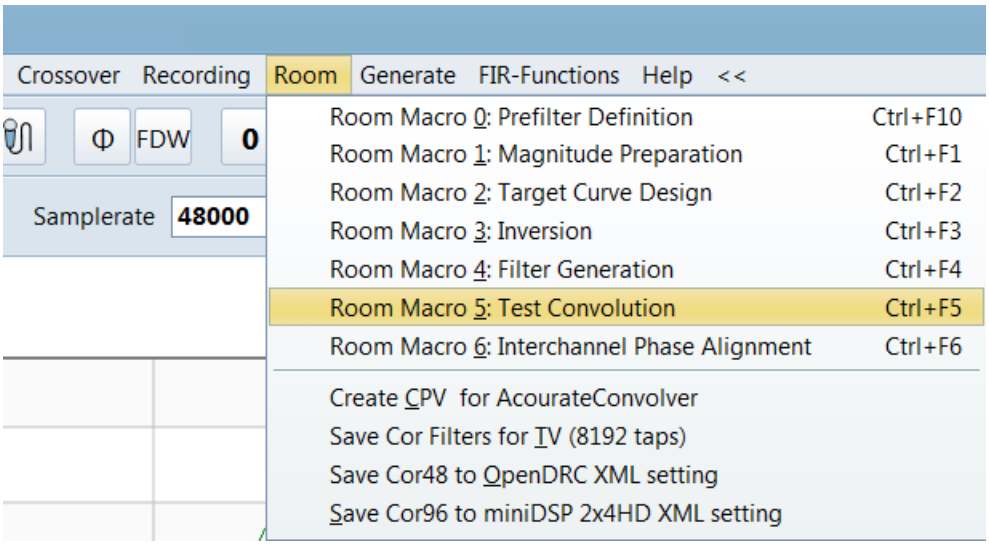
You will find several new files.

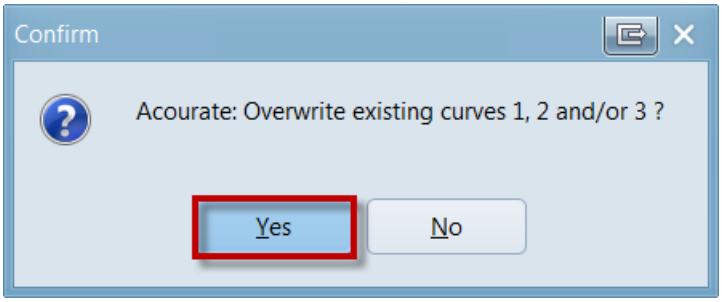
C:\ACOURATE\P1



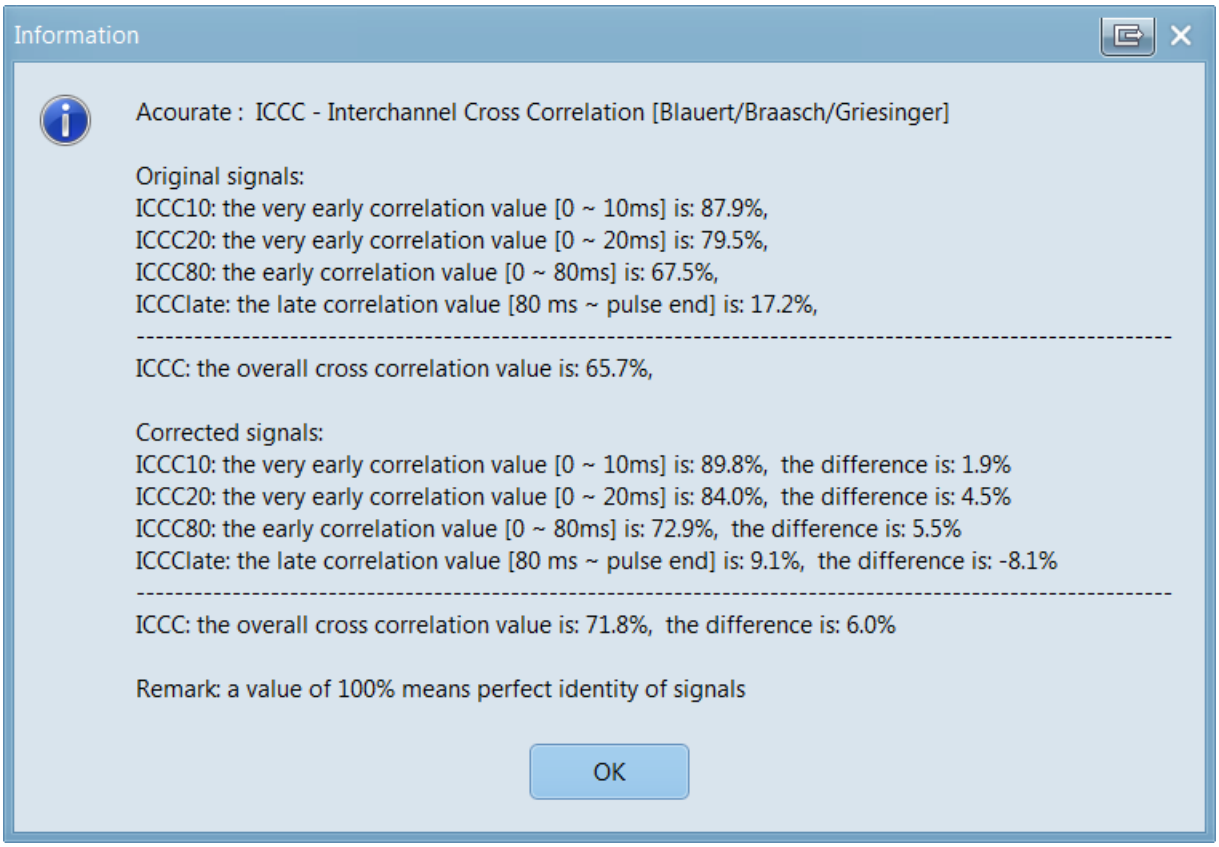
33587.txt	Text Document	4 KB
Acourate.ini	Configuration settings	3 KB
AcourateHistory.txt	Text Document	8 KB
Cor1L48.dbl	Acourate Time Domain File	512 KB
Cor1R48.dbl	Acourate Time Domain File	512 KB
CorTestL48.dbl	Acourate Time Domain File	512 KB
CorTestR48.dbl	Acourate Time Domain File	512 KB
EMM-6 Inverted.dbl	Acourate Time Domain File	512 KB
EMM-6 Inverted.wav	WAV Audio File (VLC)	513 KB
EMM-6 Mic Calibration.dbl	Acourate Time Domain File	512 KB
L Before 1-6 Oct.dbl	Acourate Time Domain File	512 KB
L Before Psy.dbl	Acourate Time Domain File	512 KB
LogSweep48_rec.wav	WAV Audio File (VLC)	24,473 KB
PreL.dbl	Acourate Time Domain File	512 KB
PreR.dbl	Acourate Time Domain File	512 KB
Pulse48L.dbl	Acourate Time Domain File	512 KB
Pulse48Linv.dbl	Acourate Time Domain File	512 KB
Pulse48Lmp.dbl	Acourate Time Domain File	512 KB
Pulse48R.dbl	Acourate Time Domain File	512 KB
Pulse48Rinv.dbl	Acourate Time Domain File	512 KB
Pulse48Rmp.dbl	Acourate Time Domain File	512 KB
R Before 1-6 Oct.dbl	Acourate Time Domain File	512 KB
R Before Psy.dbl	Acourate Time Domain File	512 KB
Target.dbl	Acourate Time Domain File	512 KB
Target.tgt	TGT File	2 KB
vecinL.dbl	Acourate Time Domain File	512 KB
vecinR.dbl	Acourate Time Domain File	512 KB
vecoutL.dbl	Acourate Time Domain File	512 KB
vecoutR.dbl	Acourate Time Domain File	512 KB

Room Macro 5: Test Convolution





You will get this Information Window.

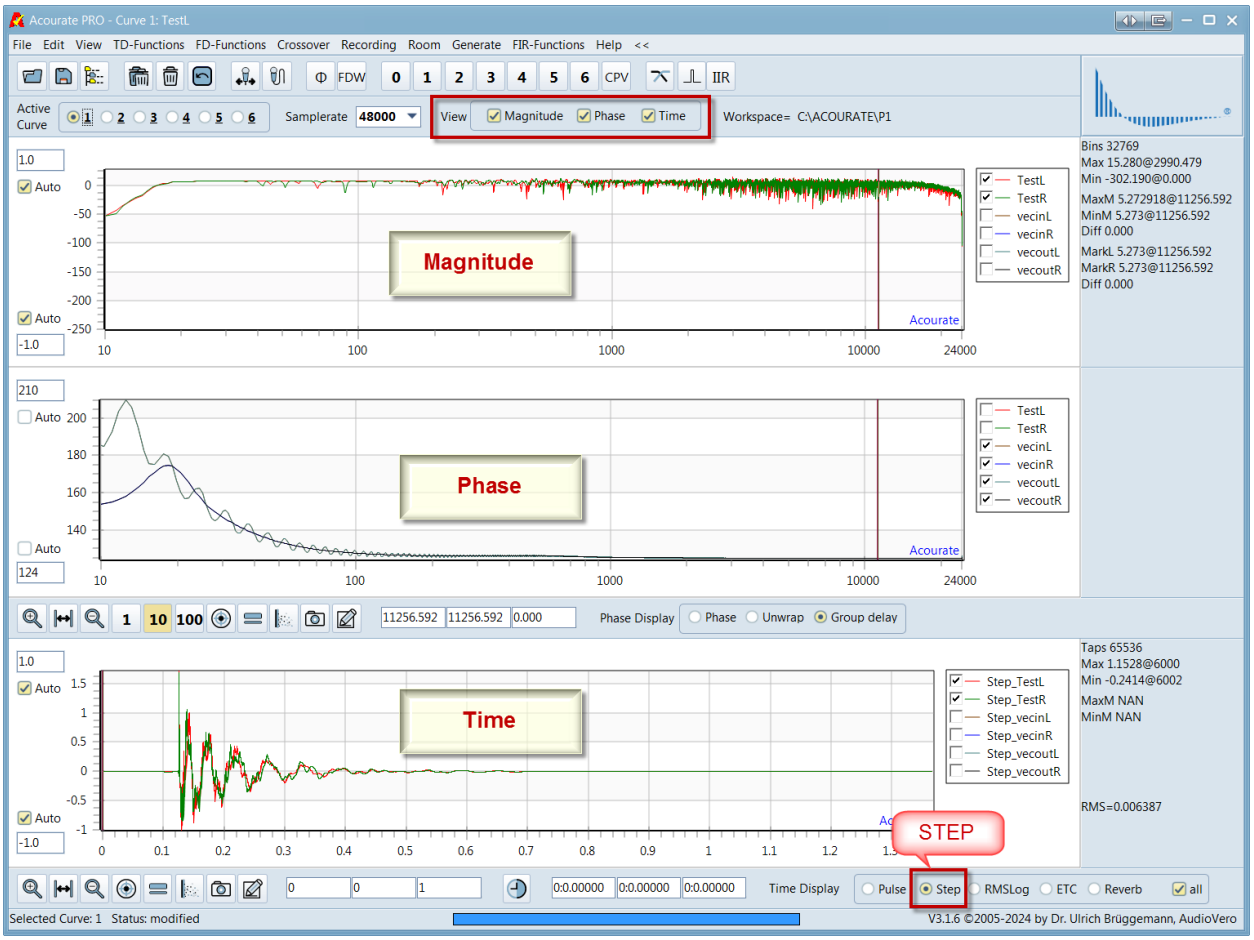


The Interchannel Cross Correlation has improved slightly over the Original Signals.

ICCC Overall Before = 65.7%

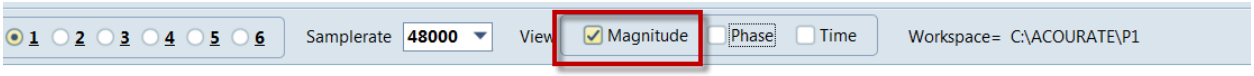
ICCC Overall After = 71.8%

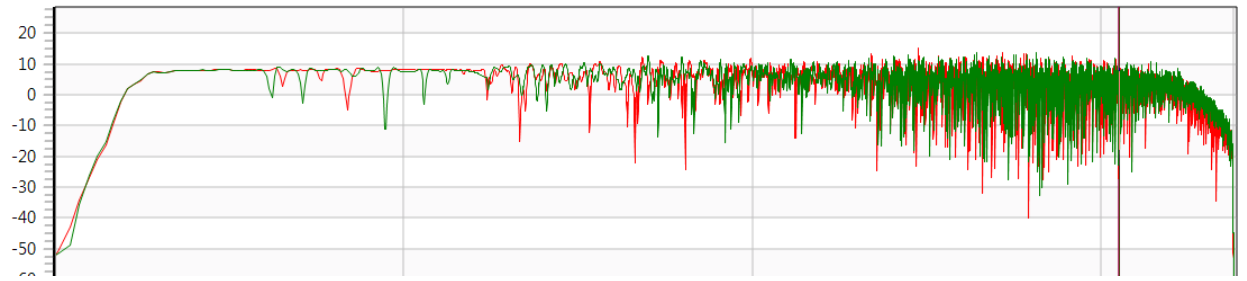
You are viewing the Magnitude, Phase and Time of the Test Convolution.

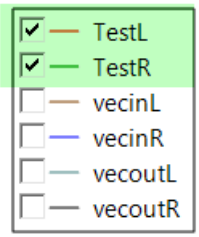


Take a closer look at Magnitude, Phase and Time.

View **Magnitude** only.



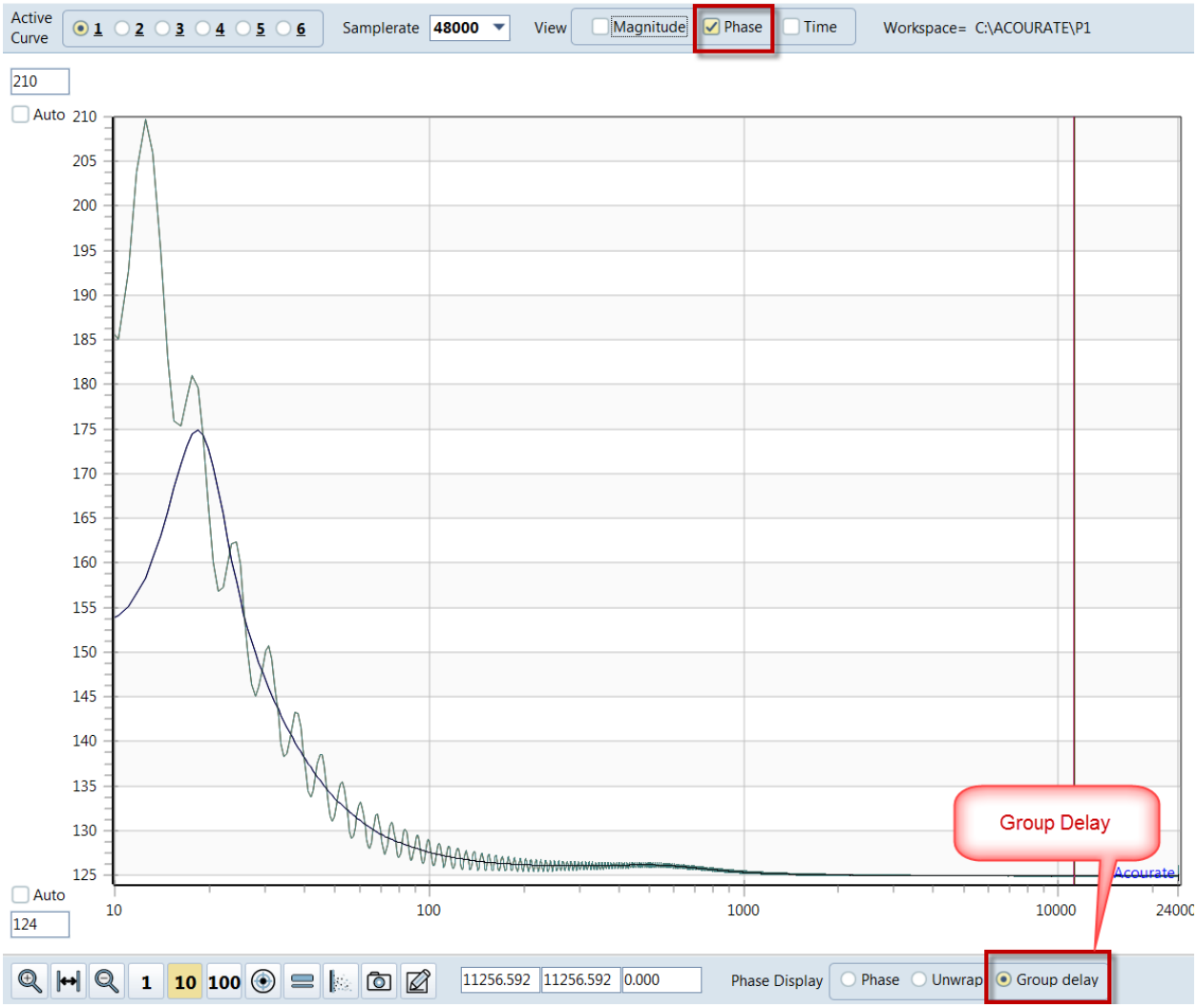


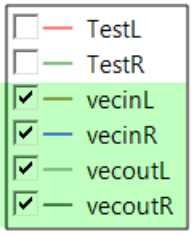


The predicted Frequency Response Curves are looking good.

They will appear smoothened when you apply a Psychoacoustic Filter or a 1/6th Octave smoothening.

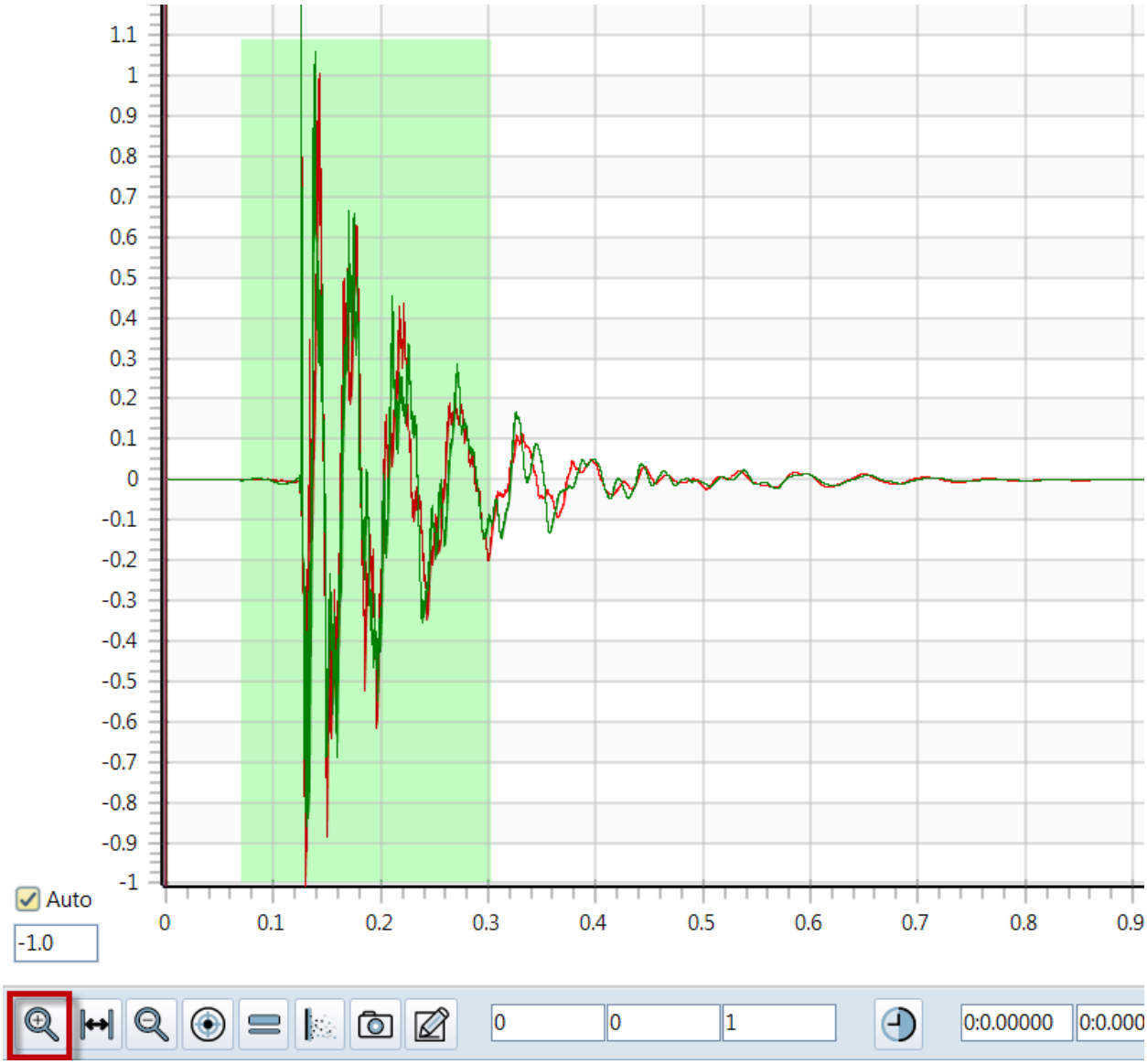
View **Phase** Only.





View **Time** Only.

Zoom into this shaded region.



This is looking fairly good.

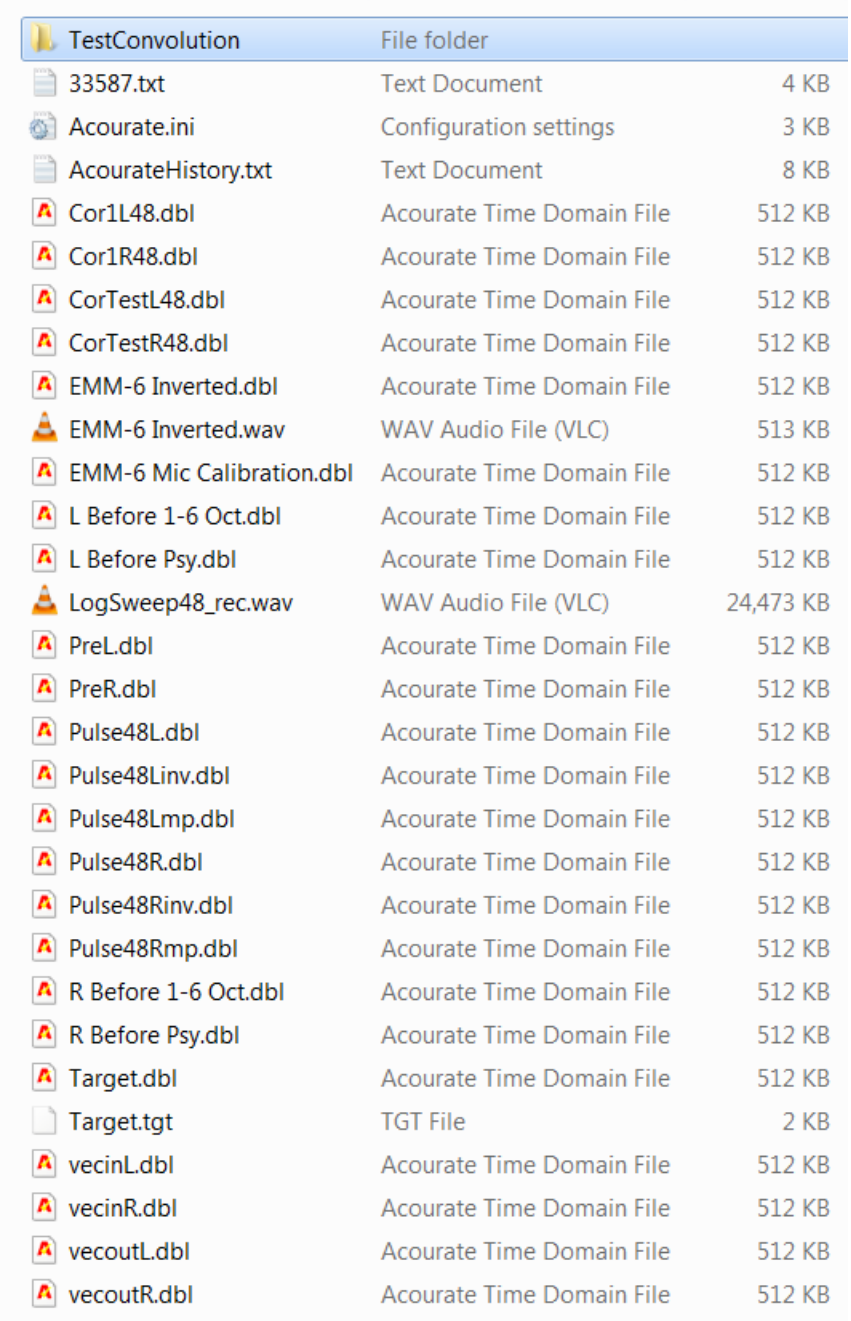
Ideally, the Step Response of the Left and Right Channels should be coincident.

This can be addressed by running Macro6.

For now, you will skip Macros6 and Generate the Output Filters to be used in ROON.

View the contents of your Project Workspace P1
You will find a new folder named **TestConvolution**.

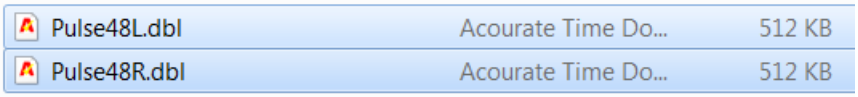
C:\ACOURATE\P1\



TestConvolution	File folder	
33587.txt	Text Document	4 KB
Acourate.ini	Configuration settings	3 KB
AcourateHistory.txt	Text Document	8 KB
Cor1L48.dbl	Acourate Time Domain File	512 KB
Cor1R48.dbl	Acourate Time Domain File	512 KB
CorTestL48.dbl	Acourate Time Domain File	512 KB
CorTestR48.dbl	Acourate Time Domain File	512 KB
EMM-6 Inverted.dbl	Acourate Time Domain File	512 KB
EMM-6 Inverted.wav	WAV Audio File (VLC)	513 KB
EMM-6 Mic Calibration.dbl	Acourate Time Domain File	512 KB
L Before 1-6 Oct.dbl	Acourate Time Domain File	512 KB
L Before Psy.dbl	Acourate Time Domain File	512 KB
LogSweep48_rec.wav	WAV Audio File (VLC)	24,473 KB
PreL.dbl	Acourate Time Domain File	512 KB
PreR.dbl	Acourate Time Domain File	512 KB
Pulse48L.dbl	Acourate Time Domain File	512 KB
Pulse48Linv.dbl	Acourate Time Domain File	512 KB
Pulse48Lmp.dbl	Acourate Time Domain File	512 KB
Pulse48R.dbl	Acourate Time Domain File	512 KB
Pulse48Rinv.dbl	Acourate Time Domain File	512 KB
Pulse48Rmp.dbl	Acourate Time Domain File	512 KB
R Before 1-6 Oct.dbl	Acourate Time Domain File	512 KB
R Before Psy.dbl	Acourate Time Domain File	512 KB
Target.dbl	Acourate Time Domain File	512 KB
Target.tgt	TGT File	2 KB
vecinL.dbl	Acourate Time Domain File	512 KB
vecinR.dbl	Acourate Time Domain File	512 KB
vecoutL.dbl	Acourate Time Domain File	512 KB
vecoutR.dbl	Acourate Time Domain File	512 KB

Open the **TestConvolution** folder.

C:\ACOURATE\P1\TestConvolution\

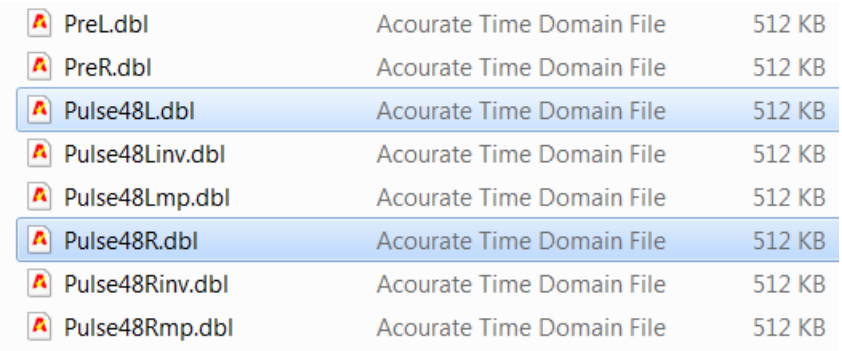


These are your **predicted** Impulse Response curves of your Left and Right Channels.

You can compare them against the **measured** Impulse Response curves of your Left and Right Channels.

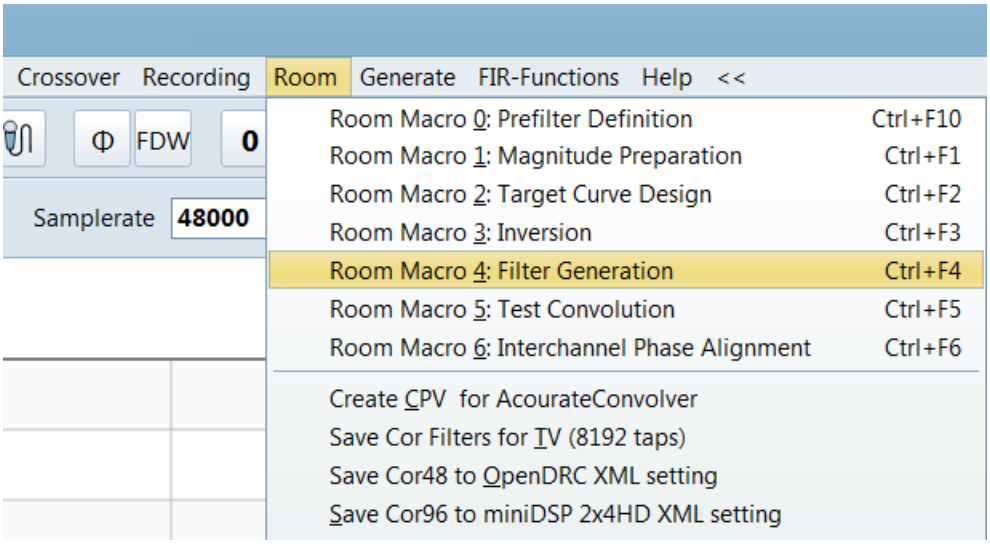
Pulse48L.dbl
Pulse48R.dpl

C:\ACOURATE\P1\

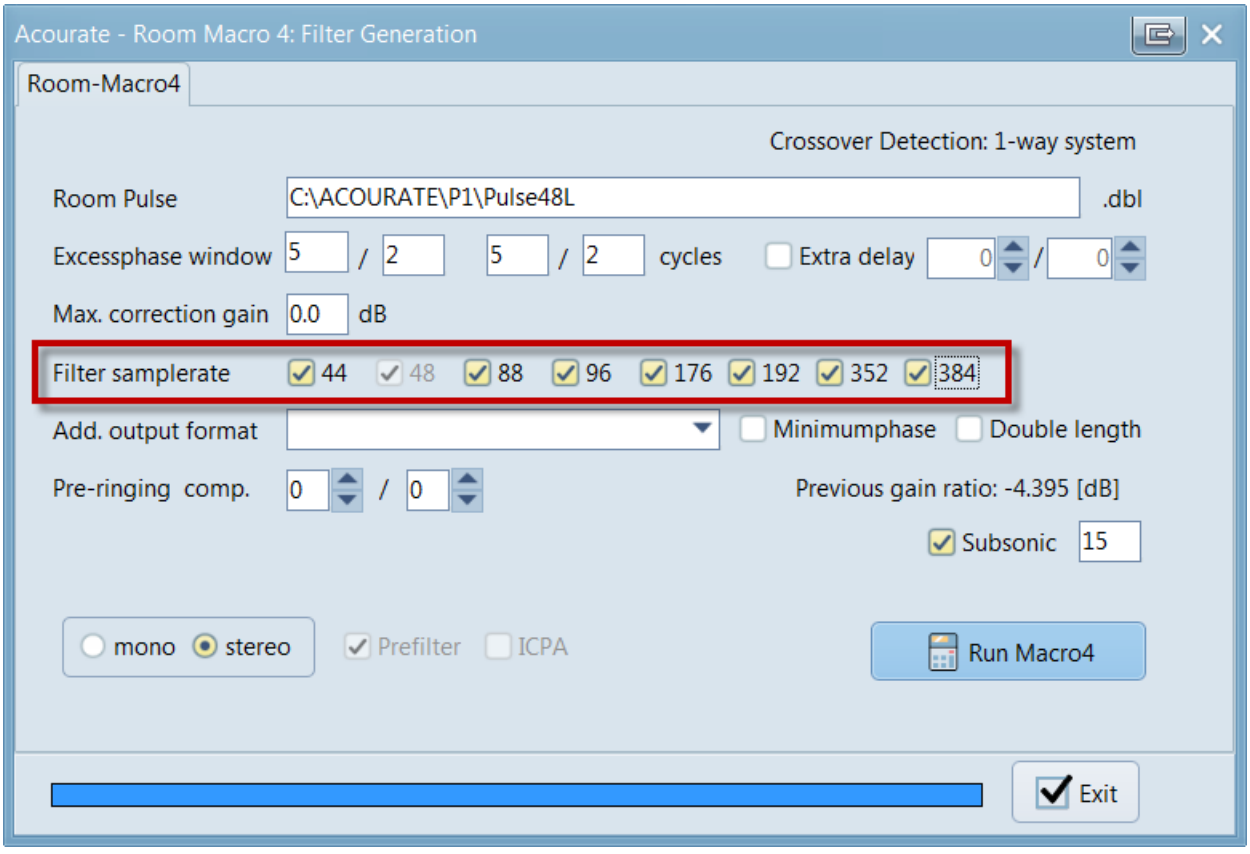


Output the Filters for ROON

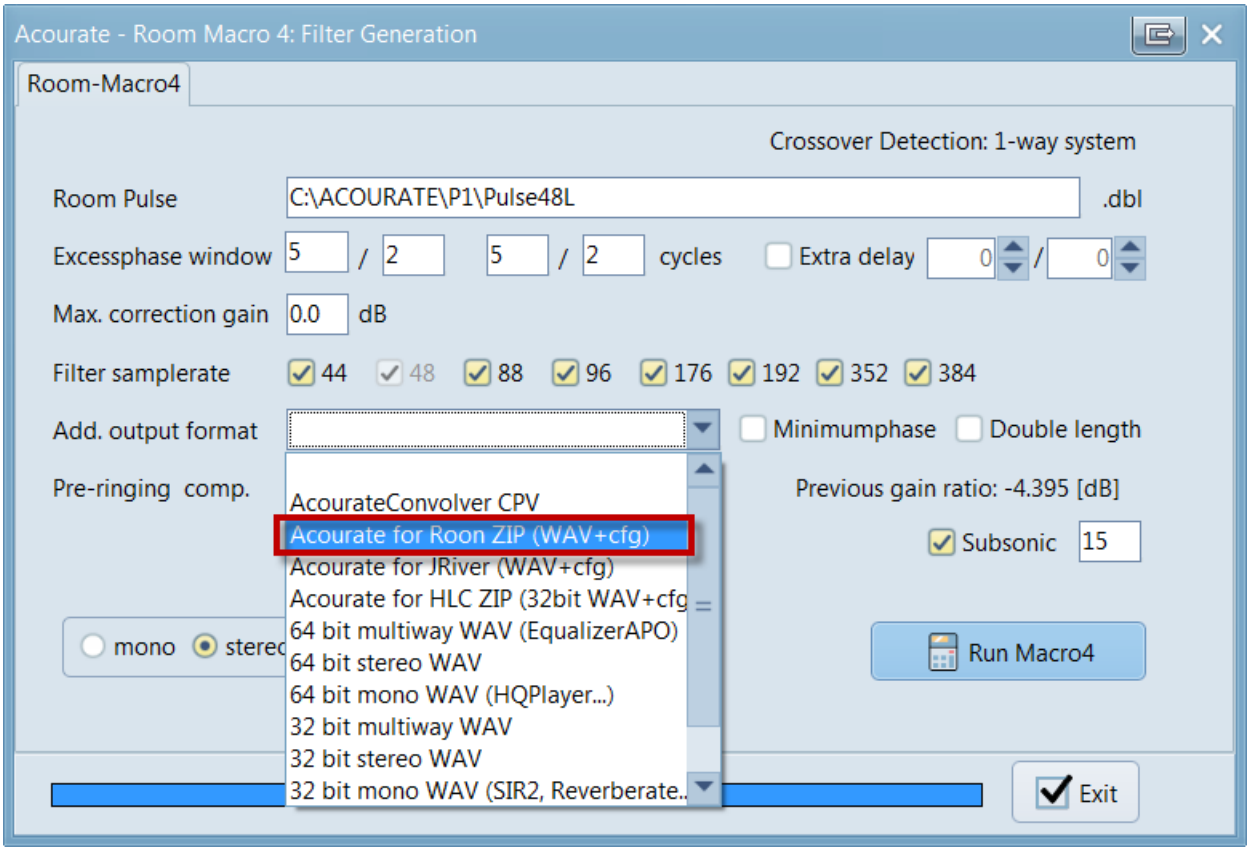
Room > Room Macro 4: Filter Generation

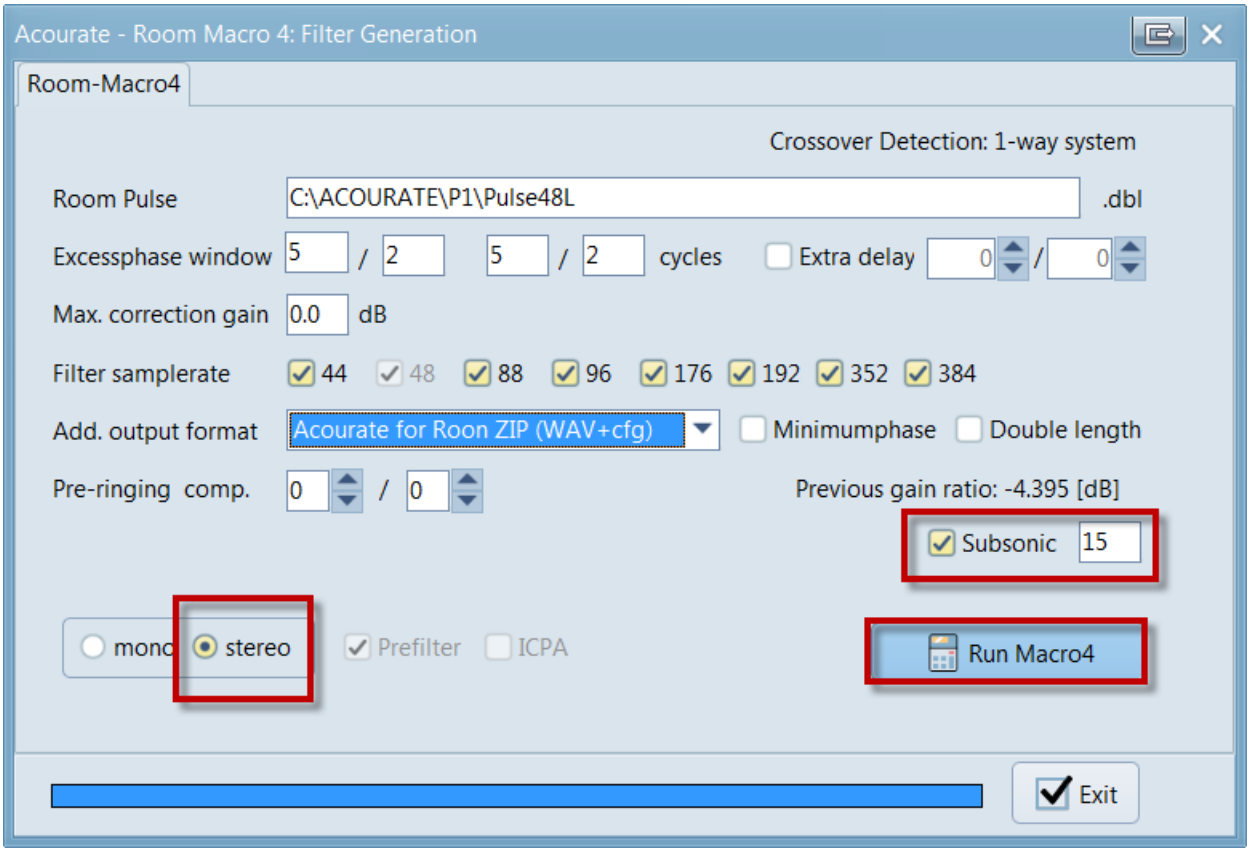


You will be generating Filters for all Sample Rates. Check all boxes.

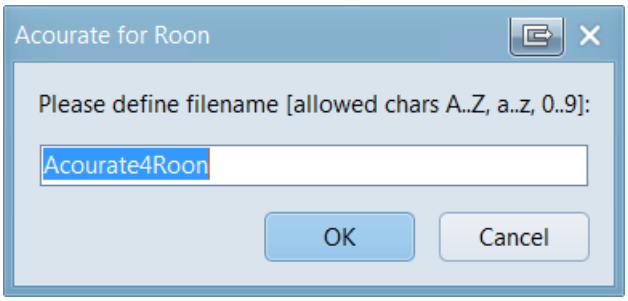


Select Output Format = Acourate for Roon ZIP (WAV+cfg)

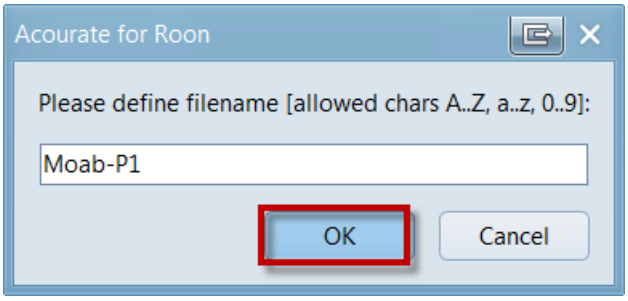


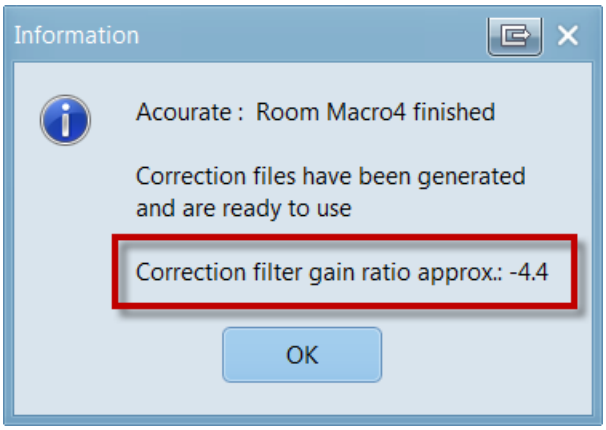


Run Macro4



Name this ZIP File = Moab-P1

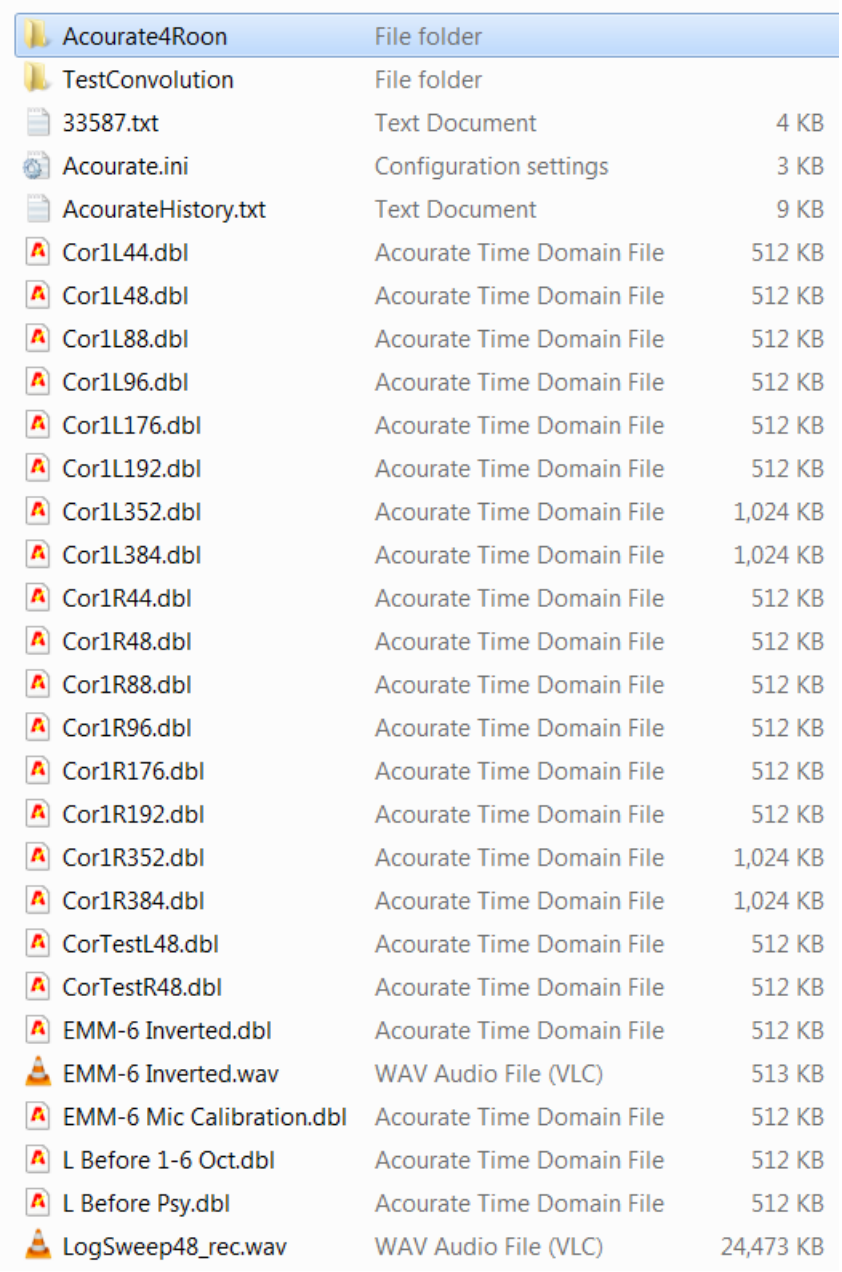




Note: Using this filter will result in a reduction in gain by -4.4dB

View the contents of your Project Workspace P1

C:\ACOURATE\P1

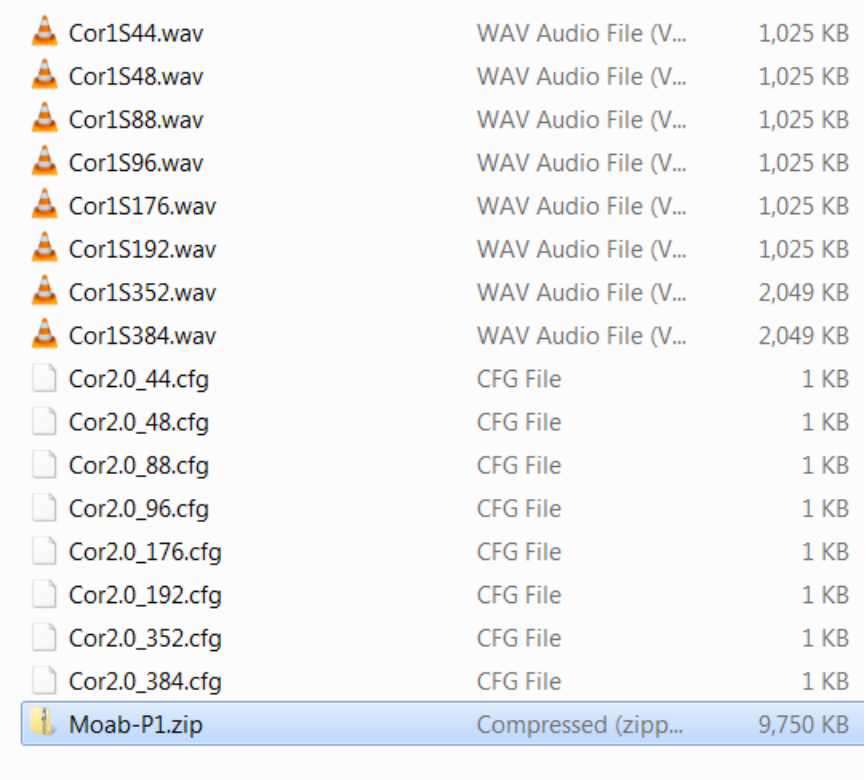


Acourate4Roon	File folder	
TestConvolution	File folder	
33587.txt	Text Document	4 KB
Acourate.ini	Configuration settings	3 KB
AcourateHistory.txt	Text Document	9 KB
Cor1L44.dbl	Acourate Time Domain File	512 KB
Cor1L48.dbl	Acourate Time Domain File	512 KB
Cor1L88.dbl	Acourate Time Domain File	512 KB
Cor1L96.dbl	Acourate Time Domain File	512 KB
Cor1L176.dbl	Acourate Time Domain File	512 KB
Cor1L192.dbl	Acourate Time Domain File	512 KB
Cor1L352.dbl	Acourate Time Domain File	1,024 KB
Cor1L384.dbl	Acourate Time Domain File	1,024 KB
Cor1R44.dbl	Acourate Time Domain File	512 KB
Cor1R48.dbl	Acourate Time Domain File	512 KB
Cor1R88.dbl	Acourate Time Domain File	512 KB
Cor1R96.dbl	Acourate Time Domain File	512 KB
Cor1R176.dbl	Acourate Time Domain File	512 KB
Cor1R192.dbl	Acourate Time Domain File	512 KB
Cor1R352.dbl	Acourate Time Domain File	1,024 KB
Cor1R384.dbl	Acourate Time Domain File	1,024 KB
CorTestL48.dbl	Acourate Time Domain File	512 KB
CorTestR48.dbl	Acourate Time Domain File	512 KB
EMM-6 Inverted.dbl	Acourate Time Domain File	512 KB
EMM-6 Inverted.wav	WAV Audio File (VLC)	513 KB
EMM-6 Mic Calibration.dbl	Acourate Time Domain File	512 KB
L Before 1-6 Oct.dbl	Acourate Time Domain File	512 KB
L Before Psy.dbl	Acourate Time Domain File	512 KB
LogSweep48_rec.wav	WAV Audio File (VLC)	24,473 KB

You have a new folder named Acourate4Roon

Examine the contents of the Acourate4Roon folder:

C:\ACOURATE\P1\Acourate4Roon\



You will find a ZIP file named Moab-P1.zip.

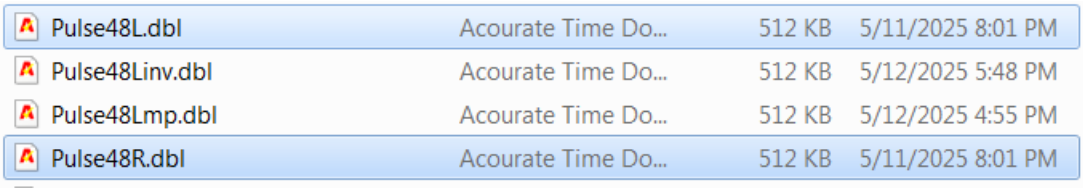
You will be importing Moab-P1.zip into ROON's Convolution Engine.

Compare the Measured and Predicted Impulse Response Curves

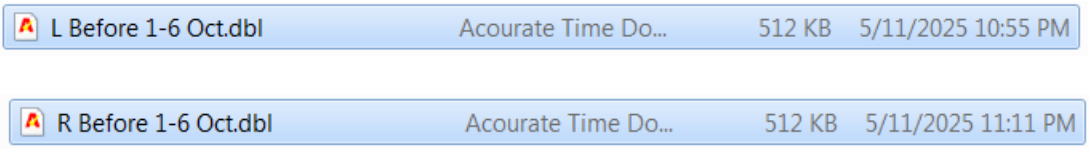
Apply 1/6th Octave smoothing to both the Measured and Predicted Impulse Response Curves.

These are your Measured Impulse Response Curves:

C:\ACOURATE\P1

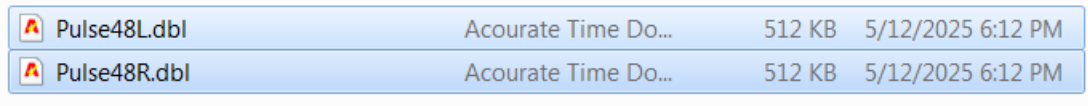


You have already applied 1/6th Octave Smoothing to them.



You will find the Predicted Impulse Response Curves under the TestConvolution folder.

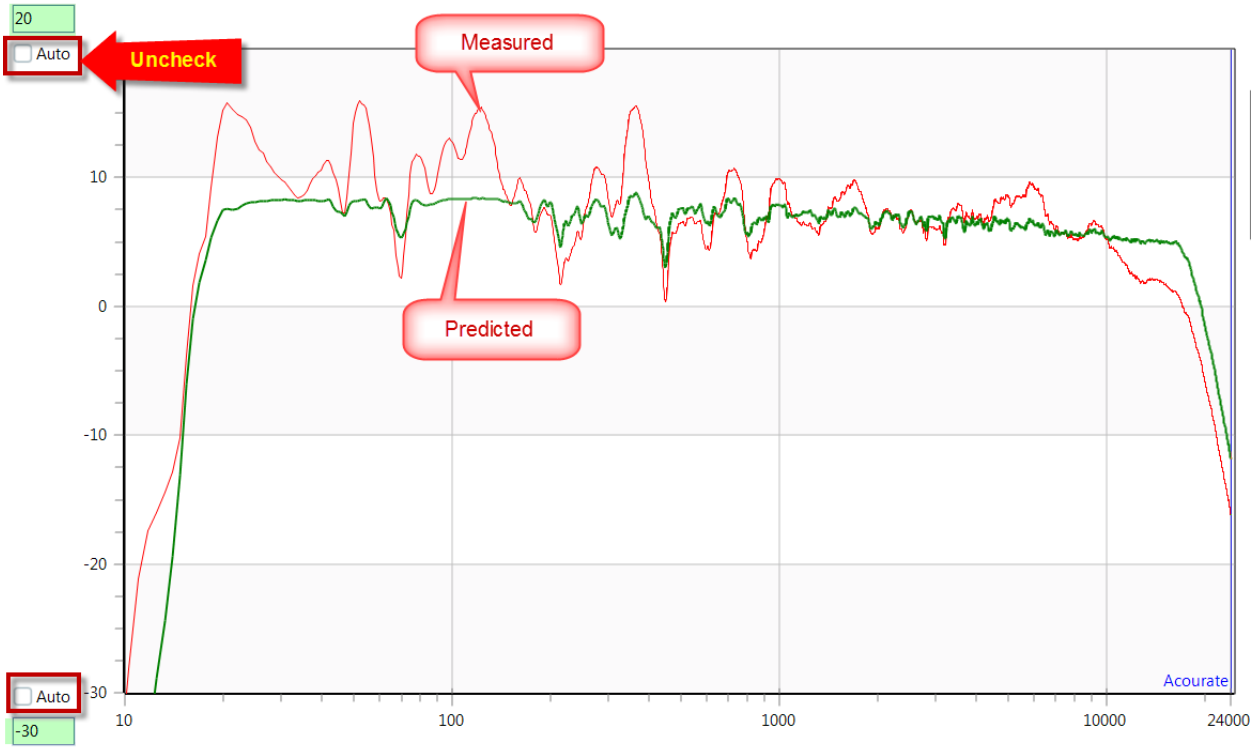
C:\ACOURATE\P1\TestConvolution\

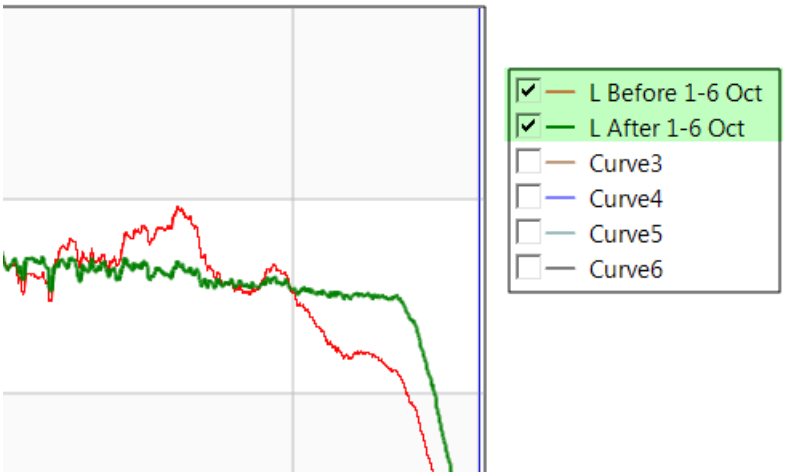


Apply 1/6th Octave Smoothing to both.

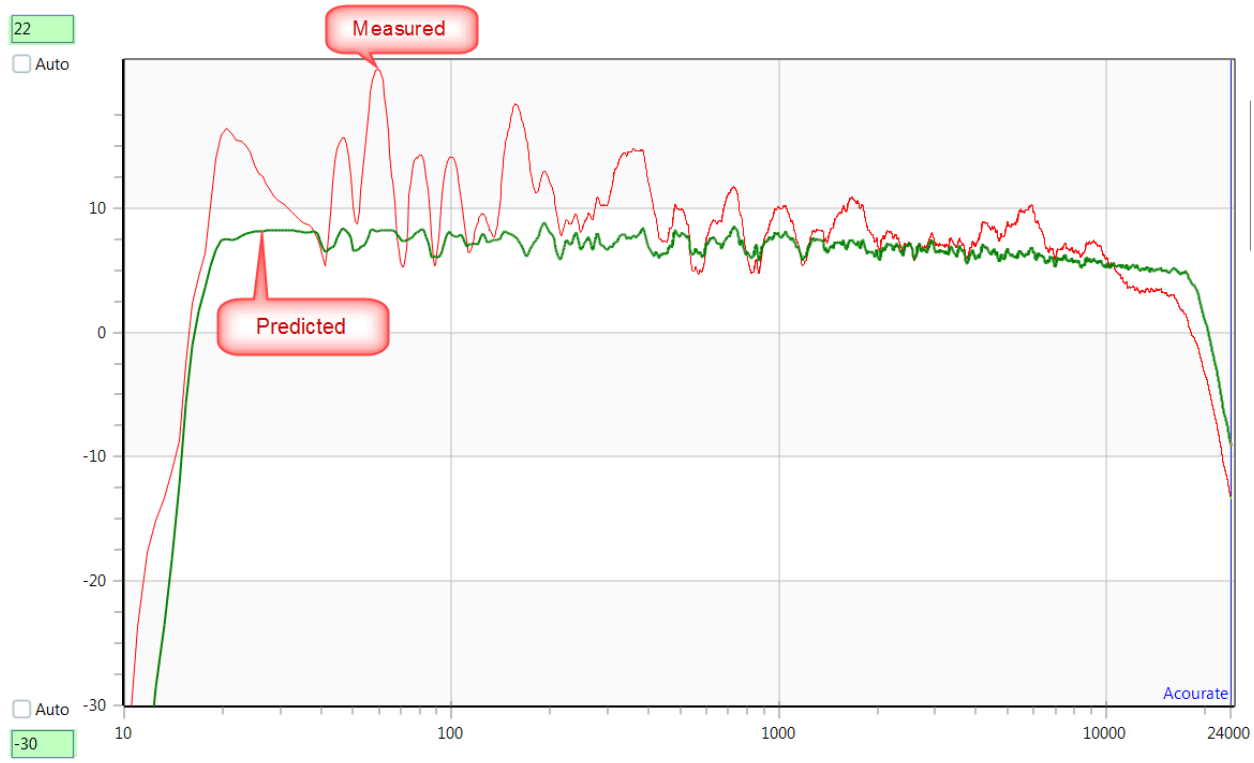
Compare the Measured vs Predicted Impulse Response Curves of the Left Channel.

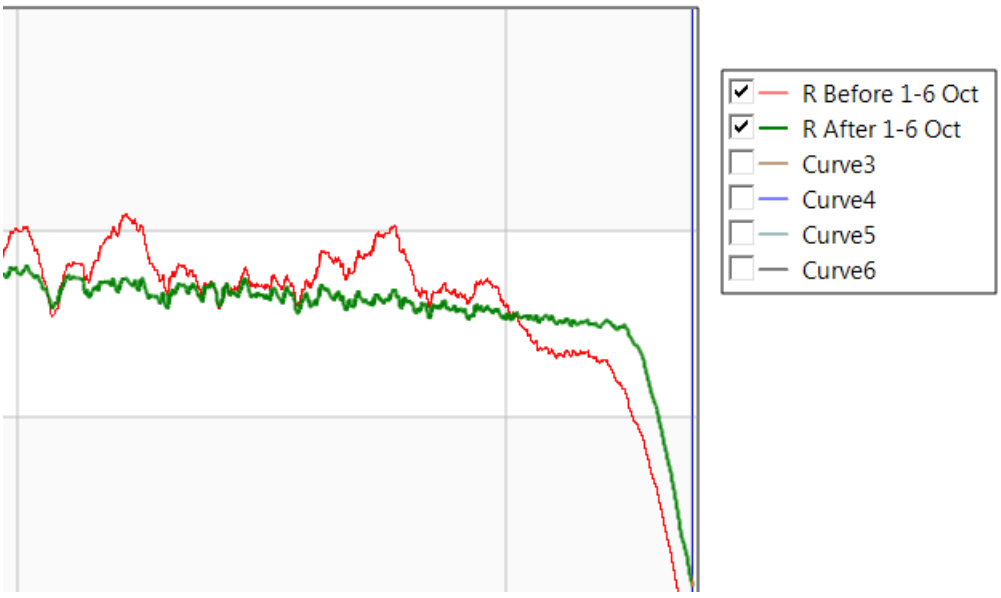
Tip: Uncheck Auto Scaling of the Y-axis.
Enter 20 for the upper bound of the Y-axis
Enter -30 for the lower bound of the Y-axis



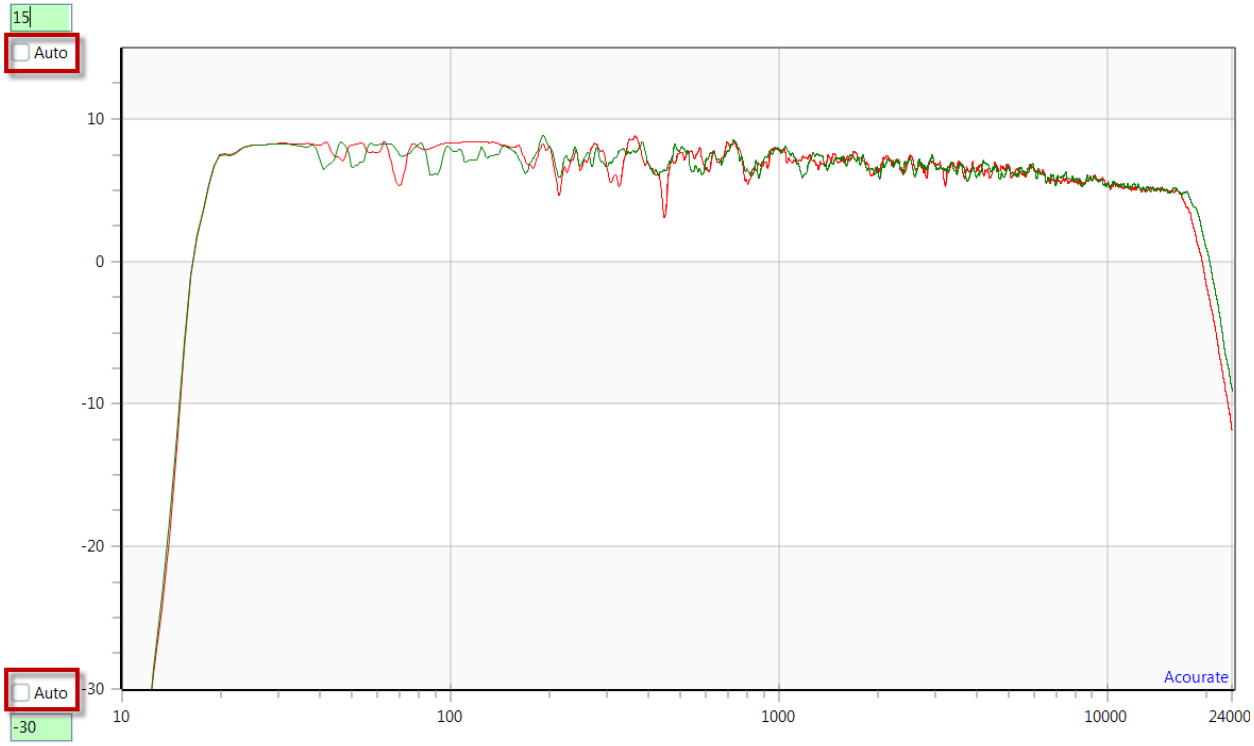


Compare the Measured vs Predicted Impulse Response Curves of the Right Channel.





Here are the Predicted Impulse Response Curves of the Left and Right Channels superimposed together.



Tip: Uncheck Auto Scaling on the Y-axis.

Enter 15 as the upper bound of the Y-axis
Enter -30 as the lower bound of the Y-axis

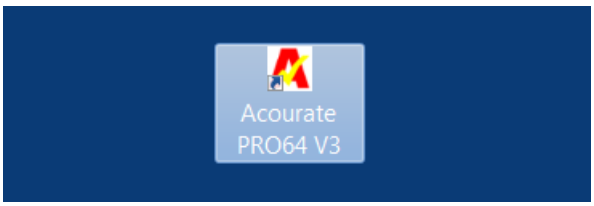
You skipped Macro6 during the creation of the output Filters encapsulated in Moab-P1.zip.

Next, you will run Macro6 that will add Time Domain corrections.

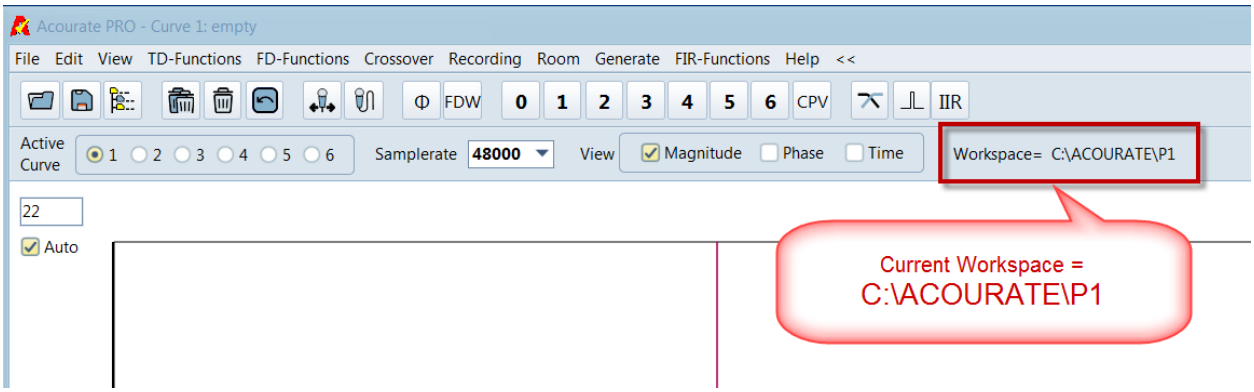
This part is optional.

Copy Project Workspace P1 to P2

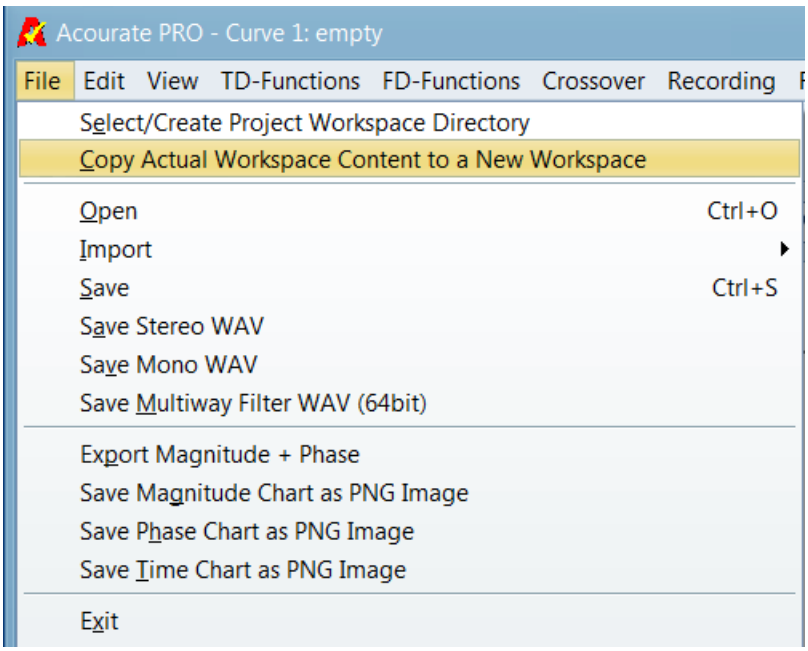
Launch Acourate v3



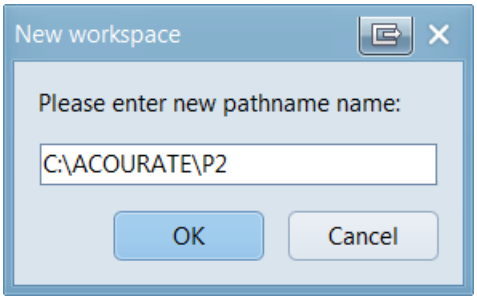
Your current Project Workspace is C:\ACOURATE\P1

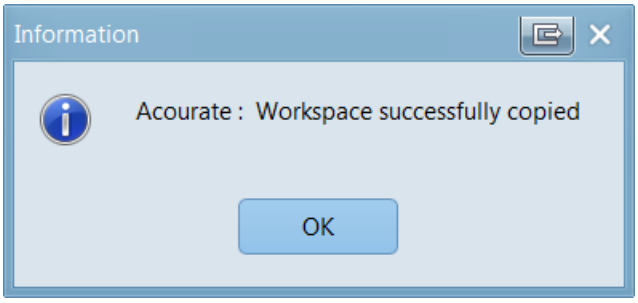


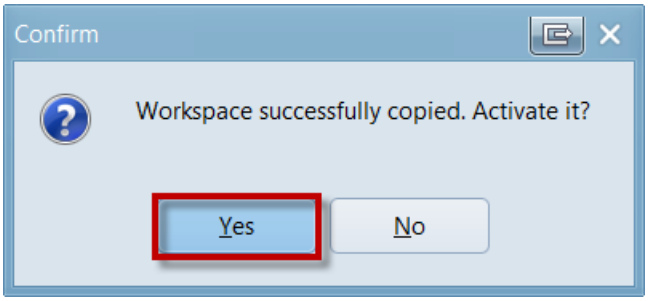
File > Copy Actual Workspace Content to a New Workspace

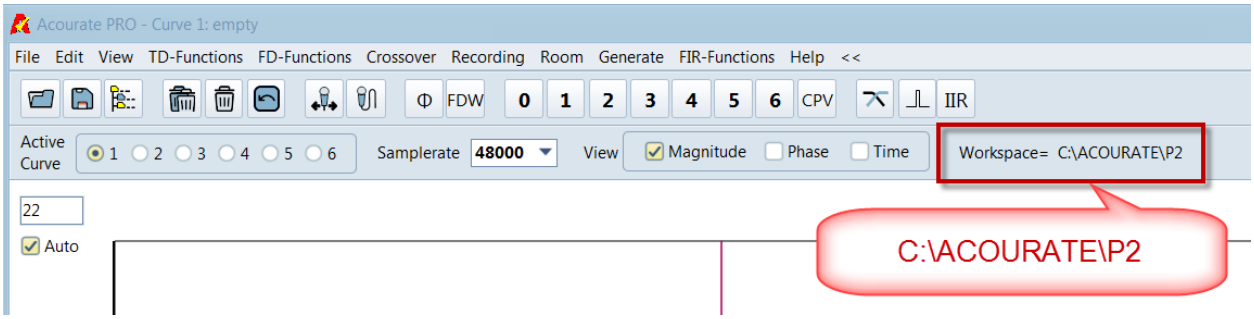


Enter new pathname = C:\ACOURATE\P2



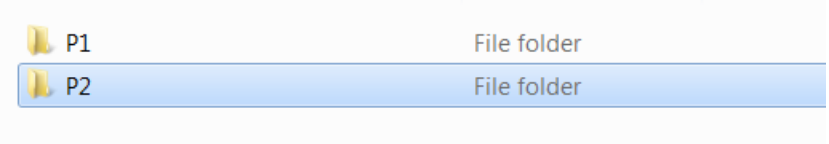




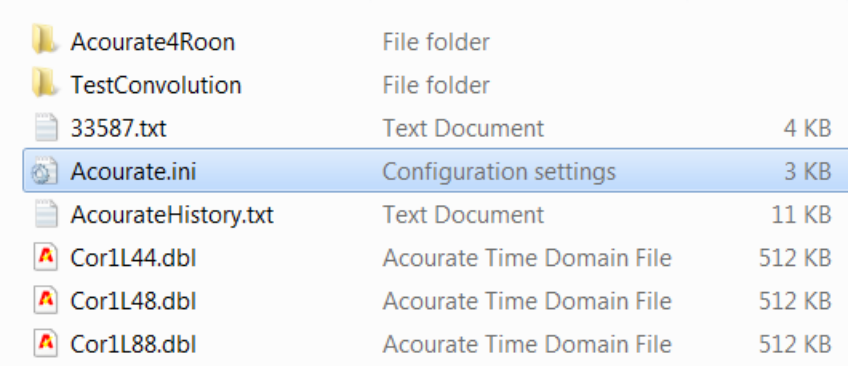


Examine your file structure:

C:\ACOURATE\



C:\ACOURATE\P2

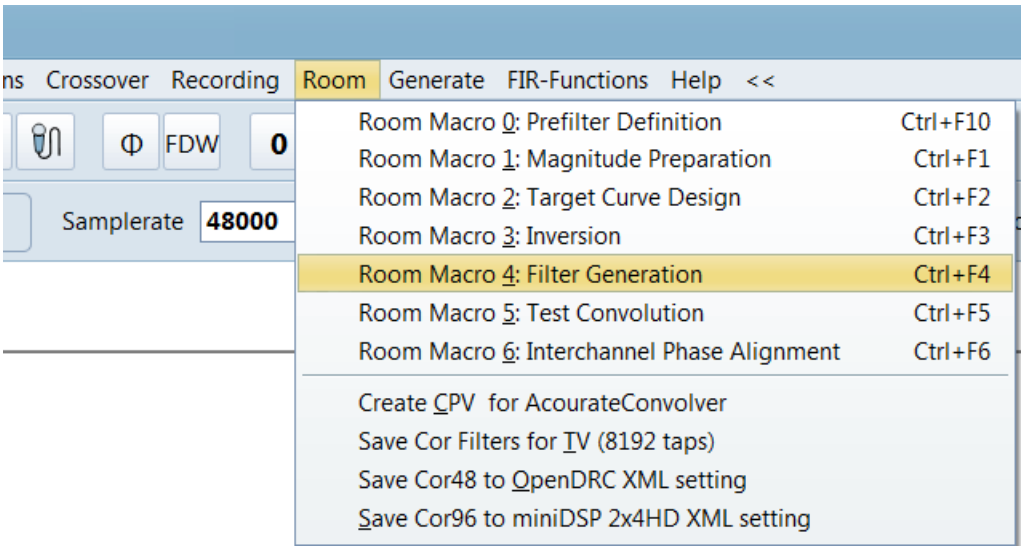


This is an exact copy of P1, except Acourate.ini reflecting the new pathnames.

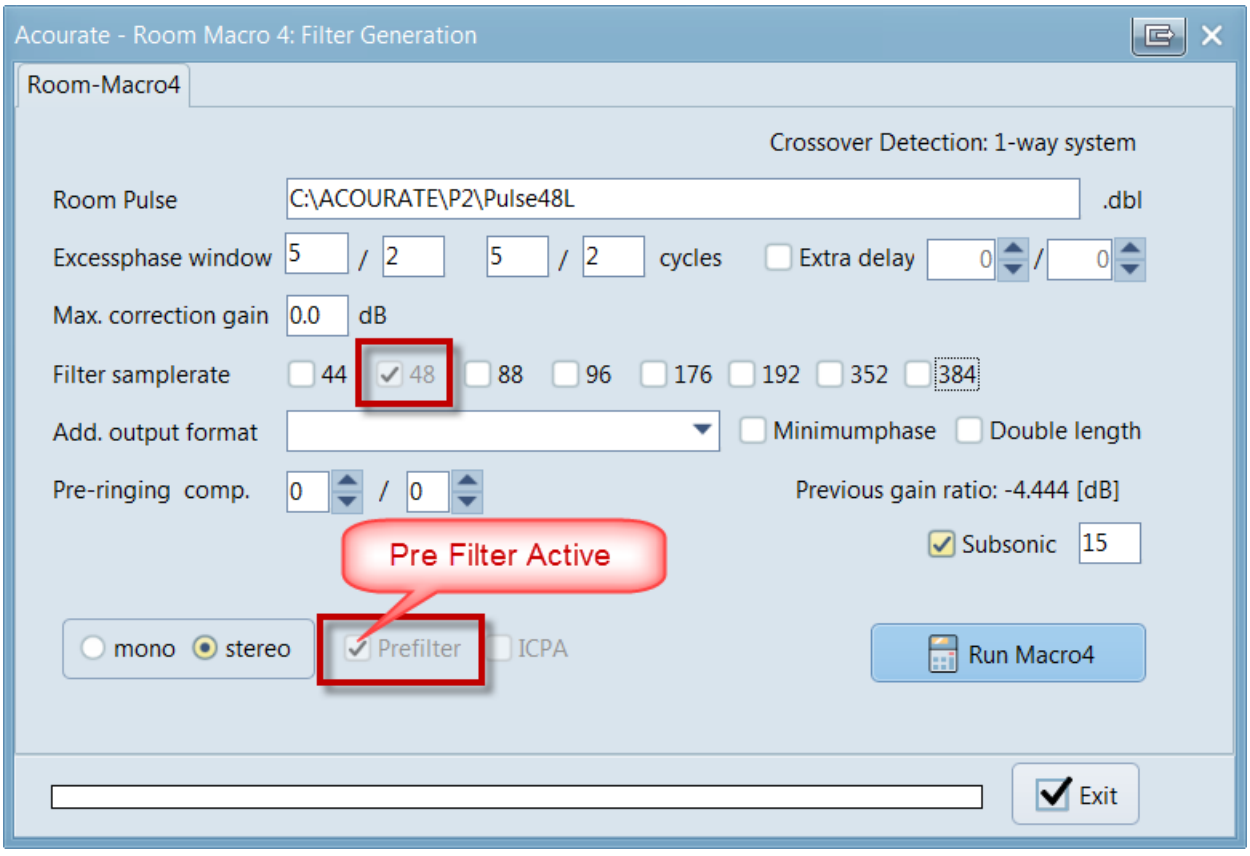
Acourate.ini

[Access]
LastSaveDir=C:\ACOURATE\P2\
[Filter]
Filter Filename=
Filter Directory=C:\ACOURATE\P2\
[RoomMacro1]
stereo=1
psycho=0
Filename=C:\ACOURATE\P2\Pulse48L
highFrequencyCut=23000
FDWlow=15
FDWhigh=15
FDWInterpolation=1
[RoomMacro3]
Targetname=C:\ACOURATE\P2\Target

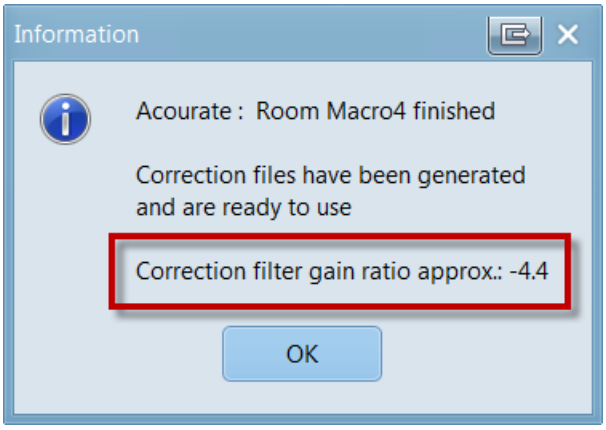
Room Macro 4: Filter Generation



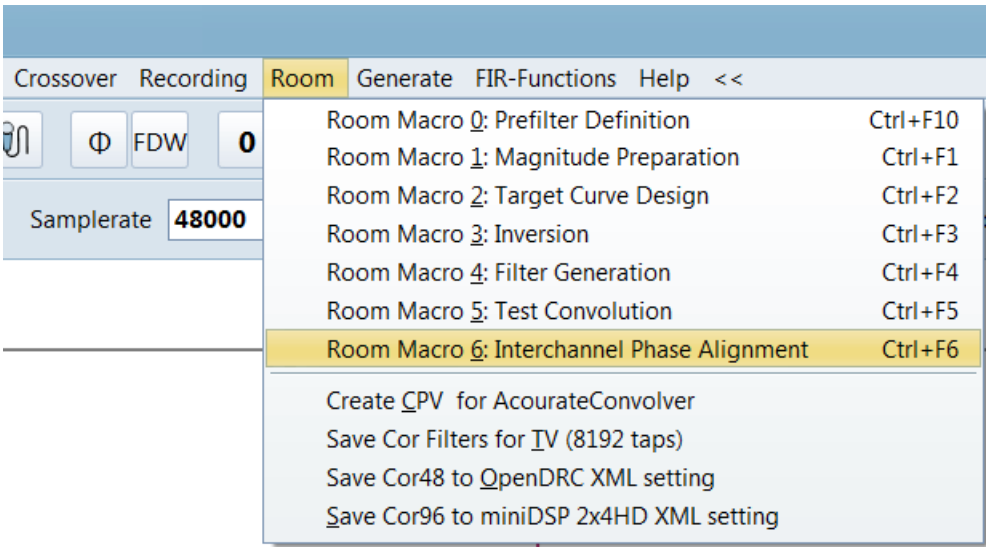
Notice, that your Pre Filter is active. Uncheck all frequency boxes except 48kHz.

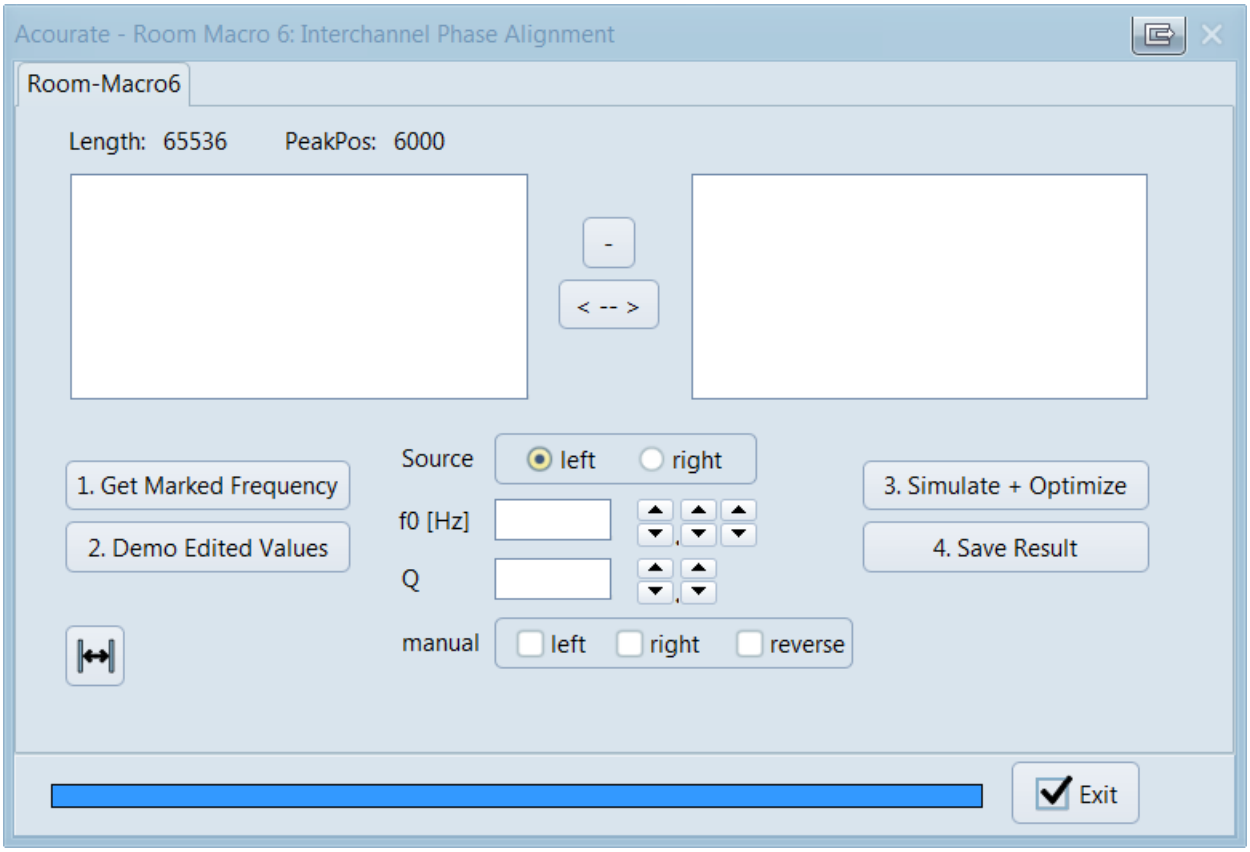


Run Macro4

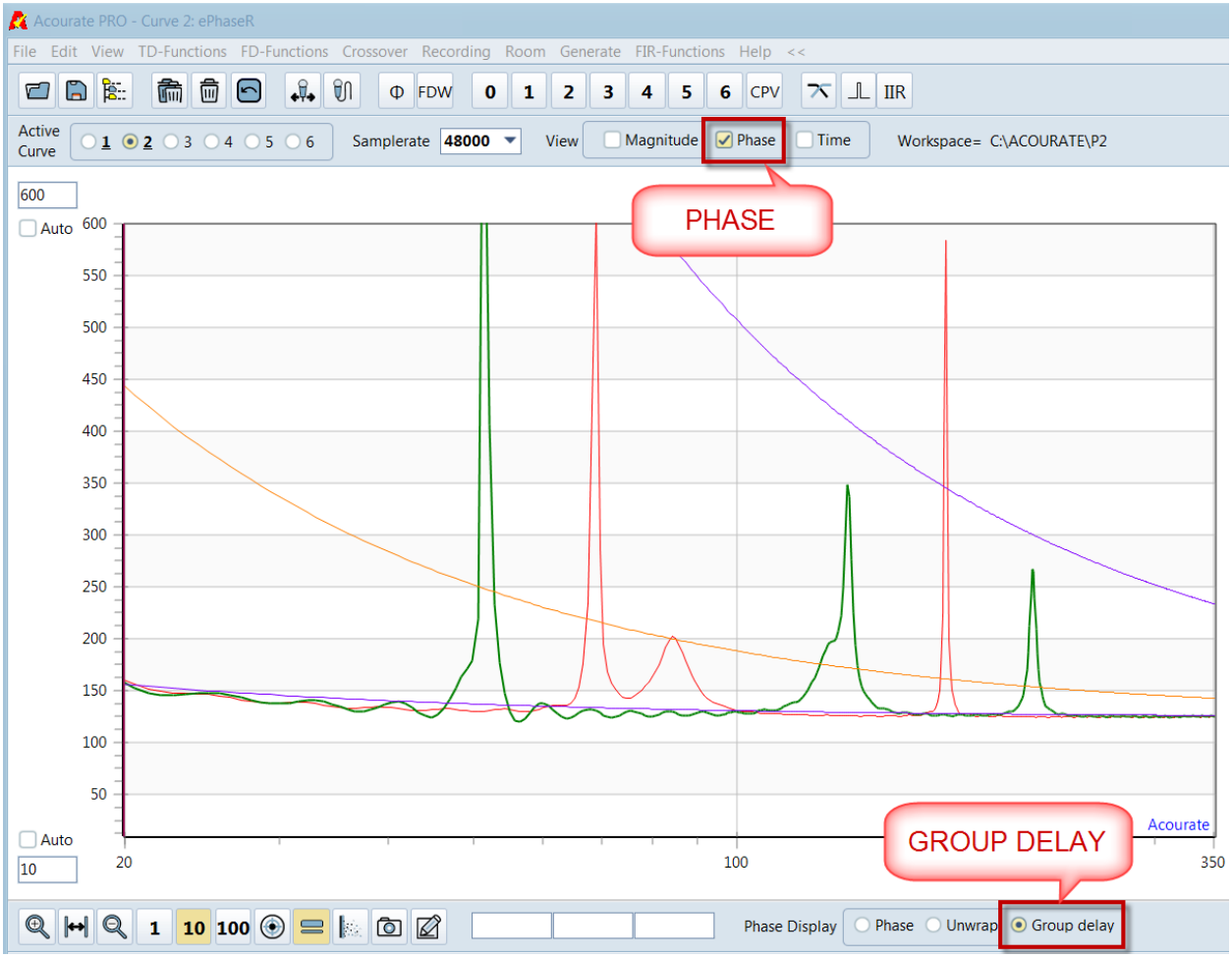


Macro 6: Interchannel Phase Alignment

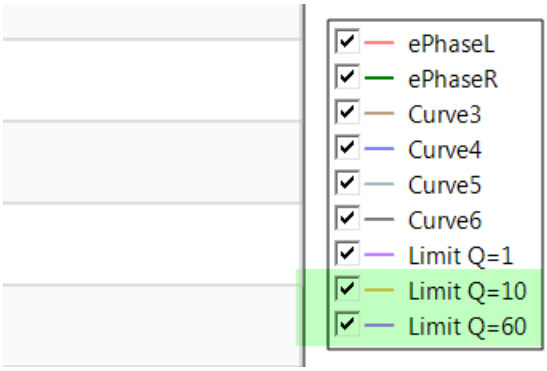



Acourate - Room Macro 6: Interchannel Phase Alignment
Room-Macro6
Length: 65536
PeakPos: 6000
-
< -- >
1. Get Marked Frequency
2. Demo Edited Values
Source
left
right
f0 [Hz]
Q
manual
left
right
reverse
3. Simulate + Optimize
4. Save Result
Exit

Macro6 brings up the Phase View displaying the Group Delay.

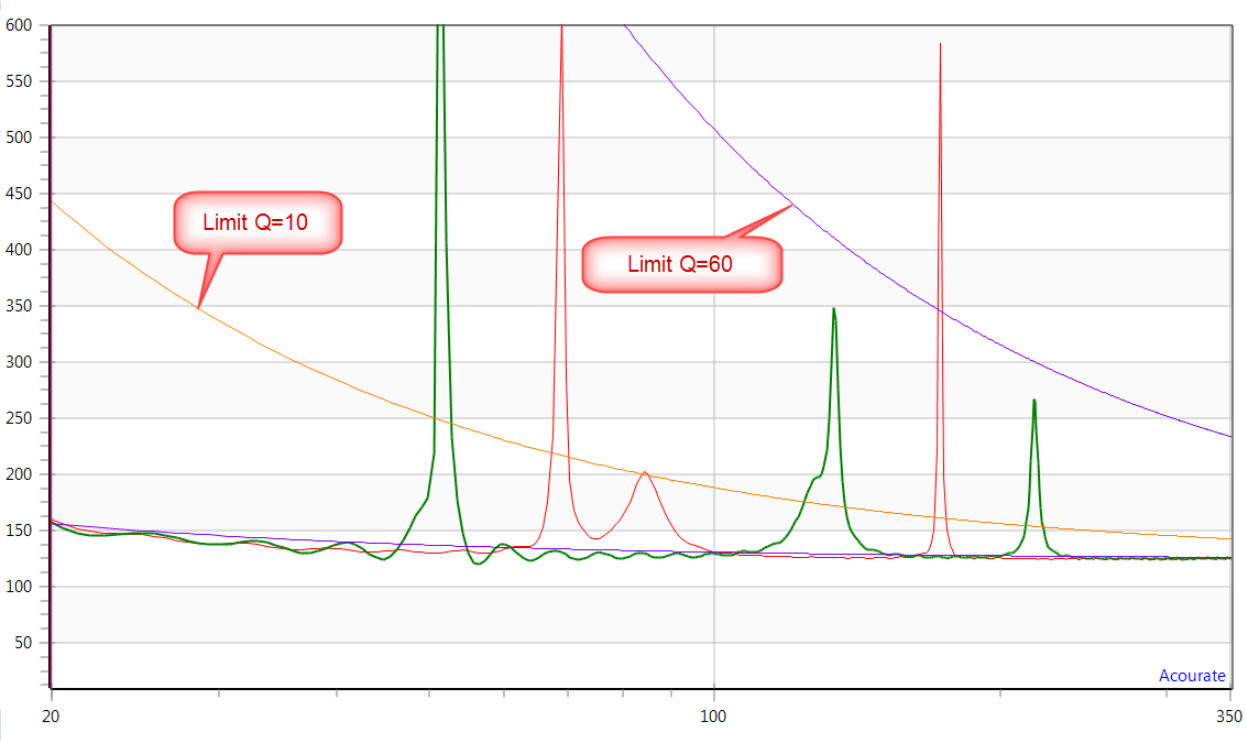


Examine the Curve Legend

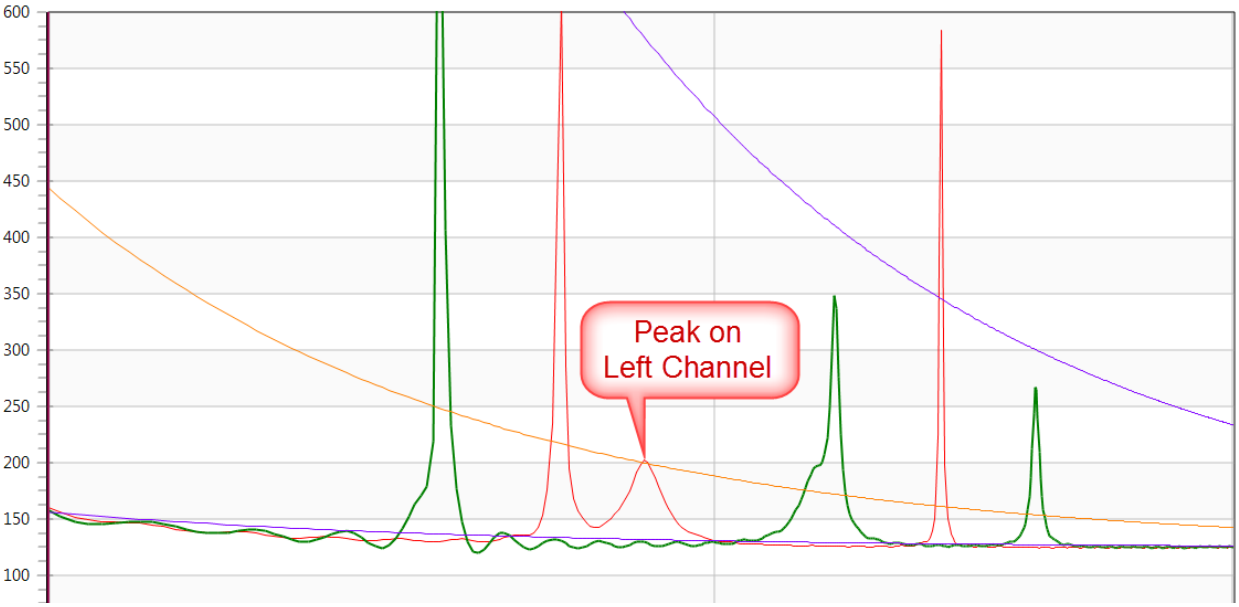


Pay close attention to the trajectory of the Limit Q=10 and Limit Q=60 curves.

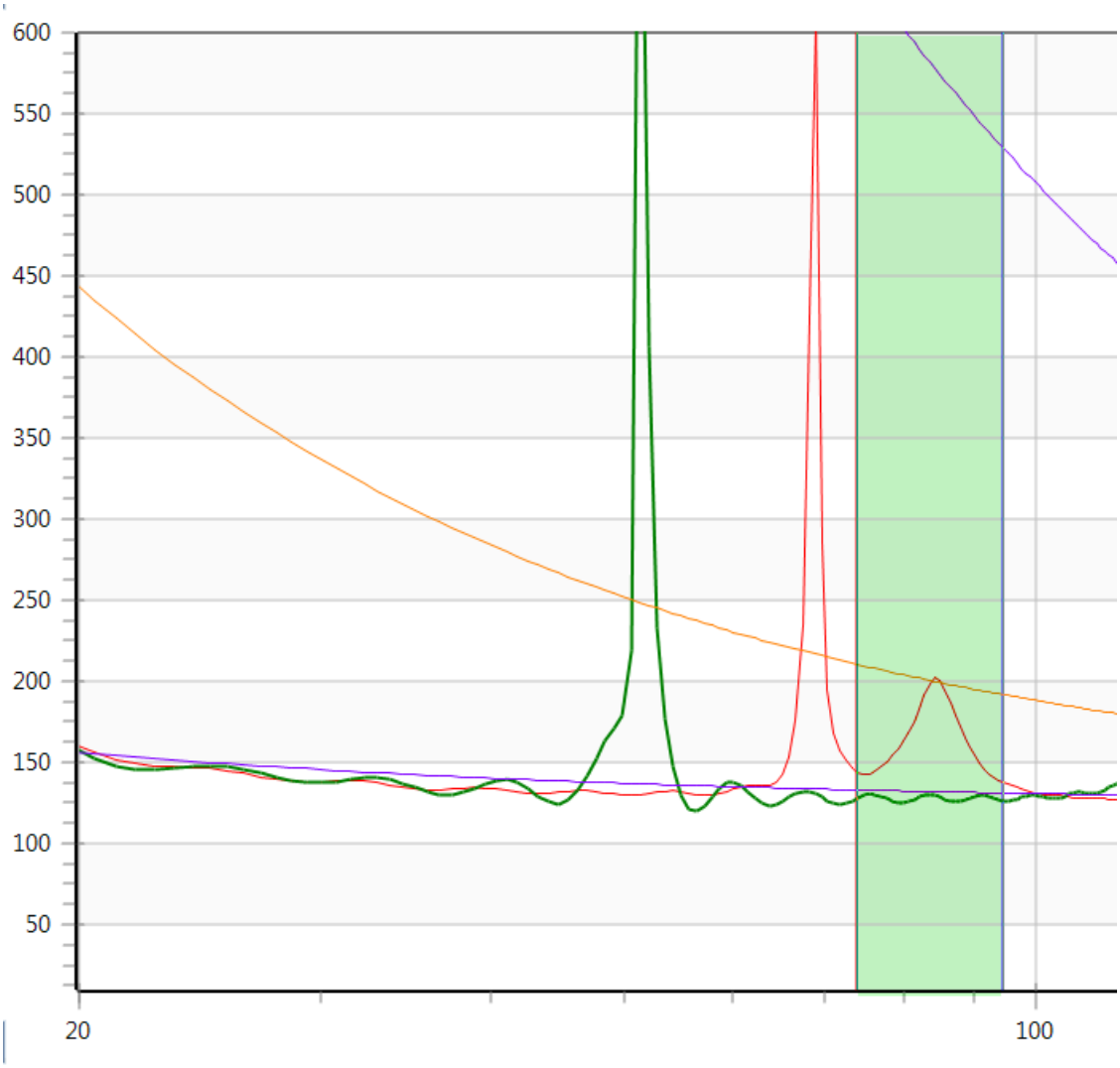
Your objective is to find peaks that are above Q=10, but below Q=60.



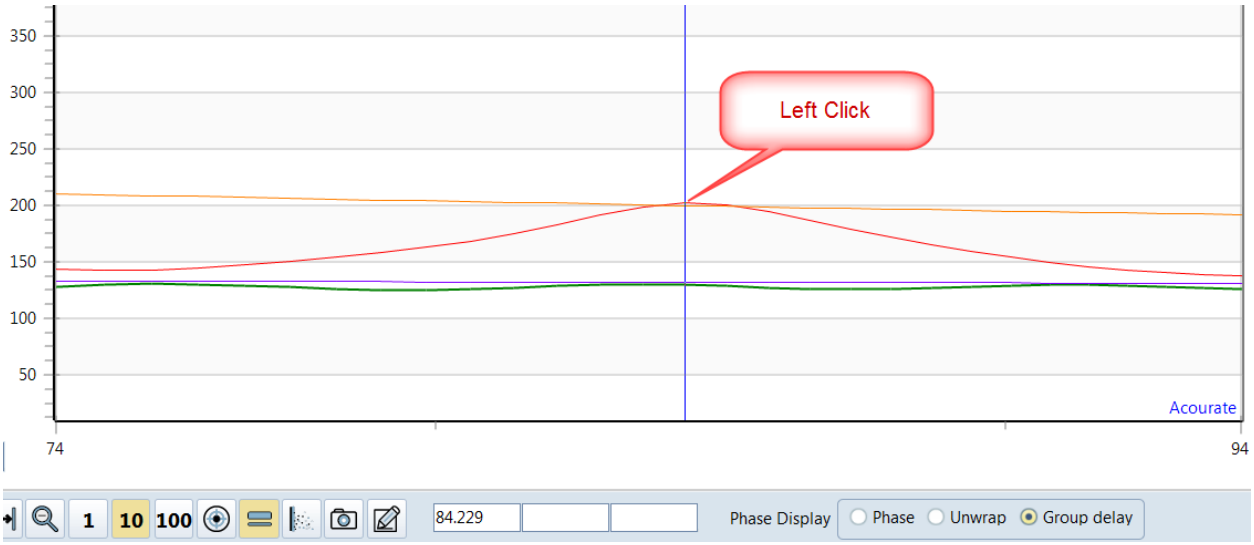
You are going to work on this Peak on the Left Channel.



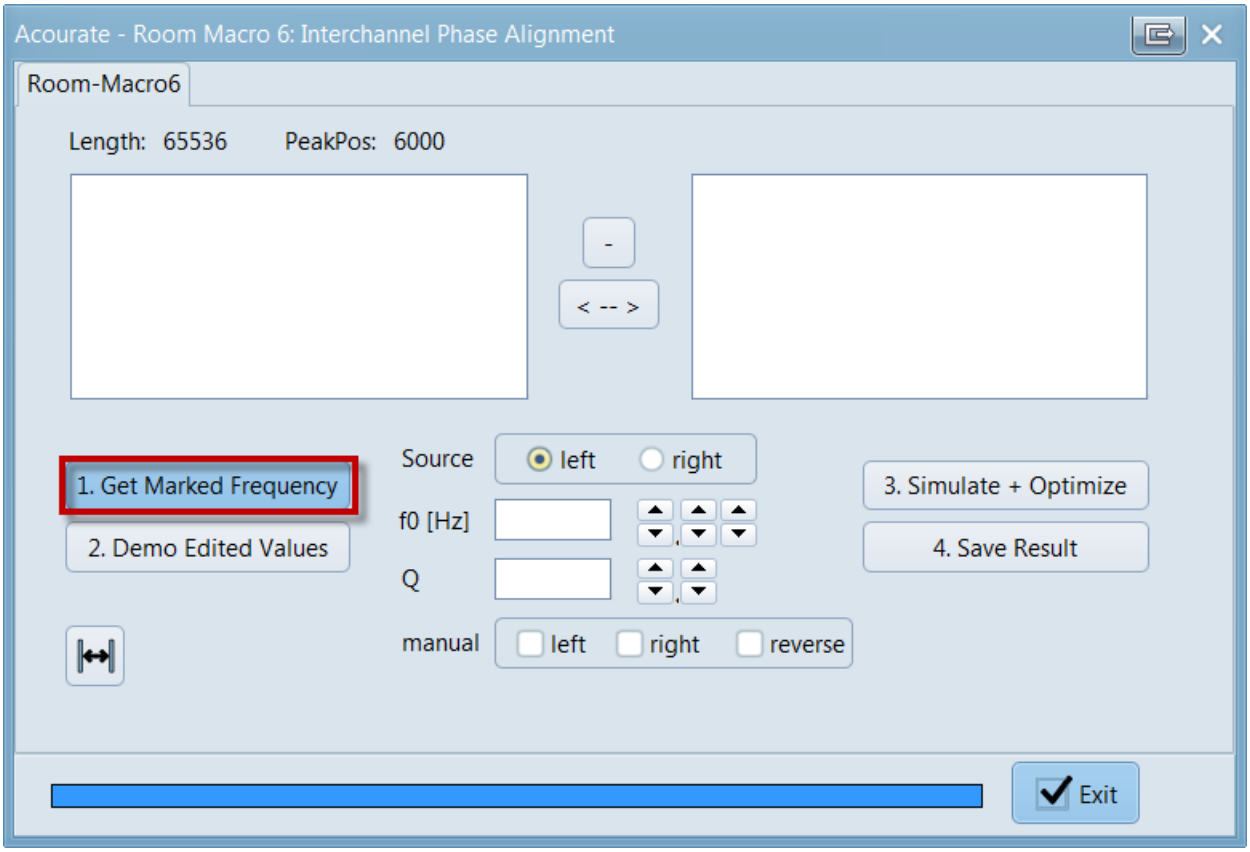
Zoom In to this region.



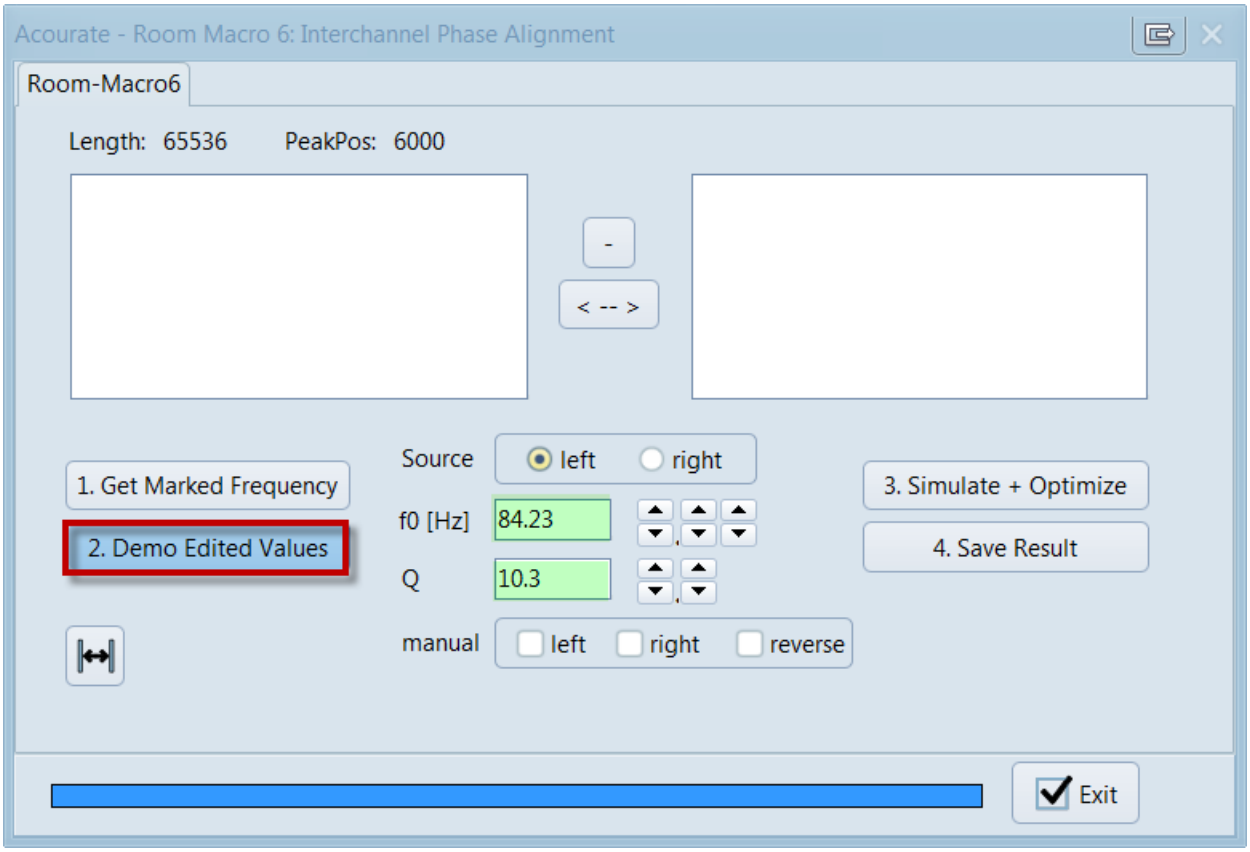
Left Click to Mark the Peak on the Red Curve.



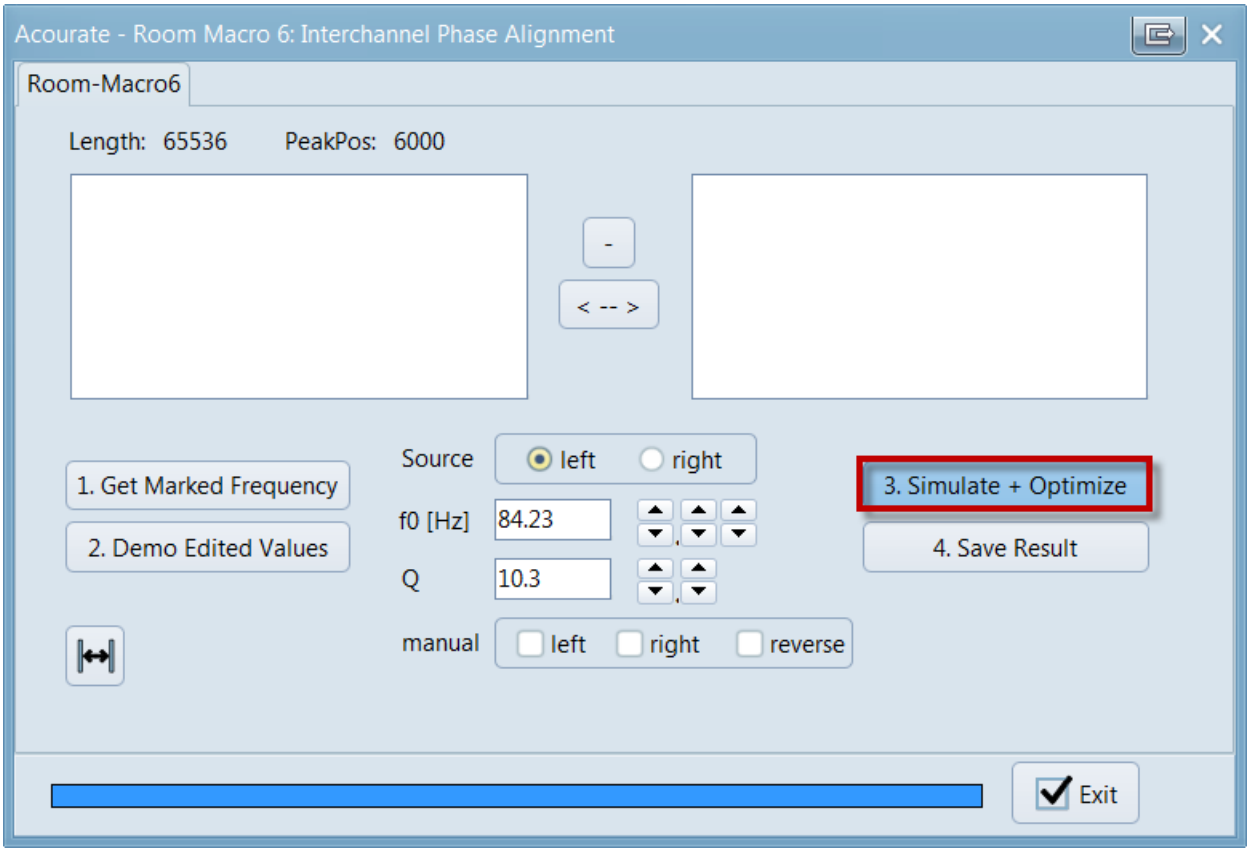
Get Marked Frequency



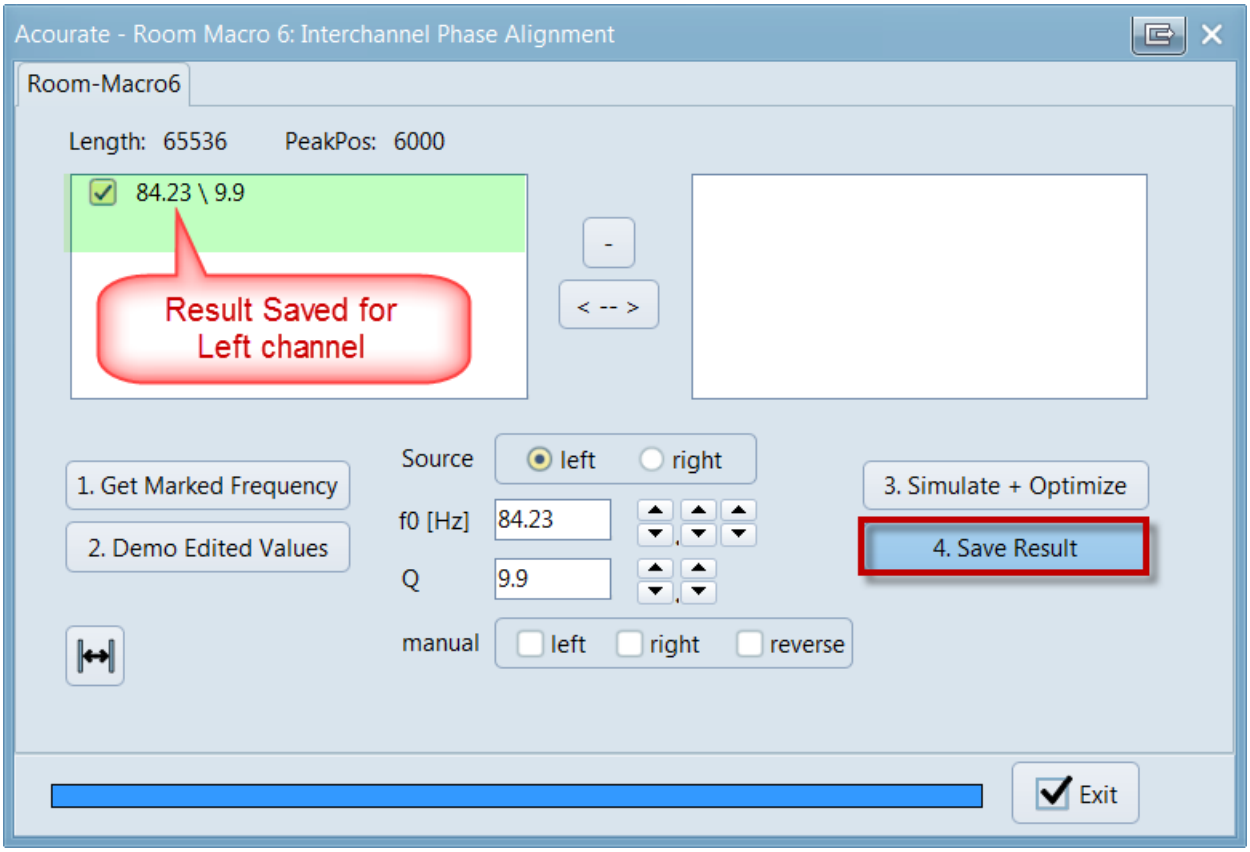
Demo Edited Values



Simulate + Optimize



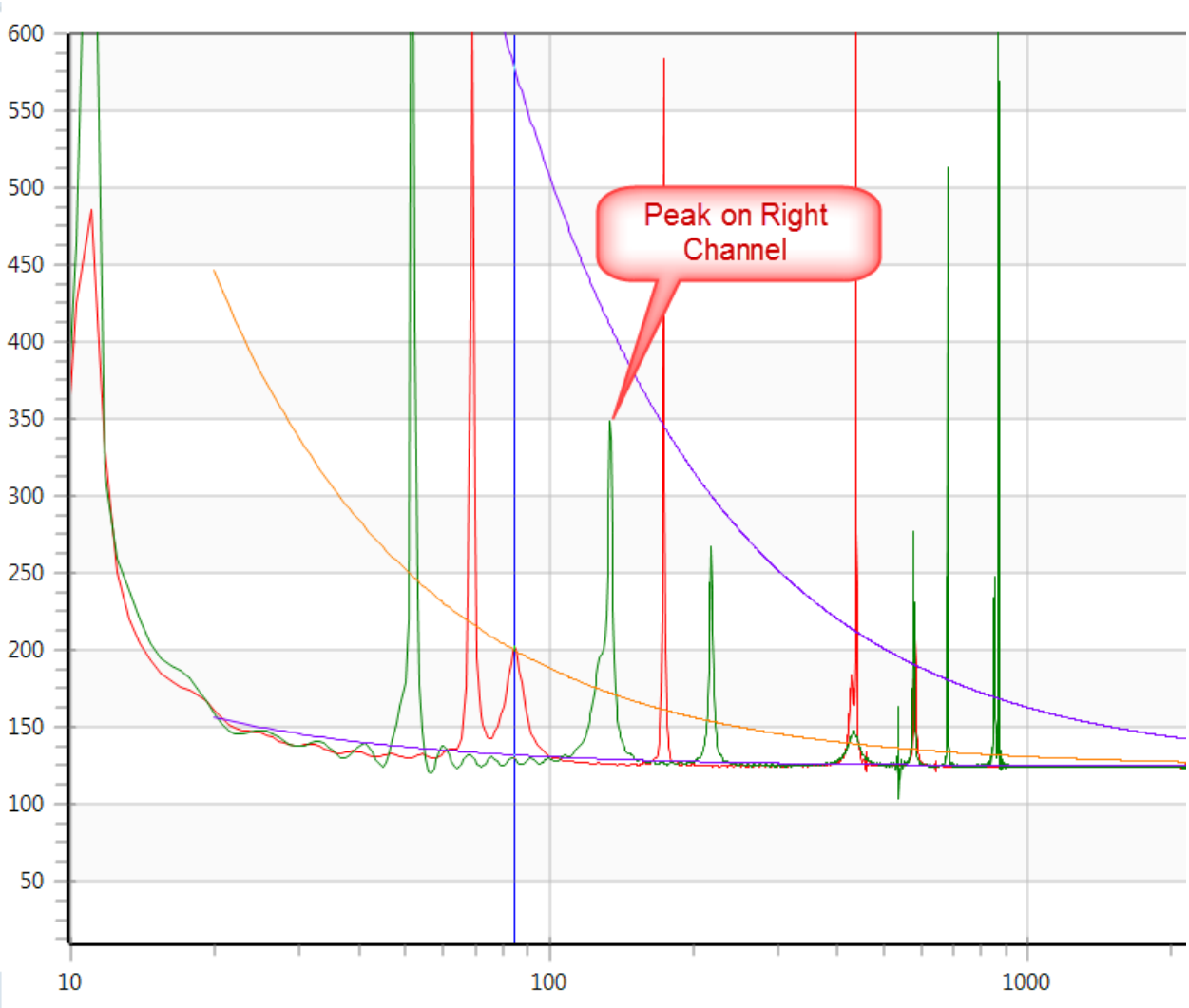
Save Results

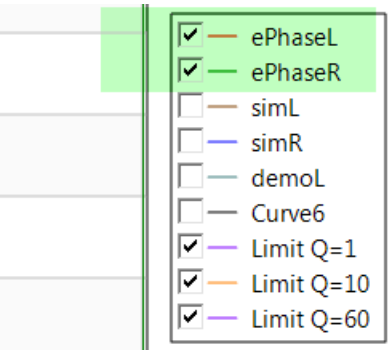


Repeat the same steps using a Peak on the Right Channel.

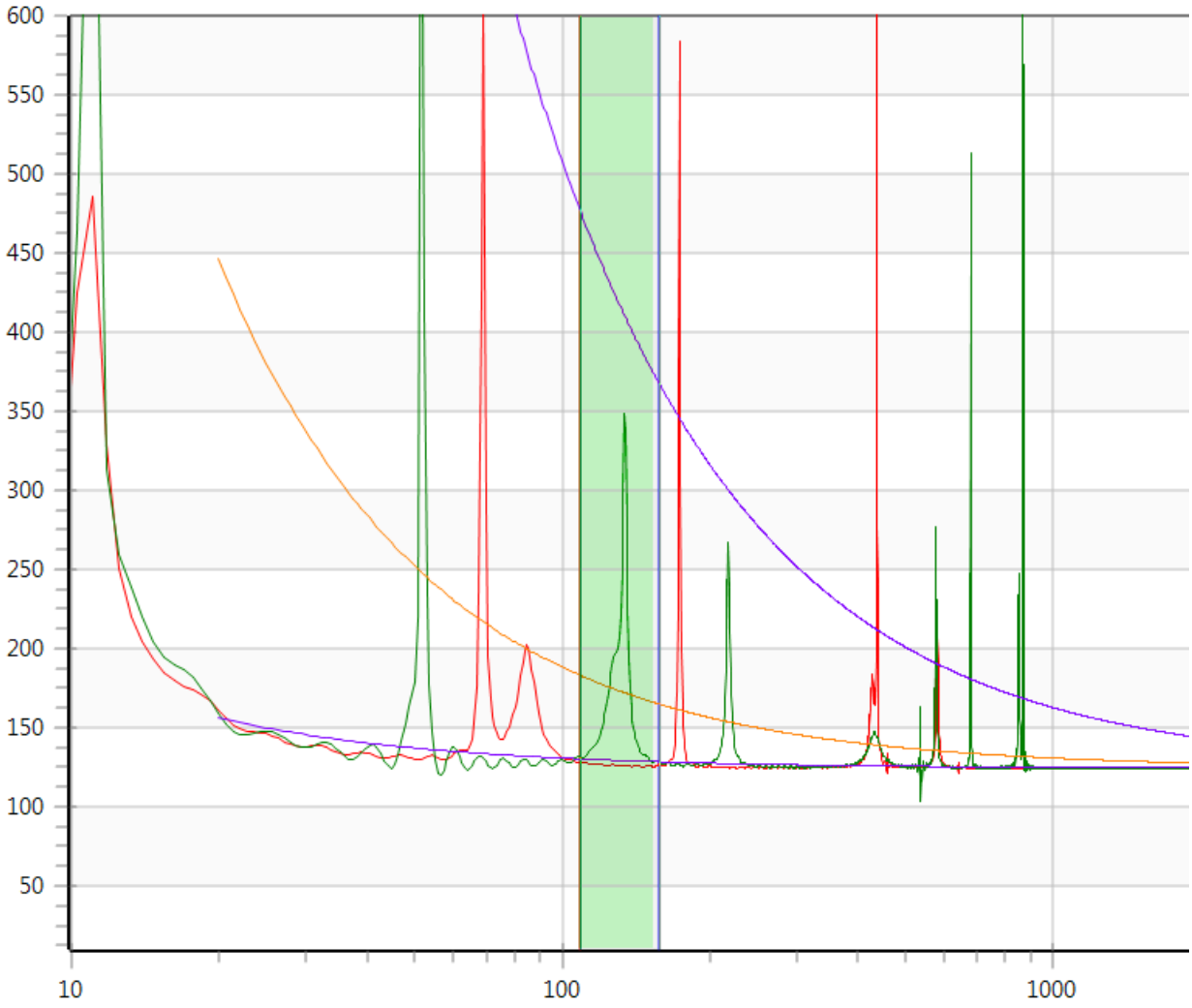
Zoom Out to full scale.

You will work on this Peak on the Right Channel.

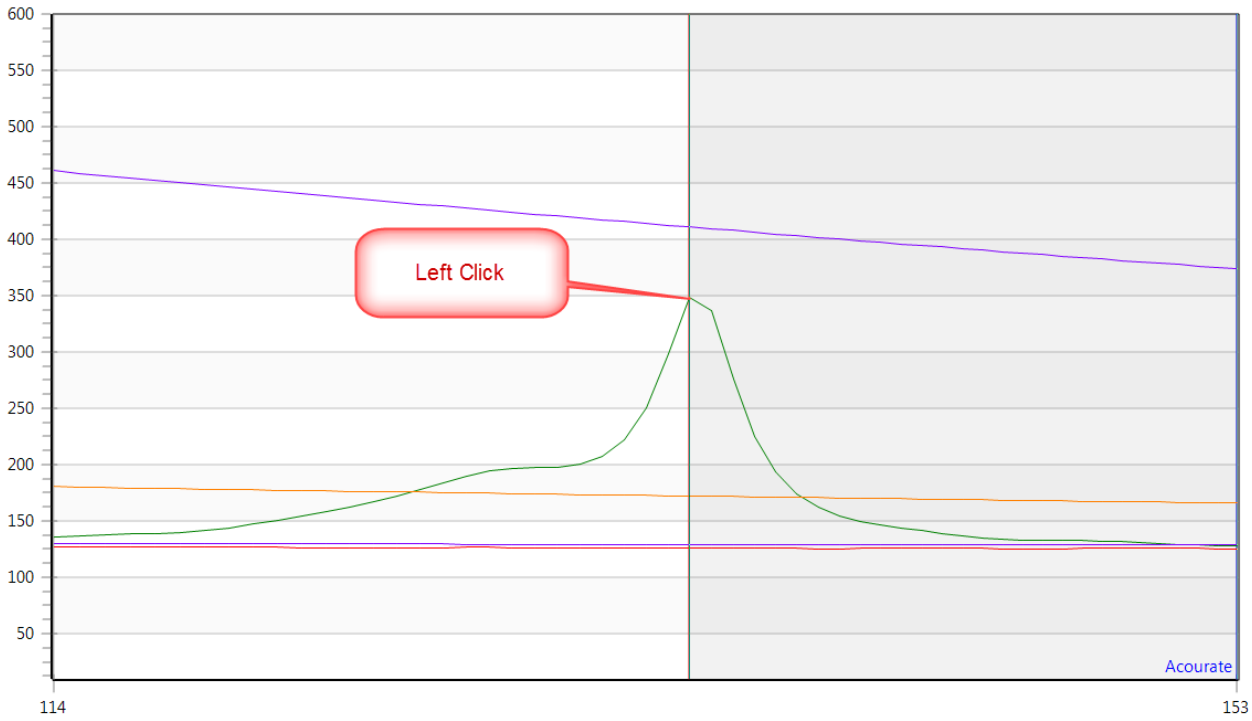




Zoom In to this Region.

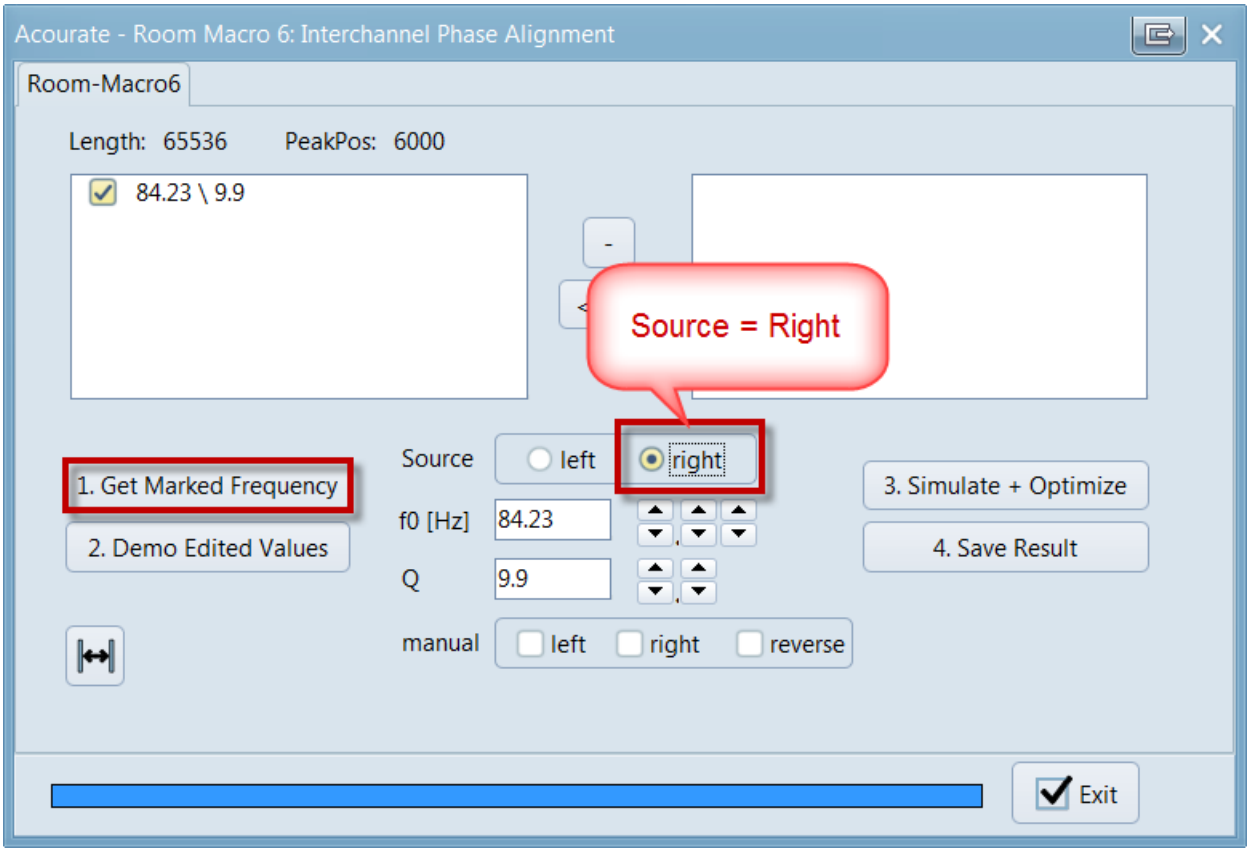


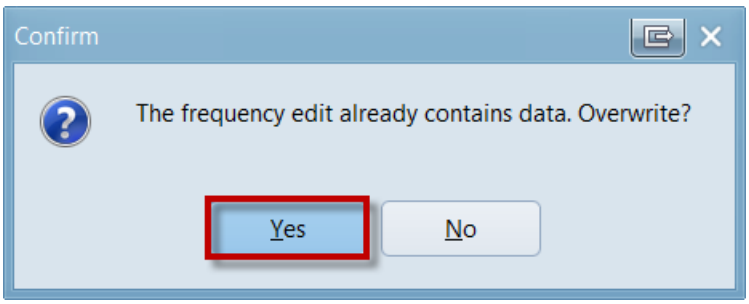
Left Click to mark the Peak on the Right Channel.

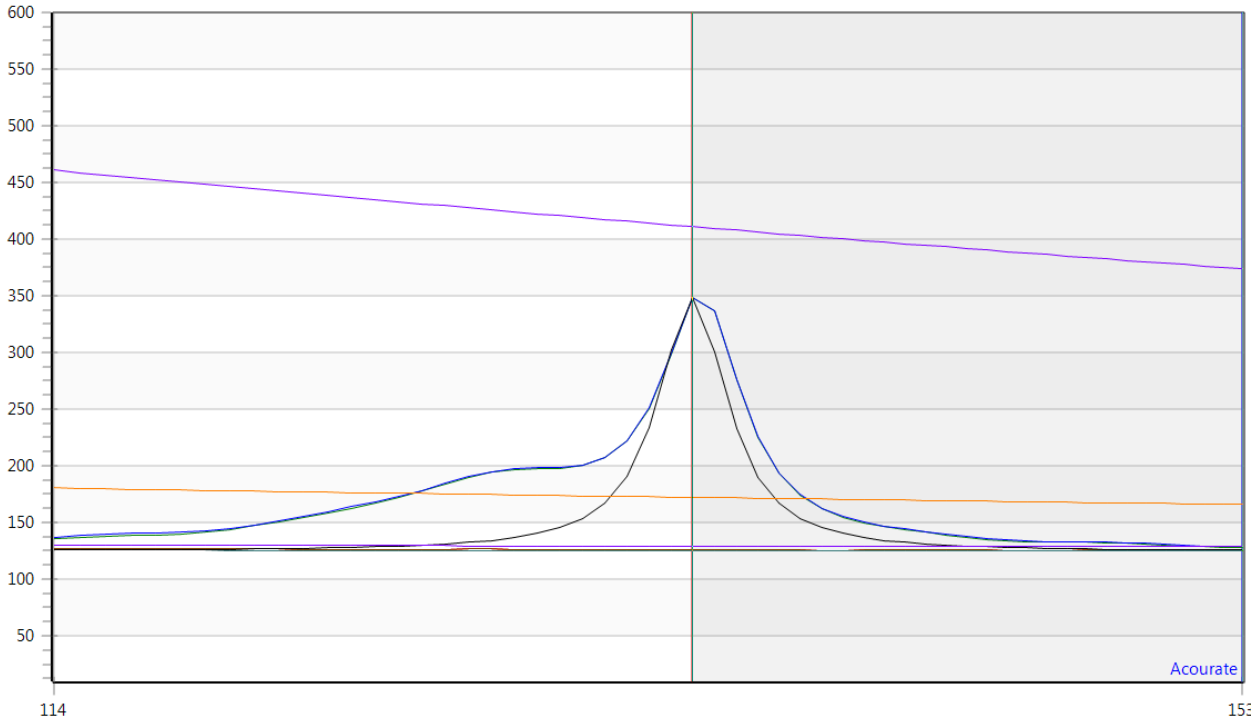


Select Source = Right

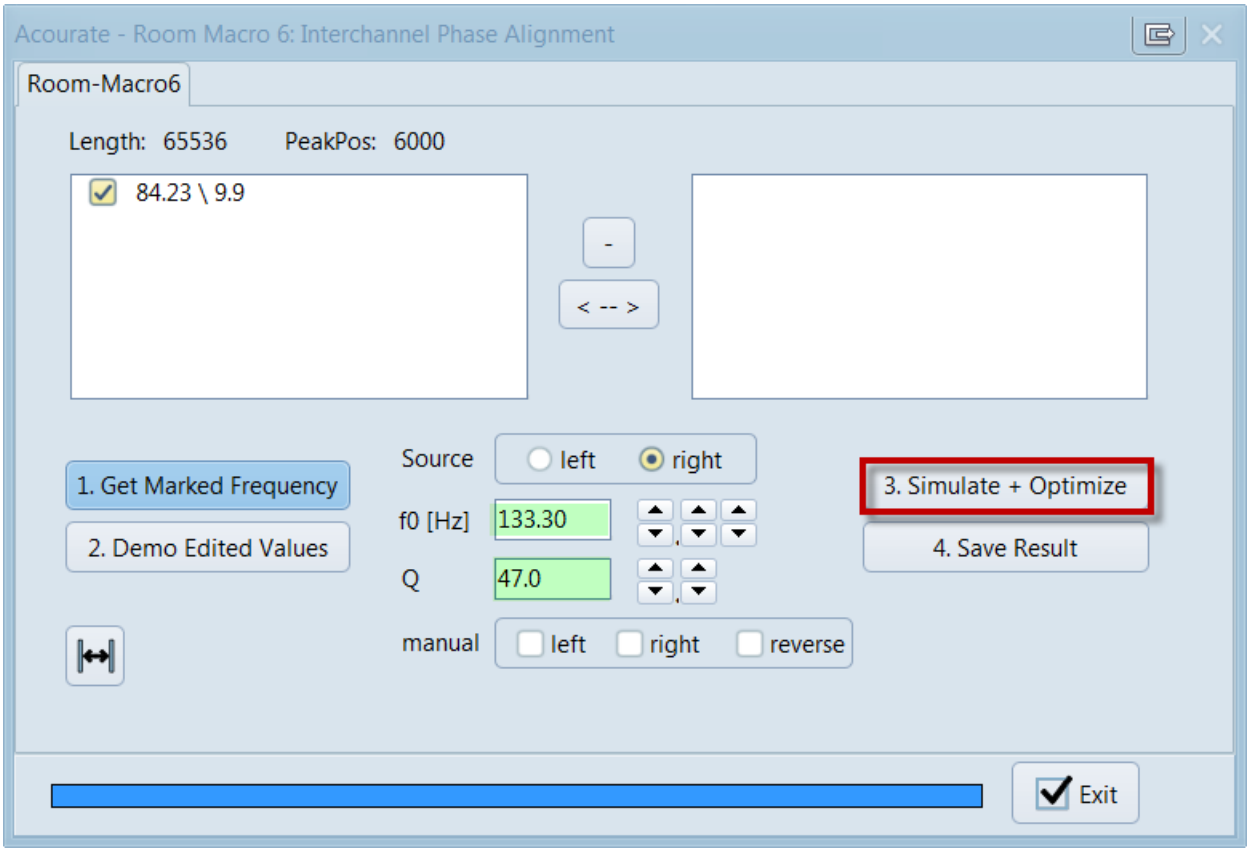
Get Marked Frequency



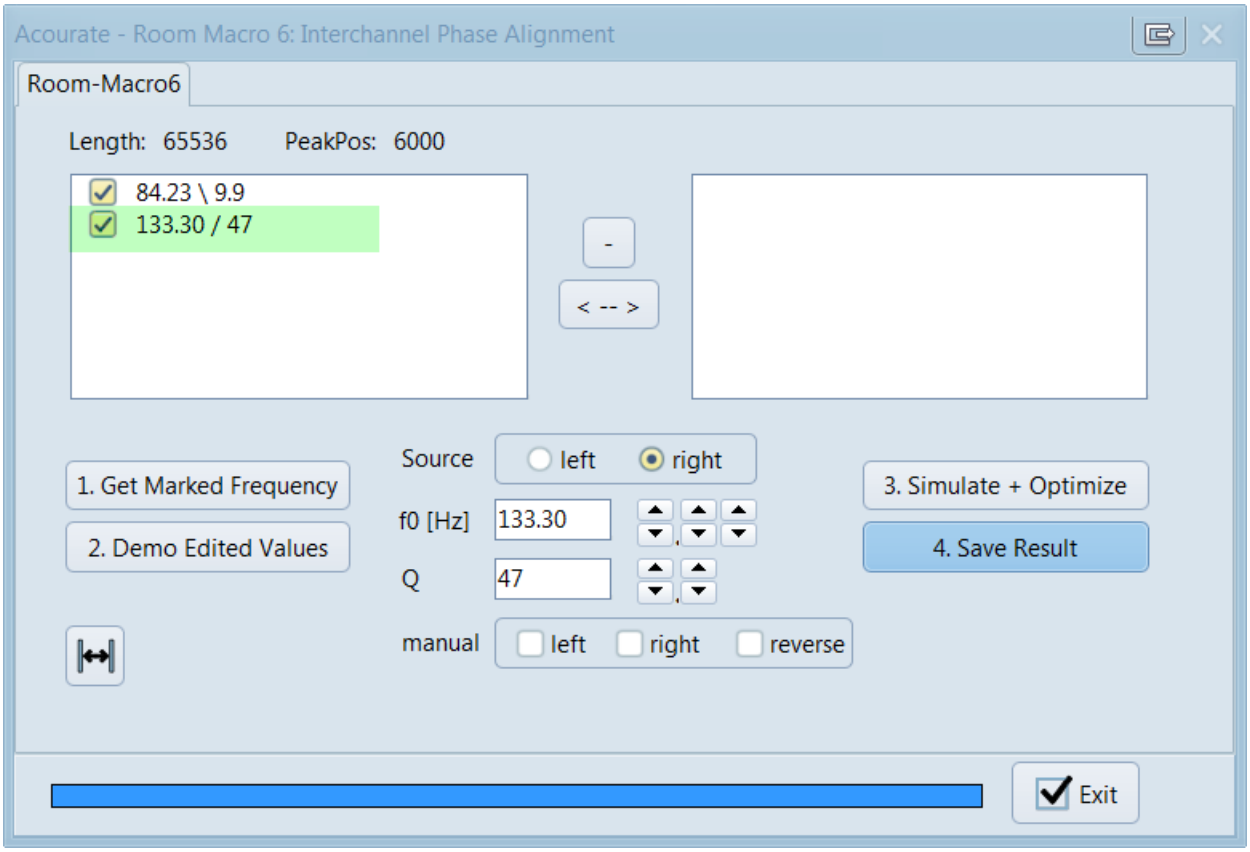




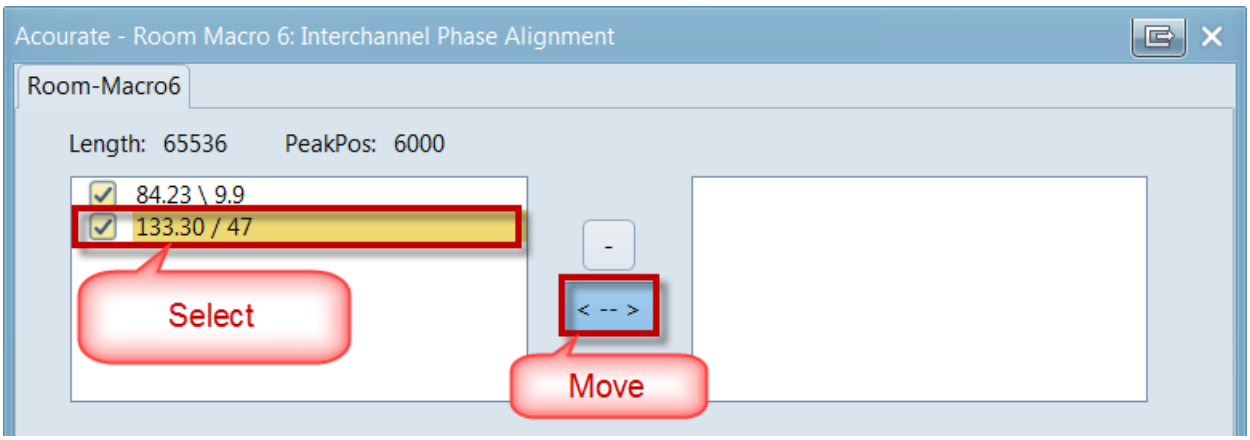
Simulate + Optimize

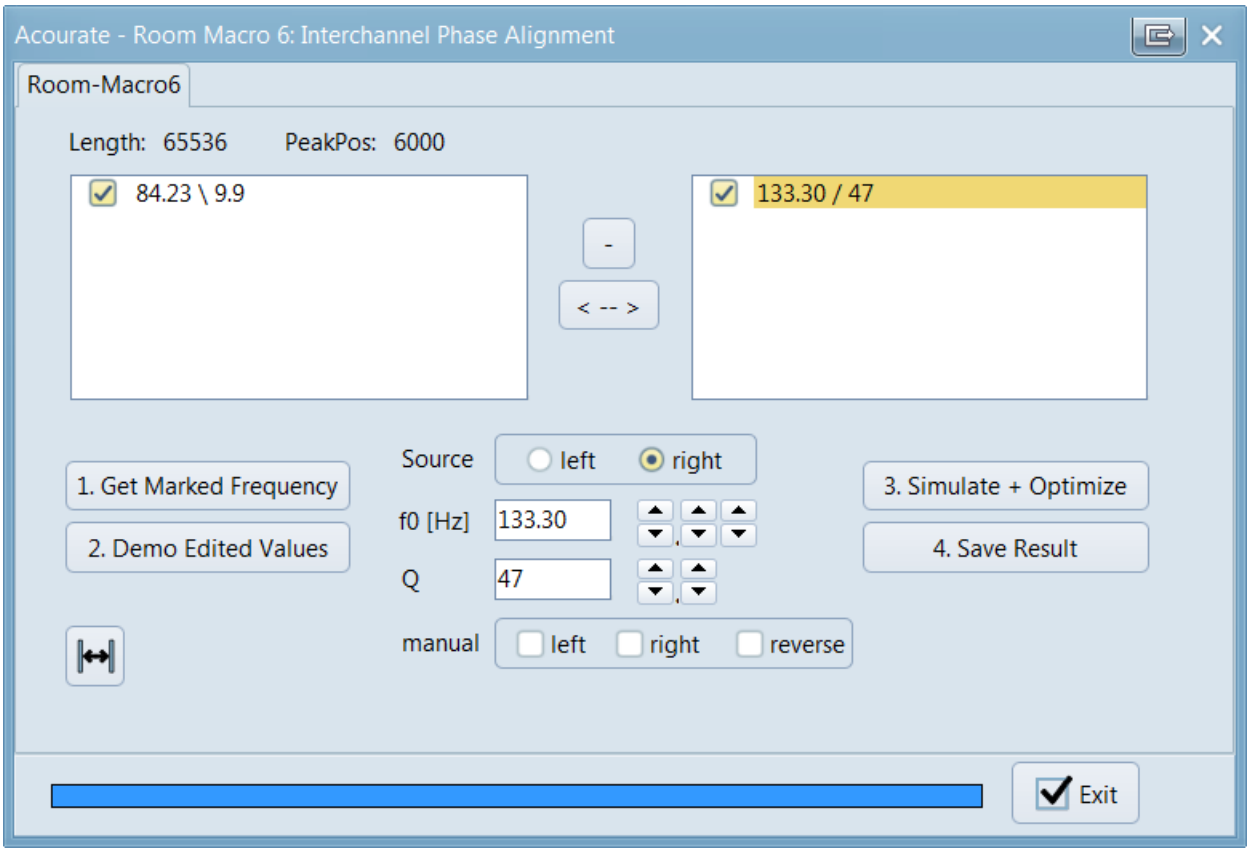


Save Result



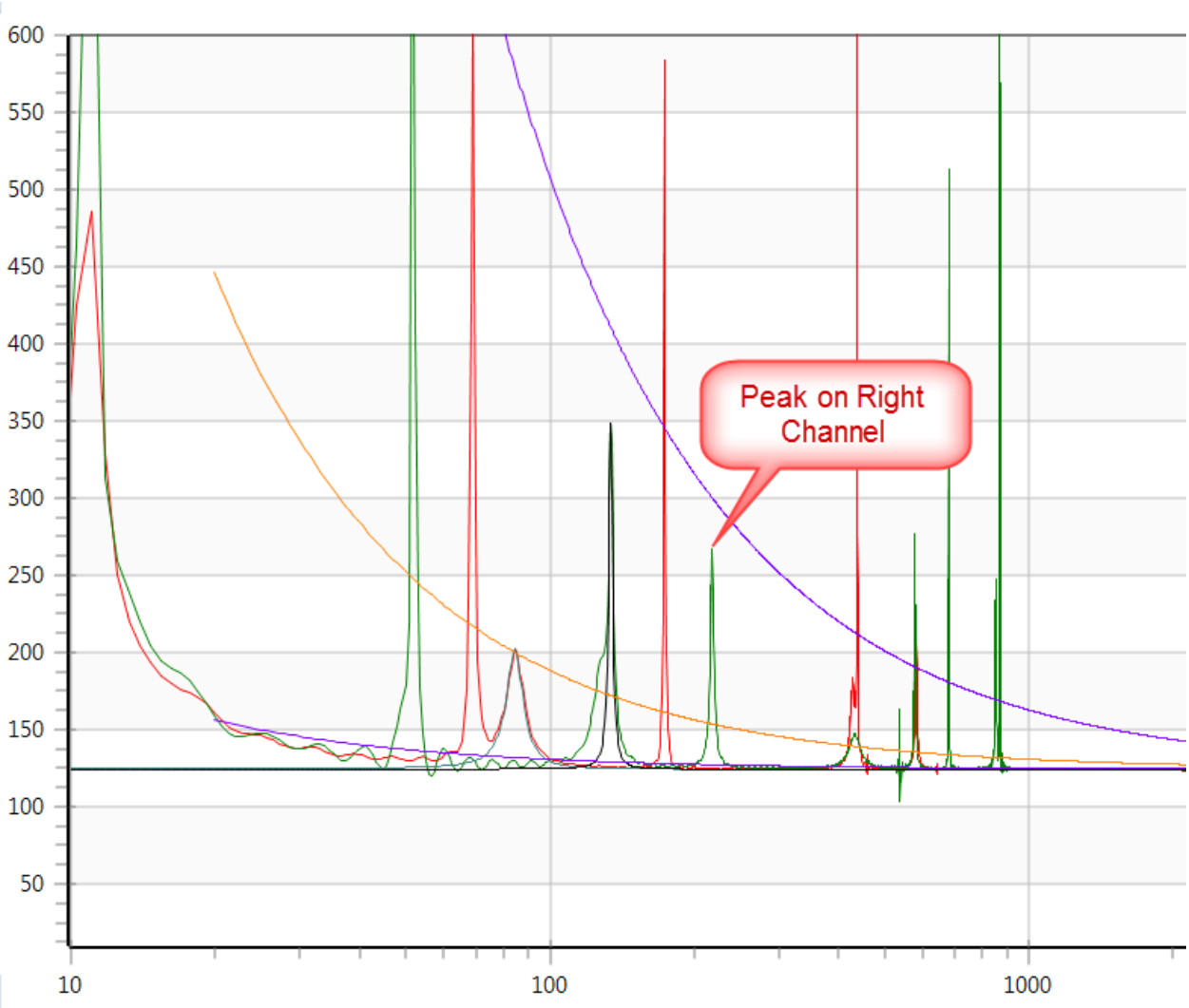
Move the 2nd result to the Right as it refers to the Right Channel.



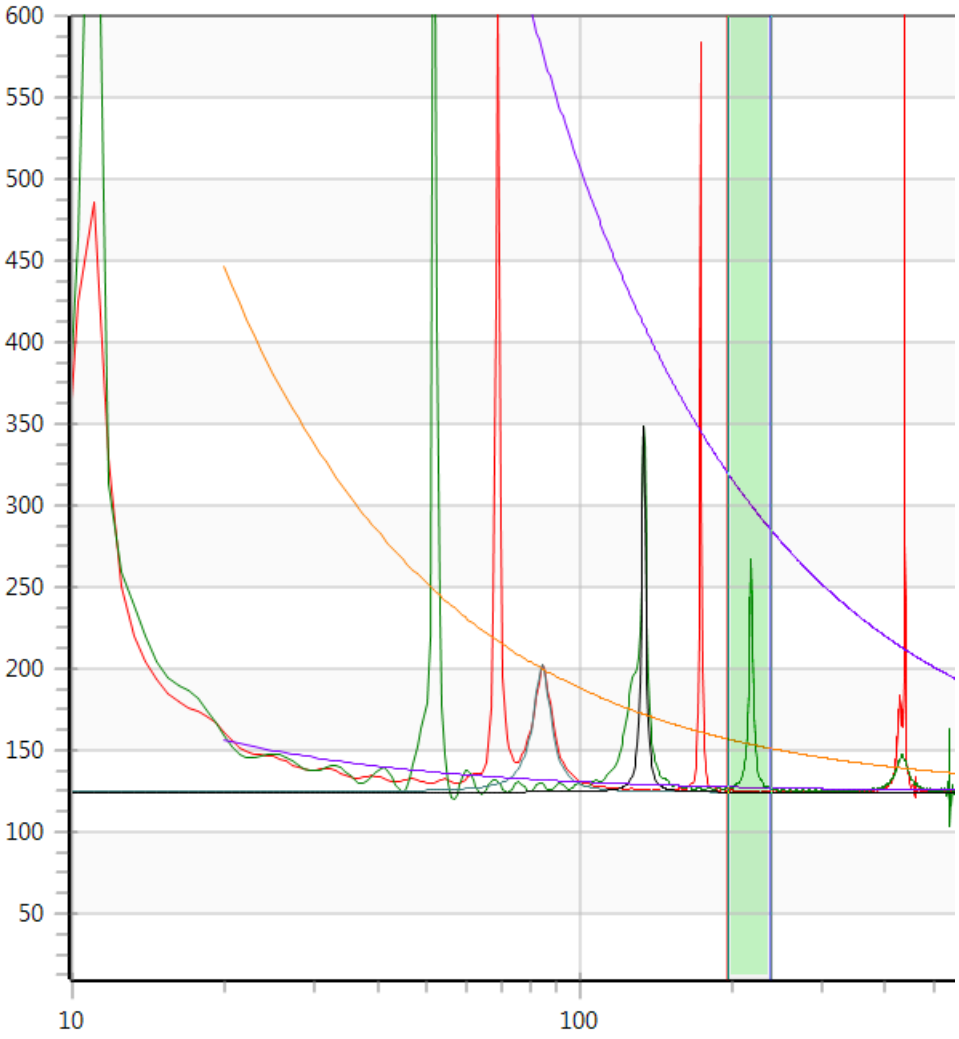

Acourate - Room Macro 6: Interchannel Phase Alignment
Room-Macro6
Length: 65536
PeakPos: 6000
84.23 \ 9.9
133.30 / 47
-
< -- >
1. Get Marked Frequency
2. Demo Edited Values
Source
left
right
f0 [Hz]
133.30
Q
47
manual
left
right
reverse
3. Simulate + Optimize
4. Save Result
Exit

Zoom Out to Full Scale

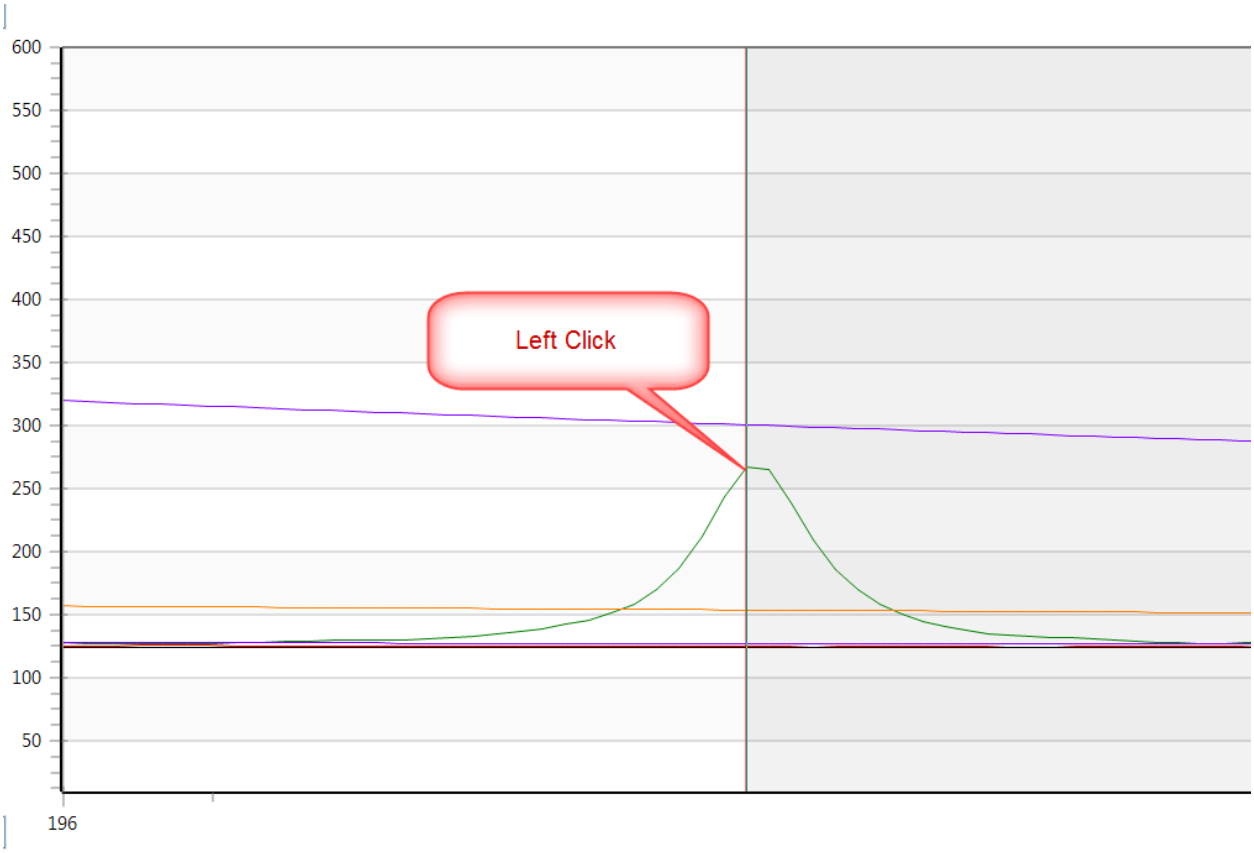
Next, you are going to work on another Peak on the Right Channel.



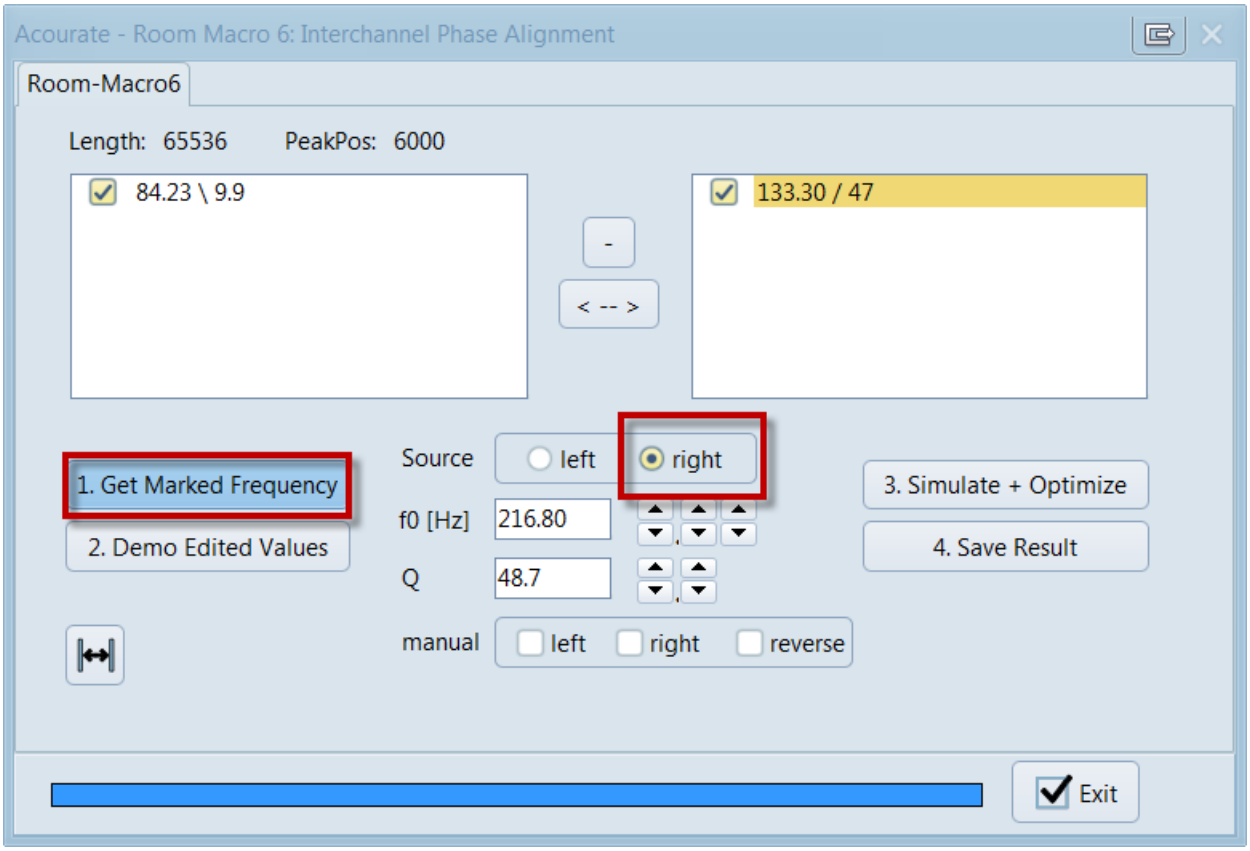
Zoom In to this Region

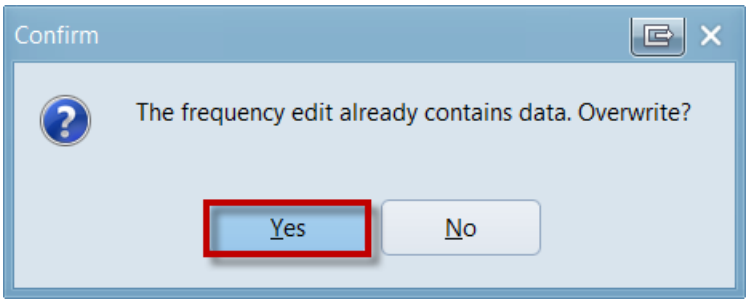


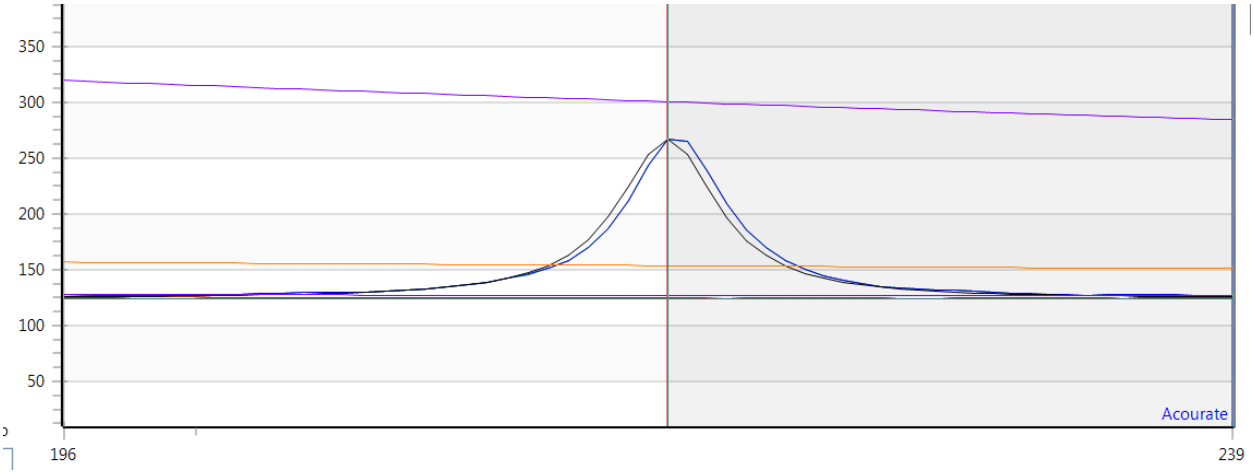
Left Click to mark the Peak.



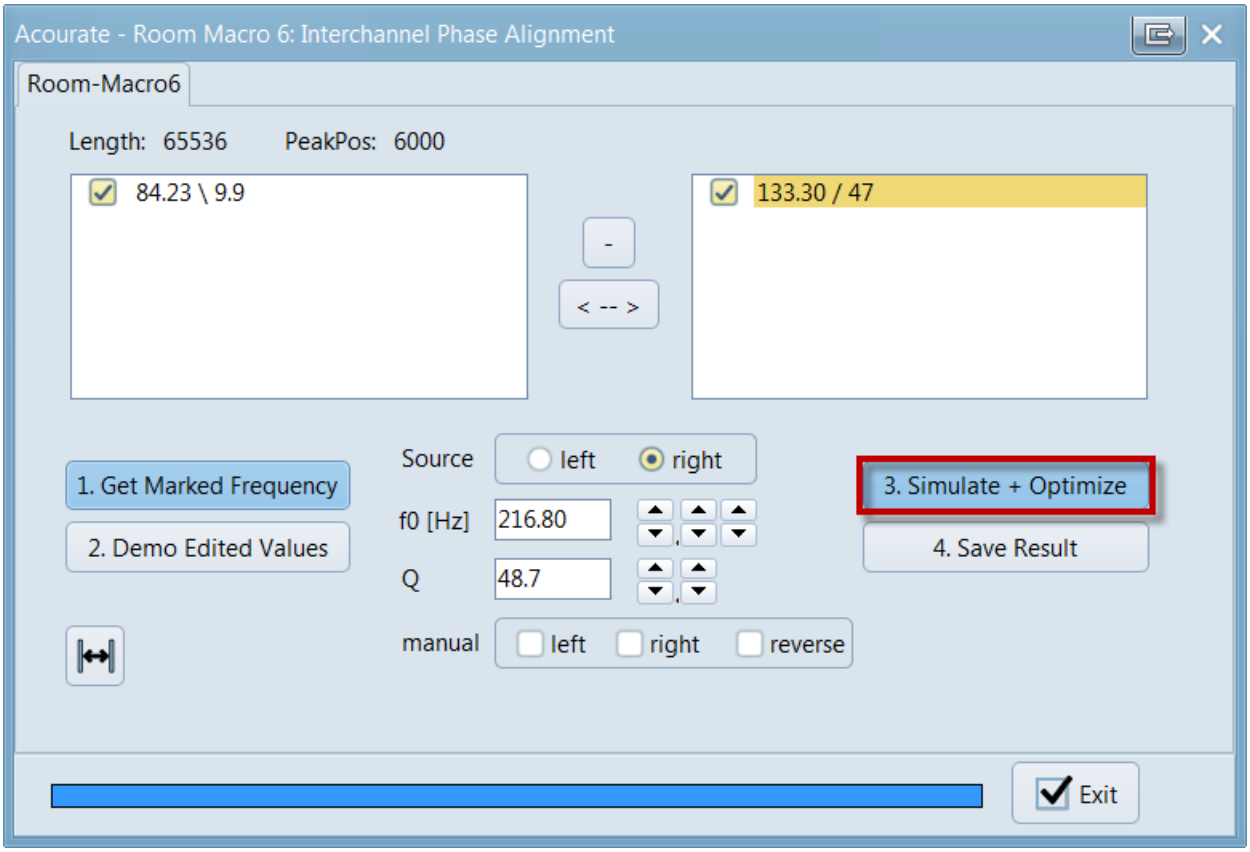
Get Marked Frequency



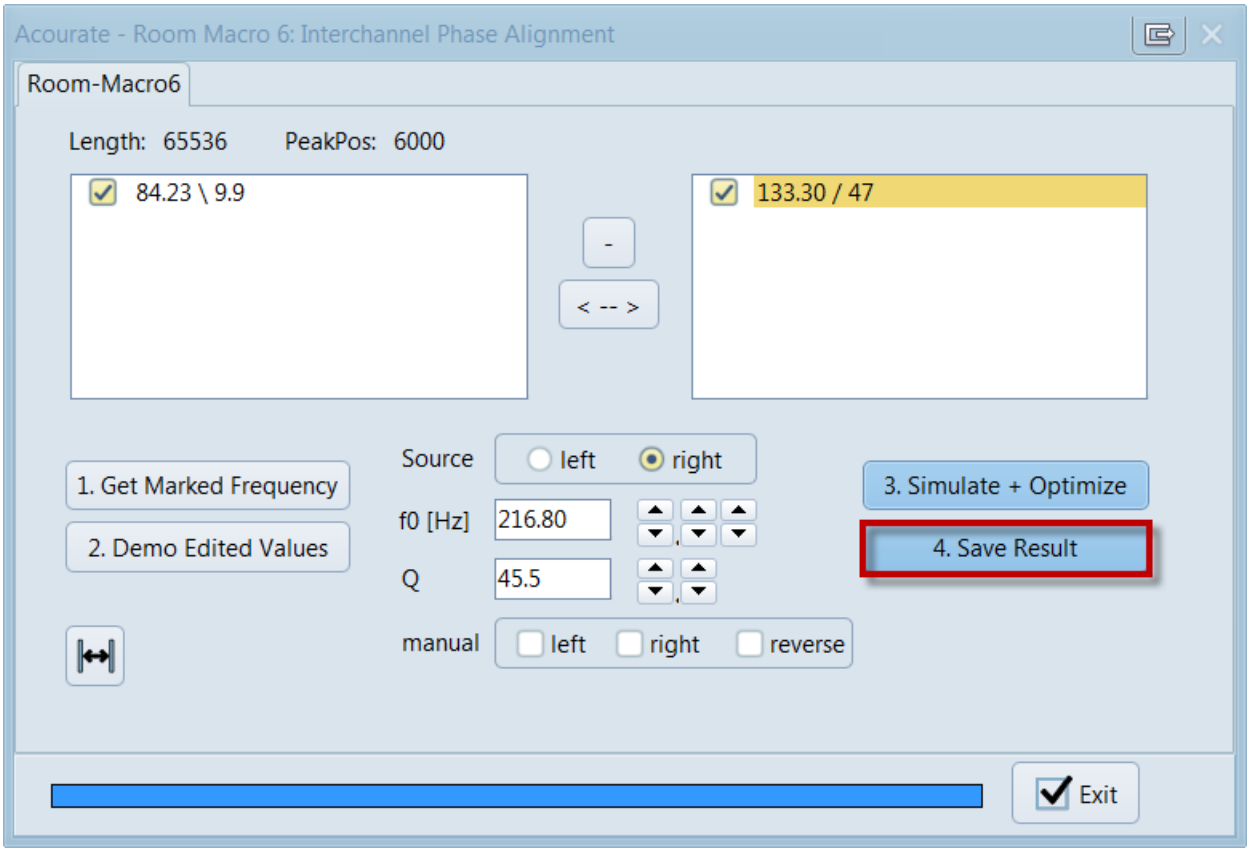


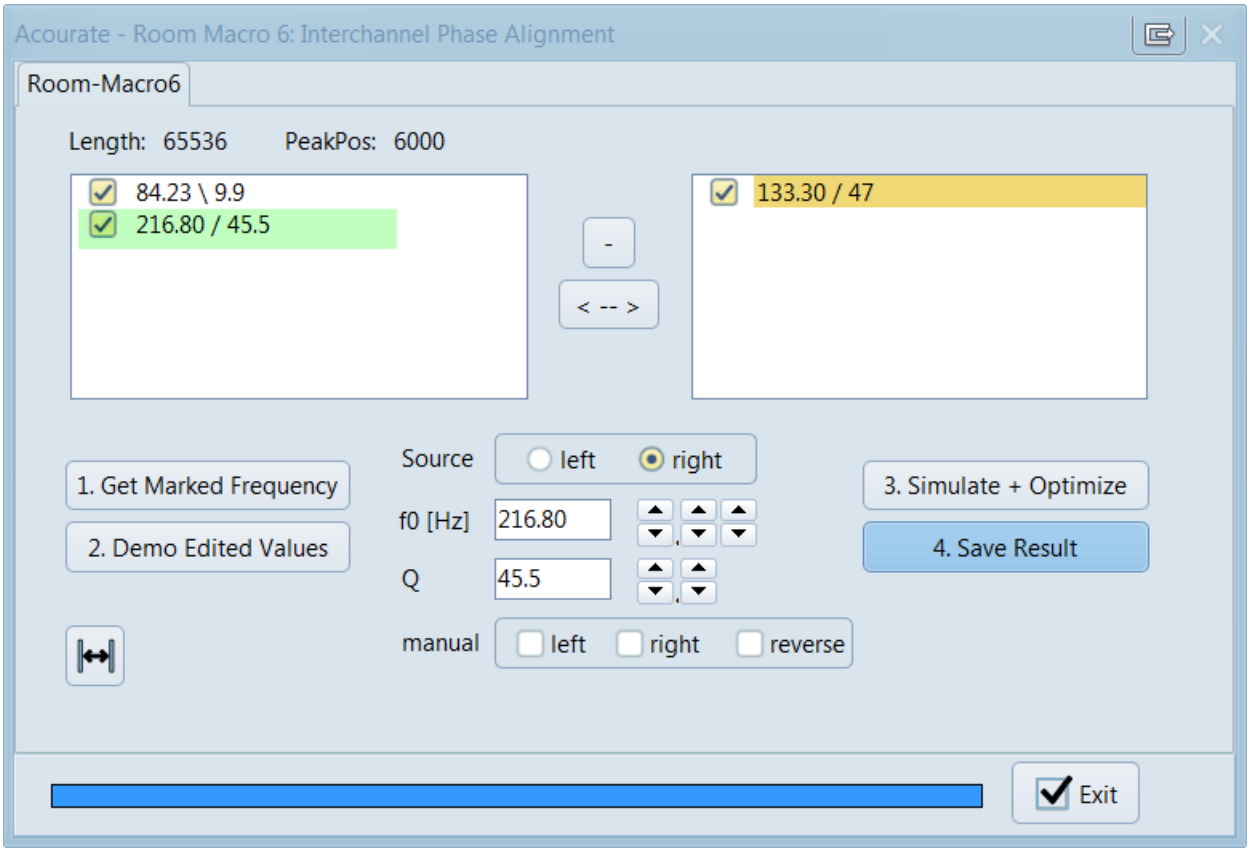


Simulate + Optimize

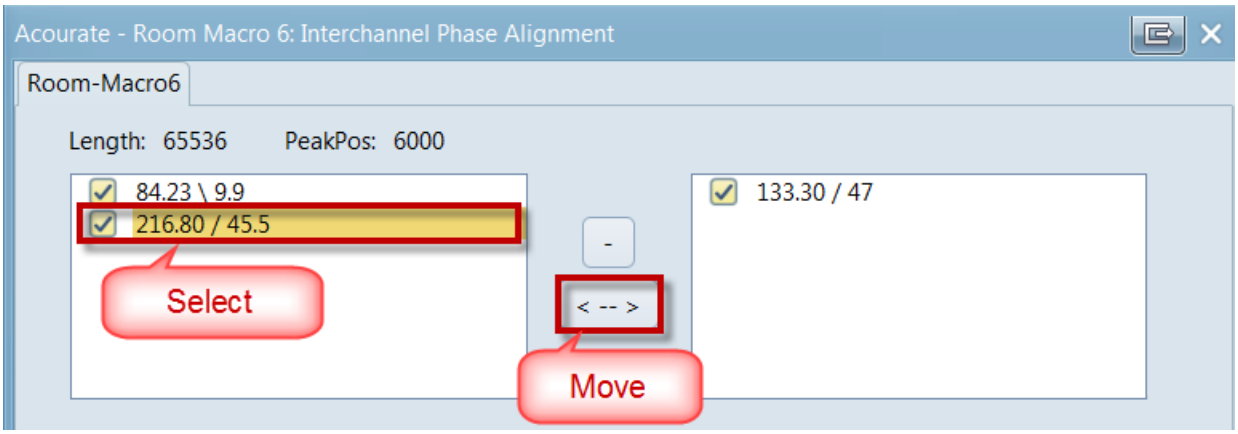


Save Result


Acourate - Room Macro 6: Interchannel Phase Alignment
Room-Macro6
Length: 65536
PeakPos: 6000
84.23 \ 9.9
133.30 / 47
-
< -- >
1. Get Marked Frequency
2. Demo Edited Values
Source
left
right
f0 [Hz]
216.80
Q
45.5
manual
left
right
reverse
3. Simulate + Optimize
4. Save Result
Exit



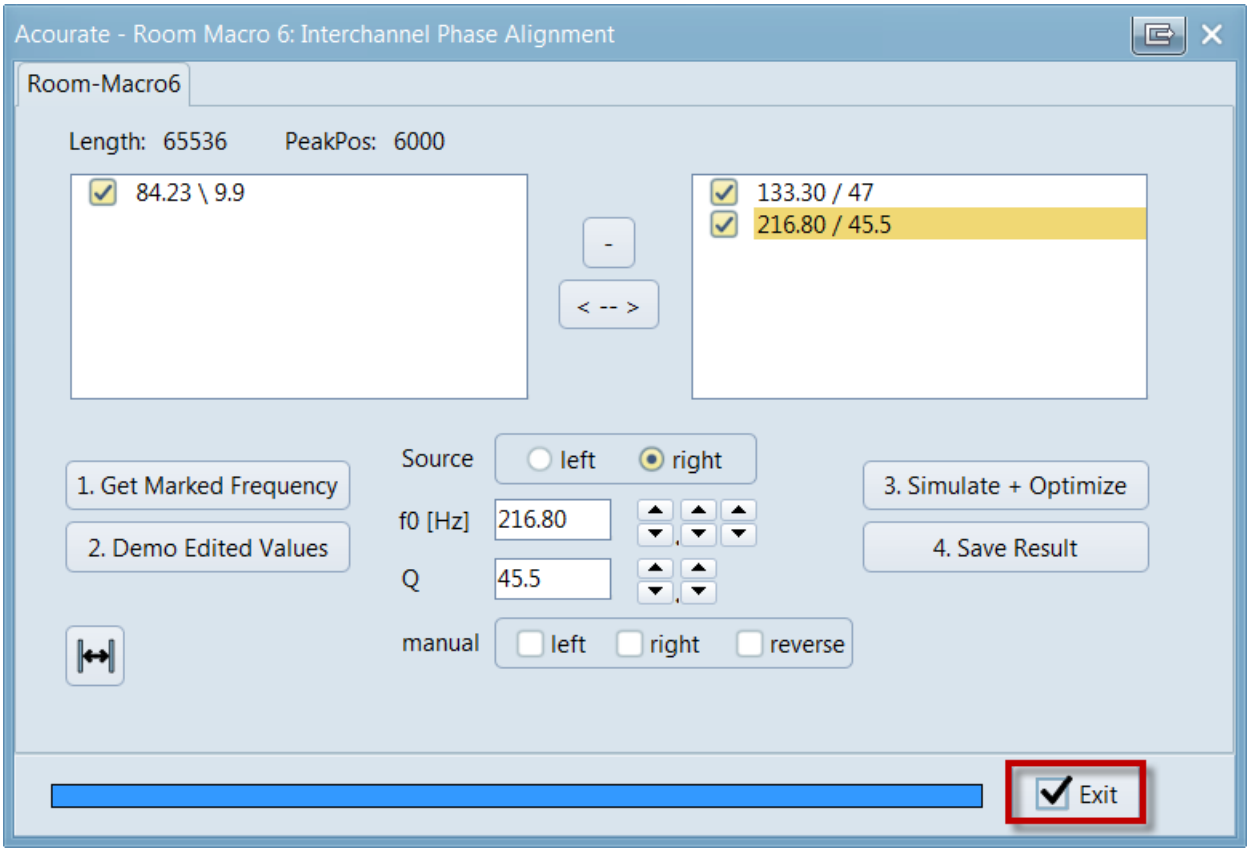
Move the 3rd result to the Right Column as it pertains to the Right Channel.



This is your final picture.

You have marked one Peak on the Left Channel.
You have marked two Peaks on the Right Channel.

All Peaks fall within Q=10, and Q=60

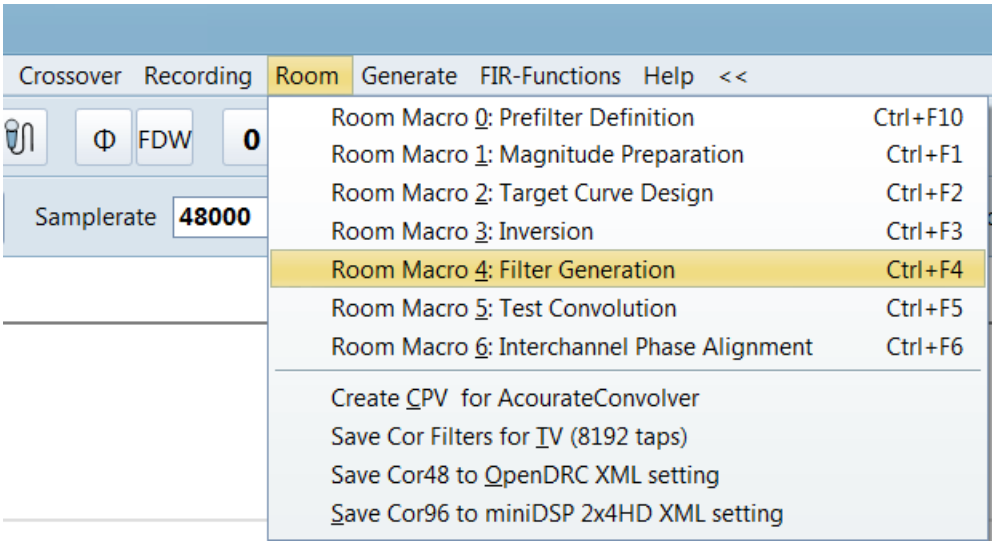


You are done entering the Parameters for Macro 6

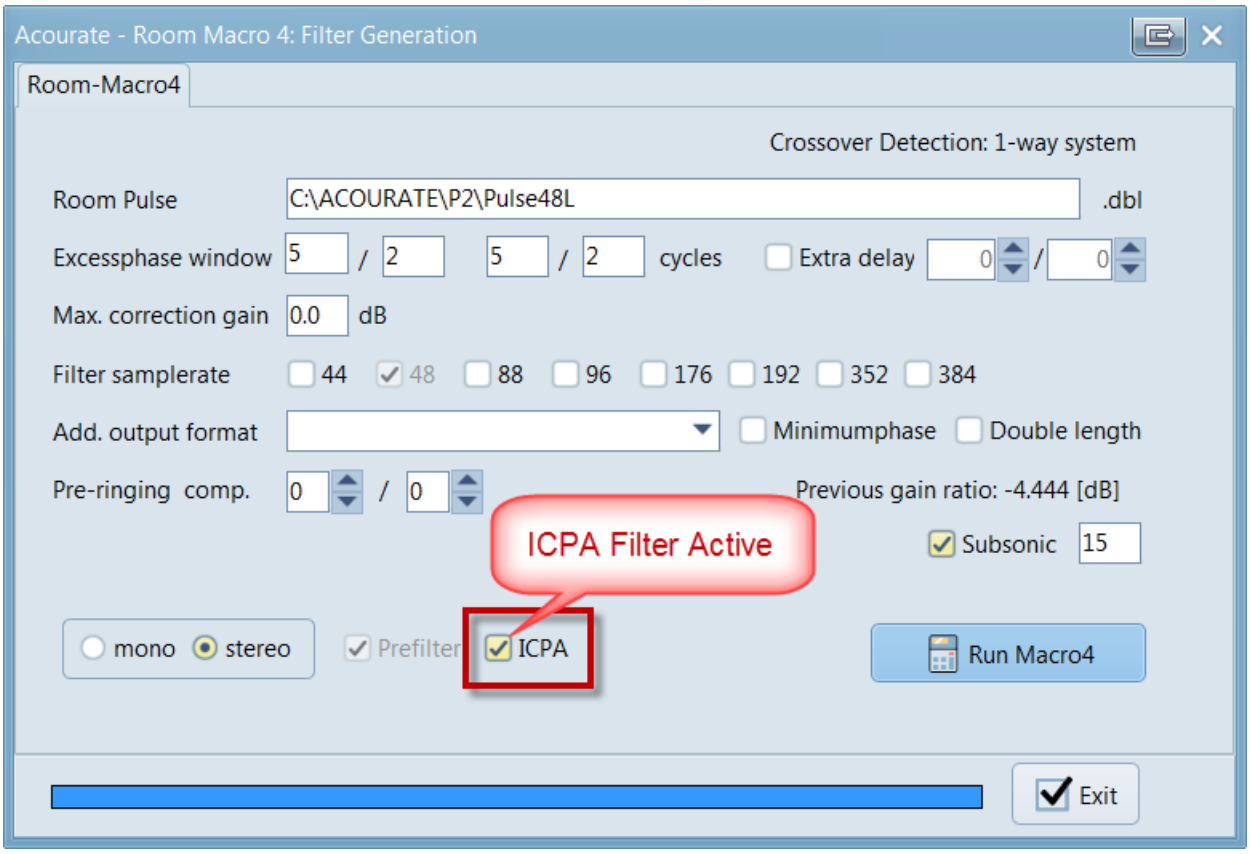
Make sure all 3 are checked.

Exit

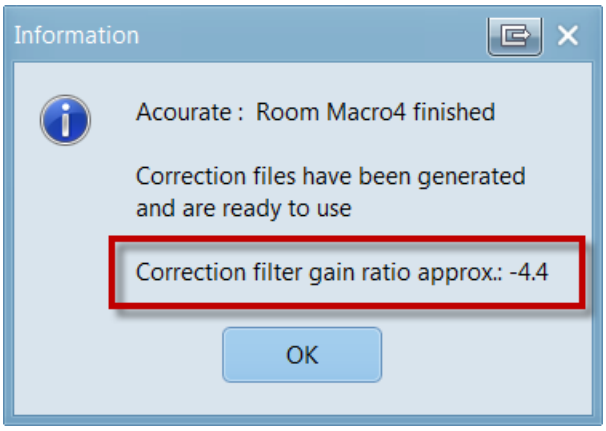
Room Macro 4: Filter Generation



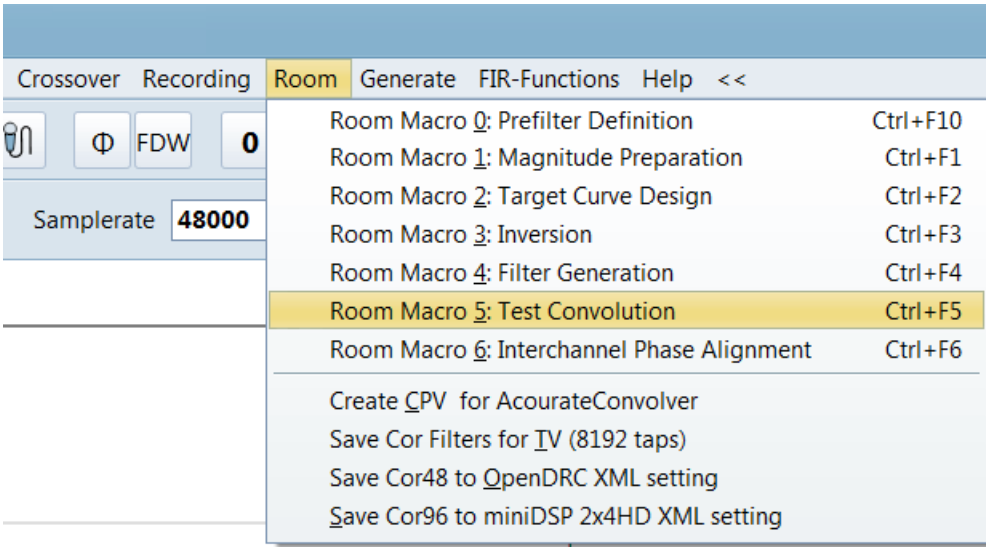
Notice how the ICPA Filter is now active in addition to the Pre Filter.



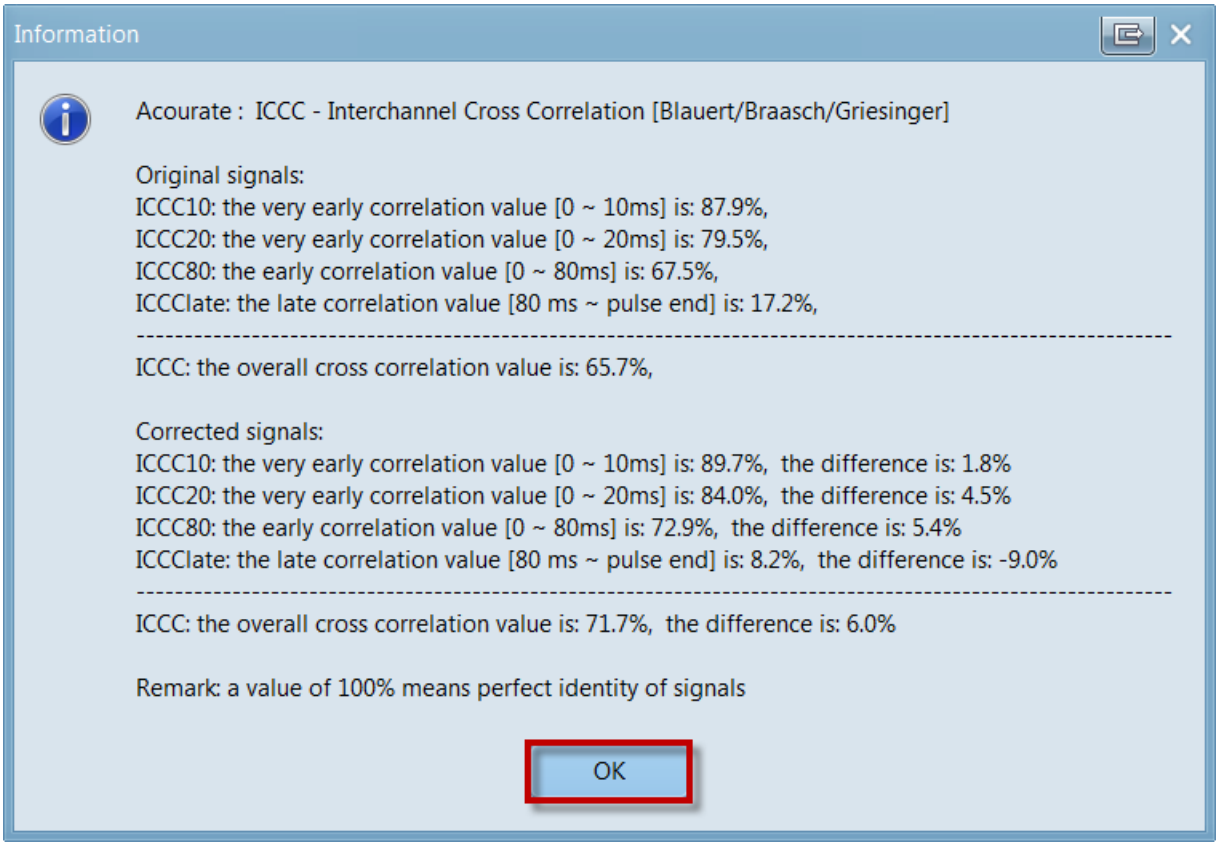
Run Macro4

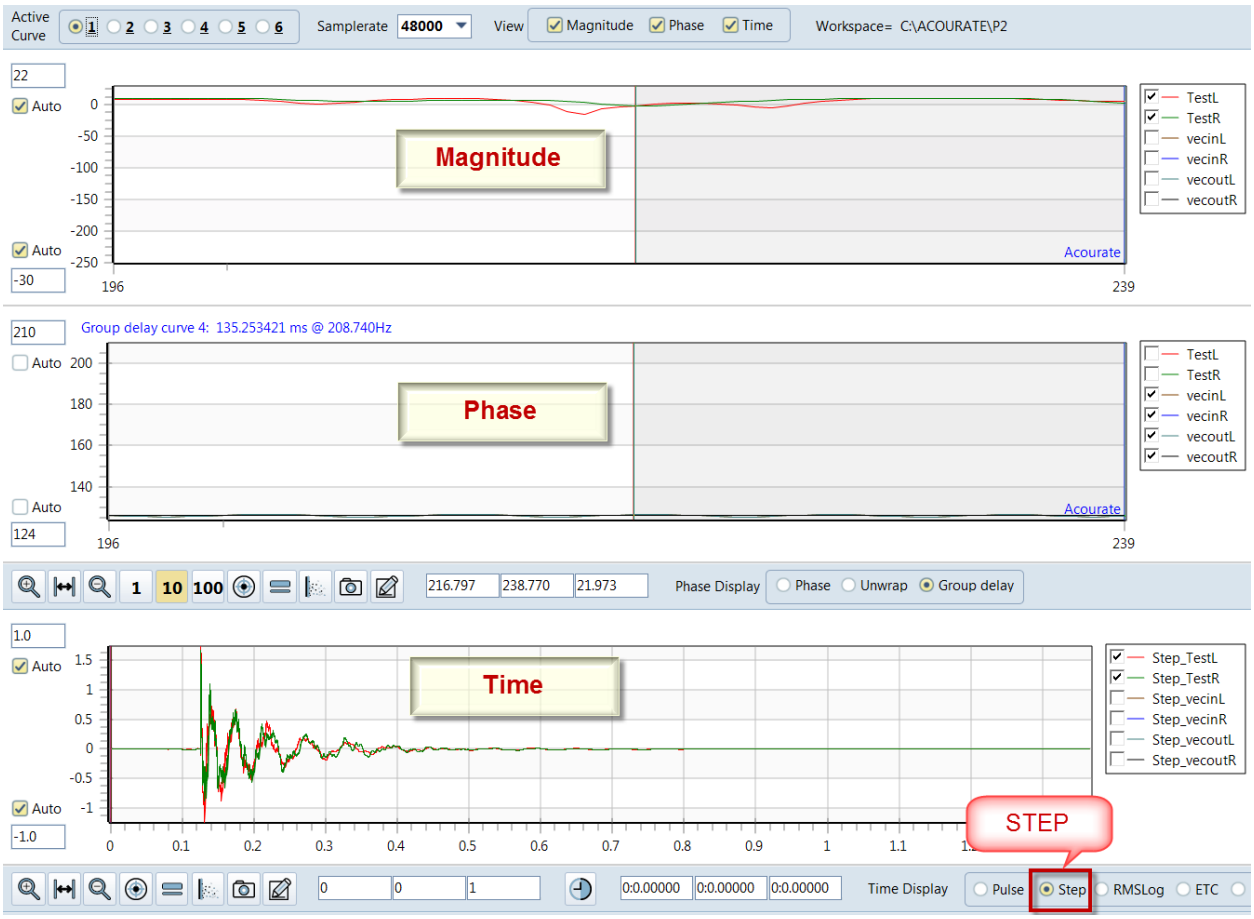


Room Macro 5: Test Convolution

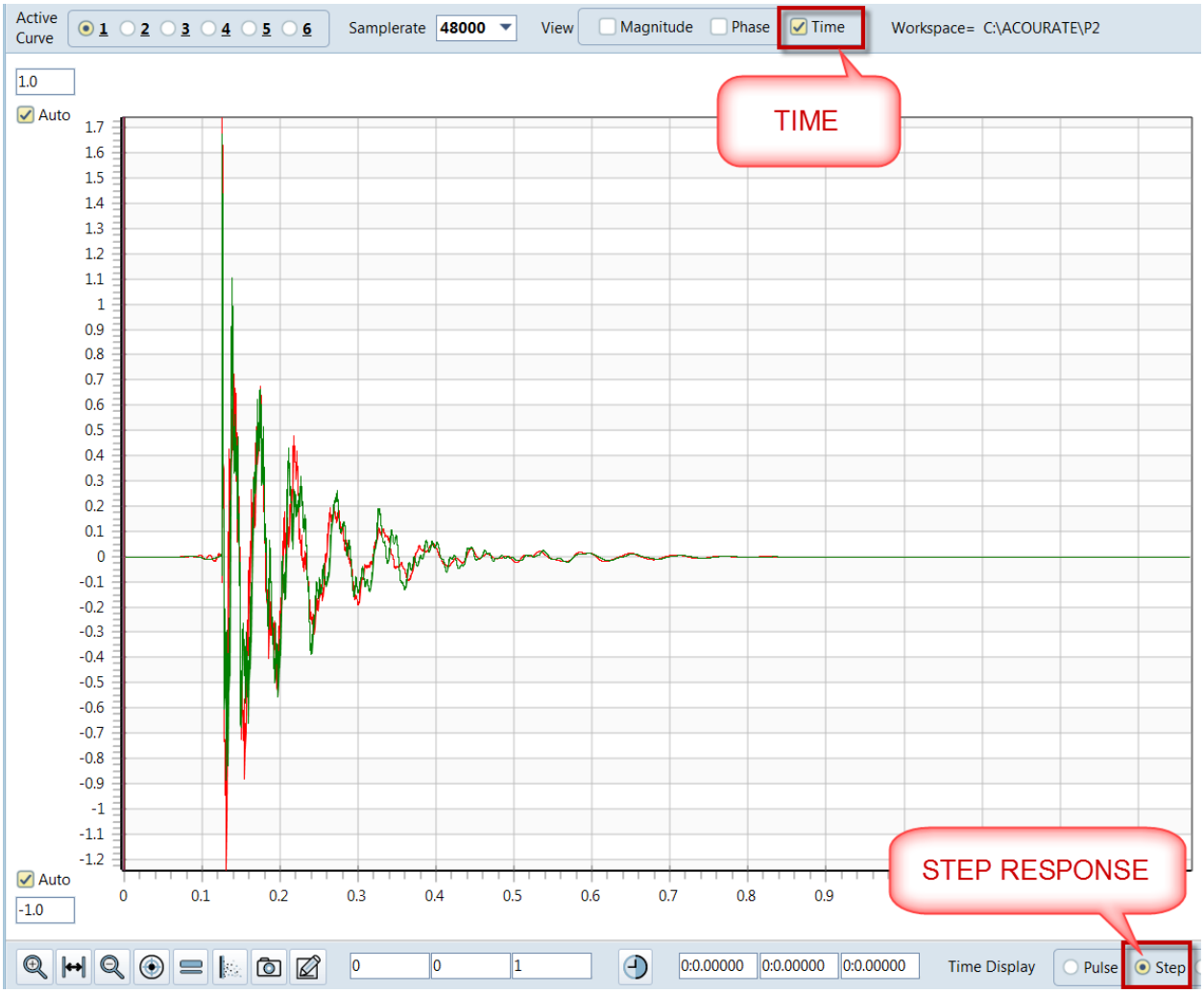


These are your new ICCC values after running Macro6.




Active Curve
1 2 3 4 5 6
Samplerate 48000
View
Magnitude
Phase
Time
Workspace= C:\ACOURATE\P2
22
Auto
-30
Magnitude
Acurate
TestL
TestR
vecinL
vecinR
vecoutL
vecoutR
210
Group delay curve 4: 135.253421 ms @ 208.740Hz
124
Phase
216.797
238.770
21.973
Phase Display
Phase
Unwrap
Group delay
1.0
-1.0
Time
Step_TestL
Step_TestR
Step_vecinL
Step_vecinR
Step_vecoutL
Step_vecoutR
STEP
0:0.00000
Time Display
Pulse
Step
RMSLog
ETC

View the **TIME** graph.

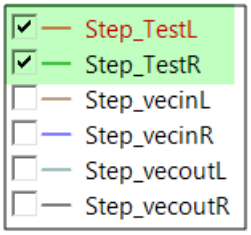


This is looking good.

The Step Responses of the Left and Right Channels match.

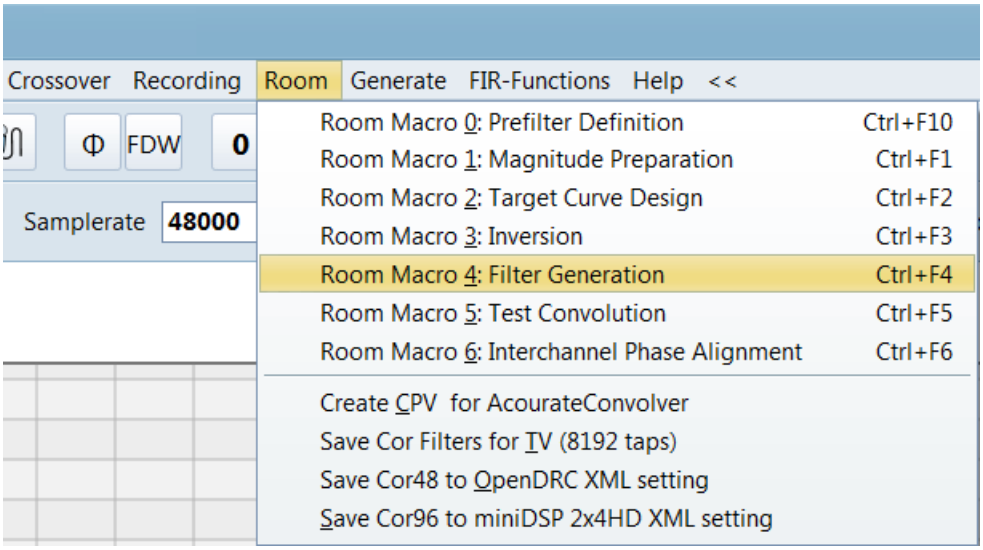
Zoom In to this Region.

The correlation is close enough.



Now you are ready to generated the Output Filters for ROON

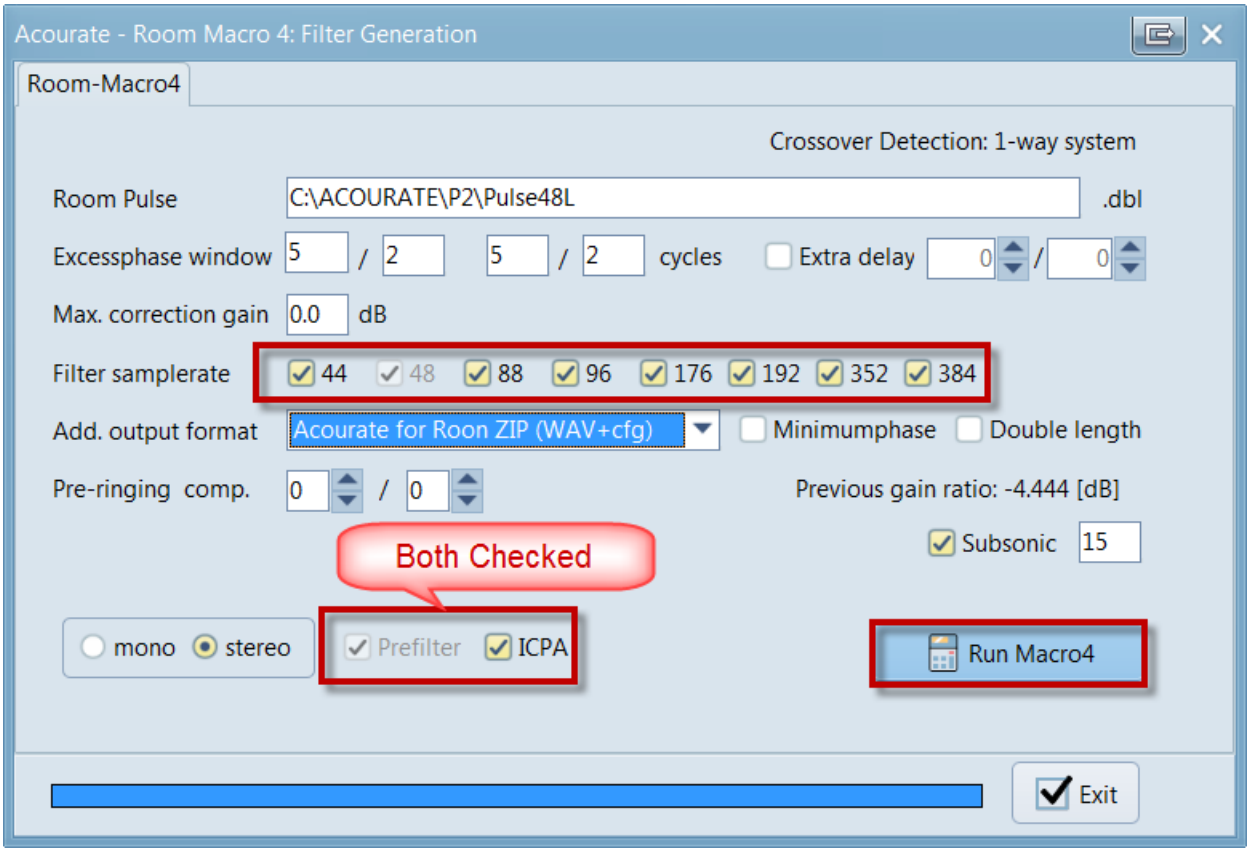
Room Macro4: Filter Generation



Check all Frequency Boxes.

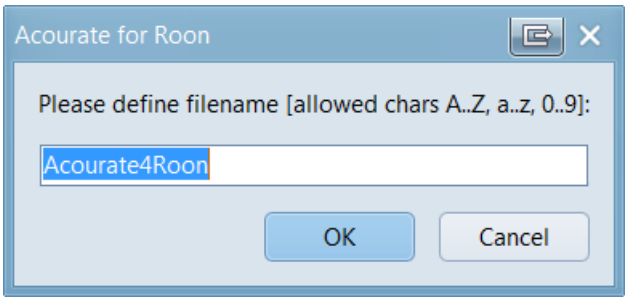
Output Format = Acourate for Roon ZIP (WAV+cfg)

Make sure both your Pre Filter and ICPA Filter are checked.

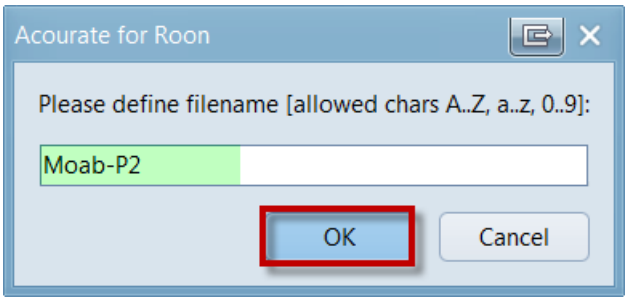


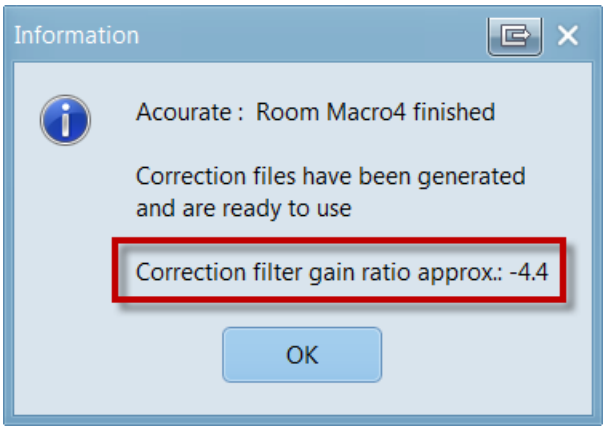
Run Macro4

Rename this file



New filename = Moab-P2

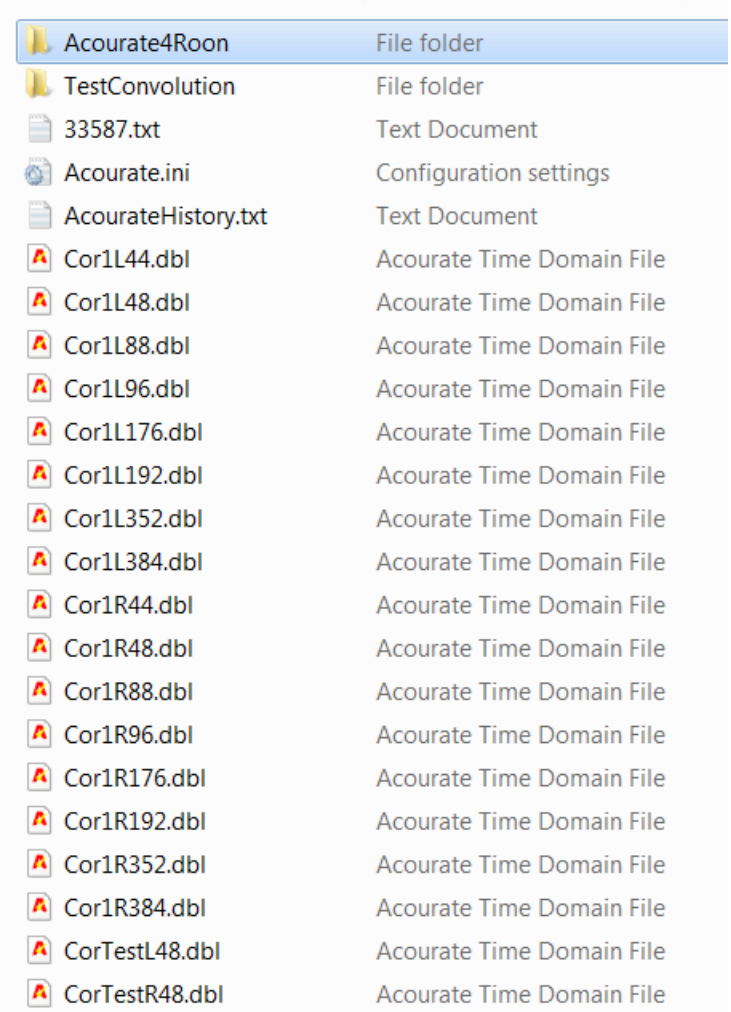


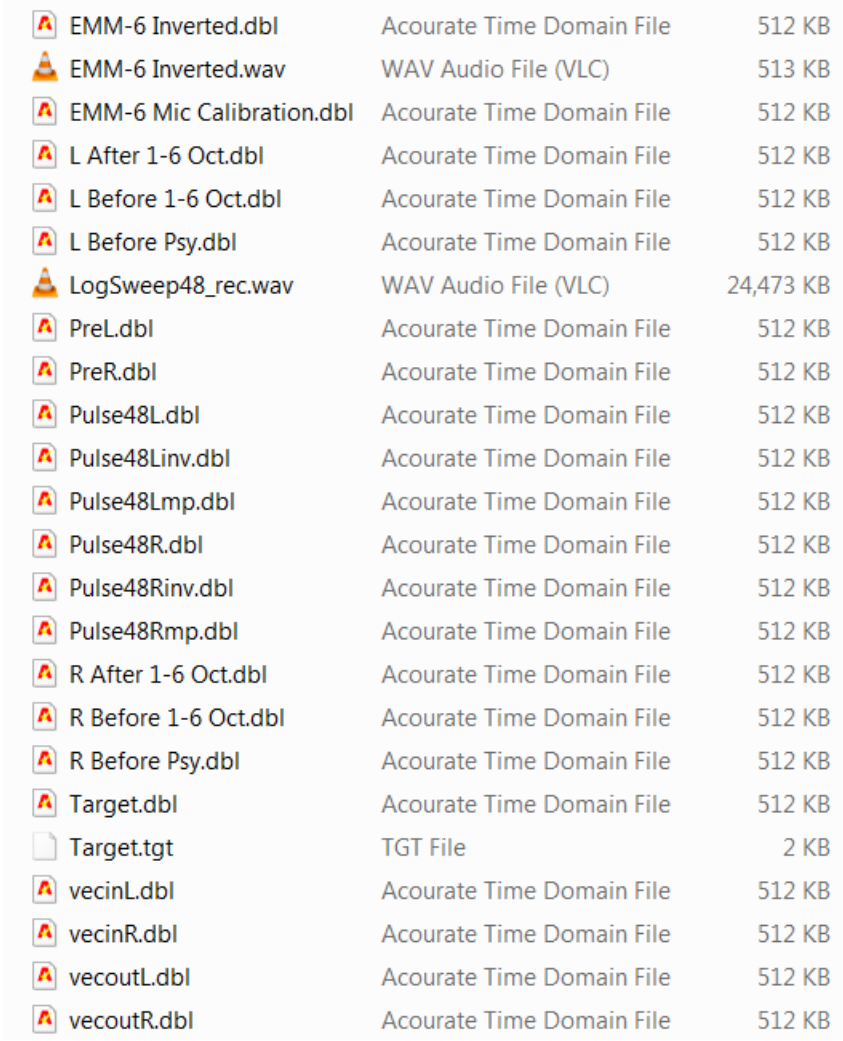


This completes your Acourate Filter Generation exercise.

View the contents of:

C:\ACOURATE\P2

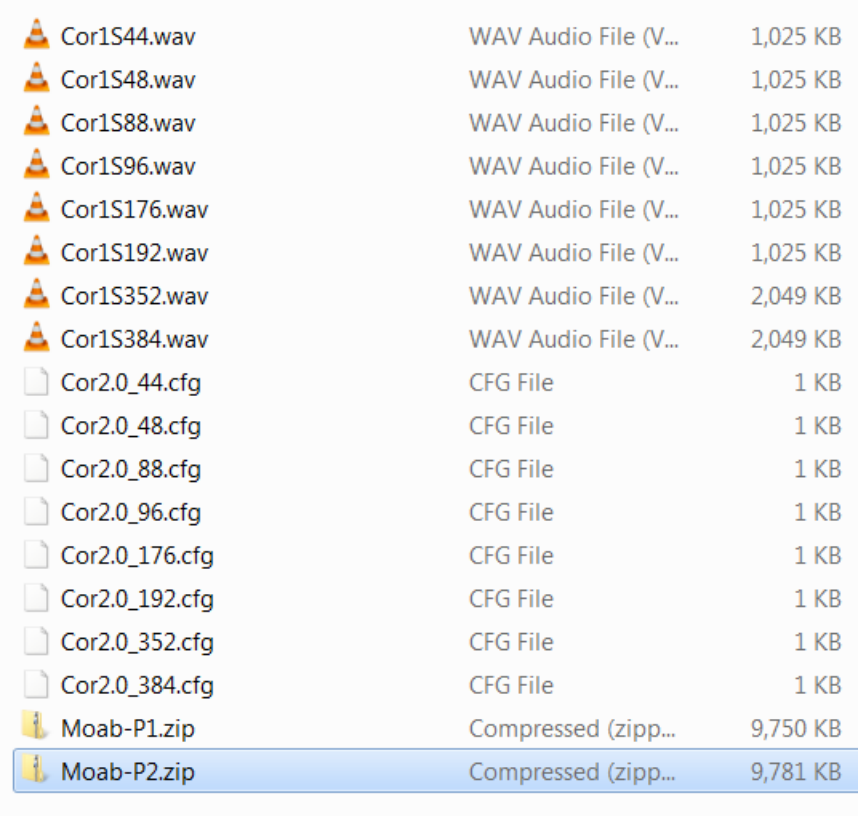




EMM-6 Inverted.dbl	Acourate Time Domain File	512 KB
EMM-6 Inverted.wav	WAV Audio File (VLC)	513 KB
EMM-6 Mic Calibration.dbl	Acourate Time Domain File	512 KB
L After 1-6 Oct.dbl	Acourate Time Domain File	512 KB
L Before 1-6 Oct.dbl	Acourate Time Domain File	512 KB
L Before Psy.dbl	Acourate Time Domain File	512 KB
LogSweep48_rec.wav	WAV Audio File (VLC)	24,473 KB
PreL.dbl	Acourate Time Domain File	512 KB
PreR.dbl	Acourate Time Domain File	512 KB
Pulse48L.dbl	Acourate Time Domain File	512 KB
Pulse48Linv.dbl	Acourate Time Domain File	512 KB
Pulse48Lmp.dbl	Acourate Time Domain File	512 KB
Pulse48R.dbl	Acourate Time Domain File	512 KB
Pulse48Rinv.dbl	Acourate Time Domain File	512 KB
Pulse48Rmp.dbl	Acourate Time Domain File	512 KB
R After 1-6 Oct.dbl	Acourate Time Domain File	512 KB
R Before 1-6 Oct.dbl	Acourate Time Domain File	512 KB
R Before Psy.dbl	Acourate Time Domain File	512 KB
Target.dbl	Acourate Time Domain File	512 KB
Target.tgt	TGT File	2 KB
vecinL.dbl	Acourate Time Domain File	512 KB
vecinR.dbl	Acourate Time Domain File	512 KB
vecoutL.dbl	Acourate Time Domain File	512 KB
vecoutR.dbl	Acourate Time Domain File	512 KB

Open the **Acourate4Roon** folder:

C:\ACOURATE\P2\Acourate4Roon\



You will find a new ZIP file named **Moab-P2.zip**

To summarize:

Moab-P1.zip = FIR Filters for *Amplitude* Correction.

Moab-P2.zip = FIR Filters for both *Amplitude* and *Time* Correction.

You will import both filters into your ROON's Convolution Engine and save them as Presets:

- Moab-P1
- Moab-P2

This way you can quickly compare the two.

In the next article you will learn how to import these FIR Filters into ROON.