ARTA calibrations for 2 channel acoustic measurements

Saturday, April 01, 2017 2:56 PM

Step 1
Use the "Generate sinus" function in ARTA and measure the output level with Oscillocope or multimeter (make sure the multimeter is use can measure 400Hz accurately)

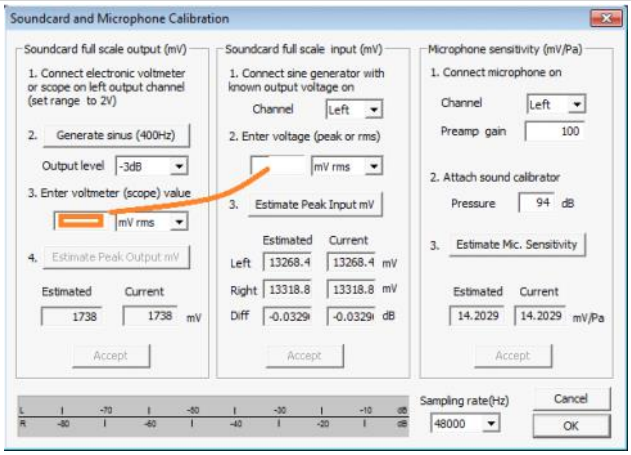
Enter the voltage in mV to step 3 of output calibration -> click Accept.

This will also pre-fill the step 2 in input calibration with this new measured value

Step 2
Wire loopback cables from both outputs to both inputs.
The input gains are 0dB for both inputs at this point.

Channel = Left
Click the "Estimate Peak Input mV" -> This will generate the 400Hz from soundcard out and feed it to both inputs.
Click "Accept" once this is done

Now change Channel = Right
Repeat the "Estimate Peak Input mV" -> click Accept



Step 3.

Connect the mic (or a mic preamp output) to the Left input instead of the loopback cable.
In case of RME soundcard the MIC preamp is built in -> so I change the input gain from 0 to +40dB

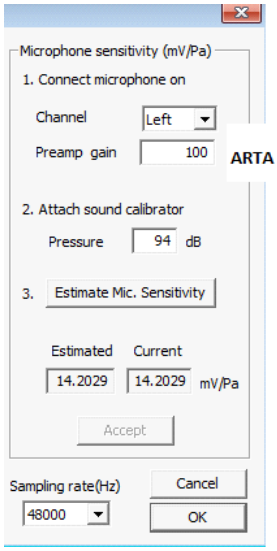
Calculate the absolute gain with formula

ARTA gain = 10^(dB gain/20)

ARTA gain $= 10^{\frac{dB\ gain}{20}}$

For the +40dB gain this means 100

Connect the pistonphone calibrator and run the "Estimate Mic. Sensitivity"
Once done click -> Accept



$$\text{ARTA gain} = 10^{\frac{dB\ gain}{20}}$$

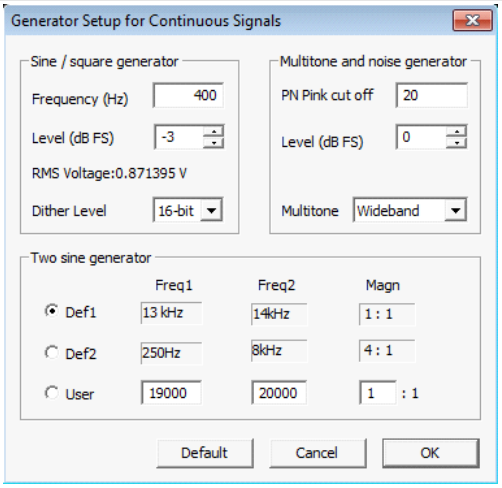
Step 4.

Adjusting the power amp to give 2.83V output.

I'm using the ARTA-s Spectrum analysis mode for that and set the generator to produce 400Hz @ -3dBFS

Connect the output of soundcard to the amplifier.

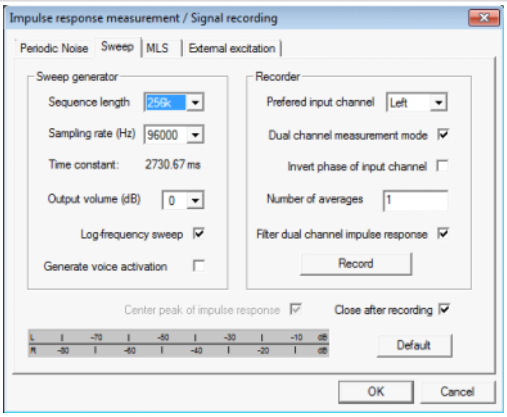
Measure the output of amplifier and adjust the volume until amplifier output 2.83V RMS



Note that the Impulse response measurement generator is slightly different

A 0dB output level in impulse response measurements equals the -3dBFS signal level in Spectrum analyzer

So to get the measurements at a level of 2.83V RMS one needs to use a
Output volume (dB) = 0



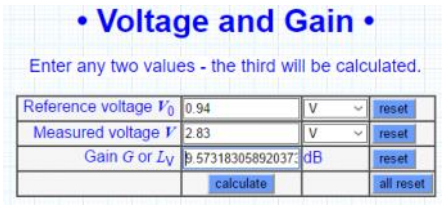
Now the calibrations are done, but for 2 channel acoustic measurements there are still few settings to adjust

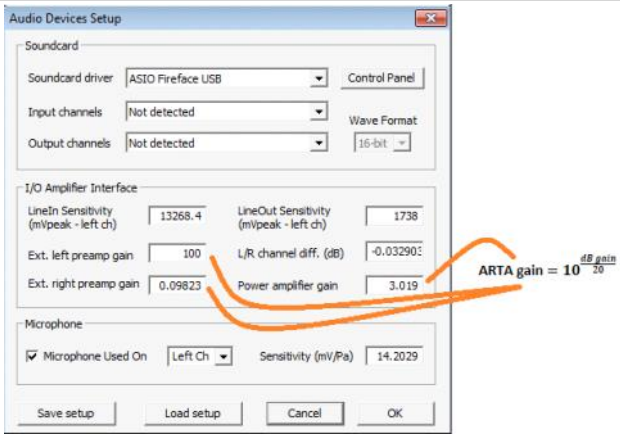
a) Mic preamp gain to be set
b) As I use an attenuator of 8,2kohm/1kohm and the input impedance of RME UCX soundcard is 8kohm I've calculated the compensation gain for Right ch input
c) I've adjusted the power amp to give 2.83V rms with 0dB signal - the gain needed in power amp to achieve that is 9.6dB

To find the power amp gain in dB after this one can either measure it with ARTA or measure the voltage in the input of amplifer and output of amplifer with multimeter or oscilloscope and calculate the gain as shown on right.

Note that forentering all these gains one needs to use the absolute gain formula again.

http://www.sengpielaudio.com/calculator-gainloss.htm





=10^(B3/20)

	A	B	C	D
	Left ch	Gain in dB	ARTA gain	
	mic preamp	40.00	100.0000	
	Right ch	Gain in dB	ARTA gain	
	attenuator	-20.15	0.0982	
	Power amp	Gain in dB	ARTA gain	
		9.60	3.0193	

http://www.sengpielaudio.com/calculator-voltagedivider.htm