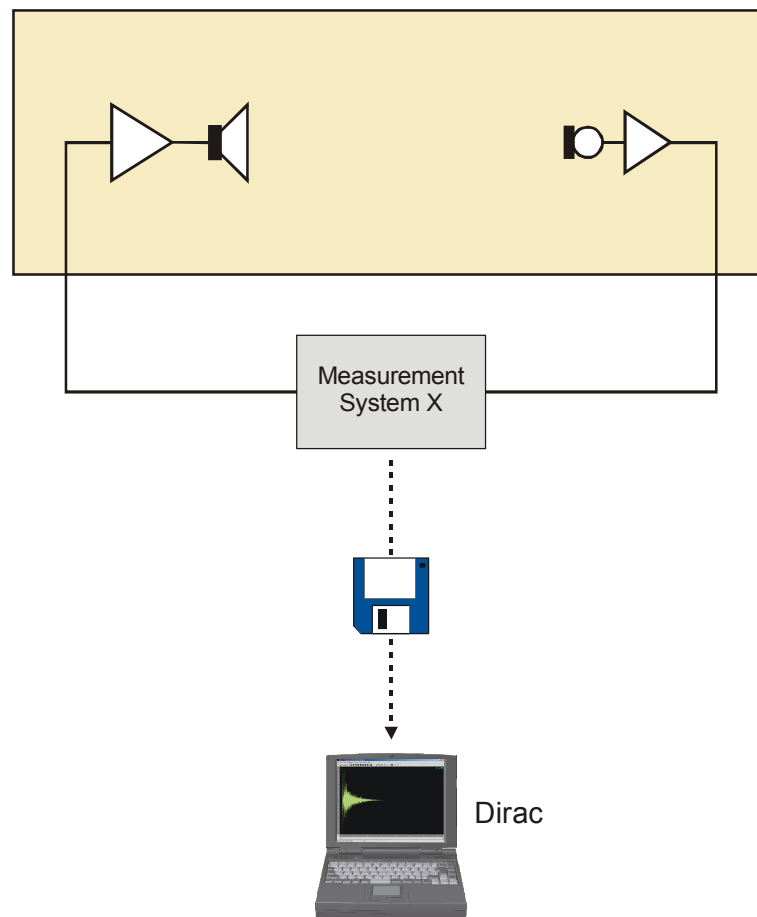




Technical Note

G FROM IMPORTED ROOM RESPONSES



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TN004 G From Imported Room Responses

1 Problem definition

In a room under test, room responses, not necessarily impulse responses, have been measured, using a certain measurement system, say System X. Unfortunately, System X is not being developed nor supported anymore. Many so called measurement files would become worthless if System X would break down, and the files could not be analyzed by another program.

An important parameter that must be obtained from the measurements with System X is the sound strength G . These measurements have been performed with a relative source channel gain G_S and a relative receiver channel gain G_R . Each response $p_i(n)$ is saved in a WAV or TXT file in 16 bit integer format $p_{16,i}(n)$, such that:

$$p_i(n) = p_{16,i}(n)$$

For each of these measurement files, G_S and G_R are known. Now, given that the System X is still available, the question is:

How to obtain the room sound strength values G from $p_i(n)$, using Dirac?

Hereafter, it is described how to create calibration files that enable Dirac to determine the G values from the room responses measured by System X.

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2 Step-by-step solution

First, information has to be gathered with regard to the reference level of System X.

1. According to ISO 3741, perform at least 3, preferably more, response measurements at different positions in a reverberation room, using System X.

The resulting files are called calibration files. In Dirac these files have to be compensated for the relative gains.

2. In Dirac, open a calibration file.
3. From the File menu, choose Properties (or Info in Dirac 2.0 or earlier).

In the File Properties dialog box, the external gain of input channel 1 shows 0.0 dB.

4. Change the external gain of input channel 1 to G_S+G_R , and then click OK. G_S and G_R (each in dB) correspond to the opened calibration file.
5. Save the calibration file.
6. Repeat step 2 through 5 for the other calibration files.

The calibration files are now ready for use.

7. From the Setup menu, choose Calibrate System.
8. In the System Calibration dialog box, click the Add button, select all calibration files, and then click the Open button.
9. Fill in the volume of the reverberation room the calibration files were measured in.
10. Fill in a descriptive calibration name, e.g. G calibration System X, and then click OK.
11. After completion of the calibration, click OK.

Now Dirac is ready to accept System X measurement files for calibrated G calculations. Each measurement file also has to be compensated for the relative gains.

12. Open a System X measurement file.
13. From the File menu, choose Properties.

In the File Properties dialog box, the external gain of input channel 1 shows 0.0 dB.

14. Change the external gain of input channel 1 to G_S+G_R , and then click OK. G_S and G_R (each in dB) correspond to the opened measurement file.

Now, the measurement file is calibrated and can be saved and/or evaluated as such.

15. Repeat step 12 through 14 for the other measurement files.

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Notes

- If System X does not use scaling factors, you can omit s in step 4 and 14 ($s = 0$ dB).
- If G_S is the same for all measurements in the reverberation room and the room under test, you can omit it in step 4 and 14 ($G_S = 0$ dB). The same holds for G_R .
- If G_S , G_R and s are the same for all measurements in the room under test, you can omit steps 12 through 15, by changing the external gain of input channel 1 in step 4 to $(G_S+G_R+s)_{\text{calibration}} - (G_S+G_R+s)_{\text{measurement}}$ instead of $(G_S+G_R+s)_{\text{calibration}}$.
- If s , G_S and G_R can all be omitted, only perform steps 1 and 7 through 11.
- If files from System X do not represent impulse responses, but responses to another type of signal, make sure the calibration files are measured using the same signal type (e.g. single or dual channel, same sample frequency, and MLS, sweep or noise) and length.

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