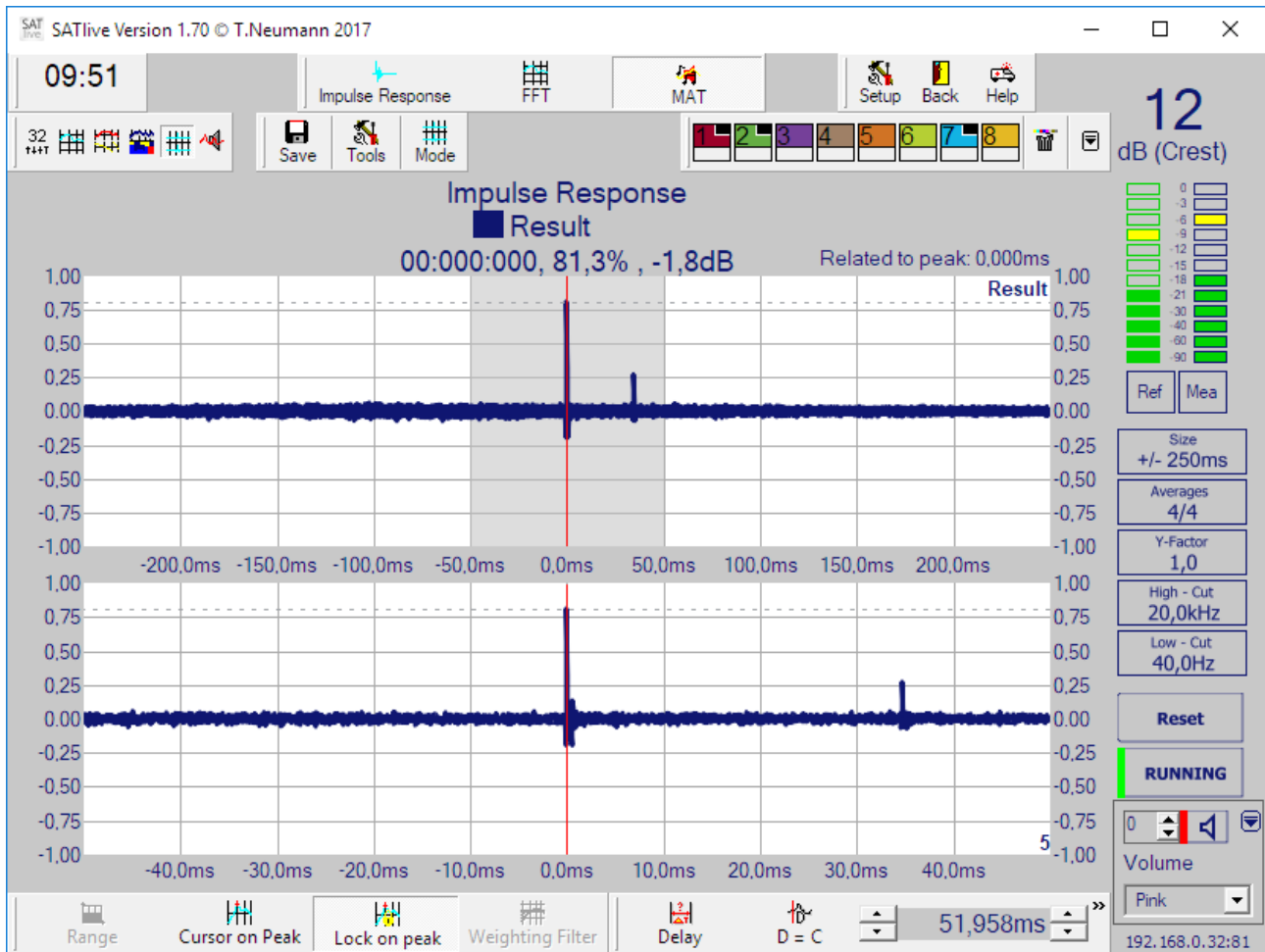


# SATlive 1.7



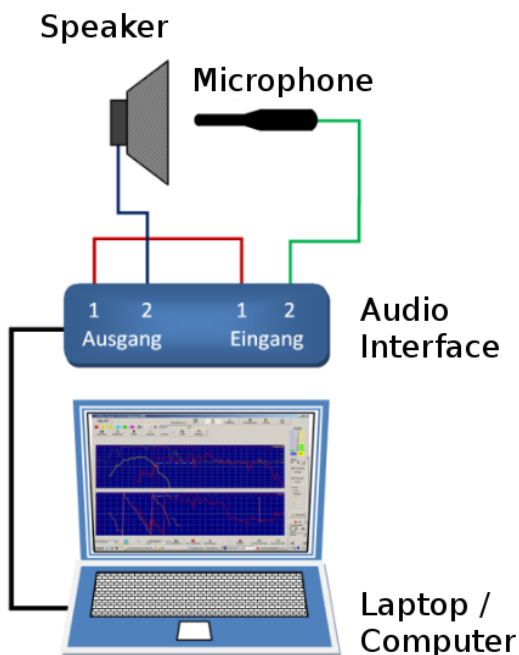
## Measuring Delays

A Step by Step instruction

## A few things to mention

- This document shows a simple step by step way to determine the distance in time between to audio sources (reproducing Mid – High frequency content).
- The measurement delivers the exact difference of the arrival times. This will not necessarily be the best delay setting for a particular situation.
- The placement of the measurement – mic depends on your audio – concept.
- In this document we do not care about the individual delay of each speaker. Instead we'll look for the difference of the arrival times. This will ensure that any latency (digital mixing desk ... ) which might influence a single measurement will be removed, because it will occur the same way in both measurement.
- For delay – lines you should ensure that the delay – line will not arrive earlier as the front of house signal.
  - Look on your situation and determine the positions with the longest distance between both source.
  - If possible, use one of this positions as the position of your measurement mic.
- SATlive offers much more possibilities for this or similar tasks, willing to be a step by step instruction, this document focuses on one way of doing it.

## Setup



### Basic - Routing

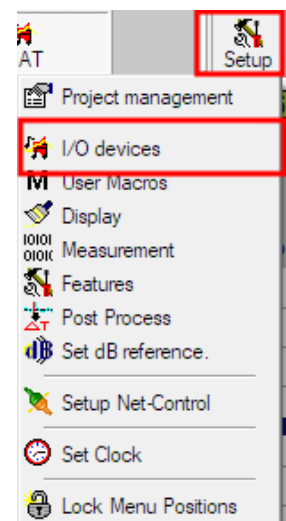
Measurement Mic feeds one input ('MIC').

Second input gets signal for comparison ('REF').

Output feeds second input ('REF') and the system to measure.

Take care to feed the same signal into both inputs.

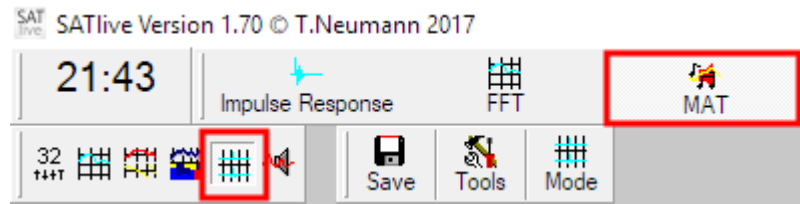
- Use the VU meter to verify the correct assignment of the inputs.
- Make sure that the output of your audio device delivers only playback signal.
  - If available turn the output mixer to Playback
  - Disable 'direct monitoring'
- In case of problems use *Setup* → *I/O devices* to adjust the I/O settings.



## Measurement

### Select Measurement

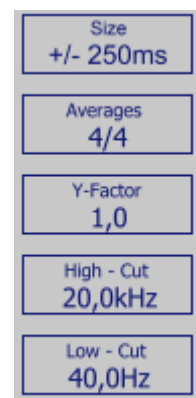
In SATlive choose **MAT**, then choose **Impulse – Response**.



### Setup the IR Measurement

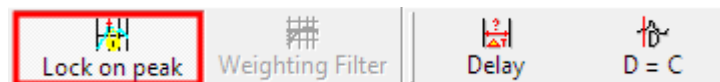
Verify the settings for the IR – measurement in the right menu – area.

To adjust a value, click on the area and select the correct value from the menu.



### Enable Lock – Cursor on Peak

Make sure that the entry 'Lock Cursor on Peak' in the lower menu area is activated.



### Set and Start Signalgenerator

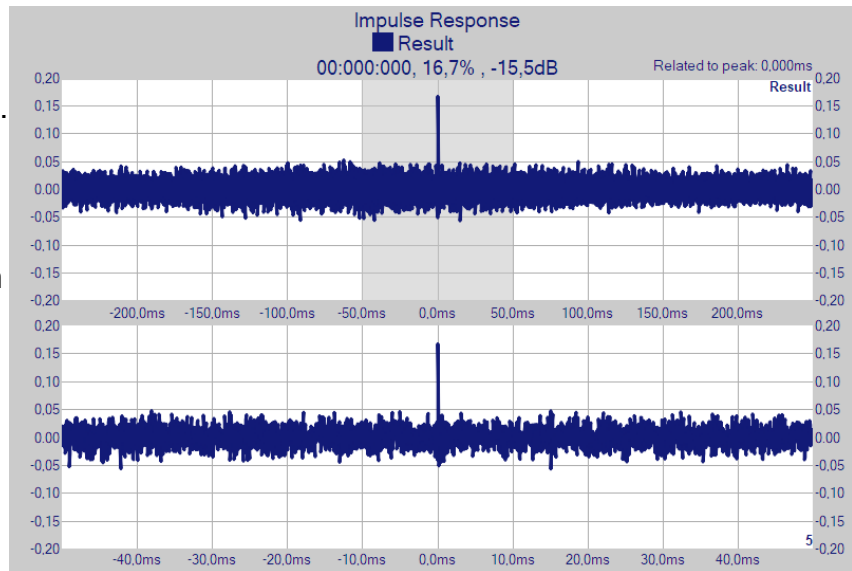
In the Signalgenerator, located at the lower right corner:

- Select signal **Pink**.
- Start the output by pressing the key **G** on your keyboard.
- Use the arrow keys to adjust volume.
- Start with low output level.



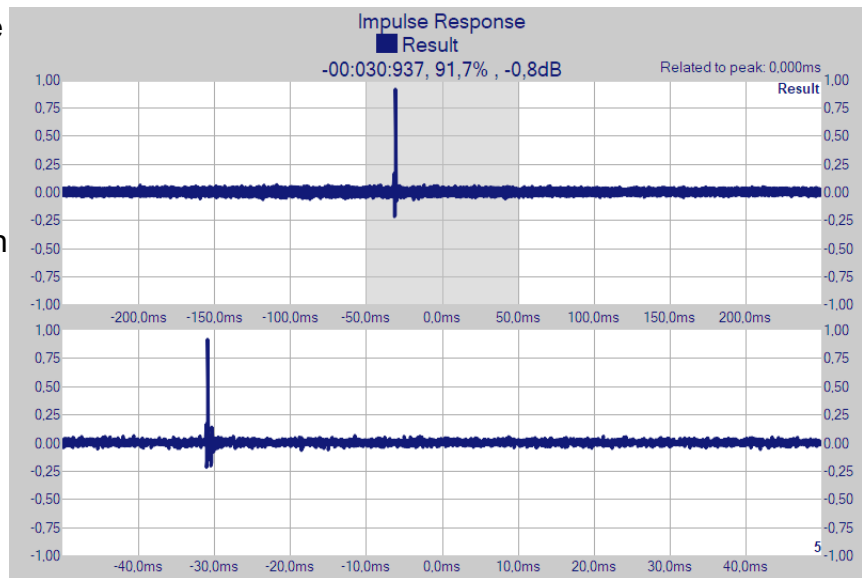
## Measure FoH

- Play the output signal using **one side** of the front of house speakers.
- Adjust the levels.
- Increase level until the cursor locks to a certain time.
- Press the key **A** to adjust the amplitude display.
- Press **Ctrl – D**
- The peak will move to the center of the display.
- The time display at the top will show zero.



## Measure the Delayline

- Mute audio of the front of house speakers.
- Send audio to the delay – line speaker corresponding to the front of house speaker used before.
- The peak related to the delay – line will show.
- The cursor will jump to the peak.
- The difference between both source shows at the top, with the first measurement being the reference.
  - The peak of the delay – line will show left of the center, which means that the signal of the delay – line arrives before the front of house signal. The front of house signal has been defined as ‘time zero’.
  - The delay shown at top is a negative value, which you need to compensate by a positive delay.
- Apply the delay to the delay – line speaker(s). Doing so will move the peak to the center position.



## Remarks

- This document just shows one way of determining the delay needed to compensate the difference in arrival time.
- This procedure works only for mid – high or full range speakers. It is not suitable for alignment of top and subs.
- A longer interval and / or more averages will increase the quality of the result.
- See the SATlive manual for detailed information about each subject.