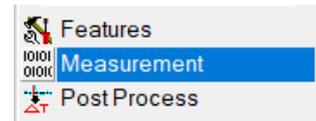


Friday for Features will take a look on not so well-known features in SATlive, thus helping you to improve your user experience with SATlive.

The topic of today's Fridays for Features is:

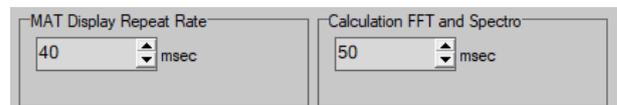
Don't let the setup upset you – Setup → Measurement



This setup section contains some parameters which need some explanation. As an introduction let's take a short look on how the different measurements work in SATlive. We can distinguish between *discrete* measurements, which will start and end at a certain moment in time and *continuous* measurements, where no such certain moment will exist.

The measurement of the impulse – response and the FFT are discrete measurements, even when they repeat, while the RTA and the transfer-function measurements will run continuously.

So there are two different time – settings.



The left one, labeled *MAT Display Repeat*

*Rate*, will control the refresh of the display during a continuous measurement.

On each time a new snapshot of the result will show. Decreasing this value will result in a more responsive display while increasing it will reduce the CPU load.

During a *discrete* measurement, the display will update each time when a new result is available. Using the setting *Calculation FFT and Spectro* controls the interval when a measurement will start. A new measurement will start even with one or more measurements still running.

A lower value will increase the repeat – rate and the responsiveness of the display while increasing the CPU load.

Because multiple measurements will partly share the same input data, reducing the interval will also decrease the effect of averaging.

Being a nice algorithm in many ways, the FFT has a major disadvantage for audio purposes. That is the fact that the FFT will deliver the result in a linear frequency scale, which means that we'll get the same amount of information for the range from 50 Hz to 100 Hz as we would get for the range from 8000 Hz to 8050 Hz. A single FFT will deliver a flat frequency response when fed with white noise. With the human hearing being non-linear on both the amplitude and frequency resolution the normal FFT is not a perfect fit for audio measurements.

To overcome this, we do not run only one but many FFTs for different octaves. In SATlive we call it *Smooth FFT*, while other manufacturers use other names like FPPO (Fixed Points Per Octave). You can find more details about the *Smooth FFT* in the manual, starting on page 240 (manual of version 1.70.46).

When we'll look at the unprocessed result of a Smooth FFT, fed with pink noise, it will look kind of strange. You'll see the -3 dB slope of the pink noise in each octave, while the overall averaged result being flat. Due to the comparison of two FFTs this does not matter in the calculation of the transfer function, but to show a nice result we'd need to compensate the result.



This is the purpose of the *Compensate FFT* setting in this setup.

- *Flat with White Noise*: Using this option SATlive will compensate in a way that the result will look like a single FFT's result, showing a -3 dB slope when fed with pink noise. Because the spectrum of music will look more like pink noise than like white noise, using the *Set Cursor On Peak* function would always place the cursor on the left border of the display. Using the *Peak Localization Using Inverse Pink Filter (MAT - FFT)* option will overcome that problem. It will use the *Flat with Pink Noise compensation* prior to the localization of the peak.



- *Flat with Pink Noise:* This option will result in a trace that will be flat while measuring a pink - noise signal.



Using this compensation changes the behavior of the display to a kind of a *High - Res RTA* display, which is the most common use of the FFT in live audio.

- *Sawtooth with Pink Noise:* This setting will leave the result uncompensated. Beside of educational purposes (like this paper :-)) I do not know any application where this display would make sense. If you know one, please let me know.

