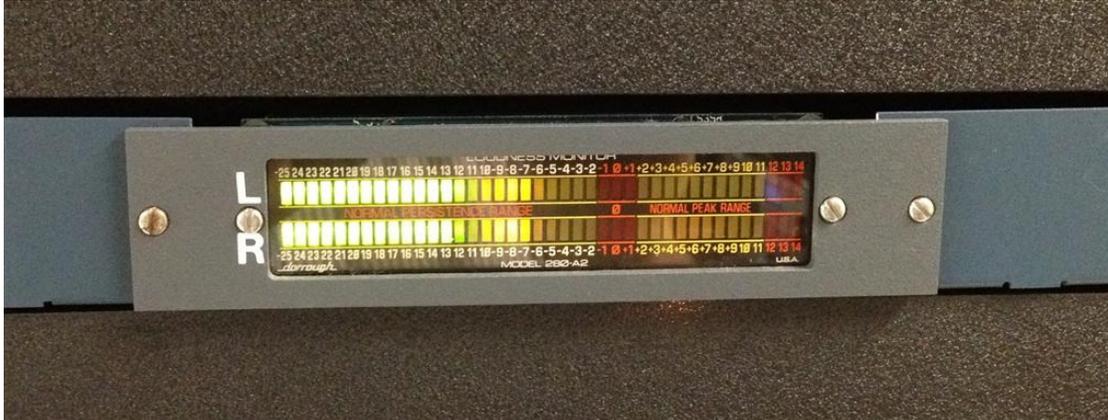Print this document

With Meters, Don't Agree to Disagree

Steve Johnston,09/19/2013

An example of a digital meter that was designed to display both VU standard response and peak tracking.

Some excellent articles have appeared lately on the history and use of audio level meters in radio, including Oliver Berliner's "The 'vu' Meter Legacy Shines On" in Radio World's May 8 issue. However, these articles have not addressed one important modern issue: We now have studios full of meters that do not respond in the same way on dynamic program material, and which do not follow the VU and PPM standards for responsiveness.

I would like to describe the situation and offers suggestions for getting along with this modern metering.

WHY DON'T THE METERS MATCH?
Once upon a time in our business, if you calibrated all the meters in a studio to agree on a steady tone, they would also agree on voice and music. Unfortunately, those days are gone. In the days of analog meters and recording media, a "vu meter" had a technical specification as to performance on a variety of audio, and you could count on vu meters all bouncing to the same levels on the same signals, resulting in a consistent level being observed from console to console and among recording and playback devices.

In other words, if you calibrated all the equipment with a standard tone, and everyone bounced the meters about the same, the results would be fairly consistent no matter what sort of programming was being produced. The same was true for facilities equipped with the less commonly used "PPM" (Peak Program Meter) standard.

But today, you can't trust that audio level meters are standardized. While they should ideally all respond to steady tone the same way, in reality, they can be wildly different on actual, dynamic program material. Some meters follow momentary peaks while others ignore them — and you will find all variations in speed of reaction between those extremes. This kind of variation leads to differing levels on production done on different equipment with different audio material.

Computer software "meters" are a big offender in this regard. The "bounce" of the onscreen "meters" is very different from real vu meters and can be misleading, especially on dry voices, resulting in different announcers getting different results, even when they think they are making the meters read the same.

In addition, the varying lag time involved in the calculation and display of the meter bar graphs in computerized systems can play a big role as humans use the display for real-time work.

WHAT TO DO?
Here at Wisconsin Public Radio, we always calibrate to a standard tone, but I recommend to our staff that they also look at the overall waveform display when finished with a recording, in order to learn how to judge the levels on real program material. I like to

see a waveform that occupies roughly two thirds of the available space. That generally results in a good level.

And you don't want many, if any, instances when the top and bottom of the waveform limits are reached. Those are peaks, which are getting hard-clipped because you are out of headroom. With experience, you can learn what meter bounce on your equipment produces a given waveform appearance, as well as corresponding loudness on playback for the typical sort of audio you are recording.

When using import software to directly transfer files into computerized storage/playback systems, it is important to do some followup checks to see how loud or soft the audio is once it gets into the system. Since people can change the way audio is displayed on their production software (Sound Forge, Adobe Audition, Audacity, Pro Tools, etc.) and the digital "meters" on that software vary in performance, there is no reliable standard between production software and automation systems for file transfers.

Audio level meters should adhere to the official VU standard for response to signals, but don't always, even if they are marked 'VU' on the face.

Have a look at the waveform in your automation after import and note how it compares to the waveform in your production software. If needed, adjust your levels using the building in normalization features of the editing software, resave the file, use the import process again and have another look. After some quality control comparisons of this sort, you'll soon learn what loudness you need on your production system to get a successful file transfer.

Remember: In digital recording, what sets the level is how the file ends up on the recording media, which these days is usually the hard drive in the device that will be used for playback on the air. Level indicators and waveforms on recording and editing devices earlier in the production process, while important for keeping audio clean and free of clipping on their own device, do not directly control the level and loudness at which your program material ends up playing back on the air.

Naturally some variation will always be present. Air studio operators are expected to use their faders, and we should always have audio processing on the outgoing audio lines, which will compensate to some degree for varying levels. But always bear in mind how modern audio level meters may bounce in differing ways.

LET'S RECAP
Getting a handle on the wildly varying audio metering is not easy. Orban has produced a free software package known as the "Orban Loudness Meter" (*www.orban.com/meter*), which accepts two-channel stereo inputs and displays instantaneous peaks, VU, PPM, CBS Technology Center loudness, ITU BS.1770-2, EBU R 128 loudness, and Reconstructed 8x Over-Sampled Peaks. The comparison of the various meters shown in the Orban program as you work with audio in your studio software and hardware can be very educational. It will help you understand the issue we face.

I have hopes that the recent interest in metering of the human perception of "loudness" and projects such as the ITU BS.1770-2 standard (see *radioworld.com/links* to read it) will stimulate enough interest in the subject that equipment manufacturers will embrace a new standard and we can begin to trust the meters again.

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