NAB Radio TechCheck

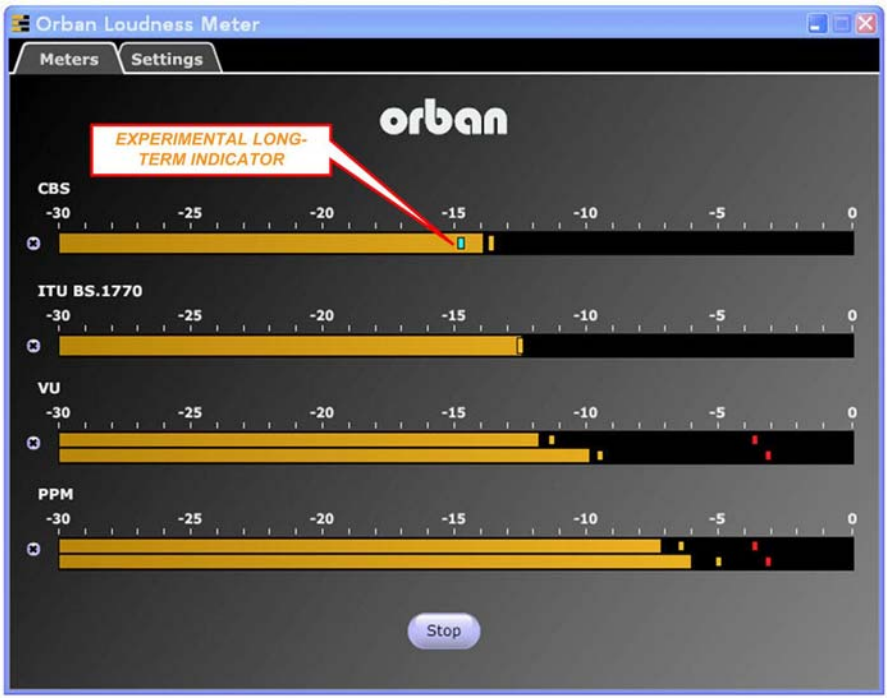
The Weekly NAB Newsletter for Radio Broadcast Engineers

June 9, 2008

Orban Loudness Meter for Windows Computers

Every radio station has a need for audio metering, and audio processing company Orban (Tempe, AZ, www.orban.com) recently made available the Orban Loudness Meter software as a free downloadable program for computers running Windows XP and Vista operating systems. Included in this software is an "experimental" long-term loudness indication algorithm which attempts to mimic a skilled operator's mental integration of the peak swings of a meter with "VU-like" dynamics.

Sounds to be monitored by this software are fed into the computer through the line-in or microphone inputs on the computer sound card (the software accepts two-channel stereo inputs). Simultaneously displayed on the computer screen are instantaneous peaks, VU, Peak Program Meter (PPM), CBS Technology Center loudness, and ITU BS.1770 loudness (see screen shot below). All meters include peak-hold functionality that makes the peak indications of the meters easy to see. The VU and PPM meters are split to indicate the left and right channels. The PPM meter also displays the instantaneous peak values of the L and R digital samples. Adjustable settings include VU meter gain (-10 to +10 dB), PPM attach time (5 or 10 msec), and meter refresh rate (20 Hz to 100 Hz). Additional information provided below on the various algorithms has been obtained from the Orban Loudness Meter installation notes, www.orban.com/meter/Installation.html.



The CBS meter is a "short-term" loudness meter intended to display the details of moment-to-moment loudness with dynamics similar to a VU meter. It uses the Jones & Torick algorithm developed at the CBS Technology Center and published in 1981 in the SMPTE Journal. Created using Orban-developed modeling software, the DSP implementation typically matches the original analog meter within 0.5 dB on sine waves, tone bursts and noise. Orban developed the CBS meter software because it was deemed useful for practicing sound engineers and researchers and because it is used in an Orban product, the Optimod 8585 Surround Audio Processor. The "experimental" indicator mentioned above is visible as a single cyan bar on the CBS loudness meter uses a relatively simple algorithm; Orban is soliciting feedback on its perceived usefulness.

The Jones & Torick algorithm has its foundation in psychoacoustic studies done at CBS Laboratories over a two year period by Emil Torick and the late Benjamin Bauer. After surveying existing equal-loudness contour curves and finding them inapplicable to measuring the loudness of broadcasts, Torick and Bauer organized listening tests that resulted in a new set of equal-loudness curves based on octave-wide noise reproduced by calibrated loudspeakers in a semi-reverberant 16' x 14' x 8' room, which is representative of a room in which broadcasts are normally heard. In 1966, they published this work in the IEEE Transactions on Audio and Electroacoustics, along with results from other tests whose goal was to model the loudness integration time constants of human hearing.

The ITU BS1770 loudness meter uses a frequency-weighted root-mean-square (RMS) measurement intended to be integrated over several seconds—perhaps as long as an entire program segment. As such, it is considered a "long-term" loudness measurement because it does not take into account the loudness integration time constants of human hearing, as does the CBS meter. The ITU-R published Recommendation ITU-R BS.1770: "Algorithms to measure audio programme loudness and true-peak audio level" in 2006.

Orban's BS.1770 loudness meter implementation uses the Leq(RLB2) algorithm as specified in the Recommendation. This applies frequency weighting before the RMS integrator. The frequency weighting is a series connection of pre-filter and RLB weighting curves. The Orban meter precisely implements equations (1) and (2) in this document by using a rolling integrator whose integration time is user-adjustable from one to ten seconds.

The Orban software runs on computers having 1.5 GHz or faster Intel or Intel-compatible processors that implement the SSE2 instruction set. The software can be driven by any installed Windows sound device. According to Orban, this is the first of a family of Orban meters. Future, paid versions are expected to offer upgraded features including logging, surround monitoring, and oversampled peak measurements that accurately indicate the peak level of the audio after D/A conversion. The Orban Loudness Meter can be found on the Internet at http://www.orban.com/meter.

NAB AM Antenna
Computer Modeling Seminar
November 20-21, 2008
NAB Headquarters
Washington, DC

Don't miss this opportunity for broadcast engineers to learn the basics needed to utilize modeling software such as MININEC and nodal analysis for designing performance-optimized AM directional antenna phasing and coupling systems and proving the performance of directional antenna patterns.

You will learn about:

- Moment Method Modeling Basics
- DA Proofing Using Moment Method Modeling
- Overcoming Limitations of Using Field Strength Measurements for DA Proofs
- State of the Art in Phasing System Design Nodal Analysis of AM DA Phasing and Coupling Systems
- Pattern Design Considerations for Optimum Performance

AM antenna experts Ron Rackley and Ben Dawson, along with antenna modeling software specialist Jerry Westberg, will lead the seminar demonstrating how moment method modeling makes analysis of actual tower current distributions possible and how a model can be used to proof an array provided the proper criteria are considered. All instructors are well known in the radio industry as experts in the field of directional antenna design and maintenance. Their decades of experience offer station engineers an opportunity to learn techniques, tips and tricks that can be immediately useful.

Seminar fee: $395.00 (NAB members) and $495.00 (non-members). For more information on the curriculum, how to register or housing go to AM DA Seminar on the NAB Web site or call Sharon Devine at (202)-429-5338. Register now for the NAB AM Antenna Computer Modeling Seminar!