TC Electronic's loudness radar meter

The unit provides a valuable tool in the ongoing fight against the loudness wars.

BY THOMAS LUND

The most fundamental audio issue of all — control of loudness — makes millions of people adjust their volume controls over and over on a daily basis. The CALM Act and legislation in other countries are signs of how serious the issue has become in digital TV and with multi-platform broadcasts around the world.

TC Electronic's radar loudness meters represent a quantum leap away from simply measuring peak level to measuring perceived loudness. The old method is responsible for unacceptable level jumps between programs and commercials, and an increased audio workload at the station because audio formats and program genres are incompatible when only peak level is considered.

Radar meters are part of a new, globally standardized system, whereby audio may easily and consistently be measured and controlled at various stages of production and distribution, thus creating a transparent loop from creation over delivery to logging. Workload is minimized and audio quality is maximized not only in AC3-based transmission, but in delivery to all platforms. Follow guidelines given in this article to be compliant with the latest ATSC, EBU and ITU recommended practices.

Loudness on the radar

The meter displays momentary loudness and loudness history in a single, unique radar view. (See Figure 1.) The circular, color-coded display makes it easy to balance audio visually and to see when level falls below or exceeds the end-listener's loudness

range tolerance. Figure 1 shows a scene from "Desperate Housewives" that is generally too soft. It's a tremendous help for a mixing engineer or a video editor to know which radar

Figure 1. This shows a scene from "Desperate Housewives" that has audio levels generally too soft.

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area to stay inside as shown in Figure 2, where a film scene from "Pirates of the Caribbean: On Stranger Tides" clearly falls outside normal broadcast expectations.

The radar itself is complemented by a true-peak warning and by two numbers to characterize the entire loudness 'landscape' of a program, film or music track precisely. By default,

the numbers displayed are program loudness and loudness range.

Program loudness is a standardized integrating loudness measurement. If one program should be aligned in
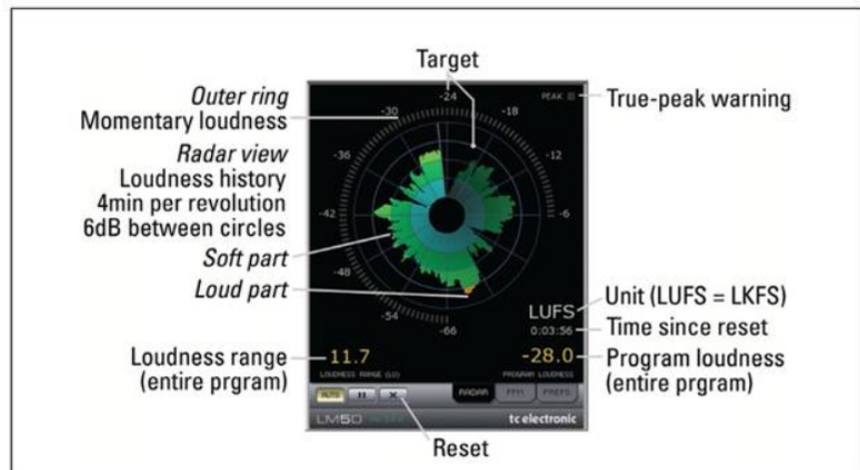
loudness with another using only a gain offset, that offset would be the difference between the program loudness values of the two. Practically speaking, both programs should simply be normalized to a certain target loudness. In the United States, the value to aim for is -24LUFS. That number is directly compatible with AC3's dialnorm parameter, which should also be set to 24.

Loudness range is a standardized measure of the loudness range of a program. It measures the difference between soft and loud parts. From an application's point of view, loudness range is compelling 1) as a production guideline, 2) for prediction of platform compliance during ingest or on a server and 3) for verifying a transparent signal path all the way from the studio to the home-listener.

Figure 2. This illustrates the target loudness within which levels should be aimed. In the U.S., the level should be -24LUFS.

> ## Audio is precious and deserves to be reproduced respectfully.

Note that the number stays the same downstream of production, even if a program is later normalized.

LKFS, LUFS and LU

Since the units used on different loudness meters currently varies, it's important to be aware of the differences and similarities of these units. First of all, LKFS (Loudness 'K-weighted' Full Scale) and LUFS are interchangeable, and both denote an *absolute* measure of the loudness of a digital signal. For instance, -24LUFS is precisely the same as -24LKFS.

LU, on the other hand, is a *relative*

measure of loudness. When displaying loudness level on an LU meter, a certain target loudness is explicit. For instance, if the target loudness level of a station is -24LUFS, the radar meter can be configured to show that number as '0'LU, which causes a level of -27LUFS to be shown as -3LU, while one of -20LUFS will be shown as +4LU. In other words, it's merely a question of preference whether an absolute or a relative display of loudness level is preferred. TC radar meters present both options to the user.

Radar meter platform range

TC's loudness radar meter comes in a number of different versions. The LM2 stereo hardware loudness meter will show the above-mentioned descriptors on a built-in display, while the full radar meter (stereo version) is included as software for PC and Mac. Further, TC TouchMonitor TM7 and TM9 feature the radar meter as does the transmission processors DB4 MKII and DB8 MKII.

Finally, it is also available for Pro Tools HD as the LM5D plug-in, for TC's System 6000 MKII digital signal processer and as a new LM6 plug-in that is compatible with most audio and video editors, such as Mediacomposer, Final Cut Pro, Pro Tools, Nuendo, Sequoia, Logic Pro and more.

Transparent and closed loop

On a global scale, broadcasting is adopting a transparent and predictable loop, spanning from production over distribution to various end-listener platforms and logging. TC embraces this closed loop and stands committed to support further loudness and true-peak based improvements to already-existing broadcast standards in the years to come. Without forgetting linear audio, work will continue optimizing delivery of data reduced formats and refining trickle-down techniques for dealing easily with multiple platforms without locking broadcasters into proprietary solutions.

Conclusion

Audio is precious and deserves to be reproduced respectfully. For ages, sound was a natural phenomenon, only existing in the exact moment it was being produced, but technology allowing for recording and reproduction of audio has changed that once and for all. Now, beautiful audible moments can be captured and reproduced to enjoy at any time.

However, technology can also be abused, which, as described in the above, is rarely beneficial to the music and film-loving listener. Excessive and inexpedient use of compression, limiting and maximization causes audio to suffer considerably. The radar meter aims to offer production, post and broadcast professionals a valuable tool in the ongoing fight against the loudness wars, and help them reclaim the right to, once again, deliver wide, dynamic-range program material. **BE**

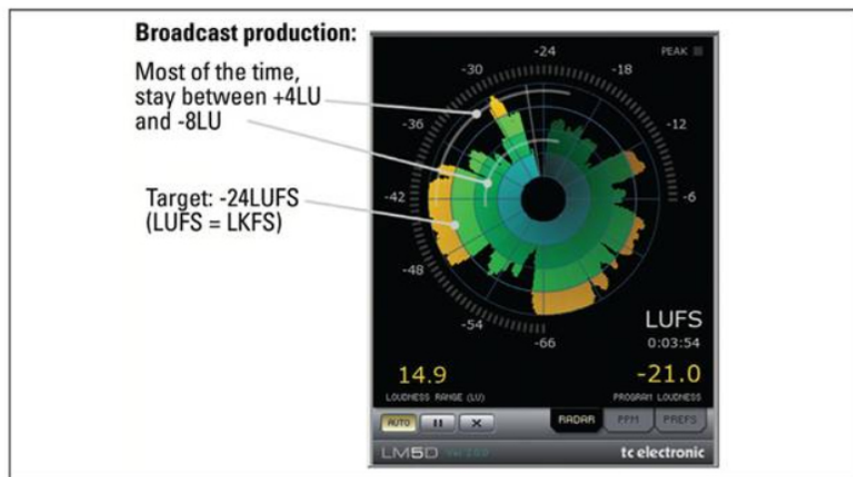*Thomas Lund is HD development manager at TC Electronic.*