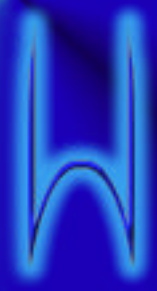

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DOLBY SR AND THE COMPATIBILITY ISSUE

BY

JOHN F. ALLEN

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With an increasing number of releases recorded in Dolby's new Spectral Recording (SR) process, some confusion has risen about how to best equip a theatre's sound system, and about compatibility with the familiar Dolby A system. This article will attempt to explain some of the issues involved.

Noise reduction systems for analog and even some digital audio recording systems are a fact of life. Though we would rather be able to do without such processing, we accept their small degradations in exchange for the benefits of less noise. Without noise reduction, excessive amounts of hiss would be heard during quiet passages and distortion could cloud the loud sections of a recording.

Noise reductions systems don't actually reduce noise at all. Instead they mask it with the audio signal itself. During the recording stage, the quiet passages are boosted, that is made louder, and then recorded. During playback, the boosted signals are reduced, let's say "un-boosted", and thus restored to their original quiet levels. As these signals are reduced, so is the underlying noise of the recording medium. In the absence of an audio signal, the underlying noise is rendered inaudible.

Each of the noise reduction systems available today does its job differently. Strictly speaking, none of the different noise reduction systems is compatible with another. How could they be? If the goal is a complimentary encoding / decoding process resulting in the input and output of the recorder sounding the same, we must precisely undo any boosting performed during the recording stage. Failure to do this results in mis-tracking which we hear as noise pumping and other inappropriate level changes.

When it comes to decoding errors, are there certain types of program materials which are more forgiving than others? Yes there are, but we must be extremely careful. Oddly enough, listening to a boosted recording with no noise reduction decoding can provide "acceptable" results if one simply turns down the treble. This is why a Dolby Stereo film can give satisfactory results when played over a monophonic sound system. Since Academy Mono rolls off the high frequencies, this effectively reduces the treble enough to

compensate for the boosted recording.

However, if one plays an un-encoded mono film through a noise reduction system, the results are terrible. The reduction circuits rapidly and audibly play havoc with the levels. Dialog intelligibility can be dramatically diminished.

COMPARING DOLBY A AND SR

Dolby A works by dividing the audio spectrum into four fixed bands and performs about 10 to 15 dB of boosting on the low level signals. High level signals are untouched. Dolby SR is vastly more complex. With both fixed and variable bands, Dolby claims that we can think of it as equivalent to a 10 band system providing 16 to 24 dB of boosting for the low level signals AND some 3 dB of compression to the high level signals.

For an analog noise reduction system, Dolby SR is most impressive. Without a doubt, the one recording medium which can benefit the most from such a process is the photographic soundtrack of motion picture films.

Since the dynamic range of 35 MM release prints is so inherently limited and the background noise rather loud, Dolby SR provides an enormous advantage, even over Dolby A. Does this mean that 35 MM films recorded in Dolby SR will equal 70 MM six track presentations? No. But it does narrow the gap.

With the obvious advantages of this new process, distributors are releasing more and more films in SR. How should exhibitors respond? It seems to me that the answer is simple: Exhibitors should equip theatres with the proper noise reduction decoders.

What will happen if an SR print is played over a mono or conventional Dolby A system? The answer to this depends on the program material. Mono reproduction seems to work quite well. What we hear is a highly compressed signal without the high distortion which usually plagues monophonic films. Stereo is a different story. U2 RATTLE and HUM was released exclusively in Dolby SR. It played fairly well over Dolby A systems due to the fact that the sound was all impulsive rock music.

SR prints of ROBOCOP were less successful when played on Dolby A systems because the soundtrack contained wide dynamic range music, effects and dialog. Since many of the effects in such a film are recorded at relatively low levels, they get boosted during the noise reduction encoding process. As Dolby A performs less "un-boosting" than SR and in different bands, the aforementioned effects end up sounding relatively too loud in the theatre. This can be quite distracting and was very apparent with ROBOCOP. To be fair,

the ROBOCOP SR mix was never intended to be compatible with Dolby A. Mixes intended to be played on both formats are carefully monitored to achieve what Dolby calls "commercial acceptability" when played over either system.

If mixers are careful, compromises can be made so that an SR release can be more "acceptable" when played through an A type system. In these circumstances, both the SR and A type presentations must be somewhat diminished. Fully SR equipped theatres would eliminate the need to compromise and allow producers to take full advantage of this new technology.

At the moment, several cinema processor manufactures have announced packages for updating their equipment to be compatible with SR playback decoding. Exhibitors should consult their dealers for further information.

SR INSTALLATION CONSIDERATIONS

The use of Dolby Spectral Recording improves the high frequency capability of optical soundtracks. Therefore, when installing SR playback equipment, it is strongly recommended that the projector's slit lens be replaced with a .49 mil type, and that the optical preamplifier be replaced or updated to match these new narrow slit lenses. The increased dynamic range available from Dolby SR releases rivals that generally associated with 70 MM presentations. As a result, a theatre's speakers and amplifiers need to be equivalent to those capable of reproducing 70 MM and digital soundtracks. For all practical purposes, the three systems can be considered to have similar dynamic range. This means that each channel, including the surround channel, should be able to deliver 111 dB Sound Pressure Level in the middle of the theatre when the amplifiers are at their maximum power output. Very few cinema systems today can even come close to this. It is also recommended that theatres be as quiet as Noise Criterion 25 so that all the soundtrack's subtleties can be heard.

Dolby SR provides a new opportunity to enhance the performance available from optical soundtracks. The results can be very satisfying and marketable to today's sound conscious audiences. Taking full advantage of SR requires proper decoding, a narrow slit lens plus a very hefty set of amplifiers and speaker systems. Presenting SR prints in non SR equipped theatres will give varying results depending on the film mix. However satisfactory such compromised results may occasionally prove to be, they will certainly not be as good as a full SR presentation.

John F. Allen is the founder and president of High Performance Stereo in Newton, Mass. He is also the inventor of the HPS-4000® cinema sound system and in 1984 was the first to bring digital sound to the cinema. John Allen can be reached by E-mail at JohnFAllen@aol.com.