THE 6 POINT CHECKLIST

Dolby E

FOR PLAYOUT, POST, AND BROADCAST

What is Dolby E?

Dolby E is an audio encoding technology created by the **Dolby** company. **Dolby E** enables broadcasting and post-production facilities to carry up to eight channels of sound over their existing stereo (two- channel) infrastructures. Unlike consumer level codecs, **Dolby E** can be decoded and re-encoded many times within a broadcast chain without any discernible loss in quality.

Where is Dolby E used?

Dolby E can be used anywhere in the broadcast chain prior to the point where the audio will be delivered to consumers. **Dolby E** is never delivered to end users, but is instead decoded back to baseband, and then encoded into the required consumer format, such as **Dolby Digital**.

Why is Dolby E used?

Dolby E technology allows broadcasters to fit up to 8 audio channels into the space of a single PCM stereo pair.

Thus when they need to add surround sound, or multiple languages, these can be carried within the existing infrastructure, making for a cost effective upgrade.

Dolby E uses a frame based structure for the audio data. This provides frame- accurate audio to ensure effortless switching, editing, encoding, and decoding.

Metadata is inserted along with the **Dolby E** data, and can be carried through to the **Dolby Digital** that is sent to the end user. The metadata controls aspects of how the audio is reproduced giving a better sonic experience for the customer.

Dolby E AC-3

Dolby E streams contain AC3 metadata. This must be configured during encoding, as this metadata is automatically transferred to **Dolby Digital**, if that is being used to deliver to the end user. The purpose of AC3 metadata is to help control the end users hardware to give the best possible sound, and consistency across different programs and medias. For example, the AC3 metadata allows the users hardware to correctly play the audio whether the hardware contains just a single speaker, such as an old fashioned television, or has stereo speakers, or has a full 5.1 surround capability, and the audio will be processed appropriately to take account of the hardware configuration.

Dialnorm metadata must always be correctly set in the **Dolby E** stream. This is to allow the end user hardware to automatically adjust the playback volume level to give consistent loudness with different programs and media.

Dolby E Guard Band

Dolby E streams contain timecode. This is not usually required for the end user but may be necessary at different stages of the overall Production workflow.

As **Dolby E** encoded audio uses a frame-based structure, the frame rate of the audio must match the video when both are wrapped into a single file. The position of the frames of audio and frames of video within the file must be corrected aligned for playback. Dolby specify a “guard band”, which is a small null band around the ‘top’ of the audio within the frame. This allows error-free cut-style editing and video switching. However note that if the guard band at the top of the frame is increased too much, then the **Dolby E** data for the frame will not fit into the available space within the frame and would continue into the start of the next frame. This would cause an error in subsequent decode or playout applications.

The measurement of where the guard band ends and the **Dolby E** data starts is often called the line position. This relates to a specific video line to which the start of the **Dolby E** data is aligned. Dolby provide a table on the recommended alignment position for every different video format.

Using hardware to encode or decode **Dolby E** always takes one frame to complete, so if the audio is processed in real time, it will lag the video by one frame after processing (assuming correct synchronisation prior to processing). Some hardware compensates for this delay by buffering the video to match, but if this is not done, later correction will be required.

Use Dolby E successfully

Dolby E is a high quality and flexible audio encoding solution, but a number of factors need to be understood and correctly controlled.

A **Dolby E** encoded stream can contain between four and eight tracks of audio. A range of channel groupings are supported, including stereo + stereo, or four mono tracks for four tracks of audio, and 5.1 and stereo, or four separate stereos, for eight tracks of audio.

Dolby E can be encoded as 16 bit or 20 bit words. When 16 bit encoding is chosen it is only possible to encode four or six tracks of audio. 20 bit word length is needed if you wish to encode the maximum of eight tracks of audio.

This has an impact on the file type that will be used to contain the **Dolby E** encoded data. File types such as MXF or MOV usually have audio tracks for

16 bit words or for 24 bit words. It is not possible to include **Dolby E** encoded audio with a 20 bit word length into files that are created for 16 bit audio, and files with 24 bit word length would be needed to carry **Dolby E** audio encoded as 20 bits. Note however that conversely, 16 bit **Dolby E** can be placed inside media files containing 24 bit audio with no limitation.