

The Dolby® DP600 Program Optimizer is an innovative and flexible system that offers the world’s first intelligent file-based audio loudness analysis and correction system that is compatible with many of the Broadcast and VOD media file formats in use today. Expanding upon the technology developed for the award winning Dolby LM100 Broadcast Loudness Meter with Dialogue Intelligence™, the Dolby DP600, enables terrestrial, cable, IPTV, and satellite broadcasters the ability to automatically normalize the loudness of all of their file-based programming and commercials faster than real time and without impacting the original dynamic range.

For compressed audio formats that include metadata (i.e. Dolby Digital, Dolby Digital Plus and Dolby E), the Dolby DP600 can automatically set as well as automatically correct previously mis-set audio metadata parameters.

Optionally, the system also offers faster-than-real-time, file-based encoding and decoding of Dolby Digital, Dolby Digital Plus, and Dolby E content, as well as enabling transcoding between Dolby E and Dolby Digital or Dolby Digital Plus formats. By taking advantage of the features of Dolby Digital Plus, the DP600 can also perform high-quality, single-step Dolby Digital to Dolby Digital Plus transcoding without having to decode and re-encode.

To ensure the highest possible workflow integration and efficiency, the DP600 offers open-access (via published APIs) to Dolby’s unique audio processing engines as well as coding technologies traditionally found only in real-time hardware. For example, the DP600 feature set complements several types of 3rd-party applications/products such as those listed below:

- a. Archiving and Media Asset Management Systems
- b. Workflow Automation Systems
- c. Media File Transcoding Systems
- d. Media File Distribution Systems
- e. Post Production

“Under the Hood” of the DP600 Program Optimizer:

The DP600 includes several Audio and Media File Processing Engines that can be utilized in numerous Broadcast and Post Production applications. Figure 1 lists the supported Broadcast Media file types, and Audio Processing Engines included in the DP600.

Dolby DP600 Program Optimizer



Dolby DP600 Processing Engines

Media File Types Supported

- MPEG-2 Transport Stream
- MPEG-2 Program Stream
- GXF (SMPTE 360M)
- MXF
- WAVE and Broadcast WAVE
- Dolby E
- Dolby Digital (AC-3)
- Dolby Digital Plus (E-AC-3)

Loudness Analysis and Correction

- Dolby E
- Dolby Digital (AC-3)
- Dolby Digital Plus (E-AC-3)
- MPEG-1 LII
- LPCM

Direct Transcoding

Dolby Digital (AC-3) to Dolby Digital Plus (E-AC-3)

Audio Encoders *

- Dolby E
- Dolby Digital (AC-3)
- Dolby Digital Plus (E-AC-3)
- MPEG-1 LII

Audio Decoders *

- Dolby E
- Dolby Digital (AC-3)
- Dolby Digital Plus (E-AC-3)
- MPEG-1 LII

* optional

Figure 1—DP600 Processing Engines

DP600 Applications, Integration & Control:

The DP600 is flexible enough to sit between many of the file-based processes commonly found throughout the broadcast infrastructure today (see Figure 2). Once connected and configured, the DP600 becomes an intelligent network processing node that can be easily adapted to your day-to-day operations and workflow. Including:

1. Program Ingest, Audio Transcoding & QC: Newly ingested content can be routed through the DP600 for loudness analysis, correction as well as transcoding from/to several audio formats such as Dolby E, Dolby Digital, Dolby Digital Plus, or MPEG1 LII before being moved to your media storage library or playout server.

2. Media Archive Processing: Previously ingested content stored in your media archive can be analyzed, logged, and if needed, corrected faster-than-real-time before being placed back into your media archive. In addition, the DP600 can also transcode your archived media file audio format to/from Dolby E, Dolby Digital, Dolby Digital Plus, or MPEG-1 LII.

3. Post Production QC & Correction: File based media and/or audio assets can be analyzed, logged, and if needed, corrected faster-than-real-time before being delivered to your clients.

4. Post Production File Encoding & Decoding: File based Dolby E, Dolby Digital or Dolby Digital Plus bitstreams can be encoded and decoded to/from Multichannel WAVE or Broadcast WAVE files with audio metadata in XML format.

5. Ad-Insertion: New ingested ad content can be passed directly to the DP600 for loudness analysis and correction before being placed into your storage archive or ad server.

6. Video-On-Demand: The DP600 can be integrated upstream from your satellite VOD delivery system (Pitcher) to ensure that all content is at the correct loudness and that the audio metadata is correct. In contrast, the DP600 can also be integrated on the downlink side downstream from your catcher.

To offer users flexibility when integrating the DP600, broadcast media files can be routed and processed through the DP600 in three ways:

1. Manual Control: Allows users set up and initiate ‘processing jobs’ on an individual or batch basis from a simple to use web browser interface.

2. 3rd-party control via published APIs: To enable system integration at any level, the DP600’s processing engines are also available as a set of web services¹. This allows 3rd-party manufacturers to integrate the DP600’s processing engines directly into their workflow thereby creating a seamless user experience without impacting your day-to-day operations.

3. Automatic “Hot Folder” processing: In this mode, users can pre-define *profiles* that govern the DP600’s behavior with specific broadcast media file types. During operation, this mode automatically detects the presence of new media files in your “Hot Folder” (defined in your *profile*) and automatically processes the media file in accordance to your *profile* settings. Once processing has been completed, the processed media file is then placed back into a pre-defined directory and made available to downstream processes.

1. XML Web services communicate using open wire formats, which are protocols understandable by any system capable of supporting the most common Web standards. The DP600 WSDL and Schema is available upon request.

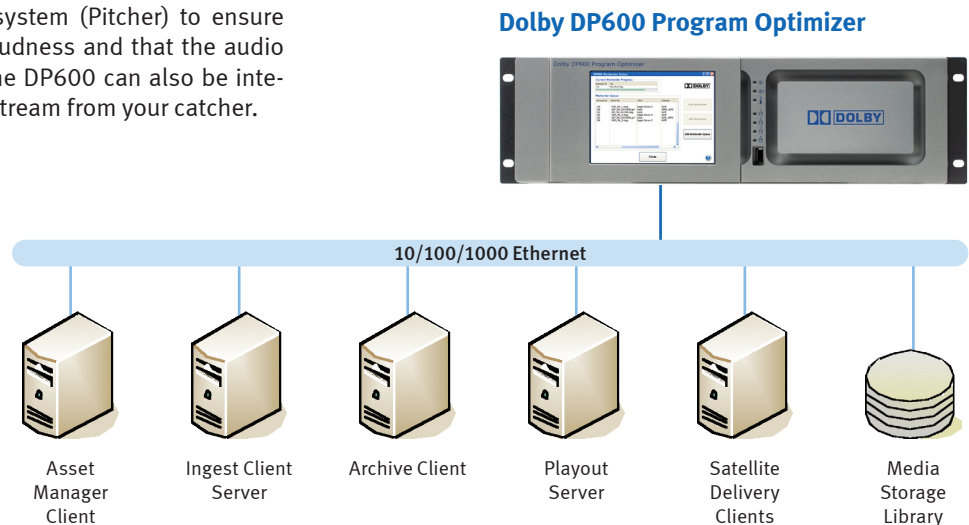


Figure 2—DP600 Integration Overview

Figure 3 shows a simplified application example of the DP600 integrated into a file-based broadcast playout facility. In this application the DP600 is placed between the ingest process and the media storage library and/or playout server. Ingested files are routed through the DP600 for loudness analysis and correction and then forwarded to downstream processes when completed. Routing the ingested files through the DP600 is accomplished in one of the three control methods defined earlier.

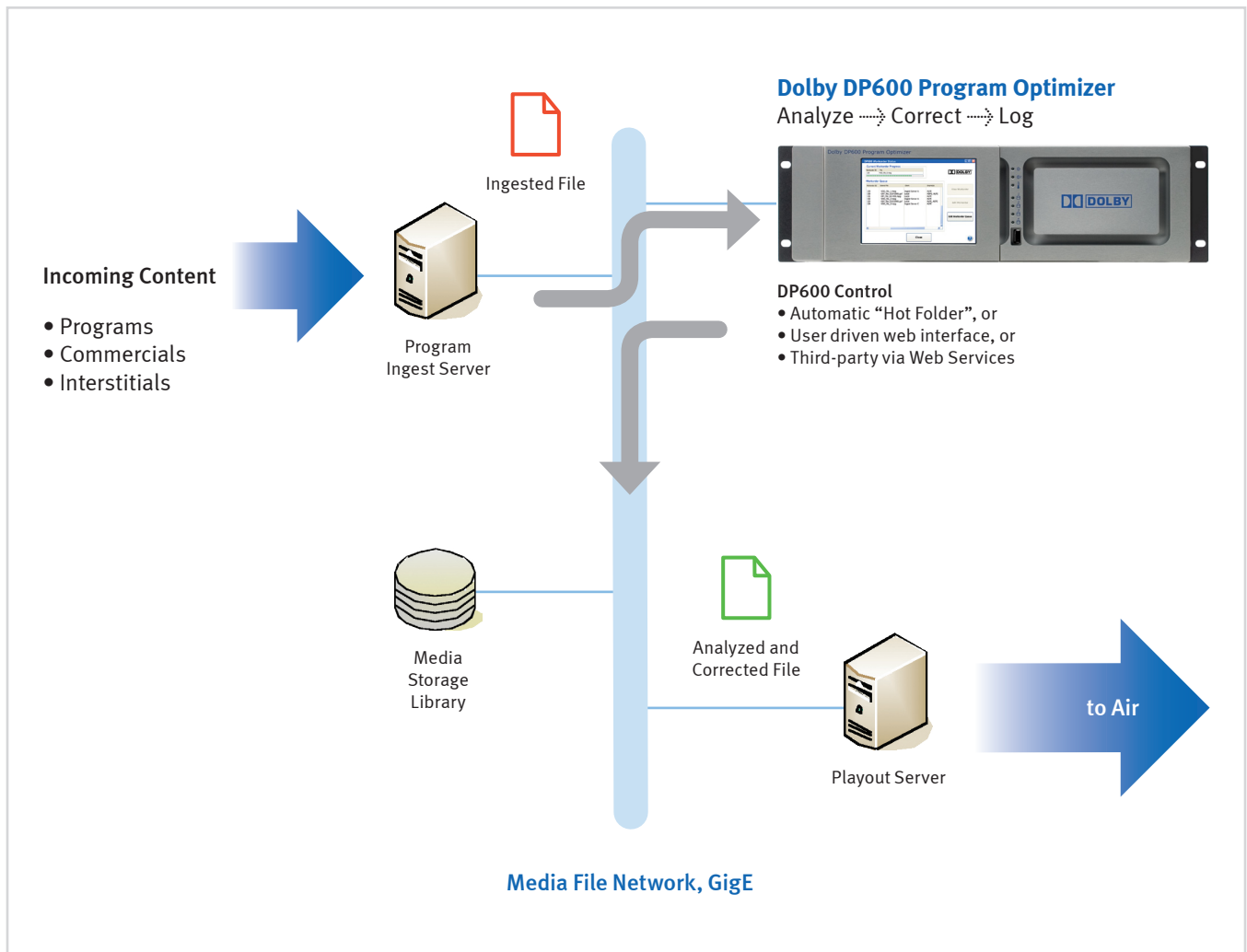


Figure 3—Media File Workflow Example; Loudness Analysis and Correction

Intelligent Loudness Normalization Process:

The DP600 expands upon the technology developed for the award winning Dolby LM100 Broadcast Loudness Meter with Dialogue Intelligence™. However, the DP600 intelligently ‘closes the loop’ on the measurement and correction process and gives users the ability to automatically normalize the loudness of all of their file-based content without impacting the dynamic range and in a faster than real time manner.

This unique process guarantees that important metadata parameters such as dialnorm are set properly for every file (program) without user intervention and/or time consuming measurement and correction processes that were previously done in real time. Importantly, any DP600’s in tandem will not re-correct any previously analyzed and corrected files.

For example, coded audio data types that include metadata such as Dolby E, Dolby Digital and Dolby Digital Plus, the loudness normalization process is achieved by automatically analyzing the audio bitstream and then comparing this analysis with the stream’s metadata. If a mismatch has been detected between the audio and metadata, the DP600 will automatically correct the metadata values without having to decode and re-encode the audio stream. See Figure 4.

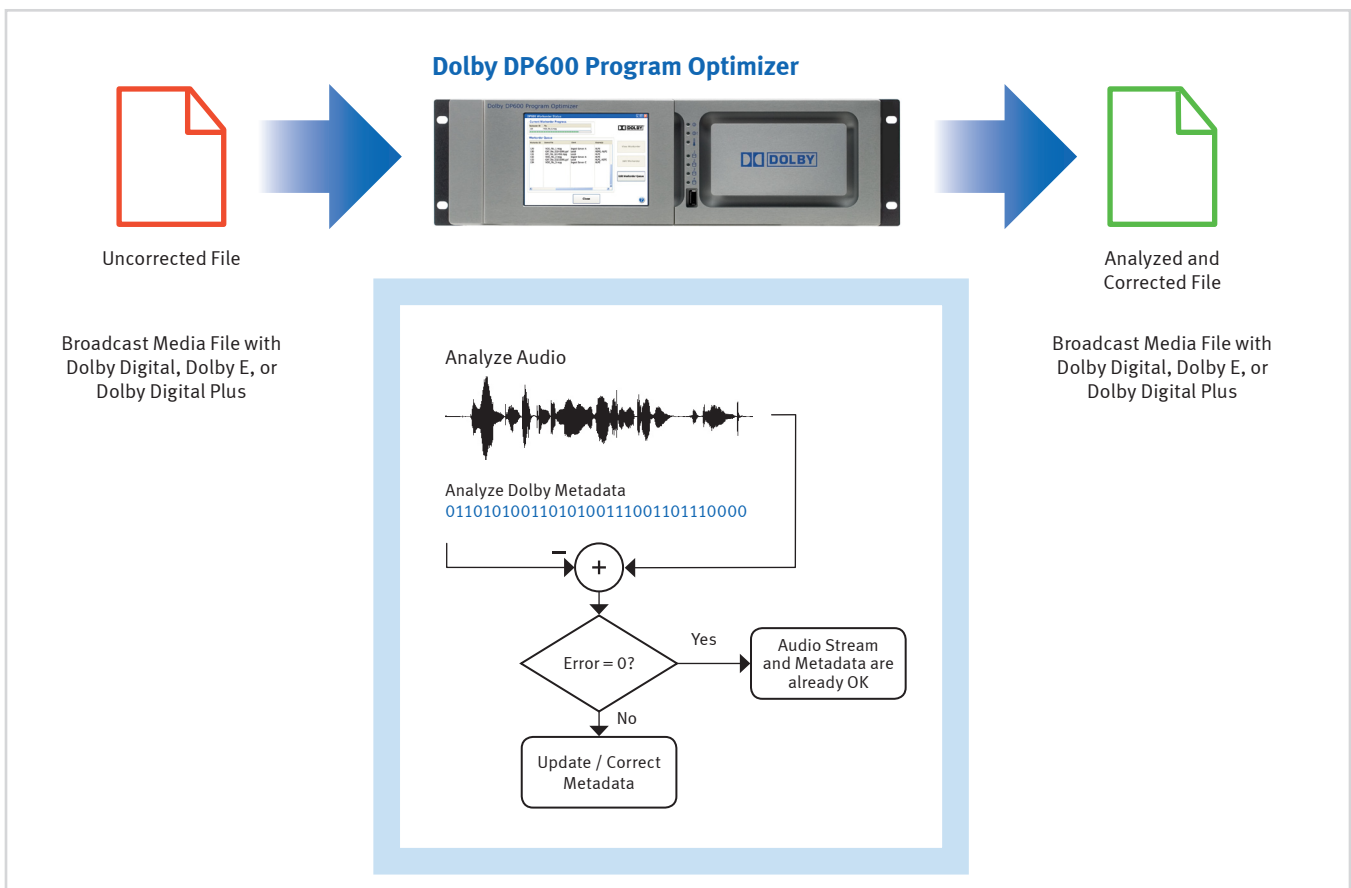


Figure 4—Coded Audio with Metadata Analysis and Correction

The DP600 can also correct coded and/or linear audio data types that do not include metadata such as MPEG-1 LII and LPCM. For these audio data types, the loudness normalization process is achieved by automatically analyzing the audio bitstream and then comparing this analysis with a user defined target loudness value. If a mismatch has been detected between the audio loudness and the user defined target loudness value, the DP600 will automatically scale the loudness to match the target value. This feature gives facilities of your file based programming to be pre-normalized to a user defined loudness level. See Figure 5.

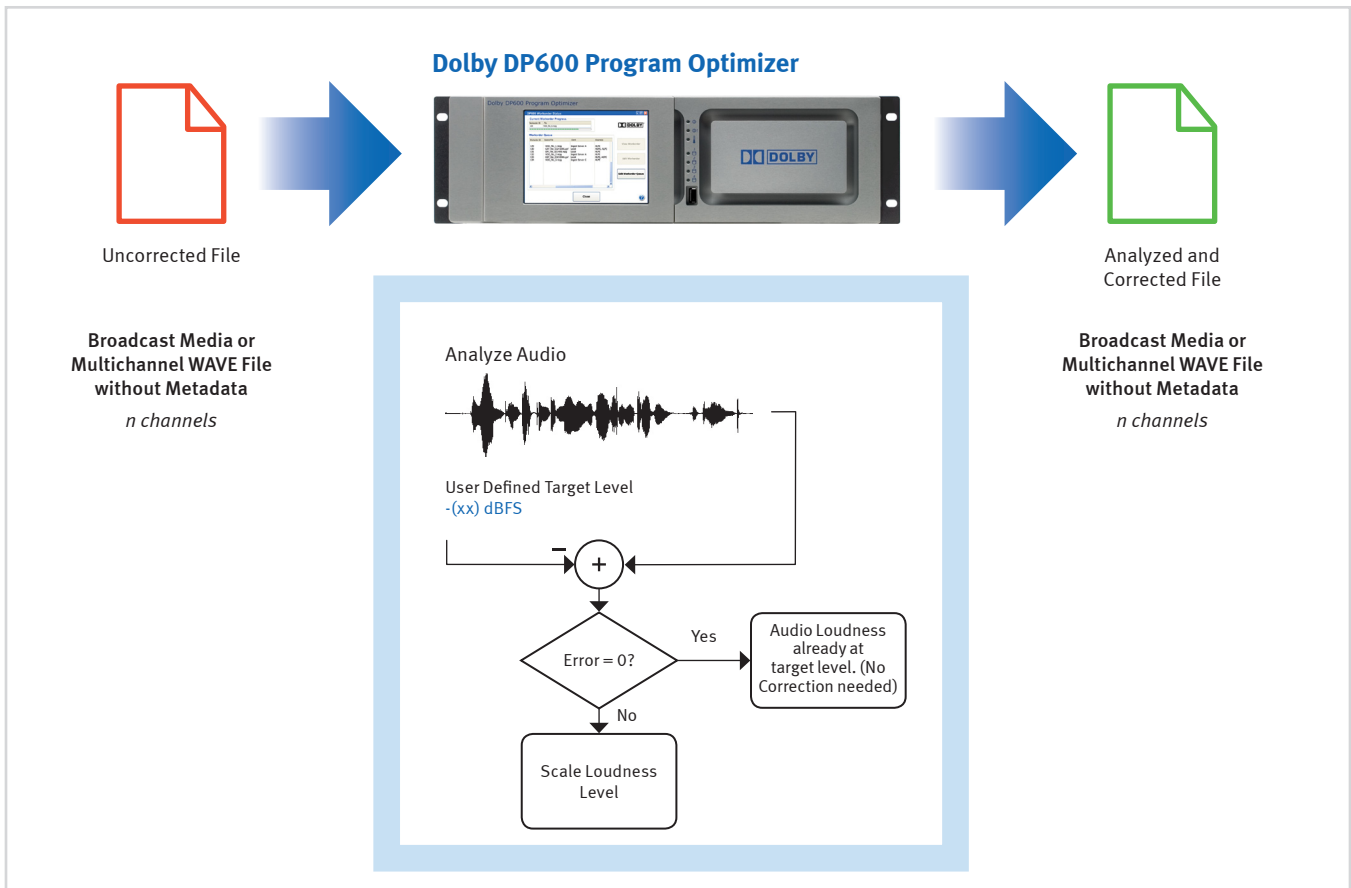


Figure 5—Audio Analysis and Correction for Audio Types without Metadata

File-based Dolby Encoding & Decoding:

Optionally, the DP600 offers access to Dolby technologies typically found in real-time hardware. These include:

- Dolby E
- Dolby Digital (AC-3)
- Dolby Digital Plus (E-AC-3)

These processes can be easily combined with each other as well as being combined with our Intelligent Loudness Analysis and Correction Engine to easily adapt to a wide range of content needs.

The audio decoder engines generate a multichannel / multi-program .wav or .pcm file with a separate XML audio metadata file.

The audio encoder engines accept multichannel / multi-program .wav or .pcm with an XML audio metadata file (if available). For audio files that do not include the XML audio metadata file, the audio analysis and metadata generation capabilities of the DP600 can automatically set metadata parameters such as ACMOD, Dialnorm that is appropriate for each program.

File-based Dolby Digital to Dolby Digital Plus Transcoder:

The DP600 also supports a unique quality-preserving Dolby Digital (AC-3) to Dolby Digital Plus (E-AC-3) transcoder. This process provides a simple migration path for next generation services utilizing your existing file-based content.

For example, media or VOD files that currently include a multichannel Dolby Digital (AC-3) audio elementary stream can be processed by the DP600 to add a Dolby Digital Plus (E-AC-3) audio elementary stream without having to demux, decode, re-encode and remux the files. All faster than real time.

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