

User Manual

Selenio X85™/X75™

Dolby® and Audio Metadata Applications

Edition B

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Publication Information

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X85-3G/X85HD/X75SD

Dolby® and Audio Metadata Applications

User Manual

**Edition B
February 2009**

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Preface

Manual Information

Purpose

This manual describes applications of Dolby and audio metadata when using X85/X75 Multiple Path Converters and Frame Synchronizers.

Audience

This manual is written for engineers, technicians, and operators responsible for the installation, and setup of the X85/X75 Multiple Path Converters and Frame Synchronizers.

Revision History


Table P-1. Manual Revision History

Edition	Date	Revision History
A	October 2008	Initial release
B	February 2009	Addition of X85 features

Writing Conventions

To enhance your understanding, the authors of this manual have adhered to the following text conventions:

Table P-2. Manual Style and Writing Conventions

Term or Convention	Description
Bold	Indicates dialog boxes, property sheets, fields, buttons, check boxes, list boxes, combo boxes, menus, submenus, windows, lists, and selection names.
<i>Italics</i>	Indicates email addresses, the names of books or publications, and the first instances of new terms and specialized words that need emphasis.
CAPS	Indicates a specific key on the keyboard, such as ENTER, TAB, CTRL, ALT, or DELETE.
Code	Indicates variables or command-line entries, such as a DOS entry or something you type into a field.
>	Indicates the direction of navigation through a hierarchy of menus and windows.
hyperlink	Indicates a jump to another location within the electronic document or elsewhere
Internet address	Indicates a jump to a website or URL
 Note	Indicates important information that helps to avoid and troubleshoot problems.

Unpacking/Shipping Information

This product was carefully inspected, tested, and calibrated before shipment to ensure years of stable and trouble-free service.

1. Check equipment for any visible damage that may have occurred during transit.
2. Confirm that you have received all items listed on the packing list.
3. Contact your dealer if any item on the packing list is missing.
4. Contact the carrier if any item is damaged.
5. Remove all packaging material from the product and its associated components before you install the unit.

In the unlikely event that your product fails to operate properly, contact Customer Service to obtain a Return Authorization (RA) number, and then send the unit back for servicing. Except for firmware upgrades, X75 products are not designed for field servicing.

Keep at least one set of original packaging in the event that a product needs to be returned for service. If the original package is not available, you can supply your own packaging as long as it meets the following criteria:

- The packaging must be able to withstand the product's weight.
- The product must be held rigid within the packaging.
- There must be at least 2 in. (5 cm) of space between the product and the container.
- The corners of the product must be protected.

Ship products back to us for servicing prepaid and, if possible, in the original packaging material. If the product is still within the warranty period, we will return the product prepaid after servicing.

Overview

This chapter describes the installation and theoretical discussion about the use of Dolby and audio metadata in X85/X75 multiple path converters and frame synchronizers.

The following topics are covered in this chapter:

- [“Installing Dolby Modules” on page 2](#)
- [“Data Port Information” on page 8](#)
- [“Dolby E Embedding” on page 10](#)
- [“Audio Delays in Dolby E and AC-3” on page 11](#)
- [“Dolby-E Audio Frame Alignment” on page 14](#)
- [“Audio Metadata” on page 16](#)

Installing Dolby Modules

To add an X75OPT-DOLBY-1 decoder, X75OPT-DOLBY-2 encoder module, or X75OPT-DOLBY-3 encoder, you must first remove the existing audio submodule or HD module, respectively, from the main board. Afterwards, the installation consists of two phases: hardware and softkey.

Information about the use of Dolby in broadcast applications is available at www.dolby.com.

Table 1-1 lists the available Dolby options.

Table 1-1. Dolby Options

Product Code	Description	Major Features
X75OPT-DOLBY-1	Internal Dolby E decoder submodule	Dolby E and Digital (AC3) integrated decompression; includes firmware upgrade
X75OPT-DOLBY-2	Internal Dolby E encoder submodule	Dolby E integrated compression; includes firmware upgrade
X75OPT-DOLBY-3	Internal Dolby digital (AC-3) encoder submodule	Dolby AC-3 integrated compression; includes firmware upgrade

Hardware Installation

The installation process for the Dolby decoder and encoder modules is similar, except that the HD submodule (rather than the audio submodule) must be removed to insert an encoder. Install the X75OPT-DOLBY-2 or -3 encoder under the HD submodule; install the X75OPT-DOLBY-1 decoder under the audio submodule (see [Figure 1-1](#)).

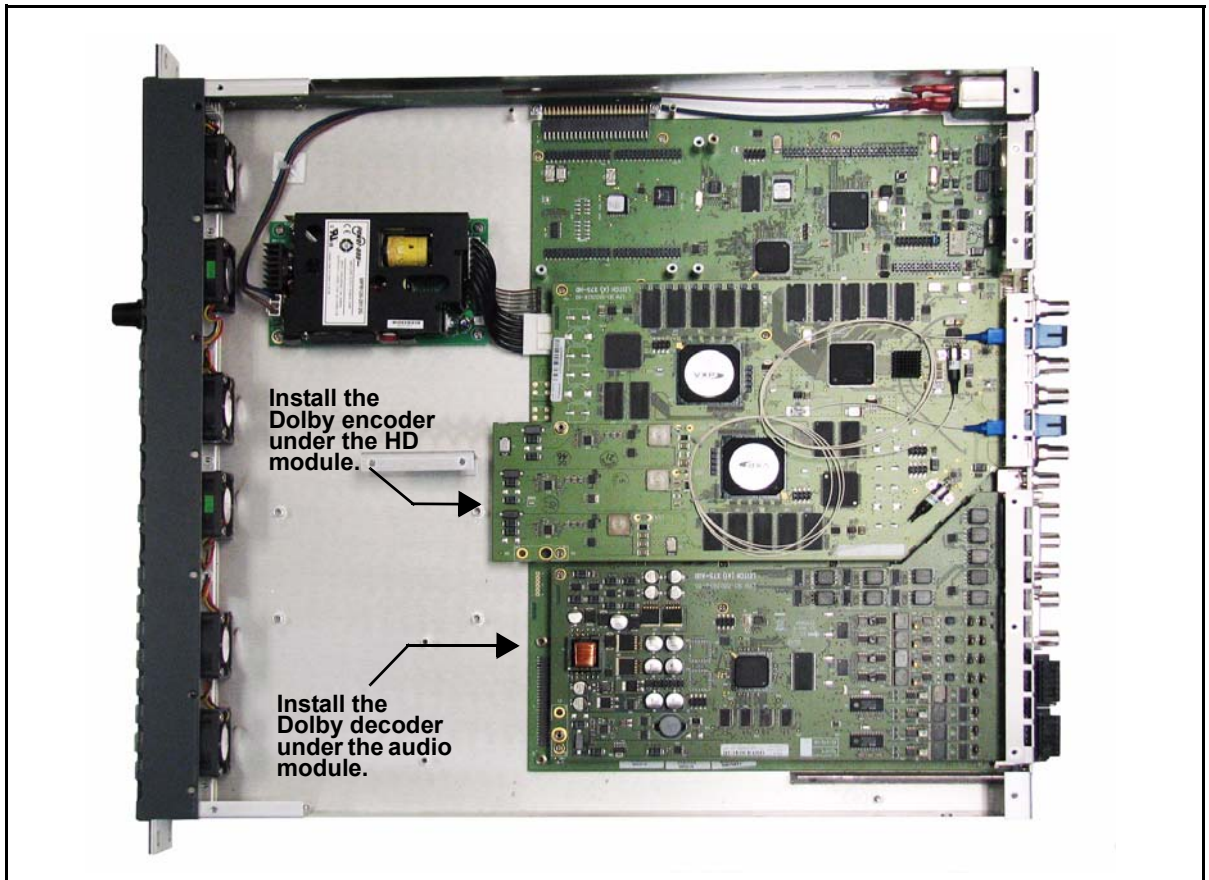


Figure 1-1. Location of Dolby Decoder and Encoder (X75OPT-HDUPG Module Shown)

The following instructions describe the installation of the decoder. The instructions are the same for the encoder, except for the different location inside the X85/X75.

1. Remove the screws along the back edge and on each side of the frame's chassis covers ([Figure 1-2](#)), and then slide the covers off. Retain the screws for later use.

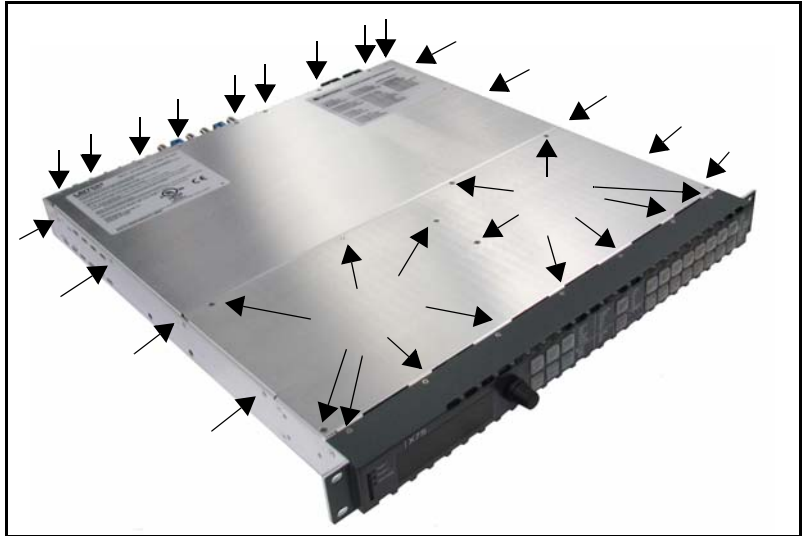


Figure 1-2. Chassis Cover Screws

2. Remove the three rear screws that secure the audio submodule to the frame (Figure 1-3) and/or the three screws that secure the HD submodule to the frame (Figure 1-4).

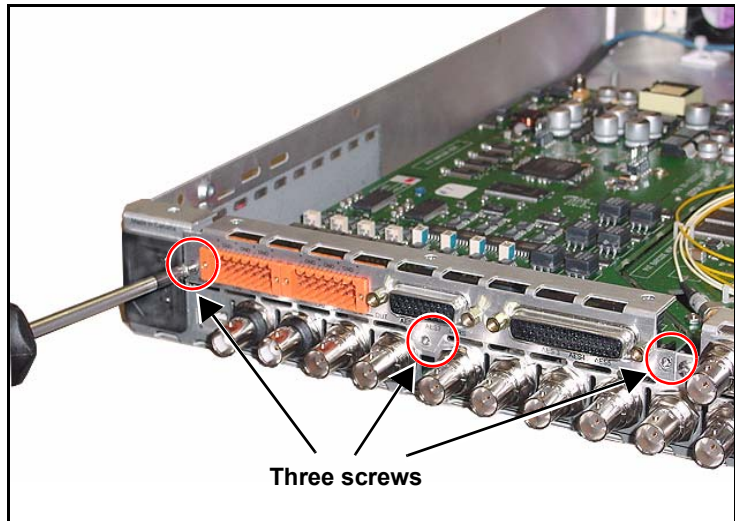


Figure 1-3. Removing Audio Back Module Screws

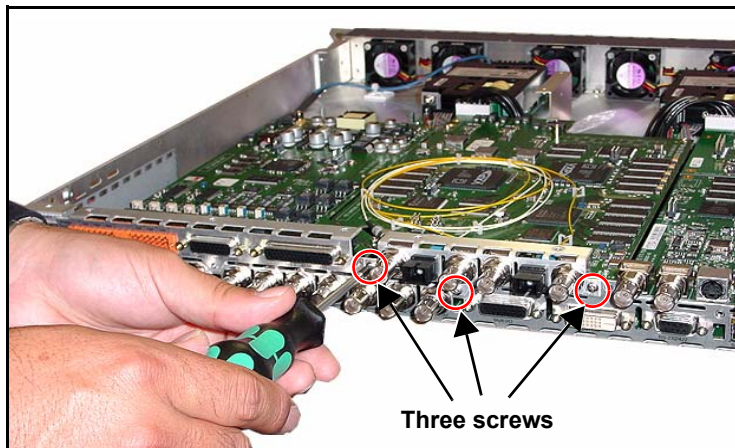


Figure 1-4. Removing HDTV Back Module Screws (X75OPT-HDUPG Module Shown)

3. Remove the three screws that secure the audio submodule to the main board (Figure 1-5) and/or the three screws that secure the HD module to the main board (Figure 1-6).

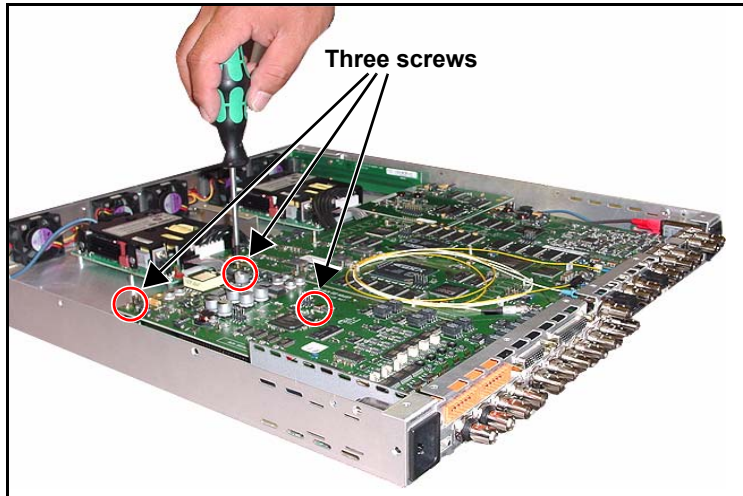


Figure 1-5. Removing Audio Board Mounting Screws

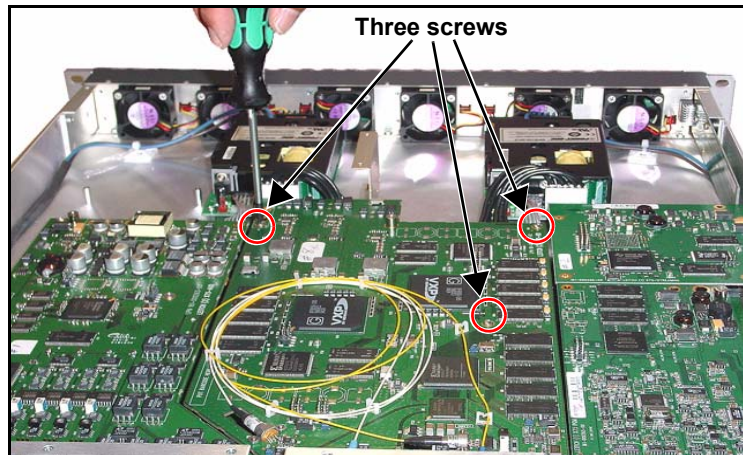


Figure 1-6. Removing HDTV Board Mounting Screws (X75OPT-HDUPG Module Shown)

4. Gently lift the audio submodule and/or HD submodule off the main board.

Be sure to lift the module off evenly to prevent the stacker connector pins from bending or breaking.

5. Inspect the connectors on the module and main board to ensure that all pins are straight.
6. Insert the Dolby decoder or encoder module into the socket. (See [Figure 1-7](#).)

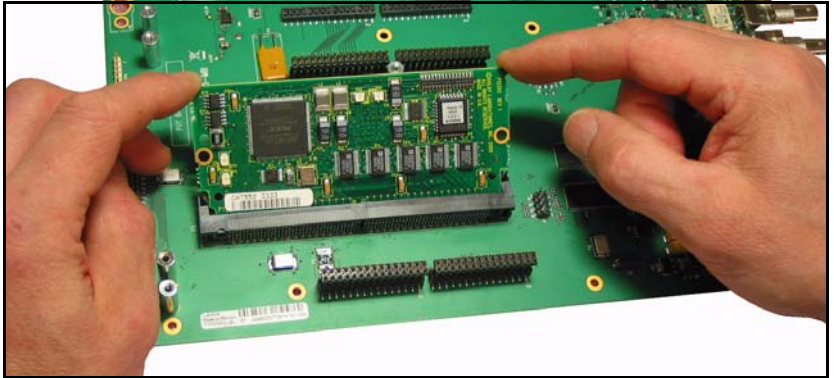


Figure 1-7. Inserting Dolby Decoder Module into Socket

7. Press the module edges down slowly until you hear the metal clips click. (See [Figure 1-8](#).)

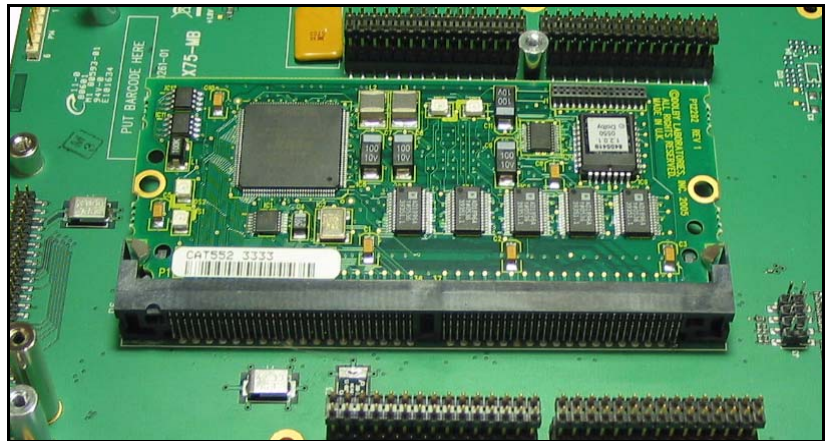


Figure 1-8. Dolby Decoder Module Installed

8. Gently reinstall the audio module above the Dolby decoder (or HD board above the encoder), using all of the screws provided.

Data Port Information

The X75OPT-DOLBY-1 decoder and X75OPT-DOLBY-2/-3 encoder modules connect internally to the **RS-232/422** port at the back of the X85/X75 unit. All of the Dolby modules use the same port, but are connected to different pins of this DB-9 connector (see [Figure 1-9](#) and [Table 1-2](#)).



NOTE

Dolby audio metadata is typically an RS-485 balanced multi-drop interface. For the audio metadata implementation in the X75, either an unbalanced RS-232 or balanced RS-422 single drop interface is provided. Frame rates above 30 frames per second are not supported.



Figure 1-9. Data Port Pinouts

Table 1-2. Data Port Pinouts

Audio Metadata	Module	Pins	Serial Interface
Output	X75OPT-DOLBY-1 Decoder	2 (TX+) and 5 (Ground)	RS-232
		2 (TX+) and 7 (TX-) and 5 (Ground)	RS-422
Input	X75OPT-DOLBY-2 Encoder	3 (RX-) and 5 (Ground)	RS-232
		3 (RX-) and 8 (RX+) and 5 (Ground)	RS-422
Input	X75OPT-DOLBY-3 Encoder	3 (RX-) and 5 (Ground)	RS-232
		3 (RX-) and 8 (RX+) and 5 (Ground)	RS-422

To change the serial interface on this port, follow this parameter path:
System Config > Setup > RS-232 or RS-422.
 (The default setting is RS-232.)

Softkey Installation

The Dolby decoder requires a softkey code to operate. The softkey can be entered using the control panel or the Web Server software application. Follow these instructions to enable the softkey option:

1. Go to the **System Config > Setup** menu and select **License Key**.
2. Enter the 14 license key characters, and then press **Enter**.

Dolby E Embedding

When the X85/X75 receives video with embedded audio, the audio is de-embedded for processing. Video is routed to a frame synchronizer, while the audio is sent to an audio synchronizer. At this point, the video and PCM audio content are aligned and synchronous with respect to each other, and the PCM audio can be encoded into a Dolby E format. The X85/X75 may internally encode the Dolby E, or a separate external encoder may be used. If the video frame rate is less than or equal to thirty frames per second, the Dolby E encoder produces a delay of one video frame. If the video frame rate exceeds 30 frames per second, the Dolby E frame rate should be adjusted to one half the video frame rate (currently, Dolby E encoding does not exceed 30 fps). Thus the encoder produces a two frame video delay in the audio stream.

The X85/X75 then allows for an additional user delay to be added to the Dolby E stream if required.

When Dolby E is embedded into video, it must be synchronously locked to the output video. When the packet header is detected, it is delayed to allow proper alignment of the packet with respect to the video stream. This variable delay will range from one half to three halves of a video frame, depending on the alignment of the Dolby E stream with respect to the output video. This operation takes place regardless of whether an internal or external Dolby E encoder is used.

The Dolby Packet header can be embedded into different user-defined lines for different output standards.

The total delay in the audio stream relative to the video stream will be the sum of the Dolby E encoder delay, plus one frame delay for the audio embedder. For video frame rates supported by Dolby E, this delay will be two video frames. For rate greater than that supported by Dolby E, this delay will be three video frames.

For video frame rates that are greater than that supported by Dolby E (720p at 50 Hz for example), with the application of a reference signal at one half of the output video rate (625 genlock 25 Hz signal for example), a one video frame delay may be applied with the adjustable user delay parameter in the X85/X75. This makes it possible for the output video with embedded Dolby E audio to be aligned with the applied reference signal. To add these user delays, follow these paths:

X85

- Video Setup > Processing > SDI 1 or SDI 2 Input Frame Delay (for HD)
- Video Setup > SD Processing > Strobe/Delay > Strobe/Delay Insert and
Video Setup > Processing > Strobe/Delay > Fixed Frame Del 1 (for SD)

X75

- Video Setup > Processing > HD Input Frame Delay (for HD-SDI)
- Video Setup > Processing > Strobe/Delay > Strobe/Delay Insert and
Video Setup > Processing > Strobe/Delay > Fixed Frame Delay (for SD-SDI)

See the *X75 and X85 Propagation Delay Tables* on the *X85/X75 System and Control Panel Documentation CD-ROM* for video propagation delay specifications.

Audio Delays in Dolby E and AC-3

When using Dolby E audio embedding on the X85/X75, audio content delay will vary, depending upon the alignment of the incoming Dolby E-encoded AES audio. When the Dolby E packet header leads the video switching line by *less than* 10 ms, it is delayed by 1 video frame *plus* the delay required to place the packet header at the appropriate location in the video. However, when the Dolby E packet header leads the video switching line by *more than* 10 ms, it is delayed only by the amount required to place the packet header at the appropriate location in the video (in other words, no video frame delay is added).

Therefore, when the Dolby E signal comes from an external source, the embedded audio content delay can vary from a minimum of $\frac{1}{3}$ of a frame, to $1\frac{2}{3}$ of a frame.

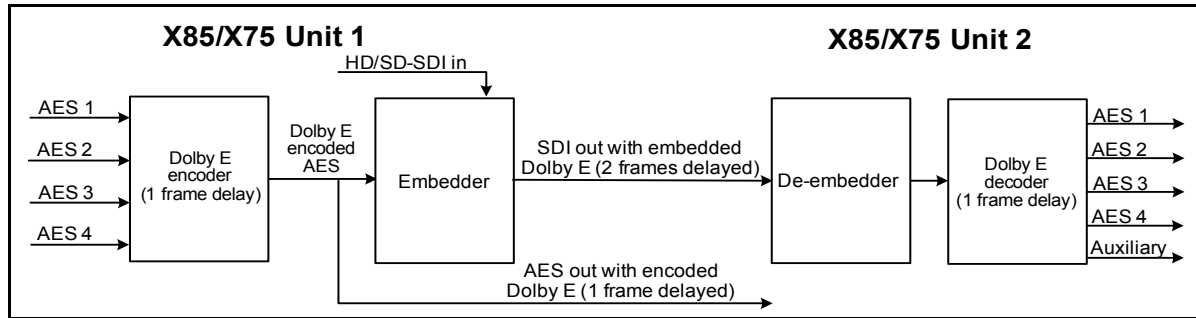


Figure 1-10. Audio Delay in Dolby E

Using the X75OPT-DOLBY-2 internal encoder, a 2-frame audio content delay is added to the HD- or SD-SDI signal (1 frame for the encoding process and 1 frame for the embedding process). If you use the X75's Dolby E-encoded AES output instead of the Dolby E- encoded SDI output, there is a 1 frame delay.

Dolby AC-3 and Dolby E add 1 frame of delay in the decoding mode. To configure the automatic alignment of embedded Dolby bit streams, use the parameters in the following locations:

X85

- **Audio Setup > Global Audio Config > Dolby E Config > SD Dolby E Start Line**
- **Audio Setup > Global Audio Config > Dolby E Config > SDI 1 Dolby E Start Line**
- **Audio Setup > Global Audio Config > Dolby E Config > SDI 2 Dolby E Start Line**

X75

- **Audio Setup > Global Audio Config > Dolby E Config > SD Dolby E Start Line**
- **Audio Setup > Global Audio Config > Dolby E Config > HD Dolby E Start Line**

You can set the desired Dolby line alignment for each output. However, if an audio channel is shared among multiple outputs, the alignment precedence is based on the output priority order defined in the path **Audio Setup > Global Audio Config > Dolby E Config > Alignment Priority**.

The default alignment order is:

1. **SDI 1 (X85)/HD (X75)**
2. **SDI 2**
3. **SD**

**NOTE**

X85/X75 Dolby modules do not currently support frame rates of more than 30 frames per second.

Dolby-E Audio Frame Alignment

The X85/X75 supports the passing of Dolby-E audio data in the same way that it passes other non-PCM audio data. If the video output contains embedded Dolby-E audio data, the X85/X75 aligns the Dolby-E audio frame such that the entire Dolby-E frame is located within the corresponding video frame.

This is critical to prevent corrupting the Dolby-E data during video switching or editing. The format of Dolby-E data burst and the timing relationship between Dolby-E frame and video frame are described in [Figure 1-11](#) below and [Figure 1-12](#) on page 15.

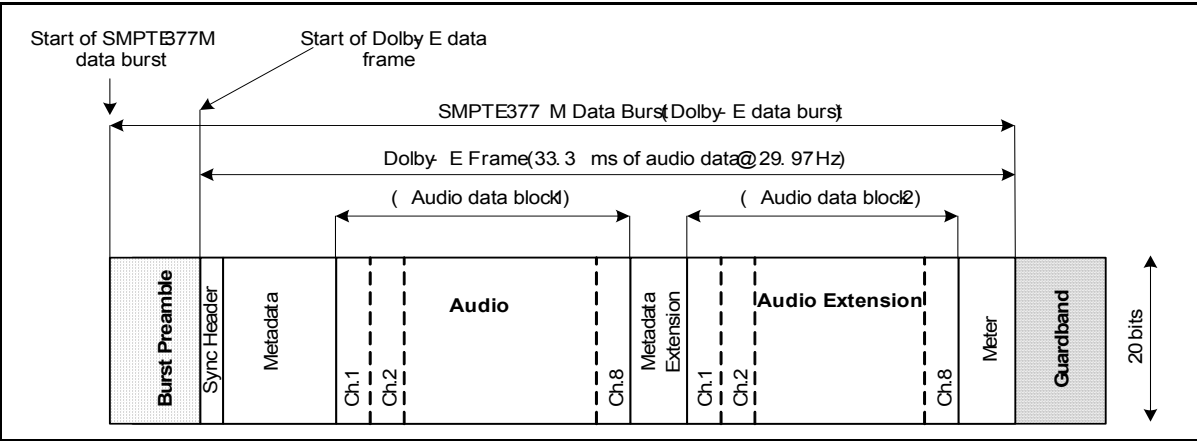


Figure 1-11. Dolby-E Data Burst Format

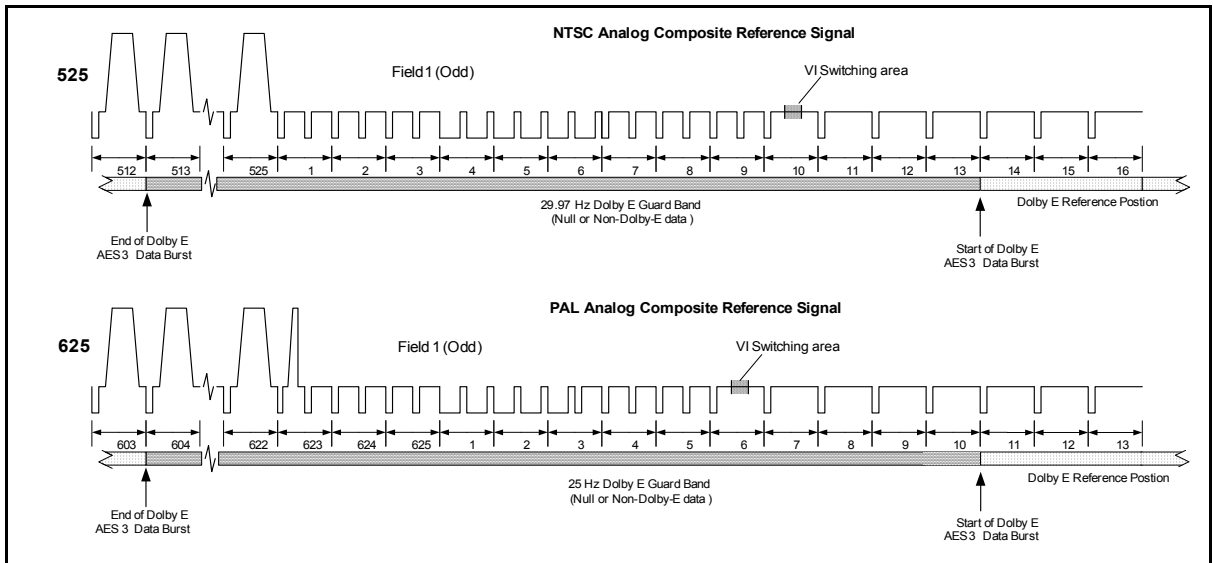


Figure 1-12. Timing Relationship Between Dolby-E Frame and Video Frame

Audio Metadata

The audio metadata feature de-embeds audio metadata from various sources and re-embeds the audio metadata into multiple outputs.

The audio metadata source may be one of the following:

- Metadata embedded in SD and 'HD (Methods A and B)
- Output of the Dolby decoder
- Input of the serial port
- Metadata generator

The audio metadata may be inserted into the following outputs:

- SDI 1, SDI 2, HD 1, and HD 2 output video (Methods A and B) on the X75
- SD 1 and SD 2, and SDI 1 and SDI 2 at 270 Mb/s (Methods A and B) on the X85
- Serial port
- Dolby encoder

Once the source is selected, it applies to all of the outputs.



NOTE

The X85 cannot decode or embed audio metadata from or to SDI 1 or SDI 2 at 1.5 or 3.0 Gb/s.

When you install the X75OPT-DOLBY-1 decoder on either the X75 or the X85, the audio metadata serial output can be enabled only when the audio metadata source is the Dolby decoder. To generate metadata via serial port from the other sources, you must remove the decoder module.

See the html parameter list included in the *X85/X75 System and Control Documentation* CD-ROM for useful information about the audio metadata parameters used in the X75. For general information about the use of audio metadata in professional video applications, visit the Dolby Web site at www.dolby.com.

Applications

Overview

This chapter describes a number of possible Dolby decoder, encoder, and audio metadata applications using the X85/X75. The following types of applications are shown:

- [“Input Video Processing” on page 18](#)
- [“Output Video Processing” on page 28](#)
- [“Input Video and Audio Processing” on page 29](#)

Input Video Processing

Table 2-1. Audio Metadata Embedding

Description	Products
The X85HD (or X75HD) processes video with embedded or separate AES audio. The processed audio is embedded at the output. As well, associated audio metadata that is provided at the data port input is embedded at the output. The drawing below describes the audio metadata and video paths.	X85HD-AV(-2PS) or X75HD-AV(-2PS)
<p>The diagram illustrates the audio metadata embedding process within a central processing block. On the left, 'Video to input' (X85: 0.27 SD/1.5 SDI/3.0 SDI, X75: 0.27/1.5 SDI) and 'Embedded: Dolby E/AC-3 AES (up to 8) Audio metadata' enter. The video path goes through 'De-embed', 'Up/down/cross conv, frame sync, proc amp, delay', and 'Embed'. The audio path (AES up to 8/analog up to 4) goes through 'Dolby decode', 'Audio gain, invert, sum, delay, swap', and 'Dolby encode'. A 'Fixed audio metadata generator' also feeds into 'Dolby encode'. On the right, 'Video from output' (X85: 0.27 SD/1.5 SDI/3.0 SDI, X75: 0.27/1.5 SDI) and 'Embedded: Dolby E/AC-3 AES (up to 8) Audio metadata' exit. The output audio path (AES up to 8/analog up to 4) and 'Audio metadata' are also shown.</p>	
Parameter Paths	
System Config > Setup > Serial Port Type > RS-232 or RS-422	
Audio Setup > Audio Metadata > Output Setup > AMeta Source > Serial Port Input	
Audio Setup > Audio Metadata > Output Setup > HD, SD1 and SD2 AMeta Insert *	
Audio Setup > Audio Metadata > Output Setup > SD1/SDI2/HD Insert Line Field 1/2**	

* The X85 can insert into SD 1 and SD 2, but not SDI 1 or SDI 2. On the X75, to support audio metadata embedded on an HD-SDI video stream, the hardware ID parameter must read ID:2 (System Config > Status/Version Info > HD Ver [date, v 0.x, ID:2]). For both the X85 and X75, select the appropriate audio metadata insertion method as per SMPTE 2020 STDS.

** Select the appropriate lines to embed audio metadata, according to your applications.

Table 2-2. Audio Metadata De-Embedding to Data Port

Description	Products
<p>The X85HD (or X75HD) processes video with embedded or separate AES audio. The processed audio is embedded at the output. As well, associated audio metadata that is provided at the embedded input may be sent to the data port output. The drawing below describes the audio metadata and video paths.</p>	<p>X85HD-AV(-2PS) or X75HD-AV(-2PS)</p>
Parameter Paths	
Audio Setup > Audio Metadata > Output Setup > AMeta Source > HD Input, SD1 Input, or SD2 Input*	
Audio Setup > Audio Metadata > Output Setup > Serial AMeta Insert > Yes**	
System Config > Setup > Serial Port Type > RS-232 or RS-422	

* The X85 cannot de-embed from SDI 1 or SDI 2.

** To send out the same audio metadata through the serial port, the Dolby decoder module must be removed. The Dolby decoder does not need to be removed if the audio metadata source is set as Dolby Decoder.

Table 2-3. Audio Metadata De-Embedding and Re-Embedding

Description	Products
The X85HD (or X75HD) processes video with embedded or separate AES audio. The processed audio is embedded at the output. As well, associated audio metadata that is provided at the embedded input may be re-embedded at the embedded output. The drawing below describes the audio metadata and video paths.	X85HD-AV(-2PS) or X75HD-AV(-2PS)
<p>The diagram illustrates the audio metadata and video paths within the X85HD or X75HD processor. On the left, 'Video to input' (X85: 0.27 SD/1.5 SDI/3.0 SDI; X75: 0.27/1.5 SDI) and 'Embedded: Dolby E/AC-3 AES (up to 8) Audio metadata' are inputs. The video path goes through 'De-embed', 'Up/down/cross conv, frame sync, proc amp, delay', and 'Embed' blocks. The audio path involves 'Dolby decode', 'Audio gain, invert, sum, delay, swap', and 'Dolby encode' blocks. A 'Fixed audio metadata generator' also feeds into the 'Embed' block. On the right, 'Video from output' (X85: 0.27 SD/1.5 SDI/3.0 SDI; X75: 0.27/1.5 SDI) and 'Embedded: Dolby E/AC-3 AES (up to 8) Audio metadata' are outputs. External inputs for 'AES (up to 8)/analog (up to 4)' and 'Audio metadata' are shown at the bottom, connecting to the internal processing blocks.</p>	
Parameter Paths	
Audio Setup > Audio Metadata > Output Setup > AMeta Source > HD Input, SD1 Input, or SD2 Input*	
Audio Setup > Audio Metadata > Output Setup > SD1 AMeta Insert, SD2 AMeta Insert, or HD AMeta Insert**	
Audio Setup > Audio Metadata > Output Setup > SD1/SD2/HD Insert Line > Field 1/2	

* The X85 cannot insert or de-embed in and out of SDI 1 and SDI 2. On the X75, to support audio metadata embedded on an HD-SDI video stream, the hardware ID parameter must read ID:2 (System Config > Status/Version Info > HD Ver [date, v 0.x, ID:2]). The hardware ID parameter must read ID:2 (System Config > Status/Version Info > HD Ver [date, v 0.x, ID:2]).

At the default setting, SD embedded audio metadata is passed transparently at SD 1 and SD 2 outputs. However, if you activate the SD-ARC feature, you will need to re-enable the embedding of the audio metadata by following the two paths shown above.

**The X85 cannot insert or de-embed in and out of SDI 1 and SDI 2.

Table 2-4. Audio Metadata Generation and Output on Data Port

Description	Products
<p>The X85HD (or X75HD) processes video with embedded or separate AES audio. The processed audio is embedded at the output. As well, associated audio metadata is authored and generated and output on the data port. The drawing below describes the audio metadata and video paths.</p>	<p>X85HD-AV(-2PS) or X75HD-AV(-2PS)</p>
<p>The diagram illustrates the internal processing of audio and video. On the left, 'Video to input' (X85: 0.27 SD/1.5 SDI/3.0 SDI, X75: 0.27/1.5 SDI) and 'Embedded: Dolby E/AC-3 AES (up to 8) Audio metadata' enter a central processing block. Inside, the video path goes through 'De-embed' and 'Up/down/cross conv, frame sync, proc amp, delay' blocks. The audio path goes through 'Dolby decode' and 'Audio gain, invert, sum, delay, swap' blocks. Both paths then feed into an 'Embed' block. A 'Fixed audio metadata generator' also feeds into the 'Embed' block. On the right, 'Video from output' (X85: 0.27 SD/1.5 SDI/3.0 SDI, X75: 0.27/1.5 SDI) and 'Embedded: Dolby E/AC-3 AES (up to 8) Audio metadata' exit the 'Embed' block. External inputs for 'AES (up to 8)/analog (up to 4)' and 'Audio metadata' are shown at the bottom, feeding into the central processing block.</p>	
Parameter Paths	
System Config > Setup > Serial Port Type > RS-232 or RS-422	
Audio Setup > Audio Metadata > Output Setup > AMeta Source > Generator	
Audio Setup > Audio Metadata > Output Setup > Serial AMeta Insert > Yes*	
System Config > Setup > Serial Port Type > RS-232 or RS-422	
Audio Setup > Audio Metadata > Metadata Generator**	

* To send out the same audio metadata through the serial port, the Dolby decoder module must be removed. The Dolby decoder does not need to be removed if the audio metadata source is set as Dolby Decoder.

** This will bring you to all control parameters for audio metadata editing.

Table 2-5. Audio Metadata Generation and Output on Embedded SDI

Description	Products
The X85HD (or X75HD) processes video with embedded or separate AES audio. The processed audio is embedded at the output. As well, associated audio metadata is authored, generated, and output into the embedded output. The drawing below describes the audio metadata and video paths.	X85HD-AV(-2PS) or X75HD-AV(-2PS)
<p>The diagram illustrates the internal signal flow for audio and video. On the left, 'Video to input' (X85: 0.27 SD/1.5 SDI/3.0 SDI; X75: 0.27/1.5 SDI) enters a central processing block. Simultaneously, 'Embedded: Dolby E/AC-3 AES (up to 8) Audio metadata' is input. The video path proceeds through 'De-embed', 'Up/down/cross conv, frame sync, proc amp, delay', and 'Embed' stages. The audio path involves 'Dolby decode', 'Audio gain, invert, sum, delay, swap', and 'Dolby encode' stages. A 'Fixed audio metadata generator' also feeds into the 'Embed' stage. On the right, 'Video from output' (X85: 0.27 SD/1.5 SDI/3.0 SDI; X75: 0.27/1.5 SDI) is produced, along with 'Embedded: Dolby E/AC-3 AES (up to 8) Audio metadata'. External inputs for 'AES (up to 8)/analog (up to 4)' and 'Audio metadata' are shown at both input and output stages.</p>	
Parameter Paths	
Audio Setup > Audio Metadata > Output Setup > AMeta Source > Generator	
Audio Setup > Audio Metadata > Output Setup > HD AMeta Insert, SD1 AMeta Insert, or SD2 AMeta Insert*	
Audio Setup > Audio Metadata > Metadata Generator**	

* The X85 cannot insert into SDI 1 or SDI 2. Select the appropriate lines for the audio metadata embedding by following Audio Setup > Audio Metadata > Output Setup > SD1/SDI2/HD Insert Line Field 1/2.

** This leads to all control parameters for audio metadata editing.

Table 2-6. External Dolby Decoder

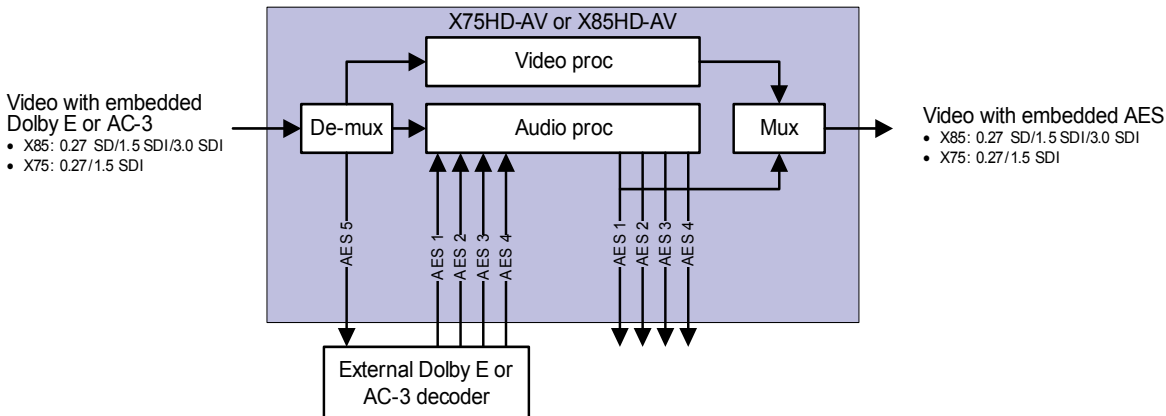
Description	Products
<p>The X85HD (or X75HD) processes video with embedded compressed audio using an external audio decoder. The system will also de-embed an embedded compressed audio stream and provide it as an AES stream into the audio decoder. (The compressed Dolby signal may be routed from one of the discrete AES inputs if required.) The X85/X75HD processes the decompressed audio streams, which can be aligned with the video signal. A discrete audio input can be used for a voice-over channel.</p>	<ul style="list-style-type: none"> • X85HD or X75HD • Audio decoder
	
Parameter Paths	
Assume that SDI (X85) or HD (X75) with embedded compressed audio is on Pair 1 of Group 1.	
Audio Setup > Routing > Input > SRC1 Input Select > HDX 1/2 (SDIX 1/2 on the X85)	
Audio Setup > Routing > Input > SRC2 Input Select > AES 1a/1b	
Audio Setup > Routing > Input > SRC3 Input Select > AES 2a/2b	
Audio Setup > Routing > Input > SRC4 Input Select > AES 3a/3b	
Audio Setup > Routing > Input > SRC5 Input Select > AES 4a/4b	
Audio Setup > Routing > Output > AES5 OutA > SRC1a	
Audio Setup > Routing > Output > AES5 OutB > SRC1b	
Audio Setup > Routing > Output > AES1 OutA > SRC2a	
Audio Setup > Routing > Output > AES1 OutB > SRC2b	
Audio Setup > Routing > Output > AES2 OutA > SRC3a	

Table 2-6. External Dolby Decoder *(Continued)*

Parameter Paths <i>(Continued)</i>
Audio Setup > Routing > Output > AES2 OutB > SRC 3b
Audio Setup > Routing > Output > AES3 OutA > SRC 4a
Audio Setup > Routing > Output > AES3 OutB > SRC 4b
Audio Setup > Routing > Output > AES4 OutA > SRC 5a
Audio Setup > Routing > Output > AES4 OutB > SRC 5a
Audio Setup > Routing > Output >SMX/HMX 1 > SRC 2a
Audio Setup > Routing > Output >SMX/HMX 2 > SRC 2b
<div><div>↓</div><div>↓</div><div>↓</div><div>↓</div><div>↓</div></div>
Audio Setup > Routing > Output >SMX/HMX 7 > SRC 5a (SMX/SDIMX 7 on the X85)
Audio Setup > Routing > Output >SMX/HMX 8 > SRC 5b (SMX/SDIMX 8 on the X85)

Table 2-7. Internal Dolby E Decoder with Audio Metadata Output from Data Port

Description	Products
<p>Using the optional internal audio decoder, the X85/X75HD processes video with embedded compressed audio. The embedded compressed audio stream is de-embedded and provided as an AES stream into the internal audio decoder. (The compressed Dolby signal may be routed from one of the discrete AES inputs if required.) The decompressed audio streams are processed and timed with the video signal. Audio metadata is extracted from the Dolby E stream and provided on the data port output. (Note: Audio metadata is not extracted from an AC-3 stream.)</p>	<ul style="list-style-type: none"> • X85HD-AV(-2PS) or X75HD-AV (-2PS) • X75OPT-DOLBY-1
Parameter Paths	
Assume that SDI (X85) or HD (X75) with embedded Dolby-E is on Pair 1 of Group 1.	
Audio Setup > Routing > Audio In SRC Select > Dolby Dec *	
Audio Setup > Routing > Input > Dolby Input Select > HDX 1/2 (SDIX 1/2 on the X85)	
Audio Setup > Audio Metadata > Output Setup > AMeta Source > Dolby Decoder	
Audio Setup > Audio Metadata > Output Setup > Serial AMeta Insert > Yes	
System Config > Setup > Serial Port Type > RS-232 or RS-422	

* When setting Audio In SRC Select to Dolby Dec, all of those four decompressed audio pairs will be automatically routed to AES outputs and HD/SD-SDI embedding outputs.

Table 2-8. Internal Dolby AC-3 Decoder with No Audio Metadata Output

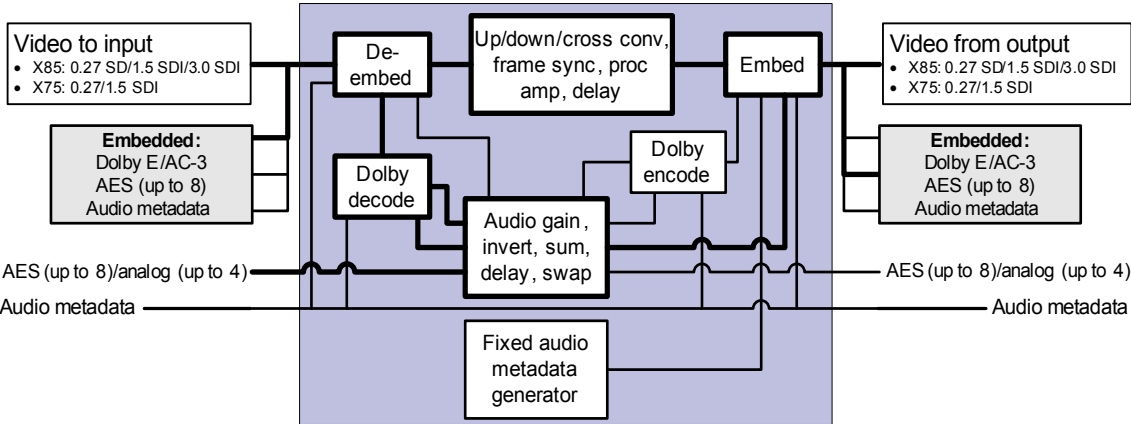
Description	Products
Using the optional internal audio decoder, the X85/X75HD processes video with embedded compressed audio. The embedded compressed audio stream is de-embedded and provided as an AES stream into the internal audio decoder. (The compressed Dolby signal may be routed from one of the discrete AES inputs if required.) The decompressed audio streams are processed and timed with the video signal. (Note: Audio metadata is not extracted from an AC-3 stream.)	<ul style="list-style-type: none">• X85HD-AV(-2PS) or X75HD-AV (-2PS)• X75OPT-DOLBY-1
	
Parameter Paths	
Assume that SDI (X85) or HD (X75) with embedded Dolby AC-3 is on Pair 1 of Group 1.	
Follow all the steps described in Table 2-7 on page 25 but ignore the audio metadata setting section.	

Table 2-9. Internal Dolby E Decoder, Embedded Audio Metadata at Output

Description	Products
<p>Using the optional internal audio decoder, the X85/X75HD processes video with embedded compressed audio. The embedded compressed audio stream is de-embedded and provided as an AES stream into the internal audio decoder. (The compressed Dolby signal may be routed from one of the discrete AES inputs if required.) The decompressed audio streams are processed and timed with the video signal. Audio metadata is extracted from the Dolby E stream and embedded on the HD output. (Note: Audio metadata is not extracted from an AC-3 stream.)</p>	<ul style="list-style-type: none"> • X85HD-AV(-2PS) or X75HD-AV (-2PS) • X75OPT-DOLBY-1
Parameter Paths	
Assume that SDI (X85) or HD (X75) with embedded Dolby-E is on Pair 1 of Group 1.	
Follow all of the steps described in Table 2-7 on page 25 for Dolby-E decoding as well as audio metadata setting.	
Audio Setup > Audio Metadata > Output Setup > HD AMeta Insert > Yes*	

* The X85 can insert into SD 1 and SD 2, but not SDI 1 or SDI 2. On the X75, to support audio metadata embedded on an HD-SDI video stream, the hardware ID parameter must read ID:2 (System Config > Status/Version Info > HD Ver [date, v 0.x, ID:2]).

Output Video Processing

Table 2-10. External Dolby Encoder

Description	Products
<p>The X85/X75HD synchronizes and processes video and AES signals. The three (AC-3) or four (E) AES signals are de-embedded and processed (or separate AES inputs may be used). The processed AES signals are provided to the input of the external Dolby E or AC-3 encoder. The compressed AES stream is fed back to the X85/X75HD where it is re-embedded with the video signal. A discrete audio input can be used for a voice-over channel.</p>	<ul style="list-style-type: none">• X85HD-AV(-2PS) or X75HD-AV (-2PS)• External audio source
<div><div><p>Video with embedded Dolby E or AC-3</p><ul style="list-style-type: none">• X85: 0.27 SD/1.5 SD/3.0 SDI• X75: 0.27/1.5 SDI</div><div><div>X75HD-AV or X85HD-AV</div><div><div>De-mux</div><div>Video proc</div><div>Audio proc</div><div>Mux</div></div></div><div><p>Video with embedded AES</p><ul style="list-style-type: none">• X85: 0.27 SD/1.5 SD/3.0 SDI• X75: 0.27/1.5 SDI</div><div><div>AES 1</div><div>AES 2</div><div>AES 3</div><div>AES 4</div><div>AES 5</div></div><div><div>External Dolby E or AC-3 encoder</div></div></div>	
Parameter Paths	
Assume that SDI (X85) or HD (X75) with embedded audio (Group 1 and 2) is applied at the HD Input.	
Audio Setup > Routing > Audio In SRC Select > HD (SDI on the X85)	
Take all the AES outputs (1-4) and feed to the external dolby encoder inputs respectively (1-4).	
Audio Setup > Routing > Input > SRC5 Input Select > AES5a5b	
Take the compressed audio output and feed it to AES Input 5.	
Audio Setup > Routing > Output > SMX/MHX1 > SRC5a (SMX/SDIMX 1 on the X85)	
Audio Setup > Routing > Output > SMX/MHX2 > SRC5b (SMX/SDIMX 2 on the X85)	

Input Video and Audio Processing

Table 2-11. External Dolby Decoder and Encoder

Description	Products
<p>The X85/X75HD processes video with embedded audio and embedded compressed audio using an external audio encoder and decoder. The system also processes video and AES program signals. Embedded compressed audio is sent to an external audio decoder, providing three (AC-3) or four AES (E) signals to the X85/X75HD. The X85/X75HD processes the audio signals and then sends them to an audio encoder. The compressed audio signal is sent to the X85/X75HD where it is embedded into the output processed program video signal.</p>	<ul style="list-style-type: none"> • X85HD-AV(-2PS) or X75HD-AV (-2PS) • External audio encoder and decoder
Parameter Paths	
<p>Assume that SDI (X85) or HD (X75) with embedded compressed Dolby E on Pair 1 of Group 1 is applied at the HD input.</p>	
<p>Audio Setup > Routing > Input > SRC1 Input Select > HDX1/2 (SDIX 1/2 on the X85)</p>	
<p>Audio Setup > Routing > Output > AES5 Out A > SRC1a</p>	
<p>Audio Setup > Routing > Output > AES5 Out B > SRC1b</p>	
<p>Audio Setup > Routing > Input > SRC2 Input Select > AES1a/1b</p>	
<p>Audio Setup > Routing > Input > SRC3 Input Select > AES2a/2b</p>	
<p>Audio Setup > Routing > Input > SRC4 Input Select > AES3a/3b</p>	
<p>Audio Setup > Routing > Input > SRC5 Input Select > AES4a/4b</p>	

Table 2-11. External Dolby Decoder and Encoder (*Continued*)

Parameter Paths (<i>Continued</i>)				
Audio Setup > Routing > Output > AES1 OutA > SRC2a				
Audio Setup > Routing > Output > AES1 OutB > SRC2b				
↓	↓	↓	↓	↓
Audio Setup > Routing > Output > AES4 Out A > SRC5a				
Audio Setup > Routing > Output > AES4 Out B > SRC5b				
Audio Setup > Routing > Input > SRC6 Input Select > AES5a/5b				
Audio Setup > Routing > Output > SMX/HMX 3 > SRC6a (SMX/SDIMX 3 on the X85)				
Audio Setup > Routing > Output > SMX/HMX 4 > SRC6b (SMX/SDIMX 4 on the X85)				
Take the compressed audio output and feed it to AES Input 5.				

Table 2-12. Internal Dolby E Decoder and External Dolby E Encoder, with Audio Metadata from X85/X75 Data Port to External Dolby Encoder

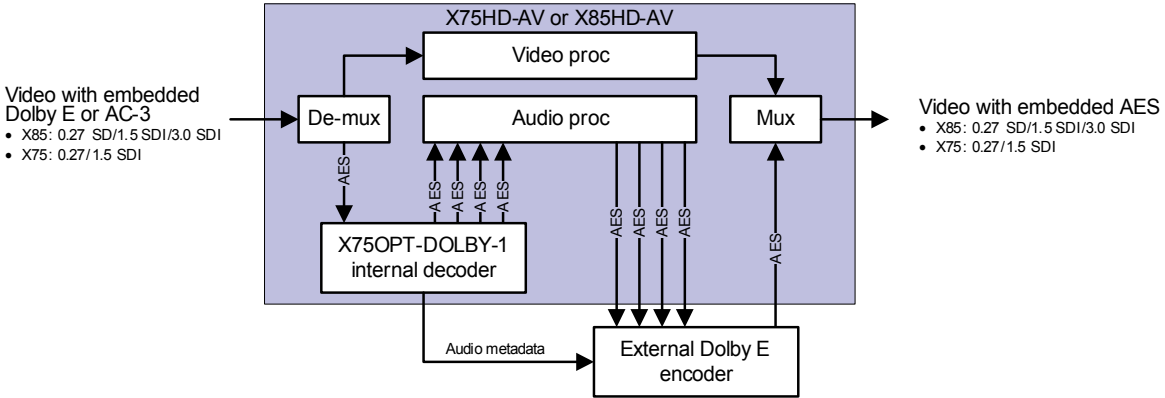
Description	Products
<p>The X85/X75HD, with an internal audio decoder and an external audio encoder, processes video with embedded audio and embedded compressed audio. The video and AES embedded program signals are processed through the X85/X75HD. Embedded compressed audio is sent to an internal audio decoder, providing four decompressed AES signals to the X85/X75HD audio processor. The processed audio signals are sent to an external audio encoder, which feeds the compressed signal back into the X85/X75HD, where it is embedded into the program signal. The processed compressed program audio signals are embedded into the output, as well. Audio metadata is provided at the data port output and input to the external encoder.</p>	<ul style="list-style-type: none"> • X85HD-AV(-2PS) or X75HD-AV (-2PS) • X75OPT-DOLBY-1 • External audio encoder
	
Parameter Paths	
Assume that SDI (X85) or HD (X75) with embedded Dolby-E on Pair 1 of Group 1 is applied at the HD Input.	
Audio Setup > Routing > Audio In SRC Select > Dolby Dec	
Audio Setup > Routing > Input > Dolby Input Select > HDX 1/2 (SDIX 1/2 on the X85)	
Take all AES out (1-4) of X75 and feed the external Dolby-E encoder input (1-4) respectively.	
Audio Setup > Audio Metadata > Output Setup > AMeta Source > Dolby Decoder	
Audio Setup > Audio Metadata > Output Setup > Serial AMeta Insert > Yes	
System Config > Setup > Serial Port Type > RS-232 or RS-422	
Audio Setup > Routing > Input > SRC6 Input Select > AES 5a/5b	
Audio Setup > Routing > Output > SMX/HMX 1 > SRC6a (SMX/SDIMX 1 on the X85)	
Audio Setup > Routing > Output > SMX/HMX 2 > SRC6b (SMX/SDIMX 2 on the X85)	

Table 2-13. Internal Dolby AC-3 Decoder and External Dolby E Encoder, with Audio Metadata Generated by External Encoder

Description	Products
<p>Video with embedded audio and embedded compressed audio is processed using the X85/X75HD, an internal audio decoder, and an external audio encoder. The video and AES embedded program signals are processed through the X85/X75HD. Embedded compressed audio is sent to an internal audio decoder, providing three AES (5.1) signals to the X85/X75HD audio processor. The processed audio signals are sent to an external audio encoder, which feeds the compressed signal back into the X85/X75HD where it is embedded into the program signal. The processed compressed program audio signals are embedded into the output, as well. Audio metadata is generated by the external encoder.</p>	<ul style="list-style-type: none">• X85HD-AV(-2PS) or X75HD-AV (-2PS)• X75OPT-DOLBY-1• External audio encoder
<div><div><div>Video with embedded Dolby E or AC-3<ul style="list-style-type: none">• X85: 0.27 SD/1.5 SDI/3.0 SDI• X75: 0.27/1.5 SDI</div><div><div>X75HD-AV or X85HD-AV</div><div><div>De-mux</div><div>Video proc</div><div>Audio proc</div><div>Mux</div></div><div><div>X75OPT-DOLBY-1 internal decoder</div><div>External Dolby E encoder</div></div></div><div><div><div>AES</div><div>AES</div><div>AES</div><div>AES</div><div>AES</div><div>AES</div><div>AES</div><div>AES</div><div>AES</div><div>AES</div></div><div>Video with embedded AES<ul style="list-style-type: none">• X85: 0.27 SD/1.5 SDI/3.0 SDI• X75: 0.27/1.5 SDI</div></div></div></div>	
Parameter Paths	
Assume that SDI (X85) or HD (X75) with embedded Dolby AC-3 on Pair 1 of Group 1 is applied at the HD Input.	
Follow all steps described in Table 2-12 on page 31 , but with 3 decoded PCM audio feeds going to theX85/X75 Audio Proc.	
Audio Setup > Audio Metadata > Output Setup > AMeta Source > Generator	
Audio Setup > Audio Metadata > Output Setup > Serial AMeta Insert > Yes	
System Config > Setup > Serial Port Type > RS-422 or RS-232	

Table 2-14. Internal Dolby E Decoder and External Dolby AC-3 Encoder, with Audio Metadata from X85/X75 Data Port to External Dolby Encoder

Description	Products
<p>Using an internal audio decoder and an external audio encoder, the X85/X75HD processes video with embedded audio and embedded compressed audio. The video and AES embedded program signals are processed through the X85/X75HD. Embedded compressed audio is sent to an internal audio decoder, providing three AES (5.1) signals to the X85/X75HD audio processor. The processed audio signals are sent to an external audio encoder, which feeds the compressed signal back into the X85/X75HD, where it is embedded into the program signal. The processed compressed program audio signals are embedded into the output, as well. Audio metadata is provided at the data port output and input to the external encoder.</p>	<ul style="list-style-type: none"> • X85HD-AV(-2PS) or X75HD-AV (-2PS) • X75OPT-DOLBY-1 • External audio encoder
Parameter Paths	
Assume that SDI (X85) or HD (X75) with embedded Dolby-E on Pair 1 of Group 1 is applied at the HD inputs.	
Follow all the steps described in Table 2-12 on page 31 and Table 2-13 on page 32 for audio metadata settings.	
Connect the remaining 3 AES outputs to the inputs of the external Dolby AC-3 encoder, respectively.	

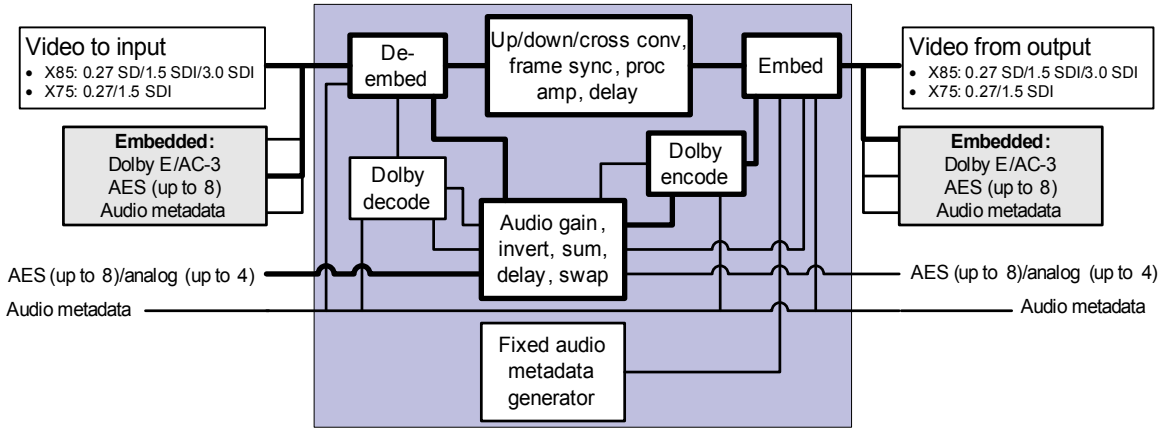
Table 2-15. Internal Dolby AC-3 Decoder and External Dolby AC-3 Encoder, with Audio Metadata Generated by External AC-3 Encoder

Description	Products
Using an internal audio decoder and an external audio encoder, the X85/X75HD processes video with embedded audio and embedded compressed audio. The video and AES embedded program signals are processed through the X85/X75HD. Embedded compressed audio is sent to an internal audio decoder, providing 3 AES (5.1) signals to the X75HD audio processor. The processed audio signals are sent to an external audio encoder, which feeds the compressed signal back into the X85/X75HD where it is embedded into the program signal. The processed compressed program audio signals are embedded into the output, as well. Audio metadata is generated by the external encoder.	<ul style="list-style-type: none">• X85HD-AV(-2PS) or X75HD-AV (-2PS)• X75OPT-DOLBY-1• External audio encoder
Parameter Paths	
Assume that SDI (X85) or HD (X75) with embedded Dolby AC-3 on Pair 1 of Group 1 is applied at the HD Input.	
Follow all the steps described in Table 2-12 on page 31 , except steps for configuring metadata.	

Table 2-16. Internal Dolby E Encoder with Audio Metadata from Data Port

Description	Products
<p>The X85/X75HD synchronizes and processes video and AES signals. Using an internal audio encoder, the four processed AES signals (either embedded or separate) are compressed. Audio metadata is provided from the data port input. The compressed stream is provided as an AES and/or embedded output for video.</p>	<ul style="list-style-type: none"> • X85HD-AV(-2PS) or X75HD-AV (-2PS) • X75OPT-DOLBY-2
Parameter Paths	
Assume 4 AES sources are applied at 4 AES inputs	
Audio Setup > Routing > Audio In SRC Select > AES	
Audio Setup > Routing > Input > SRC5 Input Select > Dolby Enc	
Audio Setup > Routing > Output > AES5 OutA > SRC5a	
Audio Setup > Routing > Output > AES5 OutB > SRC5b	
Audio Setup > Routing > Output > SMX/HMX9 > SRC5a	
Audio Setup > Routing > Output > SMX/HMX10 > SRC5b	
Audio Setup > Audio Metadata > Output Setup > AMeta Source > Serial Port Input	
System Config > Setup > Serial Port Type > RS-232 or RS-422	

Table 2-17. Internal Dolby E Encoder Generating Audio Metadata

Description	Products
<p>The X85/X75HD synchronizes and processes video and AES signals. Using an internal audio encoder, the four processed AES signals get compressed (either embedded or separate). Audio metadata is generated by the internal Dolby encoder. The compressed stream is provided as an AES and/or embedded output of video.</p>	<ul style="list-style-type: none">• X85HD-AV(-2PS) or X75HD-AV (-2PS)• X75OPT-DOLBY-2
	
Parameter Paths	
Assume 4 AES sources are applied at the 4 AES inputs.	
Follow all the steps described in Table 2-16 on page 35 for configuring Dolby-E encoding and sending out compressed audio through AES and HD/SD-SDI outputs.	
Audio Setup > Audio Metadata > Output Setup > AMeta Source > Generator	
Audio Setup > Audio Metadata > Output Setup*	

* In this menu, you can embed audio metadata on the video stream, and also output audio metadata from the internal generator through the serial port.

To send out the same audio metadata through the serial port, the Dolby decoder module must be removed. The Dolby decoder does not need to be removed if the audio metadata source is set as Dolby Decoder.

Table 2-18. Internal Dolby E Encoder with Embedded Audio Metadata

Description	Products
<p>The X85/X75HD synchronizes and processes video and AES signals. Using an internal audio encoder, the four processed AES signals (either embedded or separate) are compressed. Audio metadata is provided from the embedded input. The compressed stream is provided as an AES and/or embedded output for video.</p>	<ul style="list-style-type: none"> • X85HD-AV(-2PS) or X75HD-AV (-2PS) • X75OPT-DOLBY-2
Parameter Paths	
Assume 4 AES sources are applied at the 4 AES inputs.	
Follow all the steps described in Table 2-16 on page 35 for configuring Dolby-E encoding and sending out compressed audio through AES and HD/SDI outputs.	
Audio Setup > Audio Metadata > Output Setup > AMeta Source > SD1 Input, SD2 Input, or HD Input*	

* The X85 cannot de-embed from SDI 1 or SDI 2.

Table 2-19. Internal Dolby AC-3 Encoder with Audio Metadata from Data Port

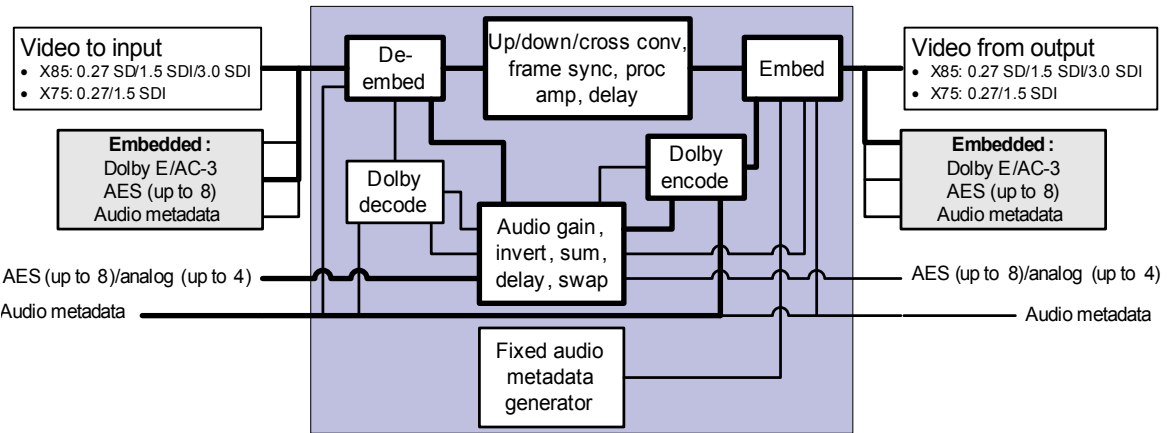
Description	Products
<p>The X85/X75HD synchronizes and processes video and AES signals. Using an internal audio encoder, three processed AES signals (either embedded or separate) are compressed. Audio metadata is provided from the data port input. The compressed stream is provided as an AES and/or embedded output for video.</p>	<ul style="list-style-type: none">• X85HD-AV(-2PS) or X75HD-AV (-2PS)• X75OPT-DOLBY-3
	
<p>Parameter Paths</p> <p>Assume 3 AES sources are applied at the 3 AES inputs</p> <p>Follow all steps described in Table 2-16 on page 35 for configuring Dolby AC-3 encoding and sending out compressed audio through AES output or HD/SD-SDI output, as well as configuring the audio metadata interface.</p>	

Table 2-20. Internal Dolby AC-3 Encoder Generating Audio Metadata

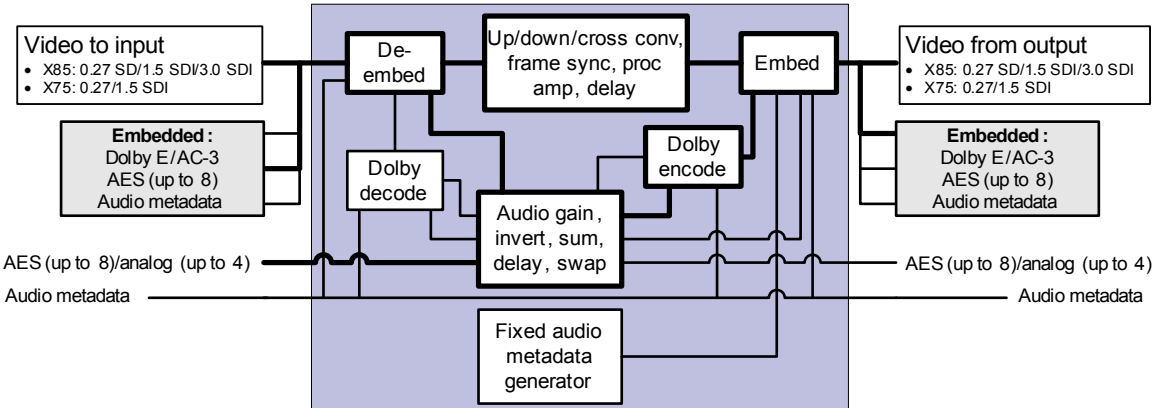
Description	Products
<p>The X85/X75HD synchronizes and processes video and AES signals. Using an internal audio encoder, the three processed AES signals get compressed (either embedded or separate). Audio metadata is generated by the internal Dolby encoder. The compressed stream is provided as an AES and/or embedded output of video.</p>	<ul style="list-style-type: none"> • X85HD-AV(-2PS) or X75HD-AV (-2PS) • X75OPT-DOLBY-3
 <p>The diagram illustrates the internal processing flow of the Dolby AC-3 encoder. It shows the path from video and audio inputs to the final outputs. Video inputs (X85: 0.27 SD/1.5 SDI/3.0 SDI, X75: 0.27/1.5 SDI) enter a central processing block. Inside, they pass through a 'De-embed' block, then a 'Up/down/cross conv, frame sync, proc amp, delay' block, and finally an 'Embed' block. Audio inputs (AES up to 8, analog up to 4) enter the block and pass through a 'Dolby decode' block, then an 'Audio gain, invert, sum, delay, swap' block, and finally a 'Dolby encode' block. A 'Fixed audio metadata generator' block also feeds into the 'Dolby encode' block. The outputs are 'Video from output' (X85: 0.27 SD/1.5 SDI/3.0 SDI, X75: 0.27/1.5 SDI) and 'Embedded: Dolby E/AC-3 AES (up to 8) Audio metadata'.</p>	
Parameter Paths	
Assume 3 AES sources are applied at the 3 AES inputs.	
Follow all steps described in Table 2-16 on page 35 for configuring Dolby AC-3 encoding, and sending out compressed audio through AES Out and video outputs.	
Audio Setup > Audio Metadata > Output Setup > AMeta Source > Generator	

Table 2-21. External Dolby E Decoder and Internal Dolby E Encoder with Audio Metadata from External Decoder to Data Port

Description	Products
<p>The X85/X75HD provides extended audio capability. For processing previously encoded audio, the X85/X75 can process audio from an external decoder with gain, channel swap, and invert. Then the signal can be timed to video and encoded internally at the output. This example decompresses and re-compresses the Dolby audio and passes the PCM audio as shown below. Audio metadata is provided by the external Dolby E decoder into the data port on the X85/X75.</p>	<ul style="list-style-type: none">• X85HD-AV(-2PS) or X75HD-AV (-2PS)• X75OPT-DOLBY-2 integrated Dolby E encoder• External Dolby E decoder
<div><div><p>Video with embedded Dolby E or AC-3</p><ul style="list-style-type: none">• X85: 0.27SD/1.5 SDI/3.0 SDI• X75: 0.27/1.5 SDI</div><div><p>X75HD-AV or X85HD-AV</p><div><div>De-mux</div><div>Video proc</div><div>Audio proc</div><div>Mux</div><div>Internal Dolby E encoder</div></div><div><p>External Dolby E decoder</p><p>Audio metadata</p></div><div><p>Video with embedded AES</p><ul style="list-style-type: none">• X85: 0.27 SDI/1.5 SDI/3.0 SDI• X75: 0.27/1.5 SDI</div></div></div>	
Parameter Paths	
<p>Assume that SDI (X85) or HD (X75) with Dolby-E is embedded on Pair 1 of Group 1. The Dolby encoder input is for a system using an analog audio board (H/W ID: 1).</p> <p>If a digital audio board (32-channel) is used , set the appropriate SRCs for the Dolby encoder input under the Output menu (Audio Setup > Routing > Output).</p>	
Audio Setup > Routing > Input > SRC1 Input Select > HDX1/2 (SDIX 1/2 on the X85)	
Audio Setup > Routing > Output > AES5 Out A > SRC1a	
Audio Setup > Routing > Output > AES5 Out B > SRC1b	
Audio Setup > Routing > Input > SRC2 Input Select > AES1a/1b	
Audio Setup > Routing > Input > SRC3 Input Select > AES2a/2b	
Audio Setup > Routing > Input > SRC4 Input Select > AES3a/3b	
Audio Setup > Routing > Input > SRC5 Input Select > AES4a/4b	
Audio Setup > Routing > Output > AES 1 OutA > SRC 2a	

Table 2-21. External Dolby E Decoder and Internal Dolby E Encoder with Audio Metadata from External Decoder to Data Port (*Continued*)

Parameter Paths (<i>Continued</i>)
Audio Setup > Routing > Output > AES 1 OutB > SRC 2b
Audio Setup > Routing > Output > AES 2 Out A > SRC3a
Audio Setup > Routing > Output > AES 2 Out B > SRC3b
Audio Setup > Routing > Output > AES 3 Out A > SRC4a
Audio Setup > Routing > Output > AES 3 Out B > SRC4b
Audio Setup > Routing > Output > AES 4 Out A > SRC5a
Audio Setup > Routing > Output > AES 4 Out B > SRC5b
Audio Setup > Routing > Output > Dolby Encoder > DolbyEnc In 1 > AES1a/1b
Audio Setup > Routing > Output > Dolby Encoder > DolbyEnc In 2 > AES2a/2b
Audio Setup > Routing > Output > Dolby Encoder > DolbyEnc In 3 > AES3a/3b
Audio Setup > Routing > Output > Dolby Encoder > DolbyEnc In 4 > AES4a/4b
Audio Setup > Routing > Input > SRC6 Input Select > Dolby Enc
Audio Setup > Routing > Output > SMX/HMX1 > SRC6a (SMX/SDIMX 1 on the X85)
Audio Setup > Routing > Output > SMX/HMX2 > SRC6b (SMX/SDIMX 2 on the X85)
Audio Setup > Audio Metadata > Output Setup > AMeta Source > Serial Port Input
System Config > Setup > Serial Port Type > RS-232 or RS-422

Table 2-22. External Dolby AC-3 Decoder and Internal Dolby E Encoder with Audio Metadata from External Decoder to Data Port

Description	Products
<p>The X85/X75HD provides extended audio capability. For processing previously encoded audio, the X85/X75 can process audio from an external decoder with gain, channel swap, and invert. Then the signal can be timed to video and encoded internally at the output. This example decompresses and re-compresses the Dolby AC-3 audio and passes the PCM audio as shown below. Audio metadata is provided by the external Dolby AC-3 decoder.</p>	<ul style="list-style-type: none">• X85HD-AV(-2PS) or X75HD-AV (-2PS)• X75OPT-DOLBY-2 integrated Dolby E encoder• External Dolby AC-3 decoder
Parameter Paths	
Assume that SDI (X85) or HD (X75) with Dolby AC-3 is embedded on Pair 1 of Group 1.	
Follow all the steps described in Table 2-21 on page 40 , except for audio metadata setting.*	
Audio Setup > Audio Metadata > Output Setup > AMeta Source > Generator	

* There are only 3 AES streams to the AES inputs of the X75.

Table 2-23. External Dolby E Decoder and Internal Dolby AC-3 Encoder with Audio Metadata from External Decoder to Data Port

Description	Products
<p>The X85/X75HD provides extended audio capability. For processing previously encoded audio, the X85/X75 can process audio from an external decoder with gain, channel swap and invert. Then the signal can be timed to video and encoded internally at the output. This example decompresses and re-compresses the Dolby audio and passes the PCM audio as shown below. Audio metadata is provided by the external Dolby E decoder into the data port on the X85/X75.</p>	<ul style="list-style-type: none"> • X85HD-AV(-2PS) or X75HD-AV (-2PS) • X75OPT-DOLBY-3 integrated Dolby AC-3 encoder • External Dolby E decoder
Parameter Paths	
Assume that SDI (X85) or HD (X75) with Dolby-E is embedded on Pair 1 of Group 1.	
Follow all the steps described in Table 2-21 on page 40 , including audio metadata settings.*	

* There are only 3 AES streams to internal Dolby AC-3 encoder inputs.

Table 2-24. External Dolby AC-3 Decoder, with Audio Metadata Provided by Internal Dolby AC-3 Encoder.

Description	Products
<p>The X85/X75HD provides extended audio capability. For processing previously encoded audio, the X85/X75 can process audio from an external decoder with gain, channel swap, and invert. Then the signal can be timed to video and encoded internally at the output. This example decompresses and re-compresses the Dolby AC-3 audio and passes the PCM audio as shown below. Audio metadata is provided by the internal Dolby AC-3 encoder.</p>	<ul style="list-style-type: none">• X85HD-AV(-2PS) or X75HD-AV (-2PS)• X75OPT-DOLBY-3 integrated Dolby AC-3 encoder• External Dolby AC-3 decoder
<div><div><p>Video with embedded Dolby E or AC-3</p><ul style="list-style-type: none">• X85: 0.27 SD/1.5 SDI/3.0 SDI• X75: 0.27/1.5 SDI</div><div><div>X75HD-AV or X85HD-AV</div><div><div>De-mux</div><div>Video proc</div><div>Audio proc</div><div>Mux</div></div><div><div>External Dolby AC-3 decoder</div><div>Internal Dolby AC-3 encoder</div></div></div><div><p>Video with embedded AES</p><ul style="list-style-type: none">• X85: 0.27 SD/1.5 SDI/3.0 SDI• X75: 0.27/1.5 SDI</div></div>	
Parameter Paths	
Assume that SDI (X85) or HD (X75) with Dolby AC-3 is embedded on Pair 1 of Group 1.	
Follow all the steps described in Table 2-21 on page 40 , except for setting the audio metadata.*	
Perform the following step for audio metadata setup:	
Audio Setup > Audio Metadata > Output Setup > AMeta Source > Generator	

* There are only 3 AES streams to internal Dolby AC-3 encoder inputs.

Table 2-25. Internal Dolby E Decoder and Dolby E Encoder

Description	Products
<p>The X85/X75HD processes video with embedded audio and embedded compressed audio using an internal audio decoder and encoder. The system also processes video and AES program signals. Embedded compressed audio is sent to an internal audio decoder, providing four AES signals for processing. The processed audio signals are then sent to the Dolby-E encoder. The compressed audio signal is sent to the X85/X75HD where it is embedded into the output processed program video signal. Audio metadata is passed from the Dolby decoder to the Dolby encoder.</p>	<ul style="list-style-type: none"> • X85HD-AV(-2PS) or X75HD-AV (-2PS) • X75OPT-DOLBY-1 • X75OPT-DOLBY-2
Parameter Paths	
<p>Assume that SDI (X85) or HD (X75) with embedded Dolby-E is on Pair 1 of Group 1 and that a digital audio board is in use (H/W ID: 3).*</p>	
<p>Audio Setup > Audio Metadata > Output Setup > AMeta Source > HD Input **</p>	
<p>Audio Setup > Routing > Audio In SRC Select > Dolby Dec</p>	
<p>Audio Setup > Routing > Input > Dolby Input Select > HDX 1/2</p>	
<p>Audio Setup > Routing > Output > Dolby Enc In 1 > SRC1a</p>	
<p>Audio Setup > Routing > Output > Dolby Enc In 2 > SRC1b</p>	
<p style="text-align: center;">↓ ↓ ↓ ↓ ↓</p>	
<p>Audio Setup > Routing > Output > Dolby Enc In 7 > SRC4a</p>	
<p>Audio Setup > Routing > Output > Dolby Enc In 8 > SRC4b</p>	

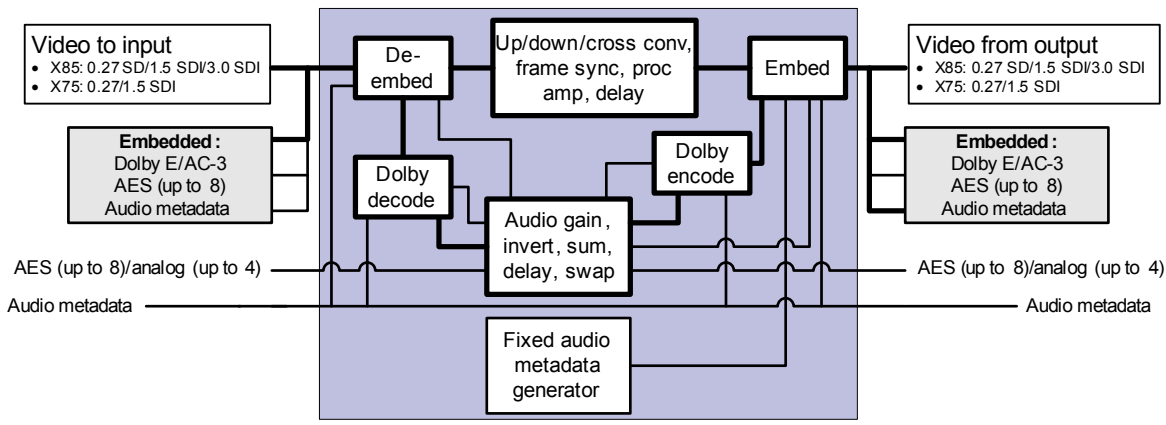
Table 2-25. Internal Dolby E Decoder and Dolby E Encoder *(Continued)*

Parameter Paths <i>(Continued)</i>
Audio Setup > Routing > Input > SRC6 Input Select > Dolby Enc
Audio Setup > Routing > Output > HMX1 > SRC6a
Audio Setup > Routing > Output > HMX2 > SRC6b
Audio Setup > Routing > Output > SMX1 > SRC6a
Audio Setup > Routing > Output > SMX2 > SRC6b

* You can also use an analog audio board (H/W ID: 3) in this configuration, but ensure the Dolby Enc input is set appropriately.

** The X85 cannot decode Dolby metadata from SDI 1 or SDI 2.

Table 2-26. Internal Dolby AC-3 Decoder and Dolby E Encoder

Description	Products
<p>The X85/X75HD processes video with embedded audio and embedded compressed audio using an internal audio decoder and encoder. The system also processes video and AES program signals. Embedded compressed audio is sent to an internal audio decoder, providing three AES signals for processing. The processed audio signals are then sent to the Dolby E encoder. The compressed audio signal is sent to the X85/X75HD where it is embedded into the output processed program video signal. Audio metadata is generated at the Dolby encoder.</p>	<ul style="list-style-type: none"> • X85HD-AV(-2PS) or X75HD-AV (-2PS) • X75OPT-DOLBY-1 • X75OPT-DOLBY-2
 <p>The diagram illustrates the internal audio processing flow. On the left, 'Video to input' (X85: 0.27 SD/1.5 SD/3.0 SDI; X75: 0.27/1.5 SDI) and 'Embedded: Dolby E/AC-3 AES (up to 8) Audio metadata' enter a central processing block. Inside, the signal passes through 'De-embed', 'Up/down/cross conv, frame sync, proc amp, delay', and 'Embed' blocks. A 'Dolby decode' block receives input from the embedded audio. The output of 'Dolby decode' goes to 'Audio gain, invert, sum, delay, swap', which then feeds into 'Dolby encode'. A 'Fixed audio metadata generator' also feeds into 'Dolby encode'. The output of 'Dolby encode' goes to 'Embed'. On the right, 'Video from output' (X85: 0.27 SD/1.5 SDI/3.0 SDI; X75: 0.27/1.5 SDI) and 'Embedded: Dolby E/AC-3 AES (up to 8) Audio metadata' are shown. External inputs/outputs include 'AES (up to 8)/analog (up to 4)' and 'Audio metadata' on both sides.</p>	
Parameter Paths	
<p>Assume that SDI (X85) or HD (X75) with Dolby AC-3 is embedded on Pair 1 of Group 1, and a digital audio board (H/W ID: 3) is used.*</p>	
<p>Follow all the steps described in Table 2-25 on page 45 for Dolby decoding and encoding, and sending out re-compressed audio through the video stream.</p>	
<p>Audio Setup > Audio Metadata > Output Setup > AMeta Source > Generator</p>	

* You can also use an analog audio board (H/W ID: 3) in this configuration, but ensure the Dolby Enc input is set appropriately.

Table 2-27. Internal Dolby E Decoder and Dolby AC-3 Encoder

Description	Products
<p>The X85/X75HD processes video with embedded audio and embedded compressed audio using an internal audio decoder and encoder. The system also processes video and AES program signals. Embedded compressed audio is sent to an internal audio decoder, providing four AES signals for processing. The processed audio signals are then sent to the Dolby AC-3 encoder. The compressed audio signal is sent to the X85/X75HD where it is embedded into the output processed program video signal. Audio metadata is passed from the Dolby decoder to the Dolby encoder.</p>	<ul style="list-style-type: none">• X85HD-AV(-2PS) or X75HD-AV (-2PS)• X75OPT-DOLBY-1• X75OPT-DOLBY-3
<p>Parameter Paths</p> <p>Assume that SDI (X85) or HD (X75) with embedded Dolby-E on Pair 1 of Group 1, and that a digital audio board (H/W ID:3) is used.*</p> <p>Follow all the steps described in Table 2-25 on page 45 for Dolby decoding, encoding, and sending out re-compressed audio through the video stream.</p> <p>Audio Setup > Audio Metadata > Output Setup > AMeta Source > HD Input **</p>	

* You can also use an analog audio board (H/W ID: 3) in this configuration, but ensure the Dolby Enc input is set appropriately.

** The X85 cannot decode Dolby metadata from SDI 1 or SDI 2.

Table 2-28. Internal Dolby AC-3 Decoder and Dolby AC-3 Encoder

Description	Products
<p>The X85/X75HD processes video with embedded audio and embedded compressed audio using an internal audio decoder and encoder. The system also processes video and AES program signals. Embedded compressed audio is sent to an internal audio decoder, providing three AES signals for processing. The processed audio signals are then sent to the Dolby E encoder. The compressed audio signal is sent to the X85/X75HD where it is embedded into the output processed program video signal. Audio metadata is generated at the Dolby encoder.</p>	<ul style="list-style-type: none"> • X85HD-AV(-2PS) or X75HD-AV (-2PS) • X75OPT-DOLBY-1 • X75OPT-DOLBY-3
Parameter Paths	
<p>Assume that SDI (X85) or HD (X75) I with embedded Dolby AC-3 on Pair 1 of Group 1 and that a digital audio board (H/W ID:3) is used.*</p>	
<p>Follow all the steps described in Table 2-25 on page 45 for Dolby decoding, encoding, and sending out re-compressed audio through the video stream.</p>	
<p>Audio Setup > Audio Metadata > Output Setup > AMeta Source > Generator</p>	

* You can also use an analog audio board (H/W ID: 3) in this configuration, but ensure the Dolby Enc input is set appropriately.

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