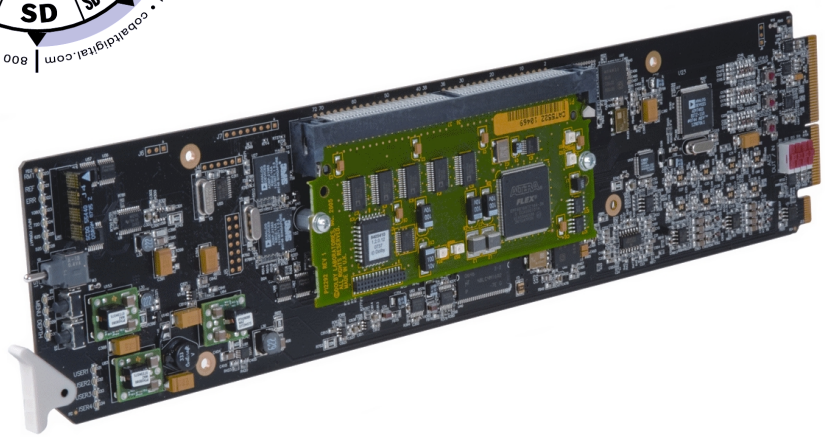
9000-Series



Dolby® Decoding Option (+DEC)

Manual Supplement

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Option

Overview

This manual supplement provides descriptions and operating instruction for the Dolby® Decoding Option on Cobalt® COMPASS® (9000-Series) cards equipped with this option. These cards are identified by the **+DEC** option suffix after the part number (for example, “9083+DEC”).

Additional functions, displays, and/or controls for the decoder function are described in this supplement. Refer to the card Owner or Product Manual for all other information pertaining to the card.

Note: Generic information provided here in examples may include functionality not present on a particular card (for example, discrete AES input/outputs).

Dolby® Decoding Functional Description

Note: Although the Dolby® decoder can provide Dolby® Digital™ (AC-3) decoding, discussion and examples here describe only Dolby® E decoding.

When Dolby® E or Dolby® Digital™ is present on a discrete AES pair or an embedded audio pair, the decoder produces up to 10 decoded channels (according to the Dolby® sub-format received from the metadata). All resulting channels are available as inputs to the audio router.

Dolby® Identification and Metadata Output Processing

(See Figure 1.) All AES pairs and embedded channels are checked by the card for valid Dolby® status. When a valid Dolby® encoded embedded or discrete AES pair is detected, the channel pair carrying the Dolby® format is displayed as “Present Dolby E” or “Present Dolby Digital”, as applicable. (The decoder always uses the metadata associated with its respective AES or embedded pair.) A selected encoded channel pair can then be directed to the Dolby® decoder. The decoder then displays the Dolby® bitstream format and program configuration (for example, “Dolby E 20-bit 5.1+2” indicating 5-channel surround with LFE channel and auxiliary stereo pair) for the selected pair, as defined by its metadata.

The card can embed metadata on the SDI output, sourced from either SDI input video or from the decoder as desired. Similarly, the card’s **DOLBY META** output can provide RS-485 metadata for downstream devices or systems. Metadata on the **DOLBY META** RS-485 output can also be sourced from either SDI input video or from the decoder as desired.

Note: On some card Rear I/O Modules, the Dolby metadata port may be labeled “RS-485”. On these cards, this port may be shared to function either as a Dolby metadata RS-485 output, or as an RS-485 LTC input/output.

Audio Decoding

(See Figure 1.) Based on the channels carrying the Dolby® encoded pair and the format defined within, the Dolby® decoder provides up to 10 decoded audio channels (**Dolby Ch 1** thru **Dolby Ch 8**; **Dolby Mix 1**, **Dolby Mix 2**). Each channel can be routed just as any other audio channel.

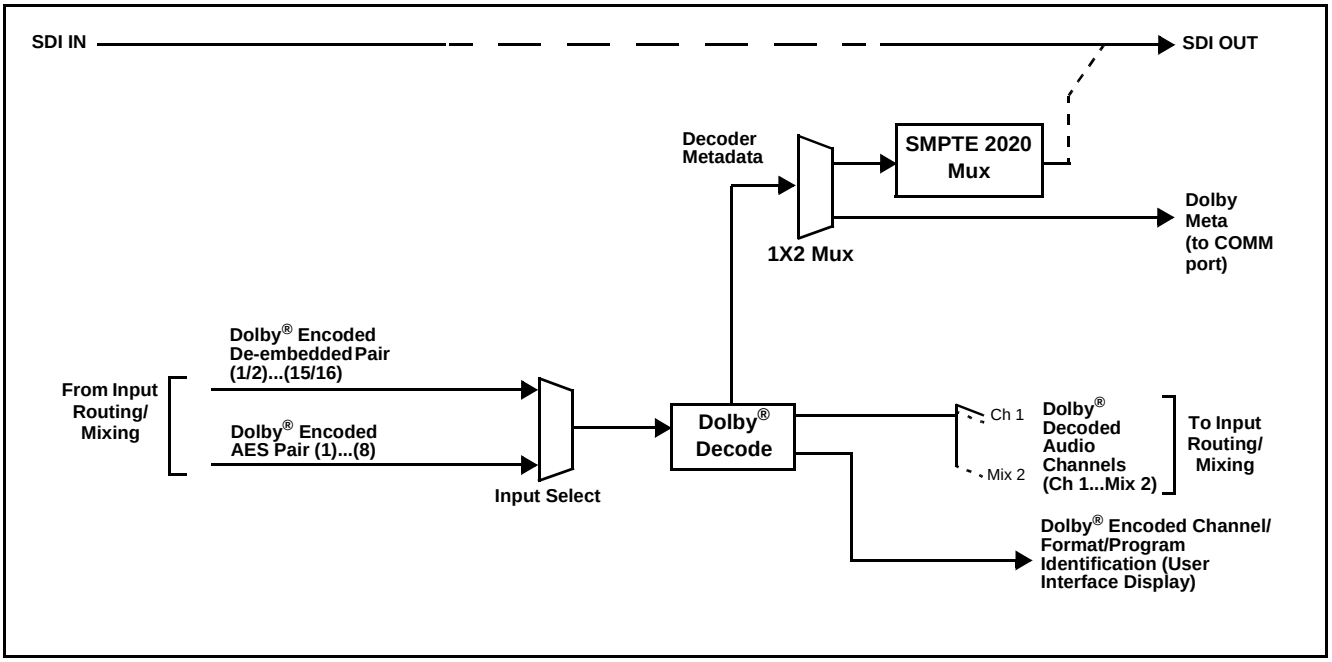


Figure 1 Dolby® Decoding and Metadata Output Processing

Dolby® Decoder Function Submenu List and Descriptions

Table 1 individually lists and describes typical Dolby® decoder controls available using DashBoard™ for cards equipped with the **+DEC** Dolby® decoder option. Where helpful, examples showing usage of a control are also provided.

Note: All numeric (scalar) parameters displayed on DashBoard™ can be changed using the slider controls, arrows, or by numeric keypad entry in the corresponding numeric field. (When using numeric keypad entry, add a return after the entry to commit the entry.)

Table 1 Dolby® Decoder Option Control List and Descriptions

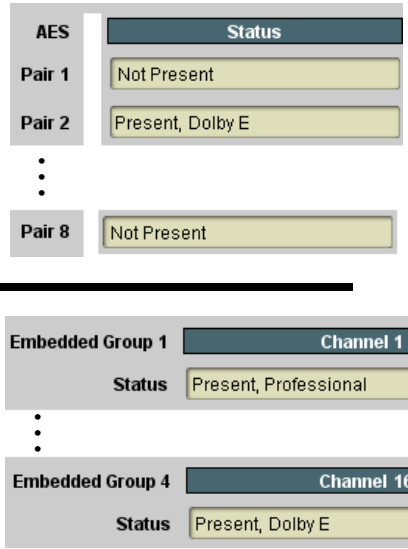
Audio Input Controls	Typical Dolby Decoder displays for cards with Audio Input Controls.
• **Status Displays** 	Individual signal status displays for AES pairs 1-8, and embedded audio channels 1-16 as follows: • **Not Present:** Indicates AES pair or embedded channel does not contain recognized audio PCM data. **Note:** Channel displaying Not Present may still carry usable audio data with **Unlocked** being displayed due to invalid headers. • **Present, Professional:** Indicates AES pair or embedded channel contains recognized AES audio PCM data. • **Present, Consumer:** Indicates AES pair or embedded channel contains audio PCM data other than AES (for example, S/PDIF). • **Present, Dolby E:** Indicates AES pair or embedded channel contains audio encoded with Dolby® E data. • **Present, Dolby Digital:** Indicates AES pair or embedded channel contains audio encoded with Dolby® Digital data. **Note:** Dolby status displays shown to the left only occur for valid Dolby® signals meeting SMPTE 337M standard. When Dolby® E or Dolby® Digital™ is present on a discrete AES pair or an embedded audio pair, the decoder can provide up to 10 decoded channels (according to the Dolby® sub-format and received metadata). All channels are available as inputs to the audio router.

Table 1 Dolby® Decoder Option Control List and Descriptions — continued

Dolby	Routes a Dolby® encoded AES pair or embedded audio source to the Dolby® decoder, and provides Dolby® configuration display and metadata handling controls.

Note: • If necessary, see Dolby® E Processing and Routing Example on page 10 for an example of using and routing Dolby® decoding.

• Decoded channels shown in DashBoard™ correlate to typical channel line-ups as shown below. Note that channel line-ups can be affected by encoding settings. Based on encoding, actual channel line-ups may vary from the examples shown here.

Dolby Format	Decoder Output Channel Line-Up									
	Ch 1	Ch 2	Ch 3	Ch 4	Ch 5	Ch 6	Ch 7	Ch 8	Mix L	Mix R
E5.1+2	LF	RF	C	LFE	LS	RS	Aux 1	Aux 2	Lo	Ro
E7.1+2	LF	RF	C	LFE	LS	RS	LB	RB	Lo	Ro
E8x1	Ch1	Ch2	Ch3	Ch4	Ch5	Ch6	Ch7	Ch8	Mono Mix 1	Mono Mix 2
D1/0	—	—	C	—	—	—				
D2/0	L	R	—	—	—	—				
D3/0	L	R	C	—	—	—				
D3/0L	L	R	C	LFE	—	—				
D2/1	L	R	—	—	S	—				
D2/1L	L	R	—	LFE	S	—				
D3/1	L	R	C	—	S	—				
D3/1L	L	R	C	LFE	S	—				
D2/2	L	R	—	—	LS	RS				
D2/2L	L	R	—	LFE	LS	RS				
D3/2	L	R	C	—	LS	RS				
D3/2L	L	R	C	LFE	LS	RS				

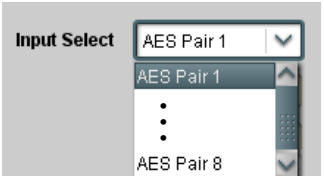
LF/RF = Left Front/Right Front
LFE = Low-Frequency Effects
S = Surround mono
LE/RE = Left Extra/Right Extra
LS/RS = Left Surround/Right Surround
C = Center (or mono as applicable)
LB/RB = Back-Surround Left/Back Surround Right
— = Not available; do not use

• See other important notes in this subsection regarding the proper use of metadata embedding tools available with the decoder function.

• Input Select

Using the **Input Select** drop-down list, routes an audio source containing locked Dolby® data to the Dolby® decoder input from the choices below.

• AES Pair as Input



AES Pair 1 thru **AES Pair 8** range in Input Select drop-down list selects an AES Pair (1 thru 8) to be the input for the Dolby® decoder.

(In this example, AES Pair 1 is the input for the Dolby® decoder)

Table 1 Dolby® Decoder Option Control List and Descriptions — continued

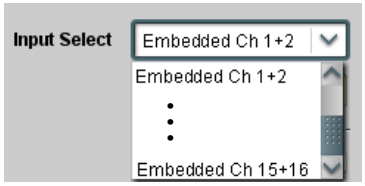
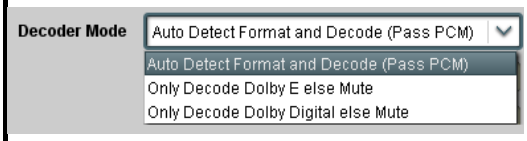
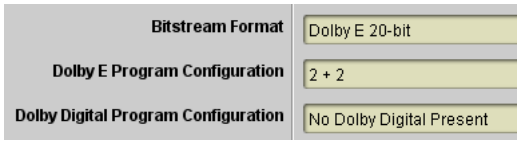
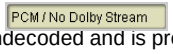
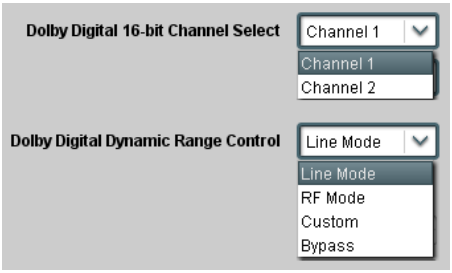
	**(continued)**
• Embedded Channel Pair as Input 	**Embedded Ch 1+2** thru **Ch 15+16** range in Input Select drop-down list selects an embedded channel pair (1+2 thru 15+16) to be the input for the Dolby® decoder. (In this example, embedded channel pair 1+2 is the input for the Dolby® decoder)
• Decoder Mode 	Using the drop-down list, selects the action to take in presence or absence of Dolby® E or Dolby Digital source from the choices shown on the left.
• Dolby Mode Display 	Shows specific bitstream information and Dolby® decoding type (Dolby® E or Dolby® Digital) for input applied to Dolby® decoder. (In this example, Dolby® E 20-bit with 2+2 format is being decoded) If selected input has invalid or missing Dolby® data (such as if wrong channels are applied to decoder),  is displayed. (In this case, PCM data passes undecoded and is present on **Dolby Ch 1** and **Dolby Ch 2** channels.)
• Dolby Digital Channel and Dynamic Range Controls 	**Channel Select** drop-down list sets the channel carrying the Dolby® Digital encoded signal for D1/0 formats as shown from choices on the left. **Dynamic Range Control** drop-down list selects from audio level compression scheme choices as shown to the left. (Line Mode is typical setting; RF Mode is used where signal may be fed through low-cost video/ audio RF modulator, in which case RF Mode helps prevent overmodulation. Refer to ATSC A/52B for more information.)

Table 1 Dolby® Decoder Option Control List and Descriptions — continued

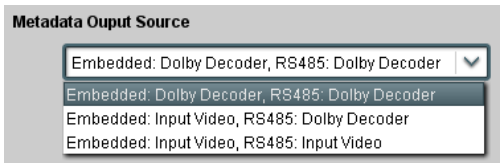
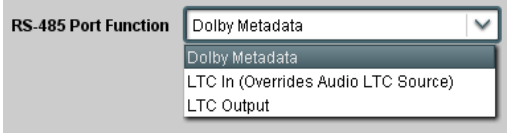
Dolby	(continued)
• **Metadata Output Source** 	Drop-down list allows embedding and RS485 metadata routing to the choices shown to the left and described below. • **Embedded: Dolby Decoder, RS485: Dolby Decoder** – Routes the metadata from the Dolby® decoder to both embedding on the output SDI and the RS485 port on card so equipped. • **Embedded: Input Video, RS485: Dolby Decoder** – Preserves input metadata and directly re-routes it to the output SDI. Routes the metadata from the Dolby® decoder to only the RS485 port on card so equipped. • **Embedded: Input Video, RS485: Input Video** – Routes the preserved input metadata to both embedding on the output SDI and the RS485 port on card so equipped. **Note:** Typically, Metadata Output Source should be set to **Embedded: Dolby Decoder, RS485: Dolby Decoder**, since this is the new metadata produced by the card decoder and should also be made available in the SDI stream and to any other external systems. If embedding new metadata, make certain to set its line number such that such that any old metadata for the same purpose is overwritten (i.e., new metadata set to the same line number as the old metadata to be replaced).
• **VBI Metadata Removal** 	**VBI Metadata Removal (On/Off)** allows SMPTE 2020-1 metadata on the received SDI to be removed (**On**). (This control is default set to **Off**, with metadata being passed).
• **Metadata Embedding** 	**Metadata Embedding (On/Off)** controls SMPTE 2020-1 metadata embedding in the SDI video output. • When set to **On**, metadata from selected source is embedded in the output SDI video. • When set to **Off**, metadata is not embedded in the output SDI video. **Note:** Metadata Embedding should **only** be set to "On" if **new** metadata is to be embedded. **Existing** metadata on the SDI input is passed through the card unaffected, requiring no operator intervention.
• **Metadata Output Line** 	Allows selection of SMPTE 2020-1 metadata line location within the VANC space for source embedding selected above. (Range is 9 thru 41; default is line 13 per standard practice.) **Note:** • Although the output line drop-down will allow any choice within the 9 thru 41 range, the actual range is automatically clamped (limited to) certain ranges to prevent inadvertent conflict with active picture area depending on video format. • The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data unless existing metadata is to be intentionally overwritten.
• **RS-485 Port Function Select**  Option	Selects function for shared RS-485 on card with **+LTC** option. For Dolby® metadata output on port, make sure control is set as shown here.

Table 1 Dolby® Decoder Option Control List and Descriptions — continued

Dolby E Metadata	Displays the status and programming details for each Dolby® E AC-3 program dictated by the received external metadata.

Note: • This display is read-only. No changes can be made to the settings. All displays are reports per the received metadata.
• Information provided here is intended as an overview of the screen. Displayed parameters are per ATSC A/52B definitions. Refer to ATSC A/52B for detailed descriptions and background.

Updates the external metadata status and program configuration display screen. The display always shows the last initiated metadata transaction; to refresh screen for any changes, click **Update**.

Note: Metadata does not continuously report. Use this button to report new metadata. When clicked, the button stays in the "depressed" position while updating. When the button displays the "out" position, update is complete and all displays are current.

Where AC-3 programs exist for the current metadata coding, the columns show the details for the individual AC-3 programs

Where AC-3 programs do not exist for the current metadata coding, the columns are collapsed

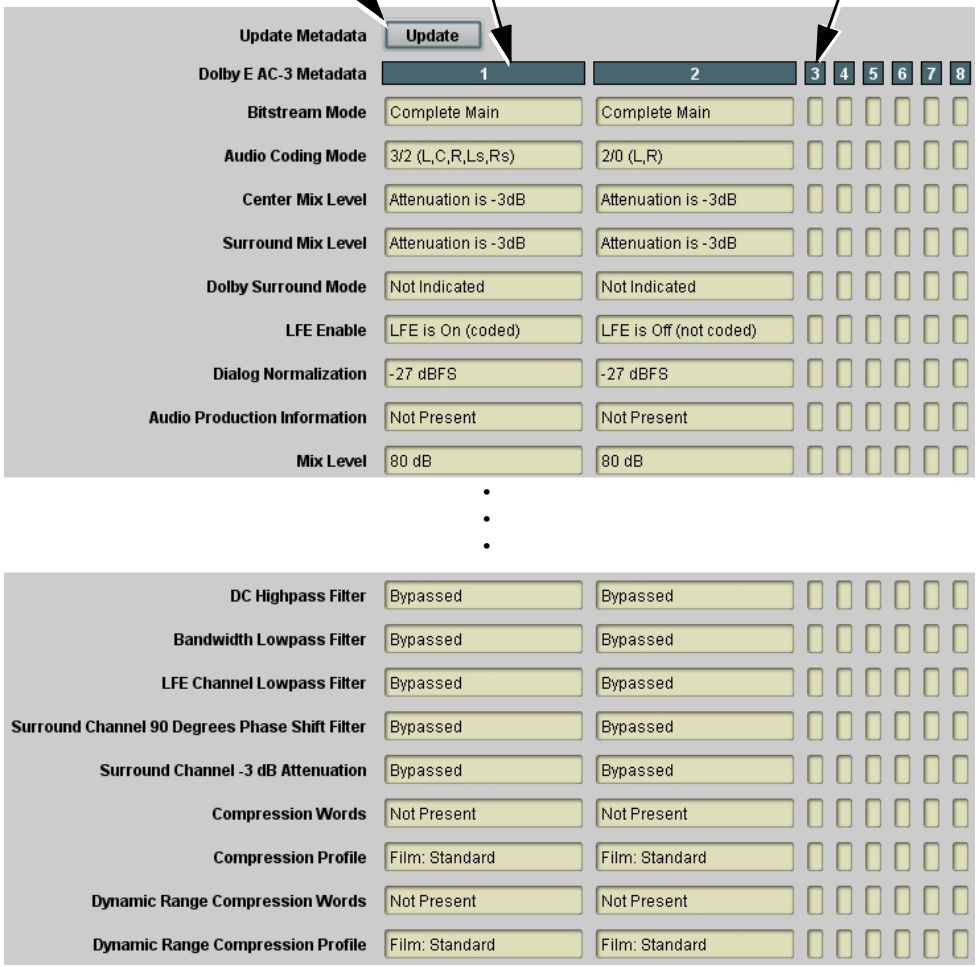


Table 1 Dolby® Decoder Option Control List and Descriptions — continued

Dolby D Metadata	Displays the status and programming details for Dolby® Digital program dictated by the received external metadata.

Note: • This display is read-only. No changes can be made to the settings. All displays are reports per the received metadata.
• Information provided here is intended as an overview of the screen. Displayed parameters are per ATSC A/52B definitions. Refer to ATSC A/52B for detailed descriptions and background.

Updates the external metadata status and program configuration display screen. The display always shows the last initiated metadata transaction; to refresh screen for any changes, click **Update**.

Note: Metadata does not continuously report. Use this button to report new metadata. When clicked, the button stays in the "depressed" position while updating. When the button displays the "out" position, update is complete and all displays are current.

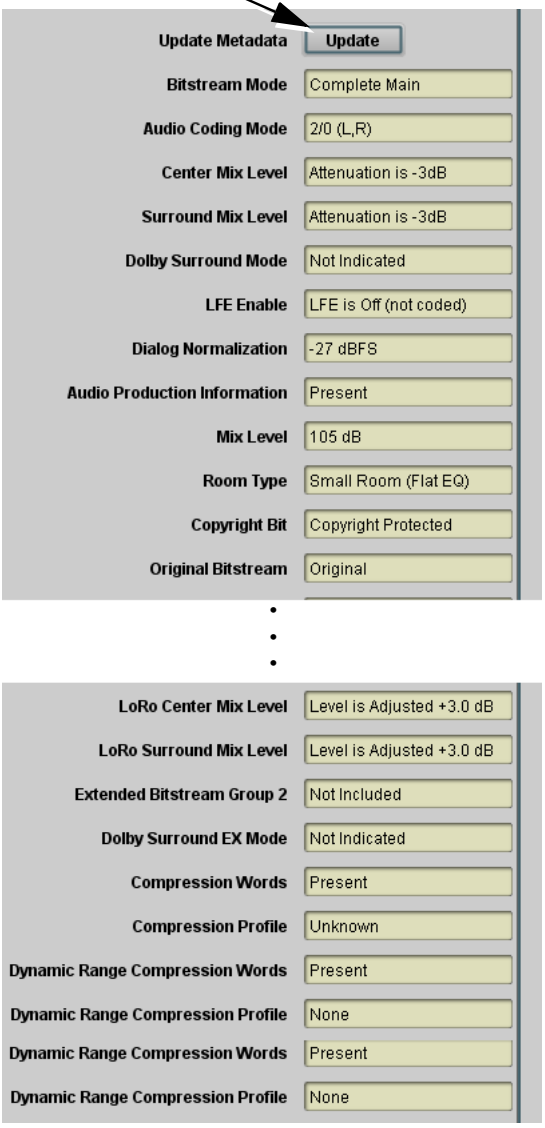
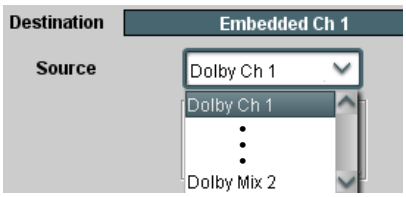
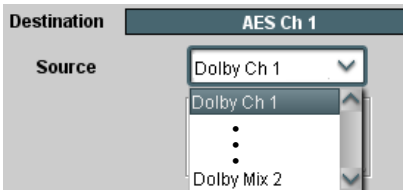


Table 1 Dolby® Decoder Option Control List and Descriptions — continued

Embedded Audio Group 1/2	Typical Dolby Decoder controls for cards with Embedded Audio Group Controls.
• Dolby Decoded Channel as Source 	**Dolby Ch 1** thru **Dolby Ch 8** range in Source drop-down list enables a Dolby® decoded channel to be the source for the selected destination Embedded Audio Group channel. (In this example, Dolby® decoded Ch 1 is the source for destination Embedded Ch 1) **Note:** Drop-down choices of Ch 1 thru Ch 8 and Mix 1/Mix 2 represent maximum channels available. Actual active channel complement is per received Dolby® format and upstream encoding. Inactive channels should not be used. Refer to Typical Dolby® E Processing and Routing Example on page 10 for an example of using Dolby® decoding.
AES Audio Out Pairs 1-4	Typical Dolby Decoder controls for cards with AES Audio Out Pairs Controls (Audio De-Embed).
• Dolby Decoded Channel as Source 	**Dolby Ch 1** thru **Dolby Ch 8** range in Source drop-down list enables a Dolby® decoded channel to be the source for the selected destination AES channel. (In this example, Dolby® decoded Ch 1 is the source for destination AES Ch 1) **Note:** Drop-down choices of Ch 1 thru Ch 8 and Mix 1/Mix 2 represent maximum channels available. Actual active channel complement is per received Dolby® format and upstream encoding. Inactive channels should not be used. Refer to Typical Dolby® E Processing and Routing Example on page 10 for an example of using Dolby® decoding.

Typical Dolby® E Processing and Routing Example

Figure 2 shows an example of using a card's DashBoard™ **Audio Input Controls**, **Dolby Decoder**, and **Embedded Audio Group 1/2** functions to decode a received Dolby® E encoded pair and route the decoded channels. The example also shows routing the metadata to the card **DOLBY META** output.

Note that the source and destination correlations shown here are only examples; **any** AES or embedded channel pair carrying encoded Dolby® data can be decoded. Decoded Dolby® channels can in turn be routed route to **any** AES or embedded channel destination.

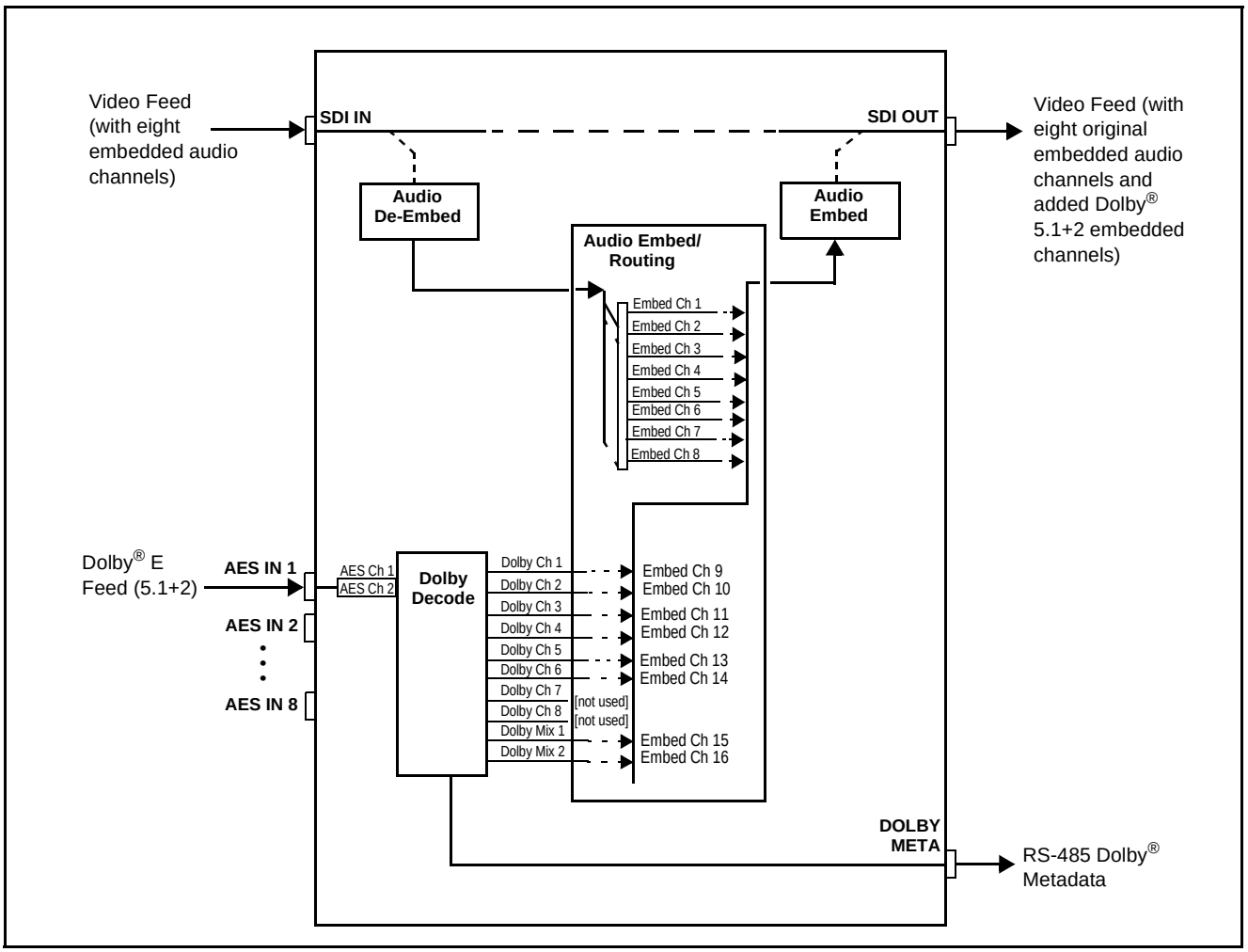
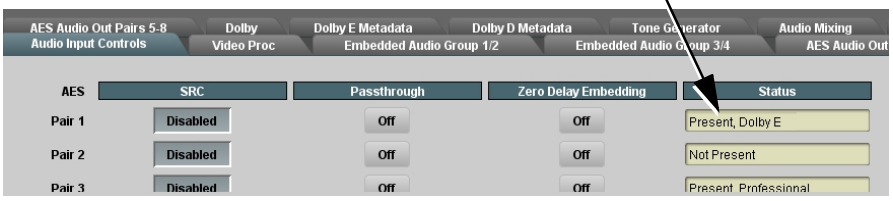
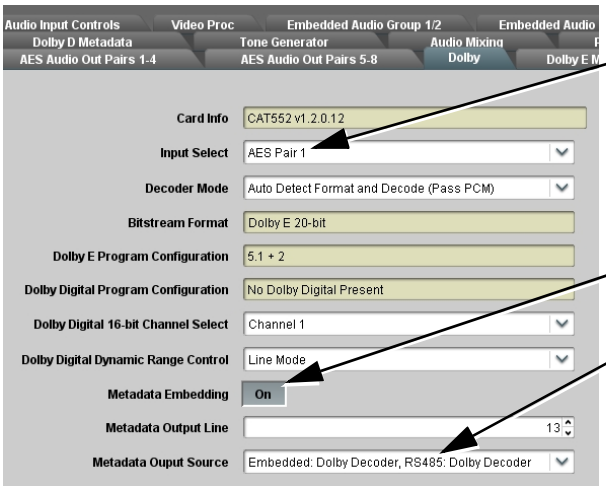


Figure 2 Typical Dolby® E Processing Example (Sheet 1 of 2)

In the example here, Dolby® E 5.1+2 data on AES pair 1 is to be decoded and embedded (using spare embedded channels 9 thru 16) along with the existing embedded audio channels (embedded channels 1 thru 8). Figure 2, sheet 2 shows the card control settings (using DashBoard™) that result in this routing.

Using the Status display in the **Audio Input Controls** function, AES Pair 1 shows Dolby® E data.

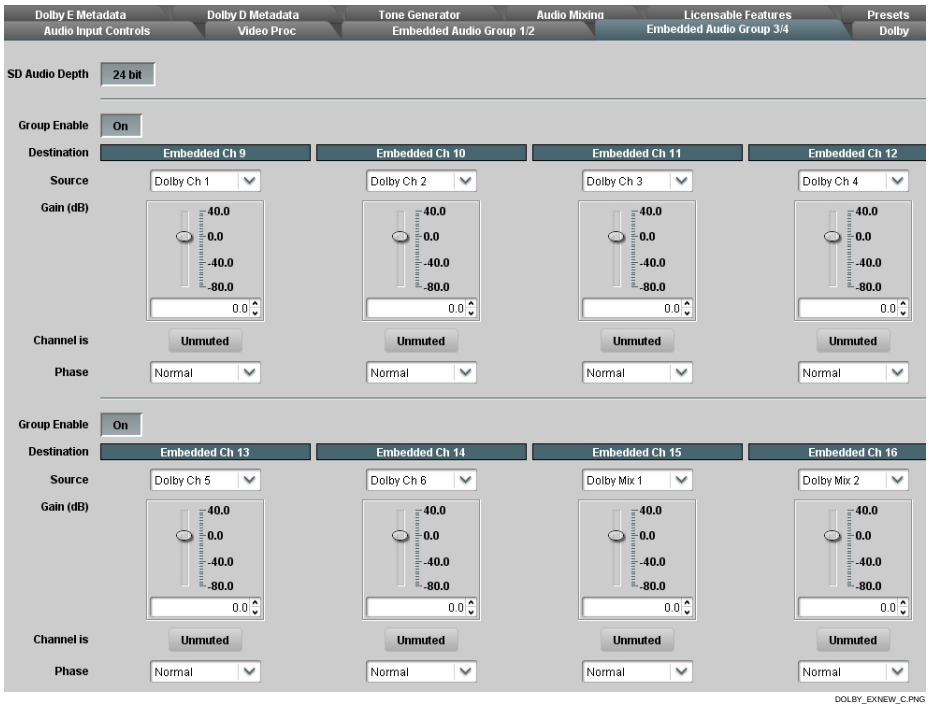




AES Pair 1 can then be selected as the **Dolby Decoder** Input Select source. The Bitstream Format and Dolby E Program Configuration displays also show this signal as Dolby® E; 5.1+2

Metadata Embedding = **On** allows decoder metadata embedding into the SDI stream (on line 13 as shown).

Metadata Output Source can be set to **Embedded: Dolby Decoder, RS485: Dolby Decoder** to select the decoder metadata as the source for embedded and RS485 metadata.



In this example, since the decoder displays a “5.1+2” configuration, the eight channels comprising this configuration can be embedded using eight spare embedded channels.

As such, the eight total decoded channels produced (Dolby Ch 1 thru Dolby Ch 6, and Dolby Mix 1 / Dolby Mix 2 corresponding to L, R, C, LFE, LS, RS, and Lo/Ro monitors) can be respectively routed to embedded channels 9 thru 16 as shown to the left using the **Embedded Audio Group 3/4** function.

(Note that decoder channels 7 and 8 are not used in this format.)

Figure 2 Typical Dolby® E Processing Example (Sheet 2 of 2)

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