DENSITÉ series

DAP-1781
8 Channel Digital Audio Processor with Dolby Decoder, Dolby-E Encoder, Dolby-D Encoder, upMAX™ Upmixer option
Guide to Installation and Operation

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Electromagnetic Compatibility

This equipment has been tested for verification of compliance with FCC Part 15, Subpart B requirements for Class A digital devices.

> **Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference, in which case the user will be required to correct the interference at his own expense.**

This equipment has been tested and found to comply with the requirements of the directive 2004/108/CE:

- EN 55022   Radiated emissions, Class A
- EN 55022   Conducted emissions, Class A
- EN 61000-3-2   Harmonic current emission limits
- EN 61000-3-2   Voltage fluctuation and flicker limitations
- EN 61000-4-2   Electrostatic discharge immunity
- EN 61000-4-3   Radiated EMF immunity – RF
- EN 61000-4-4   Electrical fast transient immunity
- EN 61000-4-5   Surge immunity
- EN 61000-4-6   Conducted immunity
- EN 61000-4-8   Power frequency magnetic field
- EN 61000-4-11   Voltage dips, short-interruption and voltage variation immunity

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How to contact us:

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1   DAP-1781   8 Channel Digital Audio Processor

1.1   Introduction

The DAP-1781 is an eight-channel high quality digital audio processor designed to work alone or with a wide range of video converters, frame synchronizer proc/amps of the Densité series.

The card features two distinct processing blocks: Input and Output. The input processing includes Dolby detection, Tone generator, delay adjustments, level controls and phase correction. Delay components include a fixed delay of up to 2 seconds as well as a video tracking delay that will automatically track the varying saw tooth delay introduced by an associated video frame synchronizer.

The output processing block includes full channel shuffling, an additional gain/attenuation stage and mixing. Each odd output channel is a mix of any two input channels, and a 4-channel mixing is available on the even output channels.

Additional audio functions such as a 16 channel dynamic processing (compressor/limiter and expander) and/or Downmixing (5.1 to LtRt) and Upmixing (2.0 to 5.1) are available as options.

The DAP-1781 offers the possibility to integrate a Dolby-E encoder, a Dolby-E and AC-3 decoder, a Dolby Digital AC-3 encoder or an upMAX^{TM} Upmixer module. One module at a time can be installed on the card.

The use of a 16 channel card-to-card audio bus allows the DAP-1781 to work with one video card and one other audio processor card. When connected to a video card, the DAP-1781 can process 8 channels of audio originating from the video card; once processed, the signals are sent back to be embedded, and are also available at the digital outputs.

Along with the audio channels, the Audio bus carries the timing, delay signaling and Dolby Metadata. When combining cards together all audio processing is synchronous and in phase, ensuring proper alignment and matched delay.

User-defined channel identification data may be encoded in the AES status bits. An input audio signal status is also available indicating input signal presence or overload.

The card is housed in a (DENSITÉ) frame, with a single or double width rear connector panel. Based on the rear module installed, the DAP-1781 is compatible with the AES3 or AES-3id digital audio standard.

1.2   Features

- Stand-alone 8 channel audio processor and delay.
- 8 channel processing of embedded audio signals.
- Fixed delay and up to 8 video frames tracking delay
- Full channel shuffling on the outputs
- 2 and 4 channel mix-down
- Audio metering data for audio levels and phase over IP.
- Dolby-E compatibility
- Dolby-E/AC-3 decoder, Dolby-E encoder or Dolby AC-3 encoder option
- Dolby-E placement correction
- Dolby Metadata insertion or extraction
- Control and modification of the Dialnorm value.
- Digital audio inputs and outputs
- Balanced AES3 or unbalanced AES3-id I/Os
- -96 to +12 dB of input and output level adjustments (0.5 dB steps)
- Locks to video card, URS frame reference or AES1 input
- Internal digital EBU tone generator
- Absence signal delay and threshold adjustable per channel
- Input and output Overload detection
- All settings through frame control panel or remotely
- Status LED and alarms remote reporting

1.3   Applications

- With an FRS-1xxx in incoming feeds applications with a SDI input signal and discreet audio.
- With an XVP-18xx or other processing card to provide audio upmix as well as discreet I/O's.
- With a video card to decode Dolby-E and feed it back for embedding.
- With a video card to encode Dolby-E and feed it back for embedding.
- Stand alone or with a video card to encode Dolby-AC3 after master control.
- Stand alone Dolby-E/AC3 decoder,
- Stand alone Dolby-E encoder,
- Stand alone Dolby AC3 encoder,
- Stand alone 4 AES audio processor.

1.4 Functional Block Diagram
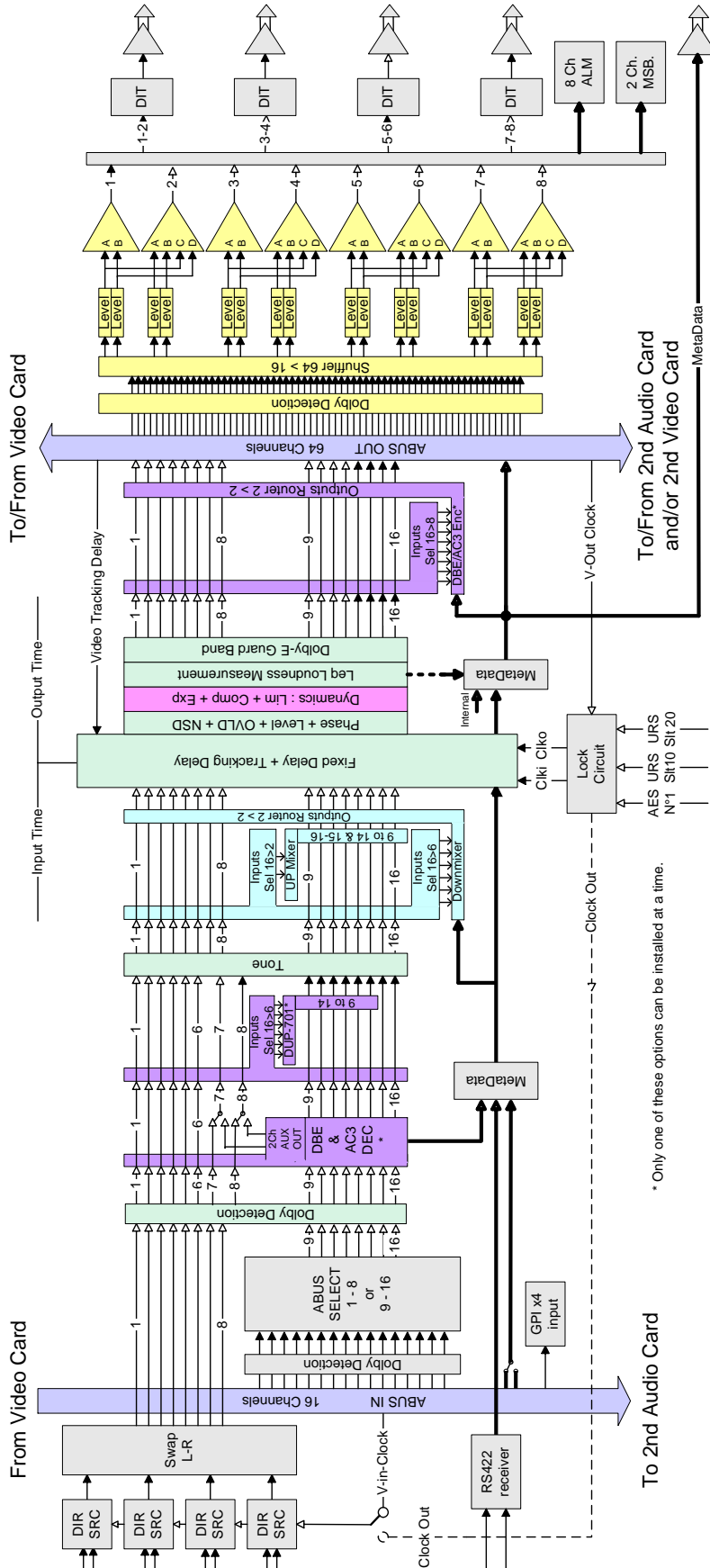
1.5 Simplified Block Diagram

DAP-1781 BLOCK DIAGRAM
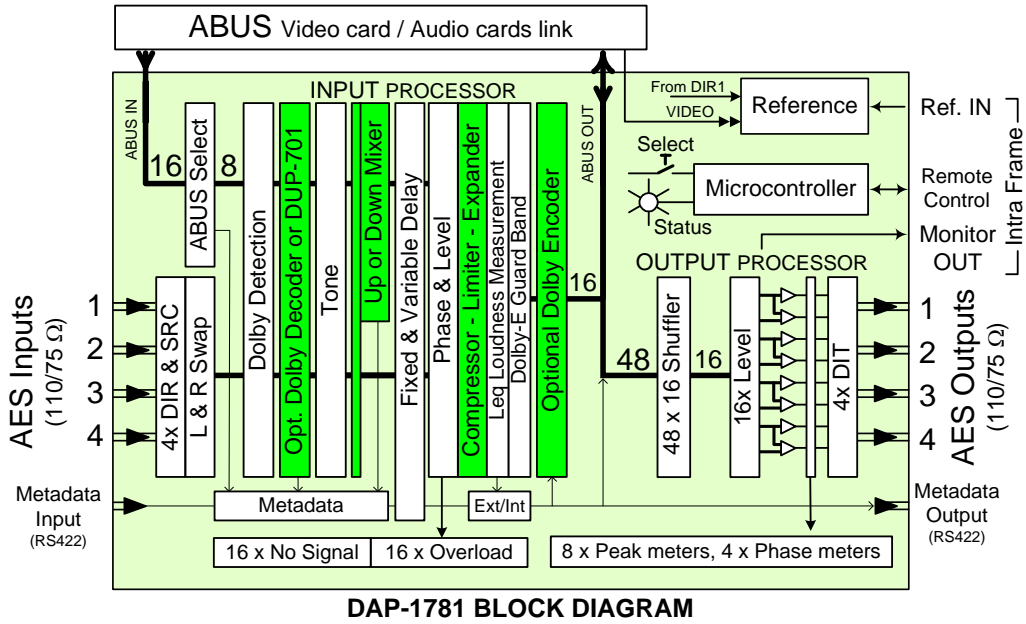
1.6 Card front-edge layout
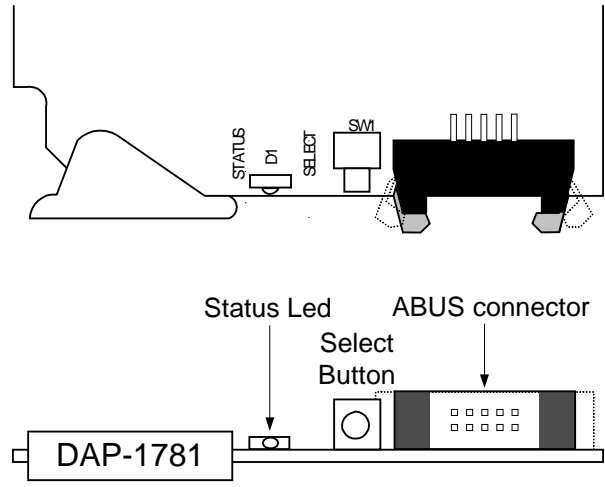
2 Installation

2.1 Unpacking

Make sure you have ordered and received the DAP-1781 and its associated rear panel. If any of the following items are missing, contact your distributor or Miranda Technologies Inc.

- DAP-1781 8-Channel Digital Audio Processor
- One of the DAP-1781 Rear Panels (see figures on page 6)
- An A-BUS flat cable

2.2 Installation in the Densité frame

The DAP-1781 must be mounted in a DENSITÉ frame. The installation includes both the DAP-1781 module, and the rear panel module. It is not necessary to switch off the frame's power when installing or removing the card.

Detailed instructions for installing cards and their associated rear panels in the Densité frame are given in the Densité Frame manual.

When the DAP-1781 is used in conjunction with a video module such as XVP-1801 and/or another DAP-1781, the A-BUS flat cable must be installed between the A-BUS connectors on the front card edges.

- ***Note*:** for a two card installation, use the two end connectors of the flat cable and leave the middle one unplugged.
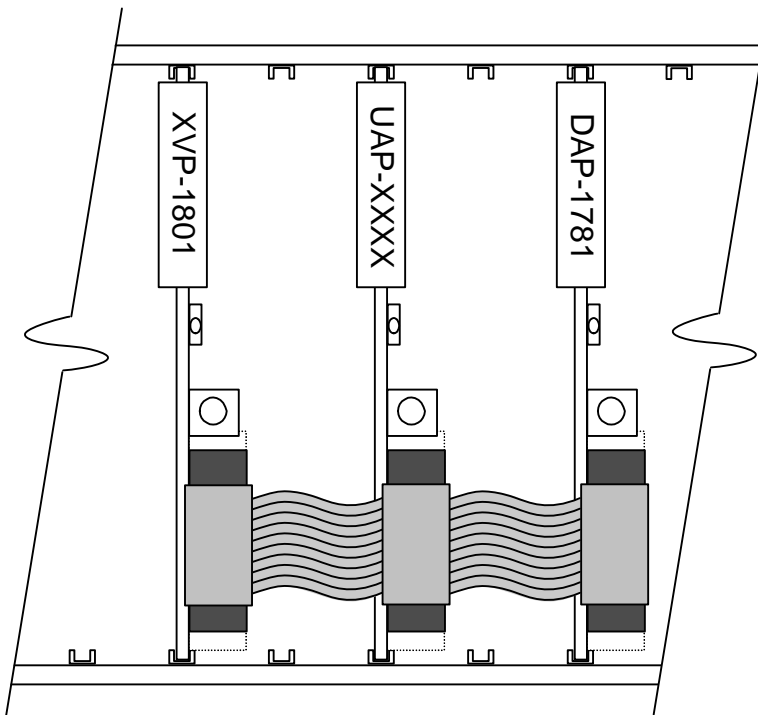
2.2.1 Rear Panel Options

Single rear panels AES3 or AES3-id compatible:

HD15-pin Female DSUB Connector	Connection
1	AES 1 Signal
2	AES 2 Signal
3	AES 3 Signal
6	AES 1 Shield
7	AES 2 Shield
8	AES 3 Shield
10	AES 4 Shield
13	AES 4 Signal

A cable adapter SUB-HD15 male to four female BNC coaxial connectors is available under the Miranda reference 1769-1600-100.

Dual rear panels AES3 or AES3-id compatible:
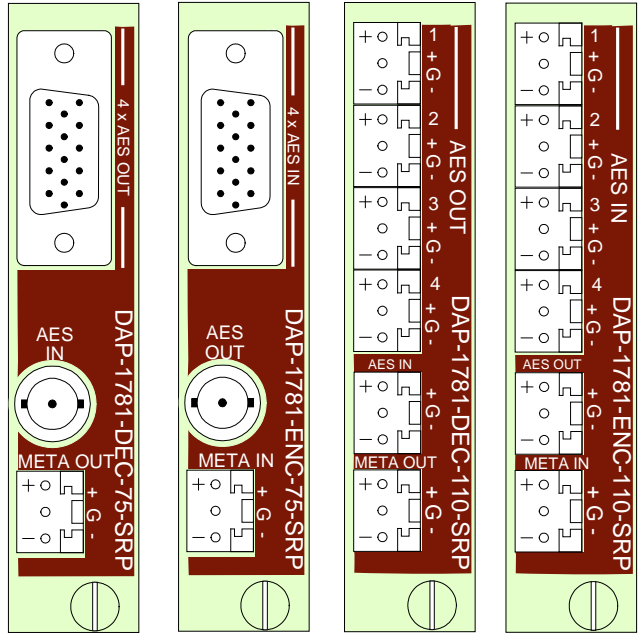
METADATA:

The Metadata input and output are provided through two RS422 asynchronous serial ports.

If a termination is needed at the Metadata input, it should be placed on the Weco connector with the cable (there is no termination on the rear panel or on the DAP-1781).

For a direct connection of the Metadata output to a Dolby DP571 (Dolby-E encoder), use the following wiring:

9-pin female D-connector	Connection	Weco
1	Shield	
2	NC	
3	TX B	Metadata OUT +
4	Ground	Ground
5	NC	
6	Ground	
7	NC	
8	TX A	Metadata OUT -
9	Shield	
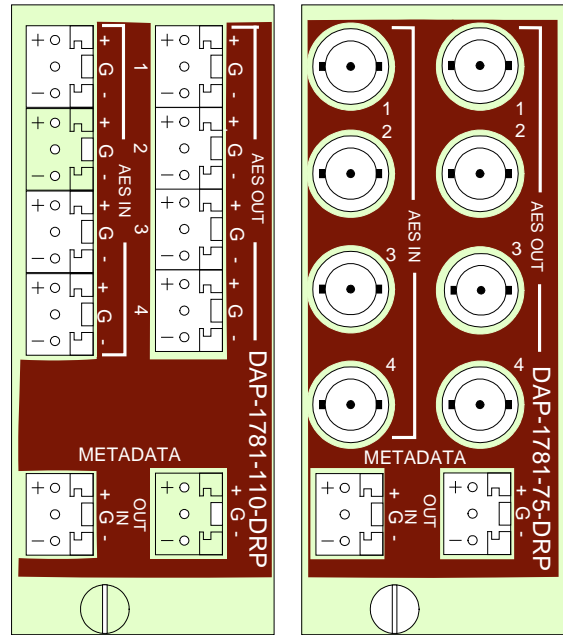
OPTIONAL DOLBY LM100 INTERFACE

On the LM100, use the Serial Remote Control Input at the rear which is a 9-pin female D-connector RS-485. For a direct connection between the LM100 and the DAP-1781 card use the following wiring:

9-pin male D-connector	Connection	Weco Metadata IN	Weco Metadata OUT
1	Shield		
2	Rx A	Metadata IN -	
3	TX B		Metadata OUT +
4	Ground		Ground
5	NC		
6	Ground	Ground	
7	Rx B	Metadata IN +	
8	TX A		Metadata OUT -
9	Shield		

Use the System Settings Menu on the LM100 to configure the serial port with these parameters:

- Remote Baud Rate   115.2 kbps
- Remote Mode   Remote
- Unit Address   8280 (default) or any valid, unique address.

On the LM100 front-panel controls, press **Shift** and ← to activate the remote operation. The button ← is lit and the unit remains in remote operation until the combination is pressed again.

GPI INPUTS - *AVAILABLE ONLY VIA XVP-1801 CARD AND A-BUS LINK*

On the XVP-1801, the rear panel GPI I/O connector is a 15-pin female D-connector. When used with the DAP-1781, the pin assignment is as follows:

XVP-1801 GPI I/O 9-pin D-connector	DAP-1781
1	GPI Load Preset User1
6	GPI Load Preset User2
2	GPI Load Preset User3
7	GPI Load Preset User4
3	GPI Load Preset User5
8	Reserved

3 Local control using the Densité frame control panel

Push the SELECT button on DAP-1781 card edge (see Section 1.6) to assign the local control panel to operate the DAP-1781. Use the control panel buttons to navigate through the menu, as described below.

All of the cards installed in a Densité frame are connected to the frame's controller card, which handles all interaction between the cards and the outside world. There are no operating controls located on the cards themselves. The controller supports remote operation via its Ethernet ports, and local operation using its integrated control panel.

The local control panel is fastened to the controller card by a hinged connector, and when installed is located in the front center of the frame, positioned in front of the power supplies. The panel consists of a display unit capable of displaying two lines of text, each 16 characters in length, and five pushbuttons.

The panel is assigned to operate any card in the frame by pushing the SELECT button on the front edge of that card. Pushing the CONTROLLER button on the control panel selects the Controller card itself. The STATUS LED on the selected card flashes yellow.
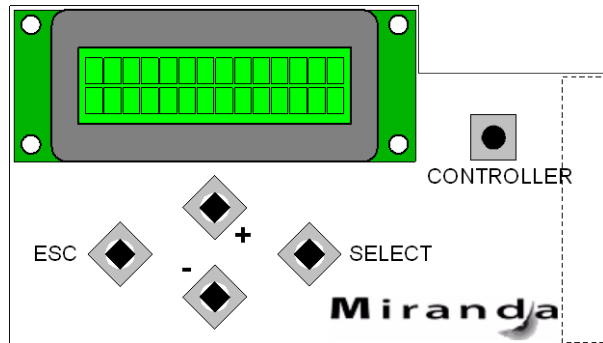
The local control panel displays a menu that can be navigated using the four pushbuttons located beneath the display. The functionality of the pushbuttons is as follows:

[CTRL]   Selects the controller card for status monitoring and adjustment

[+] [–]   Used for menu navigation and value modification

[SELECT]   Gives access to the next menu level. When a parameter value is shown, pushing this button once enables modification of the value using the [+] and [–] buttons; a second push confirms the new value

[ESC]   Cancels the effect of parameter value changes that have not been confirmed; pushing [ESC] causes the parameter to revert to its former value.

             Pushing [ESC] moves the user back up to the previous menu level. At the main menu, [ESC] does *not* exit the menu system. To exit, re-push the [SELECT] button for the card being controlled.

If no controls are operated for 30 seconds, the controller reverts to its normal standby status, and the selected card's STATUS LED reverts to its normal operating mode.

3.1 Status LED and Report

The status monitor LED is located on the front card-edge of the DAP-1781, and is visible through the front access door of the DENSITÉ frame.

This multi-color LED indicates module status by color, and by flashing/steady illumination, according to the following chart. The state flashing red is the highest error level; the green state represents no error. The chart also indicates fault reporting for this card on the DENSITÉ frame's serial and GPI interfaces.

	Activated	Serial report	GPI report	Yellow	Red	Flashing Red	Flashing Yellow
Card system error	✿	✿	✿	✿			
Reference error	✿	✿	✿		✿		
AES In 1 carrier no lock	✿	✿	✿		✿		
AES In 1 carrier biphase error	✿	✿	✿		✿		
AES In 1 carrier parity error	✿	✿	✿		✿		
AES In 1 carrier CRCC error	✿	✿	✿	✿			
AES In 1 carrier invalid sample	✿	✿	✿	✿			
AES In 1 PCM detection		✿	✿	✿			
AES In 1 Non-PCM detection		✿	✿	✿			
AES In 1 Dolby E detection		✿	✿	✿			
AES In 1 AC-3 detection		✿	✿	✿			
AES In 2 carrier no lock	✿	✿	✿		✿		
AES In 2 carrier biphase error	✿	✿	✿		✿		
AES In 2 carrier parity error	✿	✿	✿		✿		
AES In 2 carrier CRCC error	✿	✿	✿	✿			
AES In 2 carrier invalid sample	✿	✿	✿	✿			
AES In 2 PCM detection		✿	✿	✿			
AES In 2 Non-PCM detection		✿	✿	✿			
AES In 2 Dolby E detection		✿	✿	✿			
AES In 2 AC-3 detection		✿	✿	✿			
AES In 3 carrier no lock	✿	✿	✿		✿		
AES In 3 carrier biphase error	✿	✿	✿		✿		
AES In 3 carrier parity error	✿	✿	✿		✿		
AES In 3 carrier CRCC error	✿	✿	✿	✿			
AES In 3 carrier invalid sample	✿	✿	✿	✿			
AES In 3 PCM detection		✿	✿	✿			
AES In 3 Non-PCM detection		✿	✿	✿			
AES In 3 Dolby E detection		✿	✿	✿			
AES In 3 AC-3 detection		✿	✿	✿			
AES In 4 carrier no lock	✿	✿	✿		✿		
AES In 4 carrier biphase error	✿	✿	✿		✿		
AES In 4 carrier parity error	✿	✿	✿		✿		
AES In 4 carrier CRCC error	✿	✿	✿	✿			
AES In 4 carrier invalid sample	✿	✿	✿	✿			
AES In 4 PCM detection		✿	✿	✿			
AES In 4 Non-PCM detection		✿	✿	✿			
AES In 4 Dolby E detection		✿	✿	✿			
AES In 4 AC-3 detection		✿	✿	✿			
Input Metadata Absent		✿	✿	✿			
Input Metadata Comparison difference		✿	✿	✿			
Any Proc Test Signal activated	✿	✿	✿	✿			
Dolby Encoder Test Signal activated		✿	✿	✿			
CH1 (AES In 1L) NSD	✿	✿	✿	✿			
CH2 (AES In 1R) NSD	✿	✿	✿	✿			
CH3 (AES In 2L) NSD	✿	✿	✿	✿			
CH4 (AES In 2R) NSD	✿	✿	✿	✿			
CH5 (AES In 3L) NSD	✿	✿	✿	✿			
CH6 (AES In 3R) NSD	✿	✿	✿	✿			
CH7 (AES In 4L) NSD	✿	✿	✿	✿			

	Activated	Serial report	GPI report	Yellow	Red	Flashing Red	Flashing Yellow
CH8 (AES In 4R) NSD	✪	✪	✪	✪			
CH9 (EXT 1/9) NSD	✪	✪	✪	✪			
CH10 (EXT 2/10) NSD	✪	✪	✪	✪			
CH11 (EXT 3/11) NSD	✪	✪	✪	✪			
CH12 (EXT 4/12) NSD	✪	✪	✪	✪			
CH13 (EXT 5/13) NSD	✪	✪	✪	✪			
CH14 (EXT 6/14) NSD	✪	✪	✪	✪			
CH15 (EXT 7/15) NSD	✪	✪	✪	✪			
CH16 (EXT 8/16) NSD	✪	✪	✪	✪			
CH1 (AES In 1L) Overload		✪	✪		✪		
CH2 (AES In 1R) Overload		✪	✪		✪		
CH3 (AES In 2L) Overload		✪	✪		✪		
CH4 (AES In 2R) Overload		✪	✪		✪		
CH5 (AES In 3L) Overload		✪	✪		✪		
CH6 (AES In 3R) Overload		✪	✪		✪		
CH7 (AES In 4L) Overload		✪	✪		✪		
CH8 (AES In 4R) Overload		✪	✪		✪		
CH9 (EXT 1/9) Overload		✪	✪		✪		
CH10 (EXT 2/10) Overload		✪	✪		✪		
CH11 (EXT 3/11) Overload		✪	✪		✪		
CH12 (EXT 4/12) Overload		✪	✪		✪		
CH13 (EXT 5/13) Overload		✪	✪		✪		
CH14 (EXT 6/14) Overload		✪	✪		✪		
CH15 (EXT 7/15) Overload		✪	✪		✪		
CH16 (EXT 8/16) Overload		✪	✪		✪		
CH1&2 Proc Dolby E Guard Banc Error		✪	✪	✪			
CH3&4 Proc Dolby E Guard Banc Error		✪	✪	✪			
CH5&6 Proc Dolby E Guard Banc Error		✪	✪	✪			
CH7&8 Proc Dolby E Guard Banc Error		✪	✪	✪			
CH9&10 Proc Dolby E Guard Banc Error		✪	✪	✪			
CH11&12 Proc Dolby E Guard Banc Error		✪	✪	✪			
CH13&14 Proc Dolby E Guard Banc Error		✪	✪	✪			
CH15&16 Proc Dolby E Guard Banc Error		✪	✪	✪			
Dolby Encoder – Encoding Stopped		✪	✪	✪			
CH1 Mixer, Input A Overload		✪	✪		✪		
CH1 Mixer, Input B Overload		✪	✪		✪		
CH2 Mixer, Input A Overload		✪	✪		✪		
CH2 Mixer, Input B Overload		✪	✪		✪		
CH3 Mixer, Input A Overload		✪	✪		✪		
CH3 Mixer, Input B Overload		✪	✪		✪		
CH4 Mixer, Input A Overload		✪	✪		✪		
CH4 Mixer, Input B Overload		✪	✪		✪		
CH5 Mixer, Input A Overload		✪	✪		✪		
CH5 Mixer, Input B Overload		✪	✪		✪		
CH6 Mixer, Input A Overload		✪	✪		✪		
CH6 Mixer, Input B Overload		✪	✪		✪		
CH7 Mixer, Input A Overload		✪	✪		✪		
CH7 Mixer, Input B Overload		✪	✪		✪		

	Activated	Serial report	GPI report	Yellow	Red	Flashing Red	Flashing Yellow
CH8 Mixer, Input A Overload		✪	✪		✪		
CH8 Mixer, Input B Overload		✪	✪		✪		
CH1 Mixer, Output (AES Out 1L) Overload		✪	✪		✪		
CH2 Mixer, Output (AES Out 1R) Overload		✪	✪		✪		
CH3 Mixer, Output (AES Out 2L) Overload		✪	✪		✪		
CH4 Mixer, Output (AES Out 2R) Overload		✪	✪		✪		
CH5 Mixer, Output (AES Out 3L) Overload		✪	✪		✪		
CH6 Mixer, Output (AES Out 3R) Overload		✪	✪		✪		
CH7 Mixer, Output (AES Out 4L) Overload		✪	✪		✪		
CH8 Mixer, Output (AES Out 4R) Overload		✪	✪		✪		
CH1 Mixer, Output (AES Out 1L) Mute		✪	✪	✪			
CH2 Mixer, Output (AES Out 1R) Mute		✪	✪	✪			
CH3 Mixer, Output (AES Out 2L) Mute		✪	✪	✪			
CH4 Mixer, Output (AES Out 2R) Mute		✪	✪	✪			
CH5 Mixer, Output (AES Out 3L) Mute		✪	✪	✪			
CH6 Mixer, Output (AES Out 3R) Mute		✪	✪	✪			
CH7 Mixer, Output (AES Out 4L) Mute		✪	✪	✪			
CH8 Mixer, Output (AES Out 4R) Mute		✪	✪	✪			
Output Metadata Dialnorm & Measured Loudness difference		✪	✪	✪			
Measured Loudness Above Upper Threshold		✪	✪	✪			
Measured Loudness Below LowerThreshold		✪	✪	✪			
Custom 1 activated		✪		✪			
Custom 2 activated		✪		✪			
Custom 3 activated		✪		✪			
Custom 4 activated		✪		✪			
Custom 5 activated		✪		✪			
Custom 6 activated		✪		✪			
Custom 7 activated		✪		✪			
Custom 8 activated		✪		✪			
Custom 9 activated		✪		✪			
Custom 10 activated		✪		✪			
Custom 11 activated		✪		✪			
Custom 12 activated		✪		✪			
Custom 13 activated		✪		✪			
Custom 14 activated		✪		✪			
Custom 15 activated		✪		✪			
Custom 16 activated		✪		✪			
User attention							✪
Rear panel error						✪	
HW Failure						✪	

✪ : Factory default.

NOTE: if the LED is flashing yellow, it indicates that the card is under local control because the *Select* button on the front of the card has been pushed.

3.2 Menu for local control

The DAP-1781 has operating parameters which may be adjusted locally at the controller card interface. After pressing the SELECT button on the DAP-1781 module, use the keys on the local control panel (described in the Controller card manual) to step through the displayed menu and adjust the parameters. The menus are shown below.

STATUS			
GENERAL			HW ERR: *parameter1* | [CARD SYS: *parameter2*, REF: *parameter3*, RATE: *parameter4*, [REAR: *parameter5* | REAR PANEL ERROR]]
			parameter1 = FPGA | DIR | DATAFLASH | DOLBY | DUP-701
			parameter2 = OK | ERROR
			parameter3 = A-BUS (V) | A-BUS (A) | FRAME (10) | FRAME (20) | AES1 | FREE-RUN *(depends on rear, cards present on A-BUS and reference distribution cards in frame)*
			parameter4 = 23.98 fps | 24 fps | 25 fps | 29.97 fps | 30 fps
			parameter5 = UNSUPPORTED | 110-DRP | 75-DRP | ENC-75-SRP | DEC-75-SRP | ENC-110-SRP | DEC-110-SRP
AES IN			AES1 *parameter1*, AES1 FRQ *parameter2*, ..., AES4 *parameter1*, AES4 FRQ *parameter2*
			parameter1 = OK | VALIDITY | CRCC | PARITY | BIPHASE | NO LOCK
			parameter2 = UNKNOWN | 192kHz | 96kHz | 88.2kHz | 48kHz | 44.1kHz | 32kHz
CHANNEL STATUS	AES 1L		CHANNEL USE, PCM SAMPLES, EMPHASIS, FREQ MODE, SAMPLING FREQ, CHANNEL MODE, USER-BIT, AUX.BITS, WORD LENGTH, REFERENCE, SOURCE ID, DESTINATION ID.
	AES 1R		
	...		*Each item will be placed on the first line and it's corresponding status on the second line.*
	AES 4L		
	AES 4R		
AUDIO TYPE			CH1 *parameter*, ..., CH16 *parameter*
			parameter = PCM | NON-PCM | DOLBY E | AC-3
DOLBY DECODER ** Dolby E only ** Dolby Digital only*	ERROR STATUS		NO ERRORS | DOLBY D FRAME | DOLBY D CRC | DOLBY D DECODE | DOLBY E CRC | DOLBY E DECODE | DOLBY E MD | DOLBY E AC-3 MD | UNSUP FRAME RATE | UNSUP PROG CONF
	FORMAT		[DOLBY D 32 | DOLBY D 16 CH1 | DOLBY D 16 CH2 | DOLBY D 16 CH1&2 | DOLBY E 24 | DOLBY E 20 | DOLBY E 16 | PCM], [5.1+2 | 5.1+2x1 | 4+4 | 4+2x2 | 4+2+2x1 | 4+4x1 | 4x2 | 3x2+2x1 | 2x2+4x1 | 2+6x1 | 8x1 | 5.1 | 4+2 | 4+2x1 | 3x2 | 2x2+2x1 | 2+4x1 | 6x1 | 4 | 2x2 | 2+2x1 | 4x1 | 7.1 | 7.1 Screen]*, [[23.98 | 24 | 25 | 29.97 | 30] fps]*, [1+1 | 1/0 | 2/0 | 3/0 | 3/0L | 2/1 | 2/1L | 3/1 | 3/1L | 2/2 | 2/2L | 3/2 | 3/2L]**, [[32 | 40 | 48 | 56 | 64 | 80 | 96 | 112 | 128 | 160 | 192 | 224 | 256 | 384 | 448 | 512 | 576 | 640] kbps]**
	METADATA * **	COMMON*	PROGRAM CONFIG, FRAME RATE
			Each item will be placed on the first line and it's corresponding status on the second line.
		PROGRAM 1*	DIALOGUE LEVEL, CHANNEL MODE, LFE CHANNEL, DATA RATE**, BITSTREAM MODE, LINE MODE PRO, RF MODE PRO, RF OVER PROTECT*, CENTER DWNMX, SRND DWNMX, DOLBY SRND, AUDIO PROD INFO, MIXING LEVEL, ROOM TYPE, COPYRIGHT, ORIG BITSTREAM, EXTEND BSI 1, PREF DWNMX, Lt/Rt C DWNMX, Lt/Rt S DWNMIX, Lo/Ro C DWNMX, Lo/Ro S DWNMX, DOLBY SRND EX, HEADPHONE MODE, A/D CONV TYPE, DC FILTER*, LOWPASS FILTER*, LFE FILTER*, SRND 3dB ATTN*, SRND PH SHIFT*
		...	
		PROGRAM 8*	*Each item will be placed on the first line and it's corresponding status on the second line.*
	FIRMWARE VERSION		W.X.Y.Z
upMAX	CURR PROCESSING		OFF, PASS-THROUGH, UPMIX, AUTOMAX
	FIRMWARE VERSION		W.X.Y.Z
INPUT PROCESSING			ALL OK | [CH1 *parameter*, ..., CH16 *parameter*]
			parameter = OK | [SILENCE, OVERLOAD, MUTE, TONE]

STATUS				
METADATA INPUT	STATUS			NOT ACTIVE | [*parameter1* PRESENT | REV *parameter1* PRESENT | REV *parameter1* ABSENT / REV *parameter2* | REV LAST VALID | REV BLANKED | [USING GEN, [DETECTED *parameter1*]]]
				parameter1 = EXT | DEC | ABUS
				parameter2 = GENERATOR | USER1 | … | USER10 | FACTORY
	COMMON			PROGRAM CONFIG, FRAME RATE
				Each item will be placed on the first line and it's corresponding status on the second line.
	PROGRAM 1 … PROGRAM 8			DIALOGUE LEVEL, CHANNEL MODE, LFE CHANNEL, BITSTREAM MODE, LINE MODE PRO, RF MODE PRO, RF OVER PROTECT, CENTER DWNMX, SRND DWNMX, DOLBY SRND, MIXING LEVEL, ROOM TYPE, COPYRIGHT, ORIG BITSTREAM, EXTENDED BITSTREAM, PREF DWNMX, Lt/Rt C DWNMX, Lt/Rt S DWNMIX, Lo/Ro C DWNMX, Lo/Ro S DWNMX, DOLBY SRND EX, HEADPHONE MODE, A/D CONV TYPE, DC FILTER, LOWPASS FILTER, LFE FILTER, SRND 3dB ATTN, SRND PH SHIFT
				Each item will be placed on the first line and it's corresponding status on the second line.
DE GUARD BAND	CH1&2 … CH15&16			NOT DOLBY E | DOLBY E,NO V REF | XX ms YY samples
LOUDNESS	INTERNAL			OFF | [-60.00, -59.75, …, -0.25, 0] `dBFS`
	DOLBY LM-100	STATUS		STATE, SOURCE, FORMAT, DECODED, TYPE, AES INPUT, RF INPUT
				Each item will be placed on the first line and it's corresponding status on the second line.
		MEASUREMENT		VAL ELAPSED
				parameter1 parameter2
				parameter1 = X `dBFS`
				parameter2 = HR:MN:SC
DOLBY D ENCODER	STATUS			ENCODING, METADATA STATUS, METADATA SOURCE
				Each item will be placed on the first line and it's corresponding status on the second line.
	FIRMWARE VERSION			W.X.Y.Z
DOLBY E ENCODER	STATUS			ENCODING, VIDEO FRAME SYNC, SYNC FRAME RATE, METADATA STATUS, METADATA SOURCE
				Each item will be placed on the first line and it's corresponding status on the second line.
	FIRMWARE VERSION			W.X.Y.Z
AES OUT				ALL OK | [MUTE 1L, MUTE 1R, MUTE 2L, MUTE 2R, MUTE 3L, MUTE 3R, MUTE 4L, MUTE 4R]

| USER PRESET | LOAD | | USER 1, USER 2, USER 3, USER 4, USER 5 | |
| | SAVE | | | |

INPUT PROCESSING	CH1 (AES 1L)	LOCK *(CH1, 3, 5, 7)*	**OFF**, ON	
	CH2 (AES 1R)	SWAP *(CH1, 3, 5, 7)*	**OFF**, X&Y *(locked channels)*	
	CH3 (AES 2L)	TONE *(CH1, 3, 5, 7)*	**OFF**, EBU ENABLED	
	CH4 (AES 2R)	FIXED DELAY — COARSE/FINE	[-250, ..., **0**, 1, ..., 2400] ms [-47, ..., **0**, 1, ..., 47] samp	
	CH5 (AES 3L)	DOLBY E ALIGN	SEL: XXms YYsamp	
	CH6 (AES 3R)	PHASE INVERT	**OFF**, ON	
	CH7 (AES 4L)	LEVEL	CUT, -95.5, ..., -1.0, -0.5, **0**, +0.5, +1.0, ..., +12.0	dB
	CH8 (AES 4R)	MUTE	**OFF**, ON	
	CH9 [EXT CH1/9]	NSD — THRESHOLD	-72, -66, **-60**, -54, -48	dBFS
	CH10 [EXT CH2/10]	DELAY	1, 2, ..., **15**, ..., 255	s
	CH11 [EXT CH3/11]	SRC *(CH 1, 3, 5, 7)*	**AUTO**, ON, OFF	
	CH12 [EXT CH4/12]	DYN GROUP MODE	**MONO**, STEREO, GROUP 1, GROUP 2	
	CH13 [EXT CH5/13]	LIMITER — THRESHOLD	-20, -19, ..., -1, **0**	dBFS
	CH14 [EXT CH6/14]	COMPRESSOR — ATTACK TIME	**1**, 10, 40, 160	ms
	CH15 [EXT CH7/15]	RELEASE TIME	48, 24, 12, **6**	dB/s
	CH16 [EXT CH8/16]	THRESHOLD	-60, -59, ..., -1, **0**	dBFS
		RATIO	**1/1 (OFF)**, 1.25/1, 1.5/1, 1.75/1, 2/1, 3/1, 4/1, 8/1, 16/1	
		EXPANDER — THRESHOLD	**-80**, -79, ..., -41, -40	dBFS
		RATIO	**1/1 (OFF)**, 1.125/1, 1.25/1, 1.375/1, 1.5/1, 1.625/1, 1.75/1, 1.875/1, 2/1	
		DYNAMIC GAIN	**0**, +1, ..., +24	dB

DOLBY DECODER	BITSTREAM MODE		**AUTO**, DOLBY E, DOLBY D, MUTE	
	INPUT		**CH1&2**, CH3&4, ..., CH7&8 *(and CH9&10, CH11&12, ..., CH15&16 for V)*	
	DELAY COMPENSATE		0, **-1**, -2	frame
	STREAM SELECT *(Dolby D)*		**0**, ..., 6	
	CHANNEL SELECT *(Dolby D Pro 16-bit)*		**CH1**, CH2	
	LISTENING MODE *(Dolby D)*		**FULL**, EX, 3 STEREO, PHANTOM, STEREO, MONO	
	PROLOGIC MODE *(PCM, Dolby D)*		**OFF**, PROLOGIC	
	2 CH. AUX OUTPUT	OUTPUT	**OFF**, ON	
		MODE	**AUTO**, DEFAULT	
		TYPE	**LoRo**, MONO	
		PROGRAM SELECT *(Dolby E)*	**0**, ..., 7	

upMAX	OPERATING MODE			**OFF**, ON	
	PROCESSING			**PASS-THROUGH**, UPMIX, AUTOMAX, METADATA FOLLOW	
	REVERSION MODE *(METADATA FOLLOW)*			**PASS-THROUGH**, UPMIX, LAST VALID	
	INPUT	L/R		**CH1&2**, CH3&4, ..., CH15&16	
		C/LFE		CH1&2, **CH3&4**, ..., CH15&16	
		SL/SR		CH1&2, CH3&4, **CH5&6**, ..., CH15&16	
	CENTER WIDTH			0, 1, ..., **70**, ..., 100	%
	SURROUND DEPTH			0, 1, ..., **100**	%
	LFE CHANNEL			OFF, **ON**	
	LFE LEVEL			0, 1, ..., **50**, ..., 100	%
UPMIX/DOWNMIX	OPERATING MODE			**OFF**, UPMIX, DOWNMIX	
or	OPERATING MODE			OFF, **UPMIX**, DOWNMIX	
	UPMIX SOURCE	LEFT INPUT		**CH1**, CH2, ..., CH16	
		RIGHT INPUT		CH1, **CH2**, ..., CH16	
	UPMIX TYPE			**SPEECH**, MUSIC, MOVIE, CUSTOM	
	EFFECT INTENSITY			0, 1, ..., **5**, ..., 10	
	CUSTOM SETTINGS	LEFT/RIGHT LEVEL		CUT, -24, -23, ..., 0, ..., +5, +6	
		CENTER LEVEL		CUT, -24, -23, ..., 0, ..., +5, +6	dB
		LFE LEVEL		CUT, -24, -23, ..., 0, ..., +5, +6	dB
		SURROUND LEVEL		CUT, -24, -23, ..., 0, ..., +5, +6	dB
		LFE FILTER		OFF, **80 Hz**, 120 Hz	
		LEFT/RIGHT WIDTH		**0**, 1, ..., 31	
or	OPERATING MODE			OFF, UPMIX, **DOWNMIX**	
	DOWNMIX SOURCE	LEFT INPUT		**CH1**, CH2, ..., CH16	
		RIGHT INPUT		CH1, **CH2**, ..., CH16	
		CENTER INPUT		CH1, ..., **CH3**, ..., CH16	
		LFE INPUT		CH1, ..., **CH4**, ..., CH16	
		SRND LEFT INPUT		CH1, ..., **CH5**, ..., CH16	
		SRND RIGHT INPUT		CH1, ..., **CH6**, ..., CH16	
	OUTPUT MAPPING			CH1&2, CH3&4, ..., **CH15&16**	
	DOWNMIX MODE	CONTROL		**AUTO**, DEFAULT	
		TYPE		**LtRt**, LoRo	
		REVERSION		**DEFAULT**, LAST VALID	
	LEVELS	CENTER		CUT, -6.0, -4.5, -3.0, -1.5, **0**, +1.5, +3.0	dB
		LFE		CUT, -6.0, -4.5, **-3.0**, -1.5, 0, +1.5, +3.0, +4.5, +6.0, +7.5, +9.0, +10.0	dB
		SURROUND		CUT, -6.0, -4.5, -3.0, -1.5, **0**, +1.5, +3.0	dB
		OUTPUT		**NORMALIZED**, DIRECT	

METADATA			
INPUT SOURCE		**RS-422 PORT**, DOLBY DECODER, A-BUS IN	
OUTPUT SOURCE		**INPUT**, GENERATOR	
REVERSION MODE		RS-422 PORT, DOLBY DECODER, **A-BUS IN**, GENERATOR, USER1, USER2, …, USER10, FACT, LAST VALID, BLANK	
HOLD		HOLD NOW | RELEASE NOW	
PROGRAM CONFIG		**5.1+2**, 5.1+2x1, …, 7.1 Screen *(not all available in 16-bit mode)*	
PROG 1	DIALOGUE LEVEL	-31, …, **-27**, …, -1	dBFS
PROG 2	CHANNEL MODE	1+1, 1/0, 2/0, 3/0, 2/1, 3/1, 3/2	
PROG 3	LFE CHANNEL	DISABLED, ENABLED	
PROG 4	BITSTREAM MODE	**COMPLETE MAIN**, MAIN M&E, VISUALLY IMP, HEARING IMP, DIALOGUE, COMMENTARY, EMERGENCY, VOICE OVER	
PROG 5	LINE MODE PRO	NONE, **FILM STANDARD**, FILM LIGHT, MUSIC STANDARD, MUSIC LIGHT, SPEECH	
PROG 6	RF MODE PRO		
PROG 7			
PROG 8	RF OV. PROTECT	**DISABLED**, ENABLED	
	CNTR DWNMIX LVL	-6.0, -4.5, **-3.0**	dB
	SRND DWNMIX LVL	OFF, -6.0, **-3.0**	dB
	DOLBY SRND	NOT INDICATED, **NOT DOLBY SRND**, DOLBY SRND	
	AUDIO PROD INFO	**DISABLED**, ENABLED	
	MIXING LEVEL	**80**, 81, …, 111	dB SPL
	ROOM TYPE	**NOT INDICATED**, LARGE, SMALL	
	COPYRIGHT	**DISABLED**, ENABLED	
	ORIG. BITSTREAM		
	EXTND BSI 1	DISABLED, **ENABLED**	
	PREFERRED DWNMIX	NOT INDICATED, **Lt/Rt**, Lo/Ro	
	Lt/Rt C DWNMIX	MUTE, -6.0, -4.5, **-3.0**, -1.5, +0.0, +1.5, +3.0	dB
	Lt/Rt S DWNMIX		
	Lo/Ro C DWNMIX		
	Lo/Ro S DWNMIX		
	EXTND BSI 2	DISABLED, **ENABLED**	
	DOLBY SRND EX	NOT INDICATED, **NOT SRND EX**, DOLBY SRND EX	
	HEADPHONE MODE	**NOT INDICATED**, NOT HP ENCODED, HP ENCODED	
	A/D CONV. TYPE	**STANDARD**, HDCD	
	DC FILTER	DISABLED, **ENABLED**	
	LOWPASS FILTER		
	LFE FILTER		
	SRND 3dB ATTEN		
	SRND PH SHIFT		
PRESETS	LOAD TO GEN	USER 1, USER 2, …, USER 10, FACTORY	
	SAVE GEN TO	USER 1, USER 2, …, USER 10	
	SAVE INPUT TO	NO METADATA | [GENERATOR, USER 1, USER 2, …, USER 10]	
FIXED DELAY		[-250, …, **0**, 1, …, 2400] ms [-47, …, **0**, 1, …, 47] samp	

LOUDNESS

Level 2	Level 3	Level 4	Values	Unit
INTERNAL	OPERATING MODE		**OFF**, ON	
	FILTER TYPE		**LEQ(A)**, ITU-R BS.1770	
	CHANNEL SELECT	CH1	**OFF**, ON	
		...		
		CH16		
DOLBY LM-100	OPERATING MODE		**OFF**, ON	
	MEASURE STATE		**RUN**, PAUSE	
	MEASURE RESET		RESET NOW	
	CHANNEL SELECT		L, R, STEREO, **C**, ALL	
	METHOD		**SHORT**, INFINITE	
	ADDRESS		**0x8280**, …, 0xFFFF	
ANALYSIS	PROG SEL		**PROG 1**, PROG 2,…, PROG 8	
	MEASUREMENT	SOURCE	**INTERNAL**, DOLBY LM-100	
		UPPER THRESHOLD	-31, -30, …, **-21**, …, -1	dBFS
		LOWER THRESHOLD	-45, -44, …, **-33**, …, -1	dBFS
	GENERATOR	SOURCE	**MEASUREMENT**, INPUT DIALNORM, ALWAYS INPUT	
		ACCEPT	INTERNAL OFF | LM-100 OFF | LM-100 ABSENT | METADATA ABSENT | IN PROG ABSENT | GEN PROG ABSENT | -XXdB FOR PROG Y	
	OUTPUT	THRESHOLD	+/- 1, 2, …, **6**, …, 20	dB
	THRESH DURATION		0, 1, …, **60**, …, 239, 240, 245, 250, …, 300	s

DOLBY D ENCODER

Level 2	Level 3	Level 4	Values	Unit
OPERATING MODE	ENCODER CONTROL		**DOLBY D ENCODING**, PASS-THRU, ENC TEST -18dBFS, PASS TST -18dBFS, ENC TEST -20dBFS, PASS TST -20dBFS, DOLBY D MUTE, PASS-THRU MUTE	
	DATA RATE		AUTO 384, AUTO 448, 56, 64, 80, 96, 112, 128, 160, 192, 224, 256, 320, 384, 448, 512, 576, 640	kbps
METADATA CONTROL	METADATA SOURCE		**PROG 1** [(ABSENT)], PROG 2 [(ABSENT)], …, PROG 8 [(ABSENT)]	
	REVERSION MODE		**LAST USED**, STOP ENCODING	
I/O CONTROL	INPUT CHANNELS	IN1: *chan name*	CH1, CH2, …, CH8 *(and CH9, CH10, …, CH16 when A-BUS IN is present)*	
		IN2: *chan name*		
		IN3: *chan name*		
		IN4: *chan name*		
		IN5: *chan name*		
		IN6: *chan name*		
	OUTPUT MAPPING		CH1&2, CH3&4, …, **CH15&16**	
	OUTPUT STREAM		**0**, …, 6	
	OUTPUT MODE		**PRO 32-BIT**, 16-BIT CH1, 16-BIT CH2	
	CODING DELAY *		**187**, 188, …, 450	ms
	* Only for versions later than 1.0.1.8			

DOLBY E ENCODER

Level 2	Level 3	Level 4	Values	Unit
INPUT CHANNELS	IN1: PROG x, *chan*		CH1, CH2, …, CH8 *(and CH9, CH10, …, CH16 when A-BUS IN is present)*	
	IN2: PROG x, *chan*			
	IN3: PROG x, *chan*			
	IN4: PROG x, *chan*			
	IN5: PROG x, *chan*			
	IN6: PROG x, *chan*			
	IN7: PROG x, *chan*			
	IN8: PROG x, *chan*			
OUTPUT MAPPING			CH1&2, CH3&4, …, **CH15&16**	
OPERATING MODE	ENCODING MODE		**DOLBY E ENCODING**, PASS-THRU, ENC TEST -18dBFS, PASS TST -18dBFS, ENC TEST -20dBFS, PASS TST -20dBFS, DOLBY D MUTE, PASS-THRU MUTE	
	REVERSION MODE		**LAST USED**, STOP ENCODING	
	48 kHz PULL DOWN		**DISABLED**, ENABLED	
	BIT DEPTH		**20 BITS**, 16 BITS	

OUTPUT MIXERS

Level 2	Level 3	Level 4	Values	Unit
AES 1L	MODE		OFF, **A**, SUM A+B, 2 INPUT MIX [, 4 INPUT MIX *(even CH)*]	
AES 1R	SOURCE A	A-BUS SELECT	**A1**, V, A2	
AES 2L	SOURCE B *(SUM,MIX)*	CHANNEL SELECT	**1**, 2, …, 16	
AES 2R		LEVEL *(A,MIX)*	CUT, -95.5, …, -0.5, **0**, +0.5, …, +12.0	dB
AES 3L		LEVEL *(SUM)*	**-6.0**, -3.0, 0.0	dB
AES 3R	MUTE		**OFF**, ON	
AES 4L	CH STATUS ID	SOURCE	**OFF**, ON XXXX	
AES 4R		DESTINATION	*XXXX : 4 ASCII characters*	

MONITORING
- LEFT — AES OUT 1L, AES OUT 1R, ..., AES OUT 4L, AES OUT 4R
- RIGHT — AES OUT 1L, AES OUT 1R, ..., AES OUT 4L, AES OUT 4R

CONFIGURE ALARMS
- CARD SYSTEM
  - ALARM MODE — OFF, ON *(default depends on alarm)*
  - ALARM LEVEL — YELLOW, RED, FLASH RED *(default depends on alarm)*
  - ALARM REPORT — **NONE**, GPI
- REFERENCE
- AES INPUTS
  - IN1 NO LOCK
  - IN1 BIPHASE
  - IN1 PARITY
  - IN1 CRCC
  - IN1 VALIDITY
  - IN1 PCM
  - IN1 NON-PCM
  - IN1 DOLBY E
  - IN1 AC-3
  - ...
  - IN4 NO LOCK
  - IN4 BIPHASE
  - IN4 PARITY
  - IN4 CRCC
  - IN4 VALIDITY
  - IN4 PCM
  - IN4 NON-PCM
  - IN4 DOLBY E
  - IN4 AC-3
- INPUT METADATA
- TEST
  - PROC CH1-CH16
  - ENCODER
- NSD
  - PROC CH1
  - ...
  - PROC CH8
  - PROC CH9 [EXT CH1/9]
  - ...
  - PROC CH 16 [EXT CH8/16]
- OVERLOAD
  - PROC CH1
  - ...
  - PROC CH8
  - PROC CH9 [EXT CH1/9]
  - ...
  - PROC CH 16 [EXT CH8/16]
  - OUT MIXER 1, IN A
  - OUT MIXER 1, IN B
  - ...
  - OUT MIXER 8, IN A
  - OUT MIXER 8, IN B
  - AES OUT 1L
  - ...
  - AES OUT 4R
- DE GUARD BAND
  - PROC CH1&2
  - ...
  - PROC CH15&16
- LOUDNESS
  - OUTPUT DIALNORM
  - UPPER THRESH
  - LOWER THRESH
- ENCODE STOPPED
- OUTPUT MUTE
  - AES OUT 1L
  - ...
  - AES OUT 4R
- CUSTOM
  - 1
  - ...
  - 16

REFERENCE	SOURCE		FREE-RUN, AES1, FRAME (20), FRAME (10), A-BUS, **AUTO**
	DEF FRAME RATE		23.98, 24, 25, **29.97**, 30 [fps]
A-BUS CONFIG	CARD SYSTEM		**NONE**, V + >A1<, V + >A1< + A2, V + A1 + >A2<, >A1< + A2, A1 + >A2<, V + A1 + >S<
	A-BUS_IN SELECT		**EXT CH1 - CH8**, EXT CH9 - CH16
	GPI	IN 1	**DISABLED**, ENABLED
		IN 2	
		IN 3	
		IN 4	
		IN 5	
		IN 6	
VERSION			DAP-1781: XYZ
OPTIONS			DYN PROC *parameter*, UP/DOWNMIX *parameter*, LOUDNESS *parameter*
			parameter = OFF | ON
FACTORY DEFAULT	CARD PARAMETERS		RESTORE
	CARD LED ALARMS		

4   Remote control using Miranda's iControl system

The operation of the DAP-1781 may be controlled using Miranda's iControl system.

- This manual describes the control panels associated with the DAP-1781 and their use.

- Please consult the iControl User's Guide for information about setting up and operating iControl.

In iControl Navigator or iControl Websites, double-click on the DAP-1781 icon to open the control panel.

Note the following features of this panel:

Panel selection buttons

The buttons on the left side of the panel are used to select the contents of the right portion of the screen.

- The selected button is highlighted, and the main screen heading matches the button name.
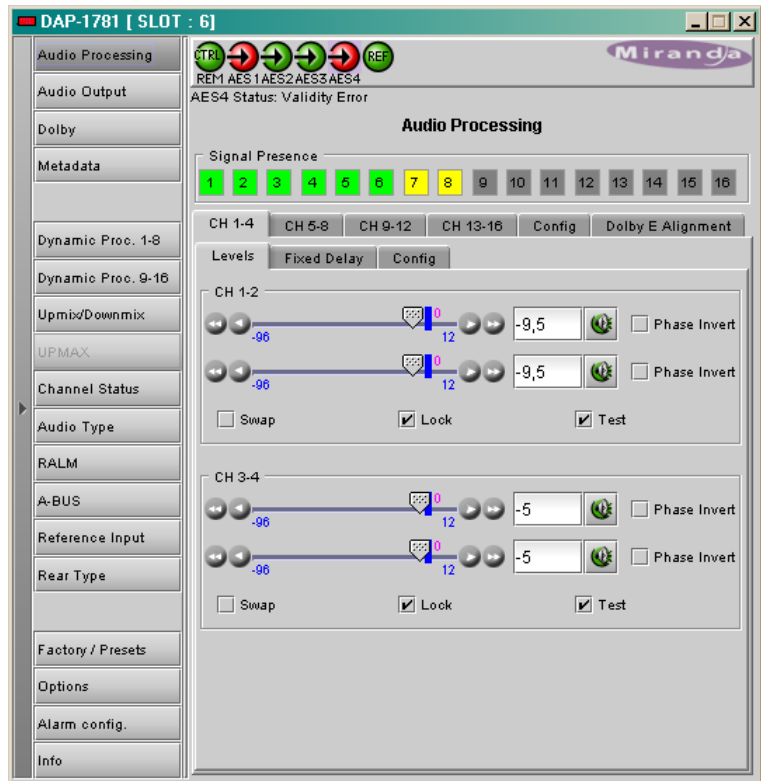
The column of buttons can be hidden or revealed by clicking the arrow icon at the left-hand side (compare the two figures on the right).

The individual control panels are described in detail below.

Status Icons

At the top, to the left of the Miranda logo, are six status icons that report various aspects of the card's operation.

Icon #	Indicates	appearance	interpretation
1	Card control status		Green if the card is controlled remotely (iControl). Yellow when locally controlled.
2 - 5	AES Inputs status		Green if OK, Red if an AES error is detected (the error can be Validity, CRCC, Parity, Biphase or No Lock) Grey if detection is disabled (card used with a single rear panel for a decoder card) *Note: Each input error can be masked independently*
6	Reference status		Green if OK, Red if an error has been detected or there is no reference connected. The error message is *Reference Input Mismatch*.

Move the cursor over an icon to see its current status in the message area below the icons. If there is an error status, the message will appear automatically. If there are multiple error messages, the display will cycle through them.

4.1 Audio Processing

4.1.1 Audio Processing - CH 1-4 to CH 13-16 tabs

The channels 1 to 8 represent the AES1 to AES4 digital inputs. When a video card is present, eight extracted audio channels are available as channel 9 to channel 16. See **Audio Processing/Config tab** for the input selection from the video card.

Signal Presence: At the top of this window are 16 indicators; they monitor audio presence and are related to the No Signal Detect parameters defined in the **Config** sub-tab (see details below). An indicator is green when a signal is present and yellow when a silence is detected according to the **Threshold** and **Delay** settings.
It turns gray for a No Lock AES Input status.
- Note: these indicators appear in green for non-PCM content.

CH 1-4 to CH 13-16 sub-tabs: each of these tabs controls the input processing (Levels, Fixed Delays and Configuration for the absence signal detection) for two pairs of channels; each channel is provided with a set of controls.

4.1.1.1   *Levels* sub-tab

Each channel has the following controls: a Level slider (from -96 to 12 dB), an input box where the desired level may be input directly, a **Mute** icon button and a **Phase Invert** checkbox.

At the bottom are three checkboxes:
- **Swap** – allows channel swapping inside a pair, available only on channels 1 to 8. .
- **Lock** – locks both channel sliders together for levels and delay, so that moving one slider moves the other one as well.
- **Test** – replaces the input signal with a stereo test tone.

Note: the **Level** sliders, the **Phase Invert** and the **Swap** checkboxes are inactive on non-PCM signals.

- **Sample Rate converter** – a manual selection of the input sample rate converter is available through a drop down menu. Its primary use will be to turn off the sample rate converter to handle Non-PCM data with an incorrect channel status (PCM/non-PCM bit).
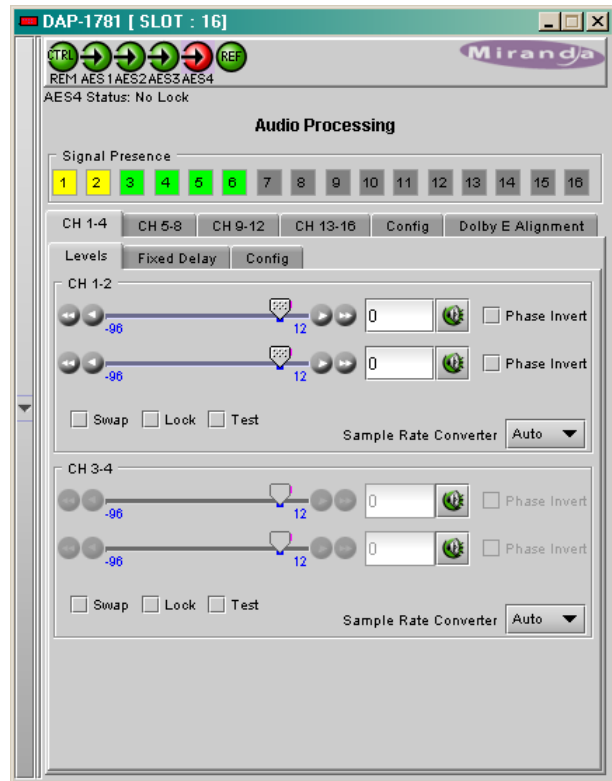
4.1.1.2   Fixed Delay sub-tab

For each channel, two sliders allow delay to be adjusted, with two levels of precision:

- *Coarse* – adjusts the delay in ms, from -250 ms to 2400 ms
- *Fine* – adjusts the delay in sample increments, from -47 to 47.

Input data boxes are available to enter numerical values directly.

The displayed value gives the delay between a card input and a digital output.

The negative values will be applied only when the DAP-1781 is slave of a video card via A-BUS. The positive small values desired have to be larger than the minimum processing delay to be effective.

If only one channel is non-PCM, the input sample rate converter is bypassed for both channels together; the remaining audio PCM channel will pass with its original sample rate, and possibly not synchronized to the reference.

When a pair of channels is non-PCM, the even channel setting is masked and the odd channel setting is applied to both channels.

Note: an access is given through the Metadata tab to apply a fixed delay to the selected input **Metadata** signal only.

4.1.1.3   *Config* sub-tab

This tab sets the card's behavior in the event of a loss or absence of audio signal.

- A signal absence is declared when the signal level is lower than the signal **threshold** during the selected period. The **threshold** can be set through the pull-down box to –72, -66, -60, -54 or -48 dBFS, the default value is –60 dBFS.

Delay: the amount of time for which the signal must be below the threshold before a signal absence error is reported can be adjusted from 0 to 255 seconds. The default value is set to 15 s, and an input box is available to enter a numerical value directly
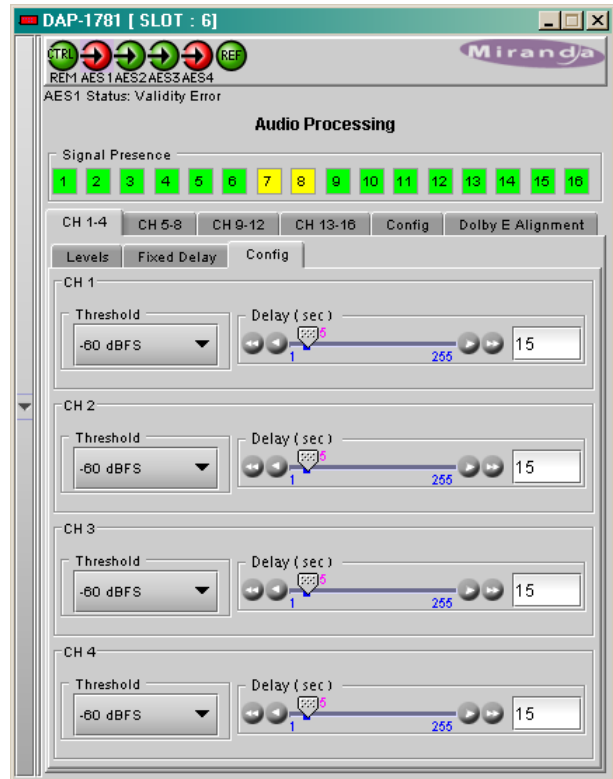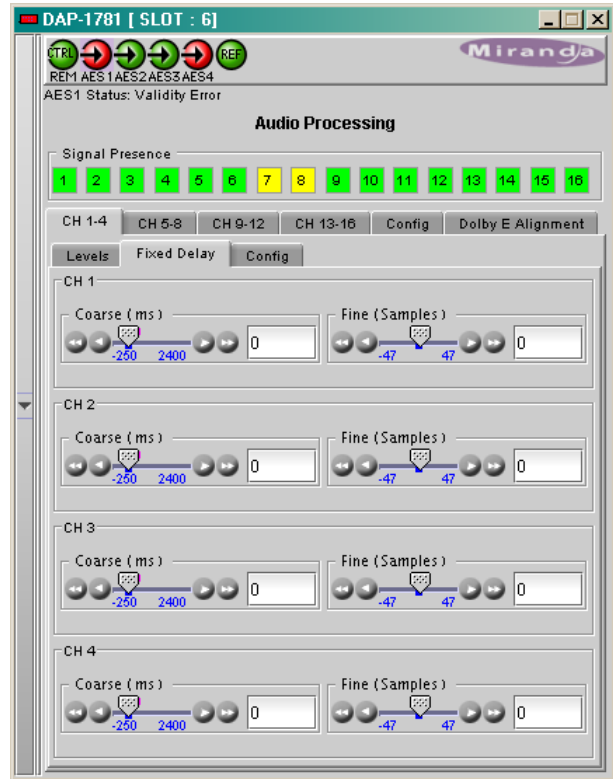
4.1.2 Audio Processing - CONFIG tab

Audio Proc Input Selection: when a video card is connected via A-BUS, up to sixteen extracted audio channels may be present.

The pull-down box allows selection of the feed for the 8 internal processing audio channels 9 to 16.

The two possible selections are *A-BUS IN CH1-8* or *A-BUS IN CH9-16*.

4.1.3 Dolby-E Alignment sub-tab

When a Dolby-E encoded signal goes through the card, its timing versus the video reference is controlled and can be adjusted manually.

The "Guard Band" refers to the number of audio samples that do not contain Dolby-E audio data around the defined video switch point. It is intended to be aligned with the vertical interval switch point of the video as defined by SMPTE RP168 and is also restricted to odd fields, allowing the Dolby-E data to be switched without corruption.

- A click on the *Auto Align* button will automatically adjust the audio timing delay to ensure a perfect zero delay with the video. This is equivalent to changing the audio delay manually in the *Fixed Delay* sub-tab.

- This alignment implies that the DAP-1781 is locked to a video reference either via A-BUS and a XVP-1801 card or via a REF-1801.

- The measurement will reflect the Dolby-E position at the outputs of the card.

The following table shows typical encoder output positions, in time from the SMPTE RP168 reference point to the SMPTE 377M header:

Frame Rate	µs
23.98	1208
24	1208
25	729
29.97	688
30	688

Note: without A-BUS, a consistent measurement implies a minimum delay of one video frame applied to a Dolby-E signal (33 ms + 18 samples @29.97 Hz, 40 ms @25 Hz).
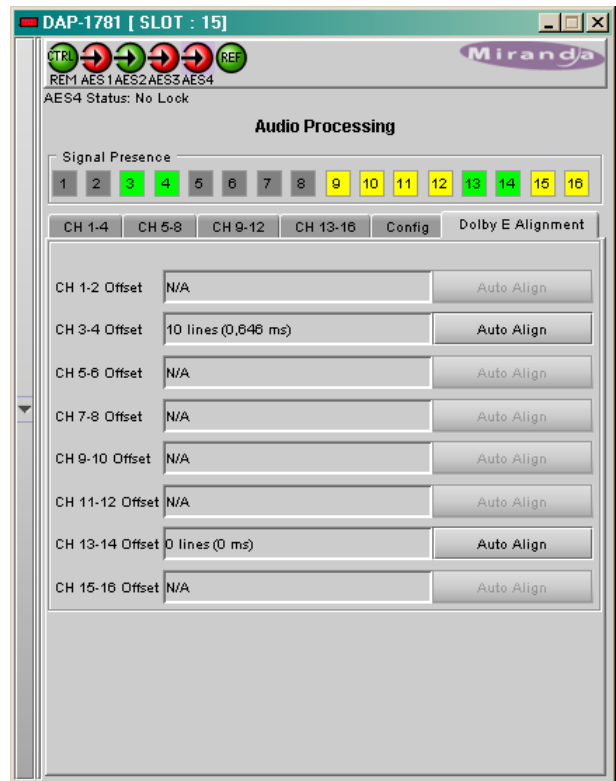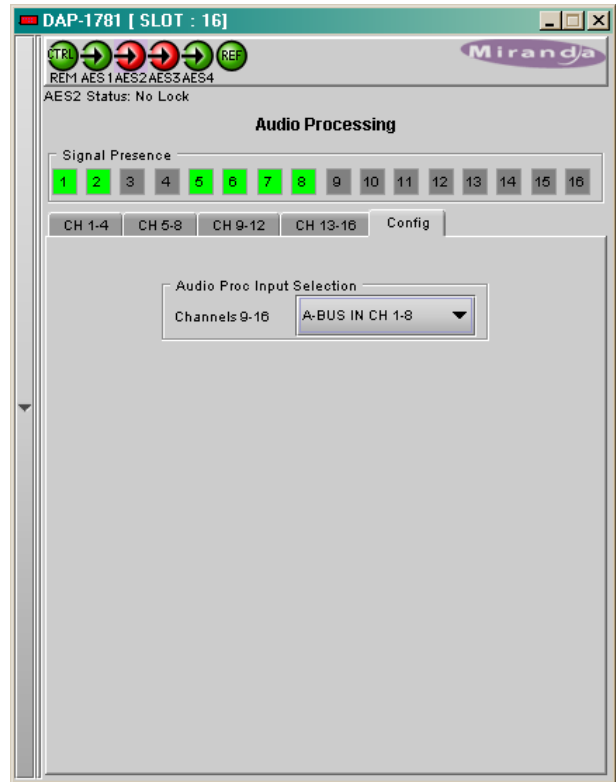
4.2   Audio Output

4.2.1   Audio Output - CH 1-2 to CH 7-8 tabs

Each of these tabs controls the output processing for two output channels – source selectors, level controls and mixers for each output.

A colored box indicates the audio type for each output of the card.

- Detected audio types can be PCM, AC3 (Dolby Digital), Dolby-E or N-PCM (other non-PCM).

The Operation Mode pulldown establishes the configuration of the controls for an output channel. There are four options:

***A** (see CH 1 in the figure on the right)*

The source is selected using the Source A A-BUS Select and Channel pulldowns, and its level is adjusted using the slider or data box.

- The A-BUS select options are:
  - ***V***   selects one of the 16 channels from the video card.
  - ***A1***   selects one of the 16 channels from an audio card. A1 is always Local, Slave 1 or Master
  - ***A2***   selects one of the 16 channels from an audio card. A2 is always Slave2 or Slave.
- The output Level is adjustable from -96 to +12 dB with the slider or a direct keyboard entry. This control is ignored for any signal marked as non audio in the channel status.

***SUM (A+B)** (see CH 2 in the figure on the right)*

Two sources are selected using the Source A and Source B A-BUS Select and Channel pulldowns. The two sources are added, and the level of the combined signal is attenuated by the amount selected in the Sum (A+B) LEVEL pulldown.

- The A-BUS select options are:
  - ***V***   selects one of the 16 channels from the video card.
  - ***A1***   selects one of the 16 channels from an audio card. A1 is always Local, Slave 1 or Master
  - ***A2***   selects one of the 16 channels from an audio card. A2 is always Slave2 or Slave.
- The *Sum (A+B) Level* pulldown offers attenuations of 0 dB, -3 dB and -6 dB.

NOTE: If you attempt to mix two different audio types to an output, only the Source A signal will be routed to this output and the Source A audio type will be displayed. The Source B signal will be ignored.

***Mix** (see CH 3 in the figure on the right)*
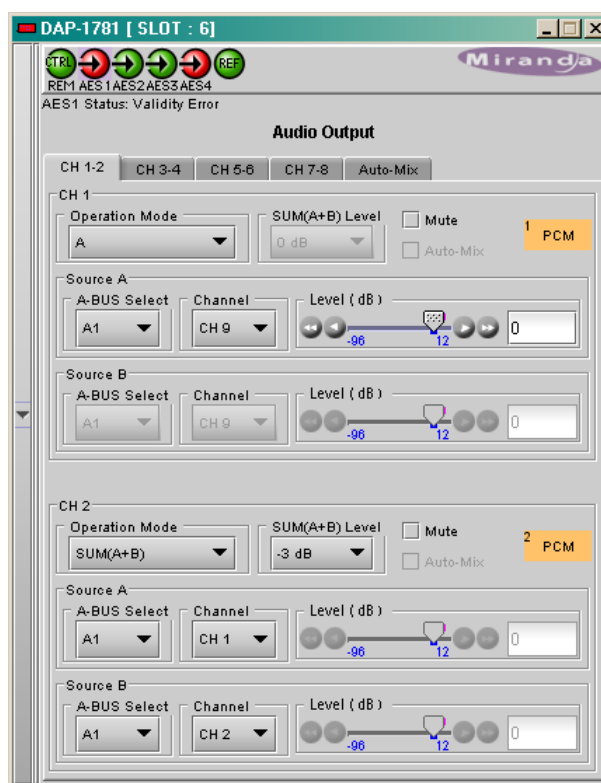
Two sources are selected using the Source A and Source B A-BUS Select and Channel pull-downs. The two sources are mixed, with the level of each source adjusted using its slider or data entry box.

- The A-BUS select options are:

  o **V** select one of the 16 channels from the video card.

  o **A1** select one of the 16 channels from an audio card. A1 is always Local, Slave 1 or Master

  o **A2** select one of the 16 channels from an audio card. A2 is always Slave2 or Slave.

- The contribution of each of the sources to the mix is adjusted using its Level slider or direct keyboard entry into the data box, over a range from -96 to +12 dB.

NOTE: If you attempt to mix two different audio types to an output, only the Source A signal will be routed to this output and the Source A audio type will be displayed. The Source B signal will be ignored.

OFF *(See CH 4 in the figure to the right)*

The output is muted.

Mix 4Ch *(see CH 6 in the figure on the right)*

This mode allows a 3-input or 4-input mix on the chosen even output. A standard 2-input mix is available on the odd output.

On the same tab, the two selected sources of the even channel are mixed with the one or two selected sources of the odd channel. The four sources are mixed, with the level of each source adjusted using its slider or data entry box.

The A-BUS select options are the same as in the other modes.
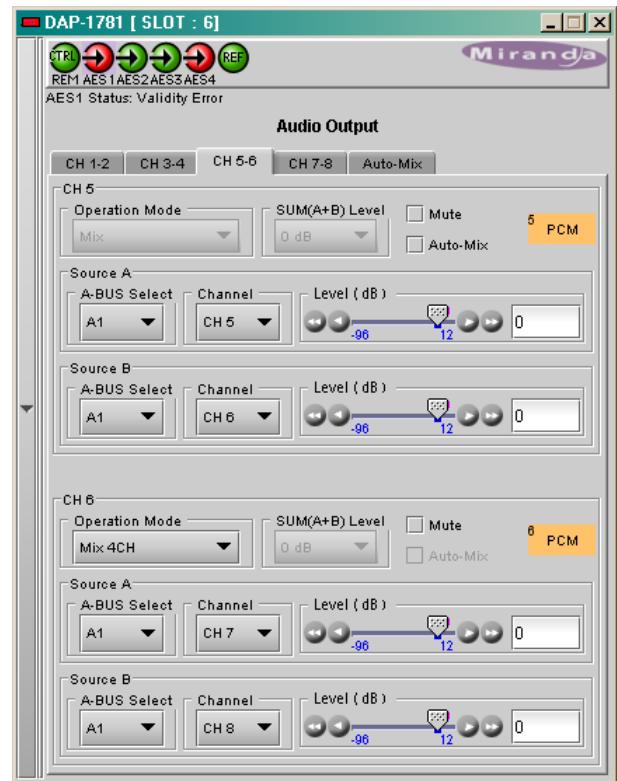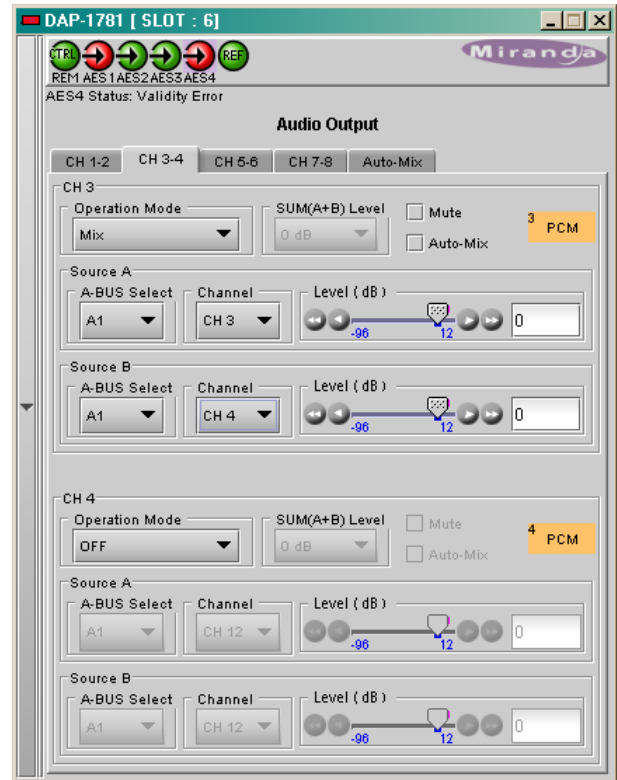
4.2.2 Audio Output – Auto-Mix

When the Mix operation mode is selected, an auto-Mix feature is proposed. With a one-click operation, the transition between two sets of sources can be done at the same time, with fade-in-time and fade-out time controlled by a slider.

All the channels that have the Auto-Mix checked will fade between Source A inputs and Source B inputs.

Refer to the picture below for a description of the three available mixing modes:
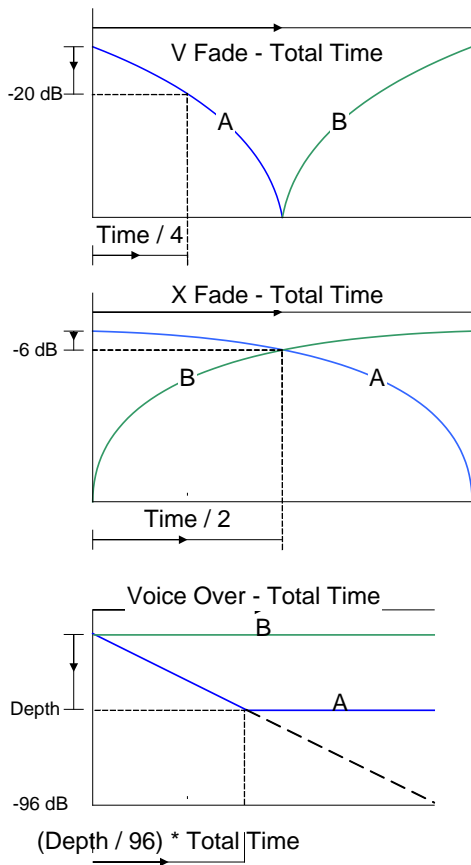
In the example shown to the right, a stereo source is present on inputs A1-Ch8 & A1-Ch9, and a mono source on A1-Ch10.

- With the A selection the stereo source passes with 0 dB gain and the mono signal is muted.

- With the B selection the stereo source is attenuated by 20 dB and the mono source passes with 0 dB gain.

The transitions are smoothed by the controlled fade-in and fade-out time.
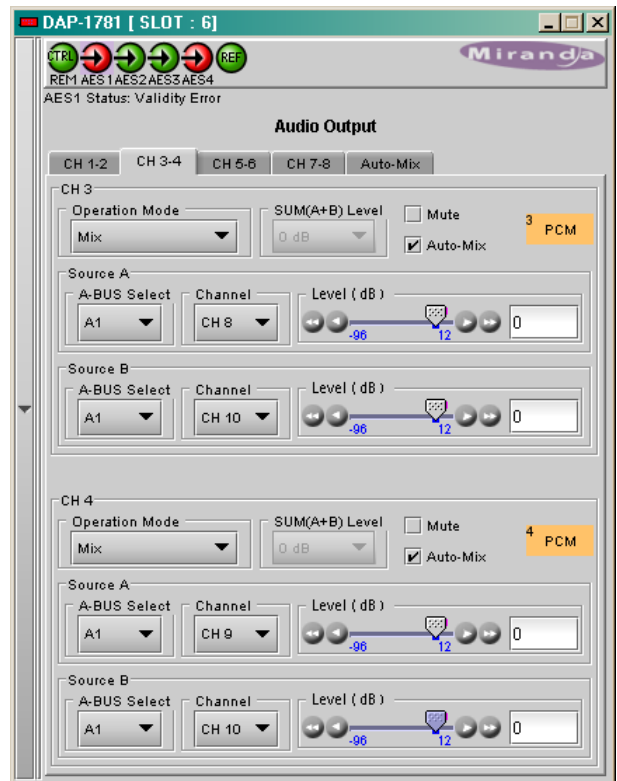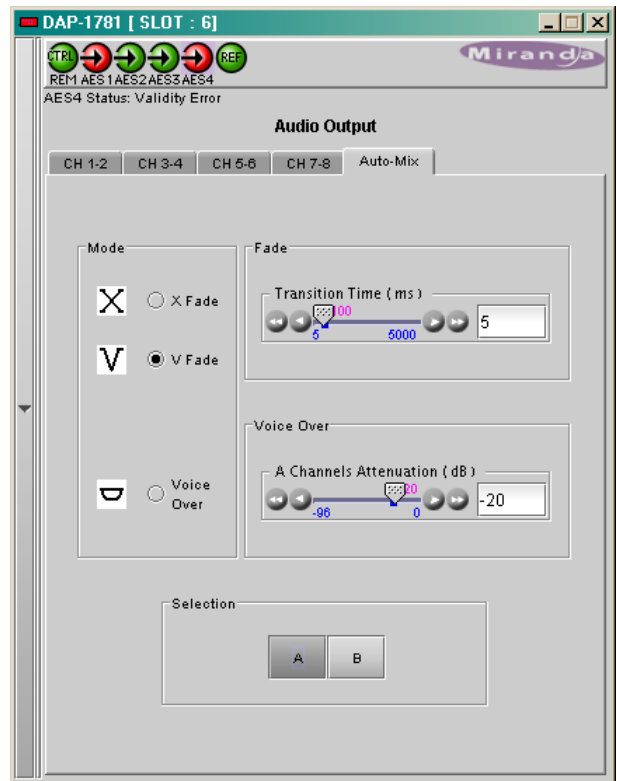
4.3   Dolby

This window provides control and status information
for an optional Dolby module. The active tab
depends on the type of the optional card physically
installed on the DAP-1781.

4.3.1   Dolby Decoder tab

The decoder supports a Dolby-E, Dolby Digital or
PCM signal; any other non-PCM signal will be lost
through the decoder module, its outputs will be
muted.

For a Dolby-E input signal, the associated Metadata
bit stream may be output to the video card (via A-
BUS) and to the rear Metadata Out connector.
(Refer to the *Metadata tab*, 4.4)

When a PCM signal is fed to the decoder input, the
selected Metadata Backup input will be selected as
Metadata source.
(Refer to the *Metadata tab*, 4.4)

A selector is provided at the Decoder input. As soon
as the *Bit Stream Detection Mode* in On, the
output channels of the Decoder are always routed
to the internal channels 9 to 16 of the DAP-1781,
with a mapping related to the input format. The
unused channels will be muted.

4.3.1.1   Control sub-tab:

The *Bit Stream Detection Mode* dictates the action
taken by the decoder for each type of input bit stream.

In *Auto* mode, the decoder automatically
recognizes and decodes PCM, Dolby Digital or
Dolby-E input bit streams. If *Dolby-E only* is
selected, the decoder recognizes and decodes only
this type of bit stream, otherwise the decoder
outputs are muted. The same applies for the *Dolby
Digital only* selection. If *Mute (OFF)* is selected, all
outputs are muted for any type of input, the Mute
mode disables the Dolby decoder.

The *Input Selection* determines the Dolby decoder input channel pair. Channels 1 to 8 represent the AES1
to AES4 digital inputs. When a video card is present, eight extracted audio channels are available as channel
9 to channel 16*.* See *Audio Processing/Config tab* for the input selection from the video card.

The *Delay Compensation* tab allows frame adjustment of the audio decoder outputs versus video delay, the
default value is minus one frame for the Dolby Decoder module. The frame length is related to the reference
input frame rate. When the DAP-1781 is referenced to its AES 1 input, or is free-running, the default frame
length is defined in the *Reference tab*.

The *Decoder Status* section indicates the bit stream format detected at the decoder input. The possible
values are: PCM, Dolby-E (16, 20 or 24 bits), Dolby Digital (16 or 32 bits, Channel 1, 2 or both). The detected
Dolby format will give access to the corresponding tab.
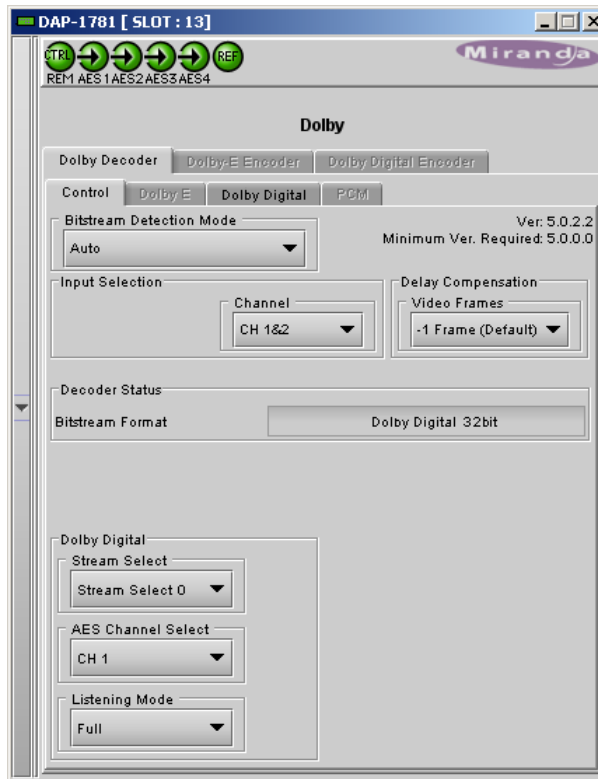
The **Dolby Digital** section is available only if the input bit stream is Dolby Digital, and the Detection Mode is Dolby Digital or Auto.

The **Stream Select** parameter selects the stream number to be decoded when multiple Dolby Digital bit streams are embedded within a single AES pair.

The **AES Channel Select** parameter selects which AES3 channel is the source of the Dolby Digital decoder if the Dolby Digital data is configured in Professional 16-bit format. If the selected channel does not contain a valid Dolby Digital bit stream, the channel data will be passed to the decoder output as a PCM signal.

The **Listening Mode** parameter selects the main channel output listening mode, it is active only for a Dolby Digital input signal. The **Full** mode is the standard one.

Monitoring in **3 Stereo** mode reproduces only the left, right and center channels, the surround channels are muted. In **Phantom** mode, the center channel output is muted. The **Stereo** mode will output only on the left and right channels, and the **Mono** mode only on center channel.

- Refer to appendix A at the end of this document: Dolby Digital Main Channel Output Functions.

4.3.1.2   Dolby-E sub-tab

The **Dolby-E** tab indicates status information for the selected Dolby-E bit stream.

The **Dolby-E Common Status** section shows two values that are common to all programs contained in the Dolby-E bit stream: **Program Configuration** and **Frame Rate**.

The **Decoder to Proc Channel Assignment** section gives the decoder output mapping to the internal channels of the DAP-1781.

- The **Main Output** sub-section shows channel assignments related to the Program Configuration.

The **Prg 1** to **Prg 8** sub-tabs indicates Metadata informations proper to each Dolby-E program: **Coding** Mode, **Bitstream** Mode, **Dialnorm** (dialog normalization) value, **Line Mode Profile**, **RF Mode Profile**, **Dolby Surround** Mode, **Surround EX** Mode and **Preferred Stereo Downmix**. The number of programs depends on the Program Configuration.
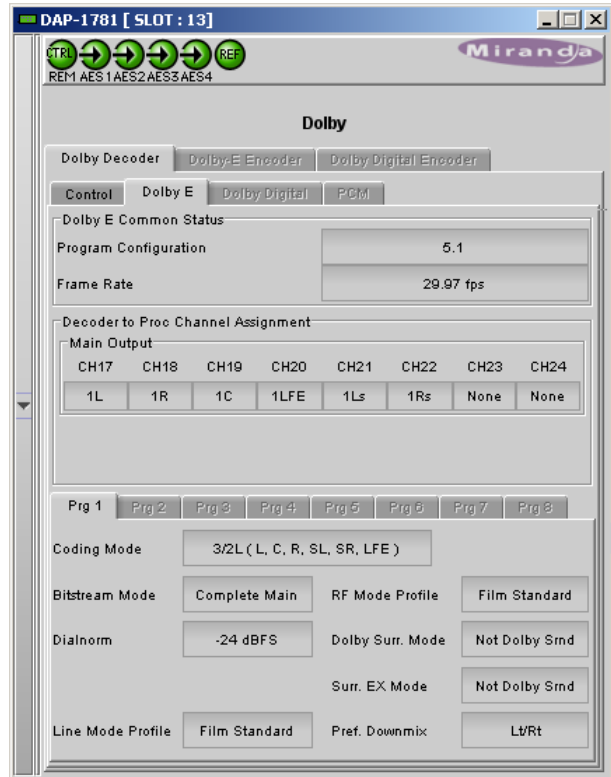
4.3.1.3 Dolby Digital sub-tab

The *Decoder to Proc Channel Assignment* section indicates the output channel assignment. The Main Output sub-section shows channels assignment related to the Program Configuration.

The *Dolby Digital Status* section indicates status information for the Dolby Digital bit stream selected at the bottom of the *Control* tab: Coding Mode, Data Rate, Bitstream Mode, Dialnorm value, Dolby Surround Mode, Surround EX Mode and Preferred Stereo Downmix.

The *Line Mode Profile* is used to control the dynamic range of the outputs.
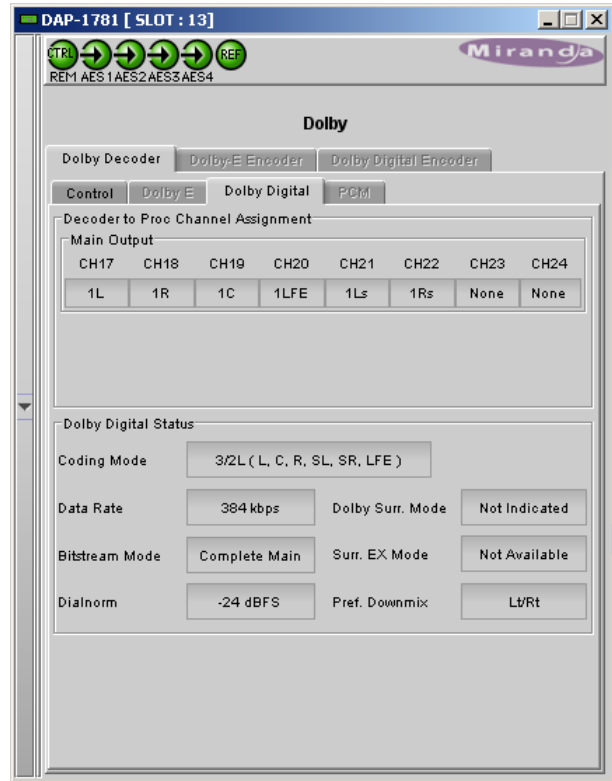
4.3.1.4 PCM sub-tab

The *PCM* tab section indicates the output audio assignment of the Dolby Decoder module when its input is a PCM signal.
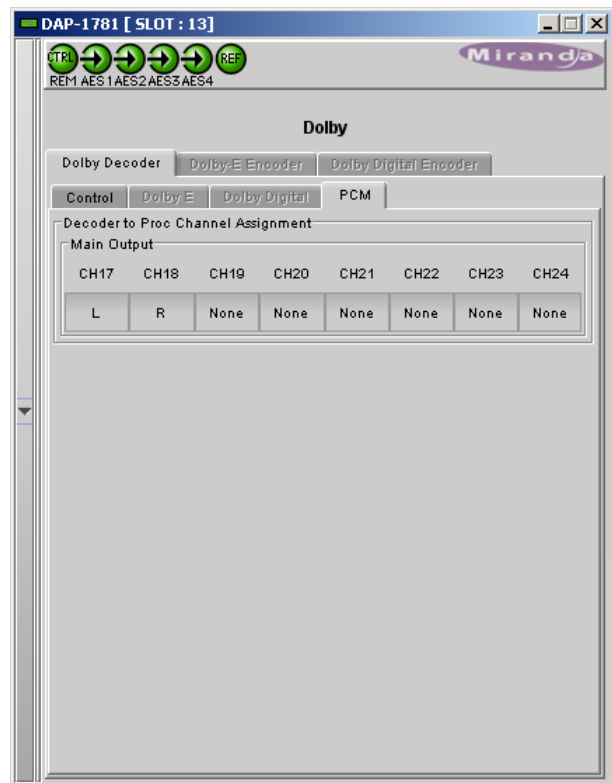
4.3.2 Dolby-E Encoder tab

A video reference signal and Metadata are required for encoding. Refer to **Ref** and **Metadata** tabs.

4.3.2.1   Inputs and Outputs

An input shuffler allows any combination of the inputs channels (default are CH1 to CH8). The Dolby-E signal is mapped into the channel pair selected in the pull-down "***Output Channels***".
Metering the encoded channels is available when the Dolby-E output is routed to one of the local card outputs; refer to the **RALM** tab.

4.3.2.2   Configuration

Encoding Mode
The operational mode can be ***Dolby-E Encode*** or ***Pass-through***. Test signals at -18, -20 dBFS and silence are available for each mode.
Encode test modes will generate a test bit-stream containing a 1 kHz sine wave for full bandwidth channels and 100 Hz for the LFE channel of a 5.1 program.
In ***Pass-through*** test modes, it will generate a 1 kHz PCM sine wave at its outputs.
When the encoding mode changes, the output mutes and resumes in the selected mode within one second. In both encoding and pass-through mode, the delay through the encoder is always one video frame.

Bit Depth
This parameter specifies the number of bits per word used in the Dolby-E bit stream. When using an output data width of 16 bits, the available program configuration will be limited to those which require a maximum total of 6 channels.

48 kHz Pull-down
When Pull-down mode is enabled the encoder will output the Dolby-E bit stream at a sample rate of (1000/1001) * 48 kHz.

Reversion Mode
The source of the Metadata to be included in the Dolby-E Metadata segment is specified in the Metadata tab. This parameter specifies the response of the module when this Metadata bit stream is lost or corrupted.

4.3.2.3   Status

Encoder
This parameter indicates the operational status of the encoder.

Video Frame Sync
This parameter indicates the status of the video reference signal provided to the encoder.

Reference Frame Rate
This parameter indicates the frame rate of the video reference signal provided to the encoder. It will be set to ***Not Indicated*** if the frame rate is not recognized.

Metadata Bit-stream
The Metadata will be reported as invalid if it contains missing and/or invalid parameters or erroneous segment checksums.
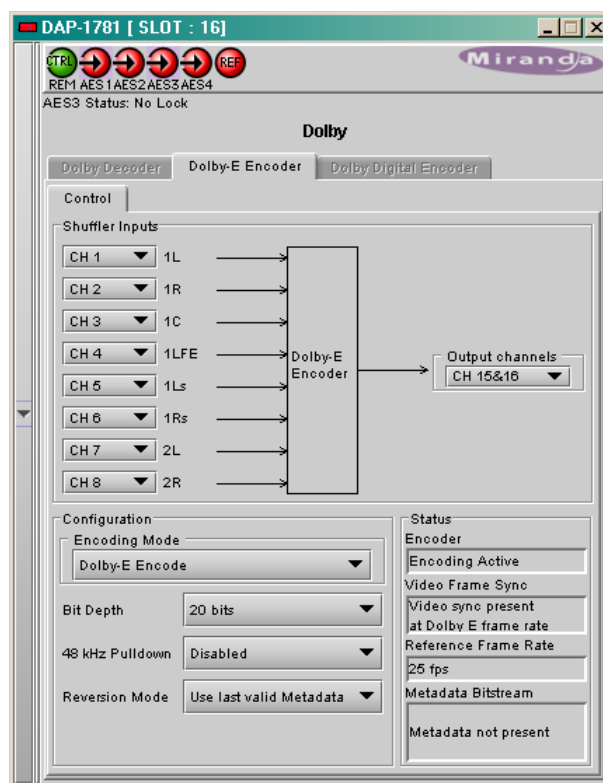
4.3.3   Dolby Digital (AC-3) Encoder tab

4.3.3.1   Inputs and Outputs

An input shuffler allows any combination of the input channels (default are CH1 to CH6). The input labeling will follow the Metadata (Coding Mode parameter for the selected Program).

The Dolby-Digital signal is mapped into the channel pair selected in the pull-down "***Output Channels***".

4.3.3.2   Configuration

Encoder Control
The operational mode can be **Dolby Digital Encode** or **Pass-through**. Test signals at -18, -20 dBFS and silence are available for each mode.

- ***Encode*** test modes will generate a test bit-stream containing a 1 kHz sine wave for full bandwidth channels and 100 Hz for the LFE channel of a 5.1 program.

- In ***Pass-through*** test modes, it will generate a 1 kHz PCM sine wave at its outputs.

When the encoding mode changes, the output mutes and resumes in the selected mode within one second.

Data Rate
The card can encode at all Dolby digital data rates between 56 kbps and 640 kbps, although there are constraints in regards to data rate versus channel configuration (audio coding mode).

It supports automatic switching of the data rate based on the Channel Mode.

Table 1: Auto Data Rate Assignment

Channel Configuration	Automatic 384	Automatic 448
1/0	96 kbps	96 kbps
1+1	192 kbps	192 kbps
2/0	192 kbps	256 kbps
2/1, 3/0	256 kbps	256 kbps
2/2, 3/1	320 kbps	320 kbps
3/2	384 kbps	448 kbps

Stream Number
Sets the output stream number from 0 to 6.

Bit-stream Format
The output mode of the Dolby Digital bit-stream can be set to 32-bit, 16-bit Channel 1 or 16-bit channel 2. The default setting is 32-bit.

Metadata source
Selects the Metadata Program used for encoding, refer to ***Metadata tab*** to access settings.

Reversion Mode
The source of the Metadata used for encoding is specified in the Metadata tab. This parameter specifies the response of the module when this Metadata bit stream is lost or corrupted.
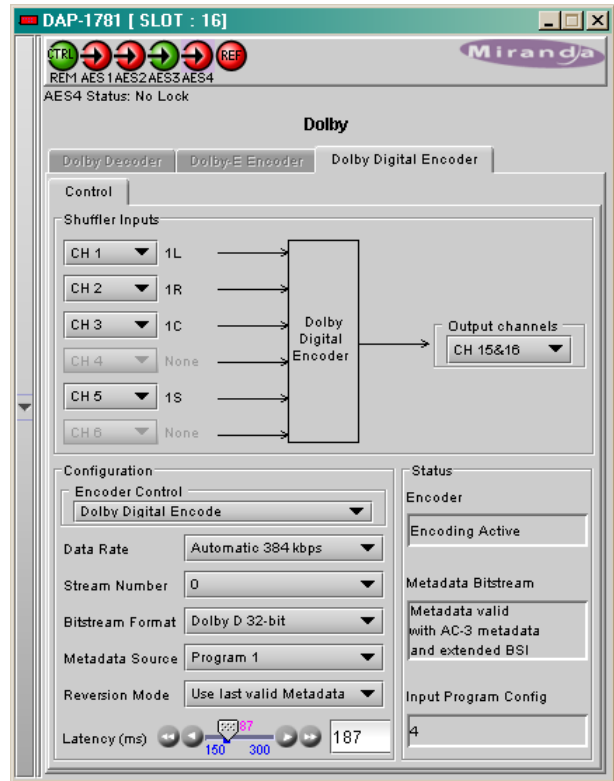
Encode Latency
This parameter specifies the Latency of the Dolby Digital encoder, in both encoding and pass-through mode. It ranges from 150 ms to 450 ms, with 187 ms default value.

4.3.3.3 Status

Encoder
This parameter indicates the operational status of the encoder.

Metadata Bit-Stream
The Metadata will be reported as invalid if it contains missing and/or invalid parameters or erroneous segment checksums.

Input Program Config
Refer to the Metadata tab to visualize or modify the Metadata stream used by the encoder.

4.4   Metadata

4.4.1   Input Status

Three icons are dedicated to the status of each metadata input. A green icon indicates the presence and validity of a Metadata bit stream.

The **RS-422** input is not available on the single width rear panels DEC-75-SRP and DEC-110-SRP, the **Decoder** input implies the presence of a Dolby Decoder optional card and the **A-BUS** input requires a XVP-1801 video card connected through the A-BUS cable.

The **A-BUS** input is not available when the DAP-1781 is in **Slave 2 of video Card - Serial Mode**, refer to A-BUS tab.

4.4.2   Source

The Metadata path appears in green, with an automatic selection between the **Primary** and the **Backup** source.
The activation of the **Generator** and the **Hold** function are manual.
The **Generator** allows the creation of a complete, specific set of Metadata.
Activation of the **Hold** function will freeze the Metadata values used for the output bit stream.
The Metadata output is fed to the RS-422 output, not available with rear panels ENC-75-SRP and ENC-110-SRP, to an optional Dolby Encoder card and to a video card via the A-BUS link for embedding.

4.4.3   Control tab

Through **Coarse** and **Fine** adjustments, a fixed delay can be applied to the input Metadata bit stream. It is useful when the audio signal processing, like watermarking, is applied to the audio signal outside the DAP-1781. The delayed Metadata bit stream will stay properly timed with its associated audio signal.

Presets
Ten user **Presets**, named **META1** to **META10**, are reserved for Metadata settings. The **Save Input** button will copy the input Metadata bit stream to any Meta Preset or to the Generator. The **Load to Generator** will copy the Factory or a Meta bit stream into the Generator. The **Save Generator** will copy the Generator to any User.

Note that a **Load to Generator**, **META1** to **META5**, action will be applied any time a **Load User Presets**, User1 to User5, occurs.

See the table in Appendix B at the end of this document for the Factory default values.
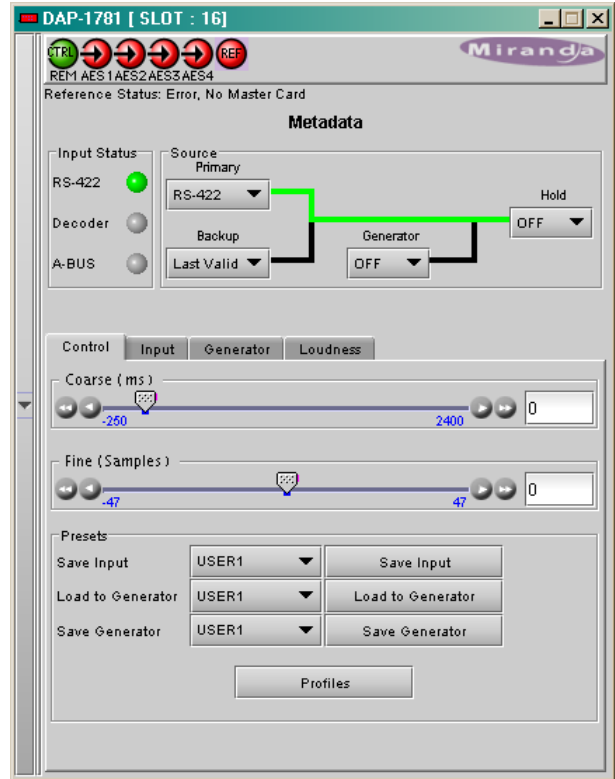
Metadata Profile Copy for Card [DAP-1781]
Click the **Profiles** button at the bottom of the Metadata panel to open a window allowing Metadata settings to be copied from this DAP-1781 card to other DAP-1781 cards.
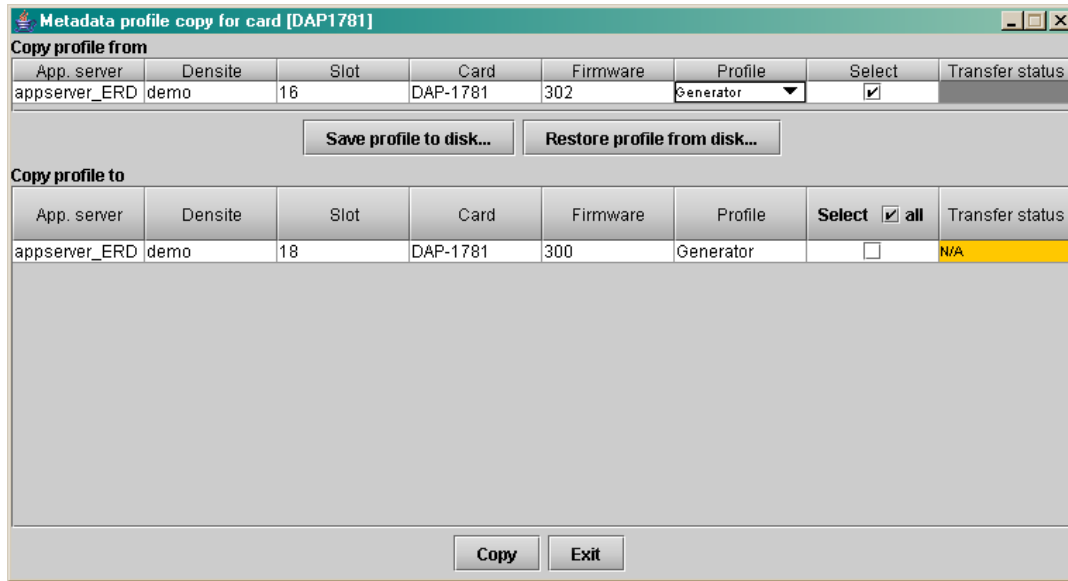
- The **Copy Profile From** line shows the current DAP-1781.
- The **Copy Profile To** table shows all other DAP-1781 cards available in the local iControl environment

Save Profile to Disk command:
This command is used to save a Metadata profile as a configuration file on a disk. On the current DAP-1781, select a Profile with the pull down menu, click the **Save Profile to Disk** button, and follow the instructions to choose a folder and a file name. The transfer status is displayed at the end of the line.

Restore Profile from Disk command:
This command is used to restore a Profile into the current DAP-1781. Click the **Restore Profile from Disk** button, and follow the instructions to choose a folder and a file name. The selected configuration file will be restored in its original Profile (i.e. a User3 Preset Profile saved to disk will be restored as a User3 Preset, not as a Generator Profile).

Copy command:
Under the **Copy Profile From** title, click on the Profile entry to open a pull-down list with the available profiles: the **Generator** one and the 10 **User** profiles. Click on one to select the source profile.

Under the **Copy Profile To** title, click in the individual **Select** boxes to select one or more destination DAP-1781 cards, or click Select All to select all of them at once.
- Cards with different firmware versions will appear as not available (N/A) in the Transfer Status column and will not be selected.

Click the **Copy** button to copy the contents of the selected source profile into the same-named profile of the destination DAP-1781 cards. After the end of the **Copy** command, you have to clear the selections before a new copy process can be started.

4.4.4 Input tab

This section displays the Metadata parameters after the automatic selection between the **Primary** Input Metadata bit stream and the **Backup** source.

These Input parameters are used throughout the card, by the Downmix, Loudness and upMAX stages, the Dolby encoder, the ABUS output...

It is split into five parts, the **Input** section at the left and four sub tabs at the right. On power-up, the Primary Input / Last Valid Metadata table is loaded with the values from the Generator Metadata table. It remains unchanged until a valid Metadata bit stream is selected as input.

Input
The two parameters at the top indicate the **Program Configuration** and the **Video Frame Rate** of the Metadata bit stream.

Depending on the Program configuration, one to eight programs are included in a Metadata bit stream. The **Program Select** zone allows the selection of one Metadata program.

The **Data Rate**, **Coding Mode** and **Dialnorm**, as well as the other data displayed on the four sub tabs **Audio Processing**, **Dynamic Range**, **Bit stream Info** and **Extended BSI** are attached to the highlighted program.
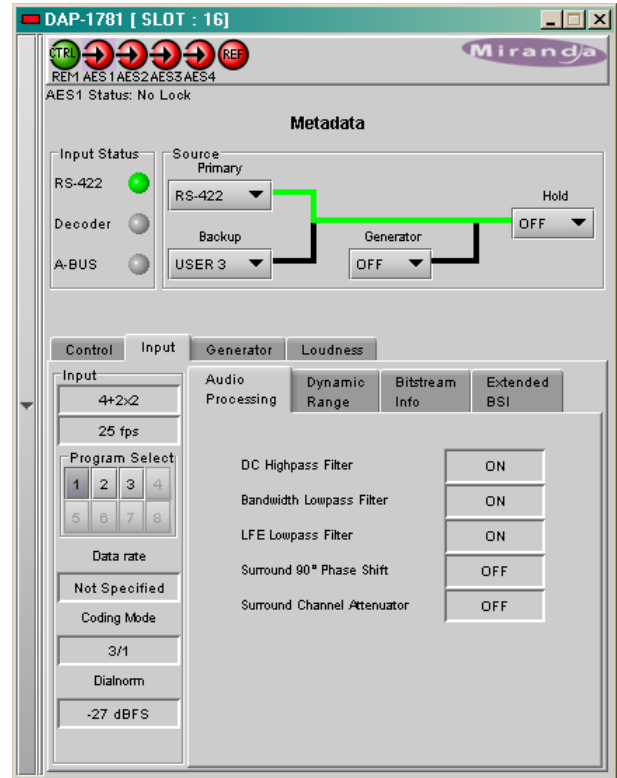
4.4.5 Generator tab

This section displays the parameters used by the internal Metadata bit stream generator. It is split into five parts, the **Generator** section at the left and four sub tabs at the right.

Generator
The top parameter sets the **Program Configuration.** The second parameter, **Video Frame Rate**, is set automatically by the card, see the reference tab.

Following the Program Configuration setting, one to eight programs are included in a Metadata bit stream. The **Program Select** zone allows the selection of one Metadata program.

The **Coding Mode** and **Dialnorm**, as well as the other data displayed on the four sub tabs **Audio Processing**, **Dynamic Range**, **Bit stream Info** and **Extended BSI** are attached to the highlighted program. The **Data Rate** parameter is always marked as not specified
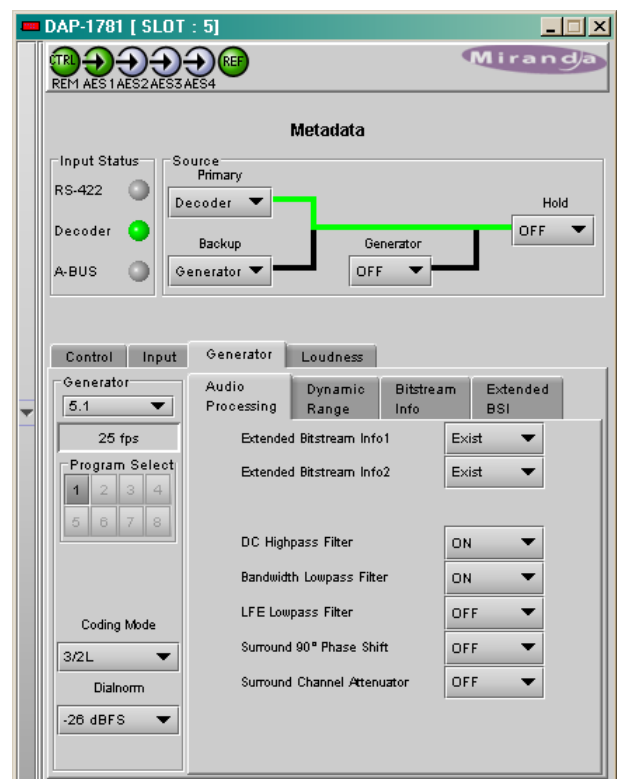
4.4.6 Loudness tab

The loudness management is an option for the DAP-1781. Once enabled, the loudness measurement becomes part of the internal processing available on the DAP-1781.

Additionally, an interface to a Dolby LM100 is proposed with a remote access to a set of commands and status of this particular product.

The **Program Select** zone allows the selection of one Metadata program. The choice will be limited by the smallest quantity of available programs between the input Metadata bit stream and the Generator bit stream.

Dialnorm

On top the **Dialnorm** value extracted from the Metadata bit stream is displayed, below is the measured **Dialnorm** value, extracted either from the internal processing or from a connected LM100.

The **Dialnorm** value active path appears in green, this path can be modified with a click on the **>>** relevant button. A click on the **Accept** button will transfer the selected value to the Generator.

When **Input** is the selected source, check **Follow** to copy permanently the primary **Input** value to the Generator. If the input disappears, the last valid value will be used.

Three alarms apply to the measured **Dialnorm** value. **Upper Limit** and **Lower Limit** are absolute values, but **Valid Range** is relative to the **Dialnorm** value present at the output of the Metadata section (-25 dBFS in the example shown to the right).

Internal

This section controls the internal **Loudness** measurement process.

The **Type** pull-down menu proposes two weighting filters: the commonly used A weighting filter and the RLB filter, as per recommendation ITU-R BS1770.

The **Channel Selection** allows measurement of a mono to multi channel audio program, any number of channels can be selected at the same time.

Measurement **ON** will start a measurement. So far, only a short term mode is active, the displayed value indicates the **Loudness** for the last ten seconds time interval.

The **Reset** button will clear the previous data and start a new measurement, and the **Pause** button will stop the measurement without clearing the last data.
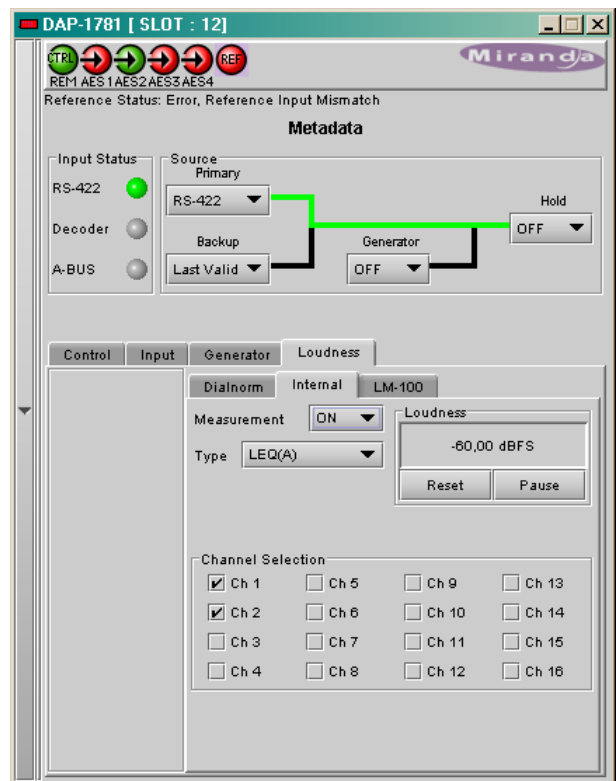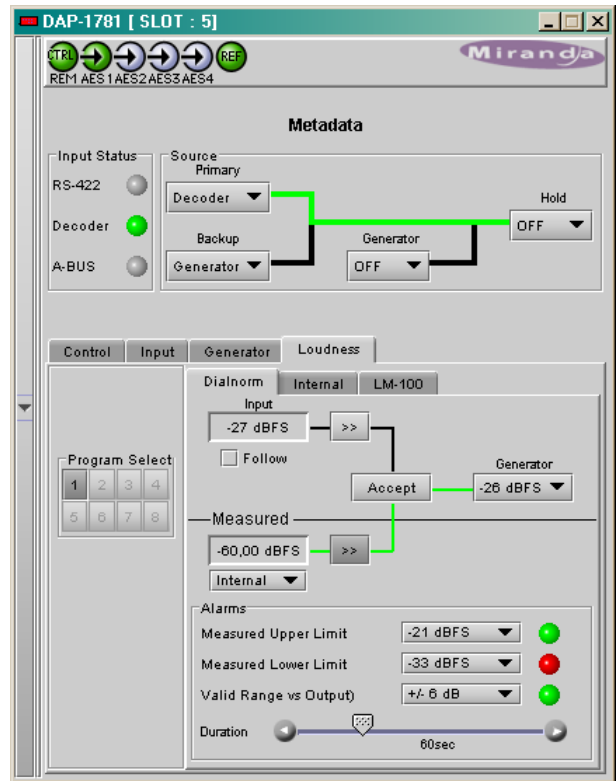
LM100

Interfacing with a remote LM100 is done through the two Metadata RS-422 ports on the DAP-1781 rear panel and the remote RS-485 port on the LM100. Refer to section 2.2.1 for connections and settings.

The **Measurement** ON command activates the link with the LM100, indicated by the green icon.

The **Method** pull down menu proposes two modes of operation relating to the measurement period: Short Term and Infinite modes.

- The **Short Term** mode will display the Leq(A) measurement value for the previous ten-second period as a "sliding window" type of function.
- The **Infinite** mode is used to measure the entire duration of a program.

The ON/OFF of the Dialogue Intelligence feature of the LM100 is not accessible via the remote RS-485 port. This feature must be enabled or disabled on the LM100 itself.

The **Channel Selection** allows measurement of a mono to multi channel audio program

The **Reset** button will clear the previous data and start a new measurement, and the **Pause** button will stop the measurement without clearing the last data.

The unit **Address** allows the identification of each LM100 connected to the same RS-485 link, provided that each unit is assigned a unique address. The valid addresses goes from 0x8280 to 0xFFFE (with bit(0) = 0, and bits(7) and bit(15) = 1).

Some Status are displayed at the bottom of the tab: analog or digital input selection, input format, stream type for a Dolby Digital signal, lock state of the digital input and its sample rate.
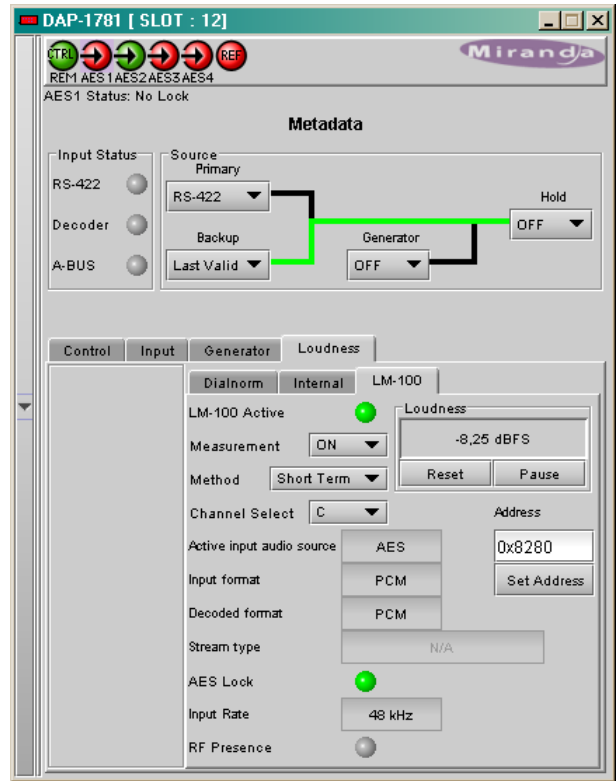
4.5   Dynamic Processing

This process is part of the input processor, refer to the block diagram.

4.5.1   CH 1 to CH 8 tabs

Each of these tabs controls the dynamic processing for one channel. The available functions are Limiter, Compressor, and Downward Expander. A Gain trim allows compensation of the loudness attenuation that follows compression.

A graphic of the input to output transfer function, *VU* and *PEAK* meters for the program, and compression meter will facilitate the adjustments for each channel. Eight channel metering is active for one minute only after any setting modification on the current tab, or after a click on *Dynamics for 1 min* box.

At any time a *Bypass Settings* checkbox allows immediate comparison between processing ON or OFF.

The *Mode* pull-down menu is used to link two or more channels, so they can share the same dynamic controls to keep a coherent stereo or multi channel image. The stereo choice links an odd channel with (odd + 1) channel.
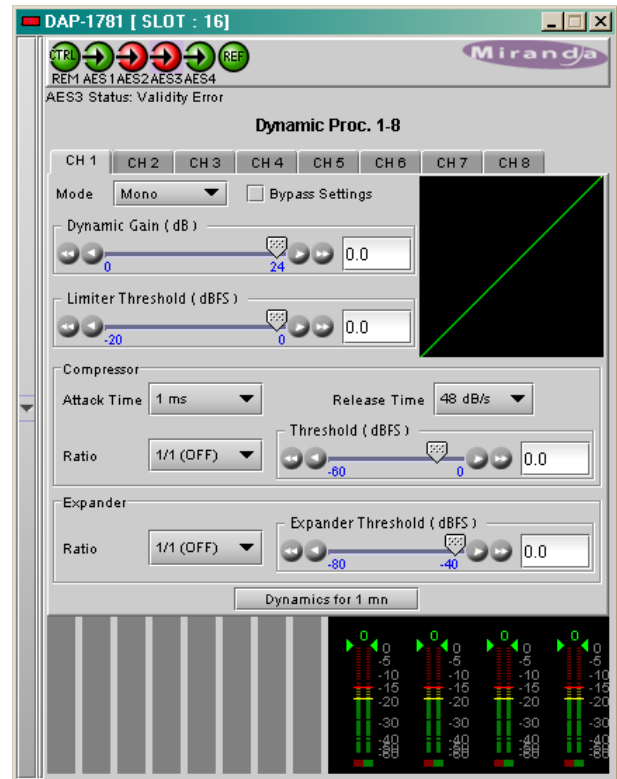
The *Dynamic Gain* is adjusted from 0 to +24 dB gain with the slider or a direct keyboard entry.

The *Limiter Threshold* is adjusted from 0 to -20 dBFS with the slider or a direct keyboard entry. 0 is the default value and corresponds to *Limiter* OFF. For analog inputs, the correspondence between the dBFS and the dBu values depends on the Input 0 dBFS setting (*Audio Processing* Tab - *Config* sub-tab).

The proposed parameters for the *Compressor* are the *Attack Time, Release Time*, *Threshold* and *Ratio*. The Threshold is adjustable with a slider between -60 and 0 dBFS, 0 is the default value and corresponds to an OFF position. The other parameter values are accessible via pull-down boxes.

The proposed parameters for the downward *Expander* are *Threshold* and *Ratio*. The output on input ratio of 1/1 is the default value and corresponds to the OFF position. The *Threshold* is accessible via a pull-down box.

At the bottom of the tab, from left to right, appear the dynamic meters and the *VU* and *PEAK* meters. The dynamic meter moves downward and gives the attenuation applied to the audio channel, the *Dynamic Gain* effect is not displayed. The top of the scale is for 0 dB. The scale goes from 0dB at the top to -31 dB at the bottom.

- The VU meter is displayed with a bar and the PEAK meter with a dot.

4.5.2   CH 9 to CH 16 tabs

The functions are the same as above but for channels 9 to 16.
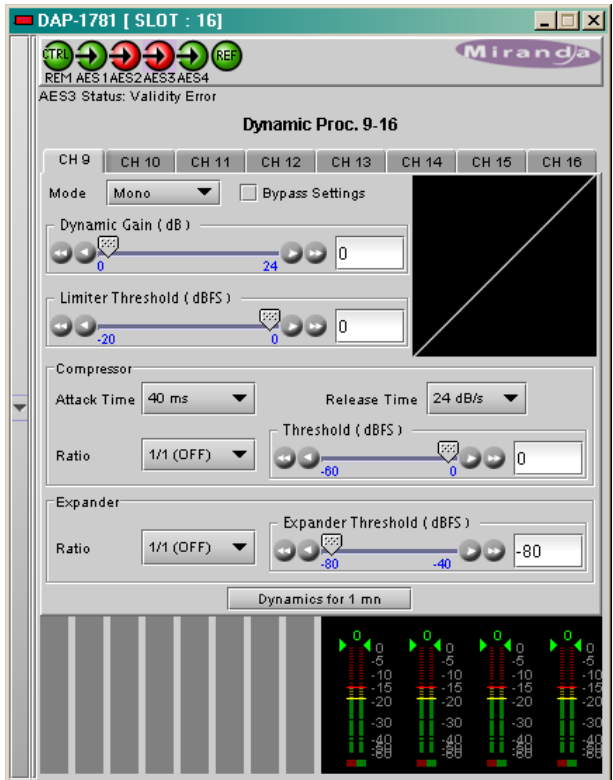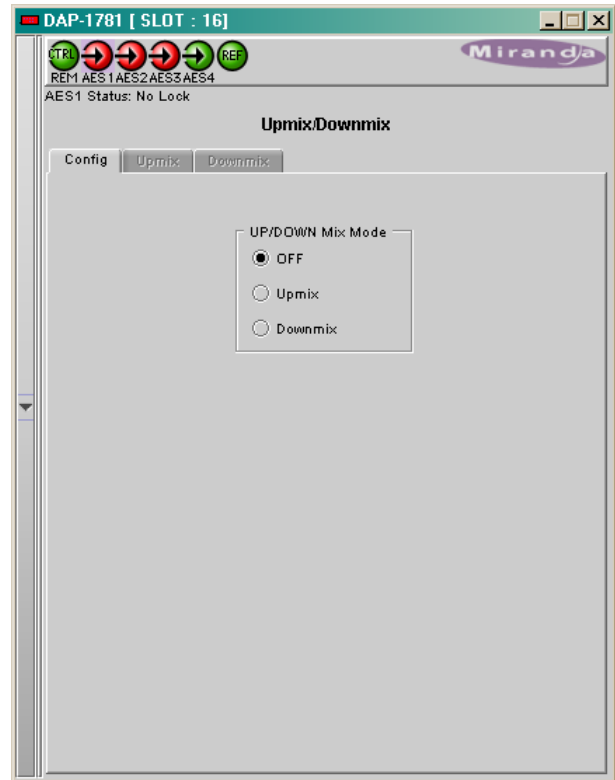
4.6   UPMIX/DOWNMIX

4.6.1   UPMIX/DOWNMIX – Config tab

With the UP/DOWN MIX option enabled (see section 4.15), the *UP/DOWN MIX mode* radio buttons offer the choice between

- OFF
- UPMIX
- DOWNMIX

Once the choice is made, the appropriate tab will be enabled (its text will not be grayed-out), and can be accessed to configure the mix process.

This process is part of the input processor, refer to the block diagram.

4.6.2   UPMIX/DOWNMIX – UPMIX tab

This feature is used to create from a stereo source a multi-channel compatible audio signal with up to six channels, mapped on channels 9 to 14: Left, Right, Center, Low Frequency Effect, Left Surround and Right Surround. The stereo input signal is routed to channels 15 and 16.

The selection of the stereo source is done with the two pull down boxes **Left Source** and **Right Source**.

The pull down box **Type** offers three different standard mixes and a custom position. The proposed standard mixes are named **Speech**, **Music** and **Movie**. For each standard, an **Effect** slider allows to keep the **Effect** very light, with the slider down to 0, or emphasized when going to 10.

The **Custom** position leaves all the settings available to the user for specific needs.
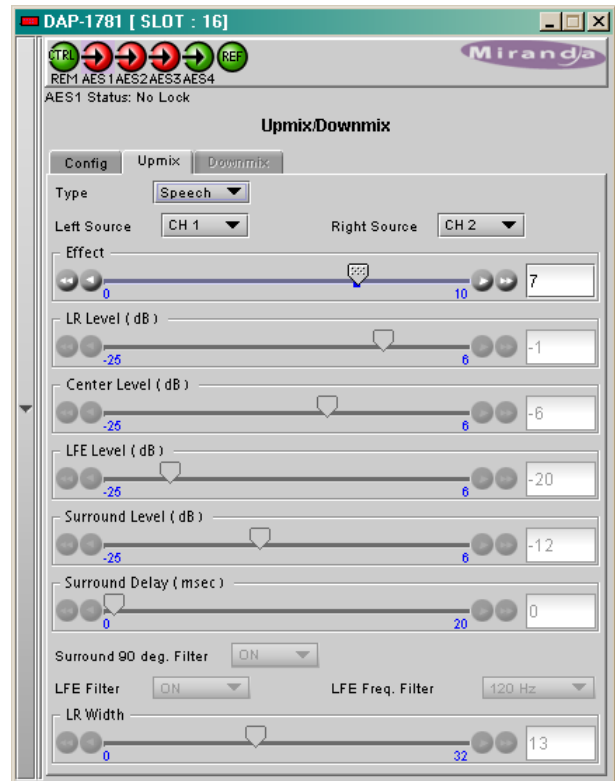
4.6.3 UPMIX/DOWNMIX – DOWNMIX tab

This tab provides resources to control the downmix of a "5.1 channel" surround-sound audio signal into an LtRt or LoRo stereo pair. The 5.1 terminology refers to six discrete audio channels, with the low-frequency channel of limited bandwidth designated as the .1 channel. The downmix can be done using any of the 16 audio channels processed by the audio processor using the Input Channels controls in the interface.

Input Channels: The default source channels are CH1 to CH6, but the input shuffler allows any combination of the input channels.

Downmix:

Operation Mode: Use the pull-down to select the downmix operating mode:

- Manual: Downmix follows the downmix parameters manually configured by the user.
- Follow Metadata: Downmix follows the downmix parameters of the Metadata.

Level Normalization: use the pull-down to select the type of normalization to be applied on the downmix output level.

- OFF: Downmix output level is not normalized. Clipping may occur depending on the input channel levels and the selected mix levels.
- Level A: Downmix output level is normalized based on the applied mix levels to provide a uniform output over the range of mix levels available. Clipping will never occur, even with full scale input channels and mix levels.
- Level B: Downmix output level is normalized based on the channel configuration to provide a uniform output loudness between 3/2 and other programs (2/0, 3/0, 2/1, 3/1, 2/2). For example, downmixing a 3/2 program produces a loudness attenuation compared to the same program in 2/0 at the same input loudness. To provide a uniform output loudness, a loudness attenuation is applied on all programs except 3/2. If the operating mode is *Follow Metadata,* the channel configuration is given by the AC-3 coding mode parameter in the metadata. If the operating mode is *Manual,* the channel configuration is given by the selected mix levels.
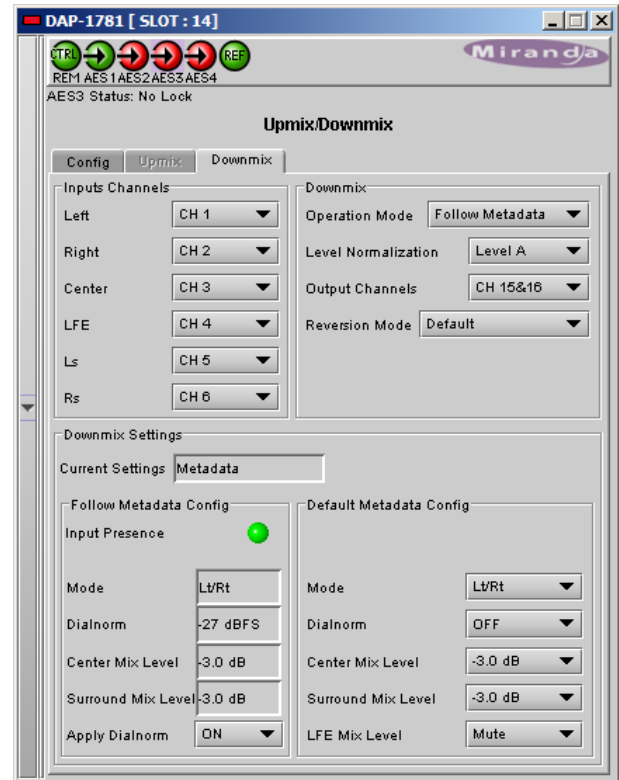
Table 2: Channel Configuration in Manual Mode

Center Mix Level	Surround Mix Level	Channel Configuration
mute	mute	2/0
not mute	mute	3/0
mute	not mute	2/2
not mute	not mute	3/2

Level-B normalization also includes Level-A normalization, based on the applied mix levels. Clipping will never occur, even with full scale input channels and mix levels.

Output Channels: The downmixed stereo pair is mapped into the channel pair selected in the pull-down menu

Reversion Mode: Used only when **Operation Mode** is set to *Follow Metadata.* It determines which downmixing configuration to revert to when there is no valid Primary (external input) Metadata. Downmixing

will use the **Default Metadata Configuration** if the **Reversion mode** is set to *Default*, otherwise it will use the metadata parameters in the selected Backup Metadata (Metadata panel) when set to *Backup Metadata*.

Downmix Settings:

The **Current Settings** status indicates the current set of configuration parameters used for downmixing depending on the **Operation Mode** and **Reversion Mode**. If the **Operation Mode** is *Follow Metadata*, Primary (external input) Metadata parameters shown in the **Follow Metadata Config** will be used. If the Primary or Backup Metadata parameter is not present or not indicated, the corresponding parameter from the **Default Metadata Config** will be used. If the **Operation Mode** is *Manual*, then the Primary/Backup Metadata is ignored and the **Manual Downmix Config** will be used.

Follow Metadata Config:

This section reports on Metadata presence if the *Follow Metadata* **Operation Mode** is selected. The four data boxes below the Metadata **Input Presence** status icon indicate the current *Mode*, plus the values in use for *Dialnorm*, *Center Mix Level* and *Surround Mix Level*.

Apply Dialnorm: This parameter allows the dialog normalization level to be applied to the downmix. The reference level is -31 dBFS. If set to *ON*, the applied level attenuation is the difference between the reference and the value indicated in the the *Dialnorm* data box.

Manual Downmix Config / Default Metadata Config:

The heading of this area of the panel changes depending on the selection in the *Operating Mode* pull-down above, but the available controls are the same in both cases.

- Operating Mode = *Manual* – the controls are used to set up the manual downmix parameters.
- Operating Mode = *Follow Metadata* – the controls are used to set up the default downmix parameters for situations where the Primary/Backup metadata is absent or when certain metadata parameters are not present or not indicated.

Mode: This pull-down menu selects the downmix mode:
- LtRt: Enables the downmix of 5.1 channels into an LtRt (Left total Right total) matrix surround encoded stereo pair.
- LoRo: Enables the downmix of 5.1 channels into an LoRo (Left only Right only) stereo pair, which is a conventional stereo signal.

Dialnorm: This pull-down selects the dialog normalization level. Select *OFF* to prevent the downmix from applying the dialnorm. The *OFF* value is equivalent to the reference level of -31 dBFS. If set to *ON*, the applied level attenuation is the difference between -31 dBFS and the value of the *Dialnorm* parameter.

Center Mix Level: Sets the center channel downmix level to the selected value.

[+3 dB, +1.5dB, 0 dB, -1.5 dB, <u>-3 dB</u>, -4.5 dB, -6 dB, Mute]

Surround Mix Level: Sets the surround channels (Ls & Rs) downmix level to the selected value.

[+3 dB, +1.5dB, 0 dB, -1.5 dB, <u>-3 dB</u>, -4.5 dB, -6 dB, Mute]

LFE Mix Level: Sets the LFE channels downmix level to the selected value.

[+10 dB, +9 dB, +7.5, +6 dB, +4.5 dB, +3 dB, +1.5dB, 0 dB, -1.5 dB, -3 dB, -4.5 dB, -6 dB, <u>Mute</u>]

Table 3: Current Downmix Settings

Legend	
	Follow Metadata Config
	Default Config
	Manual Config

Metadata Status	Metadata Parameters		Downmix Configuration		Current Downmix Settings		
Input Primary/ Backup Metadata	Input Primary/Backup Metadata Prog 1 Ext BSI *	Backup Metadata Prog 1 Ext BSI *	Operating Mode	Reversion Mode	Downmix Mode	Dialnorm	Center and Surround Mix Levels
Present	Downmix mode = Lt/Rt	×	Follow Metadata	×	Lt/Rt	Metadata	Metadata
Present	Downmix mode = Lo/Ro	×	Follow Metadata	×	Lo/Ro	Metadata	Metadata
Present	Downmix mode = Not indicated/ Reserved	×	Follow Metadata	×	Default	Metadata	Metadata
Present	Ext BSI does not exist	×	Follow Metadata	×	Default	Metadata	Default
Absent	×	Downmix mode = Lt/Rt	Follow Metadata	Backup Metadata	Lt/Rt	Metadata	Metadata
Absent	×	Downmix mode = Lo/Ro	Follow Metadata	Backup Metadata	Lo/Ro	Metadata	Metadata
Absent	×	Downmix mode = Not indicated/ Reserved	Follow Metadata	Backup Metadata	Default	Metadata	Metadata
Absent	×	Ext BSI does not exist	Follow Metadata	Backup Metadata	Default	Metadata	Default
Absent	×	absent **	Follow Metadata	Backup Metadata	Default	Default	Default
Absent	×	×	Follow Metadata	Default	Default	Default	Default
×	×	×	Manual	×	Manual	Manual	Manual

* Metadata Prog 1 Ext BSI: Metadata Program 1 AC-3 Extended Bitstream Information, Preferred Stereo Downmix Mode.
** The selected Backup Metadata source in the Metadata panel is either an external input (*RS-422, Decoder, A-BUS*) that currently does not contain metadata or *Blank* (no metadata is generated).

Downmix Modes: Additional Information

LtRt:

This mode enables the downmix of 5.1 channels into an LtRt matrix surround encoded stereo pair.

This ***LtRt*** downmixing process adds a 16.7 ms processing (801/48000 samples), the minimum delay becomes 18.9 ms (16.7 ms + 2.2 ms).
To keep control on the latency, when coupled to a video card, the tracking delay has to be larger than 19 ms, and with a stand alone card select a fixed delay larger than 19 ms.
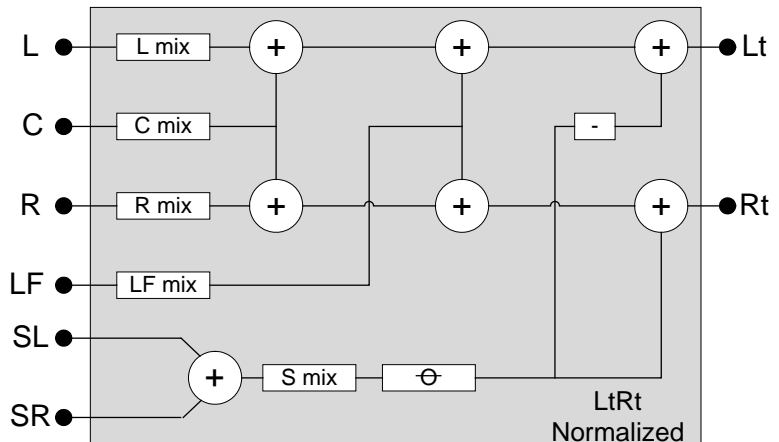
LoRo:

This mode enables the downmix of 5.1 channels into an LoRo stereo pair, which is a conventional stereo signal.

The LoRo downmixing process adds a latency of 41.7 µs (2/48000 samples) through the card. To keep control on the processing delay, the tracking delay has to be larger than 3 ms and with a stand alone card select a fixed delay larger than 3 ms.
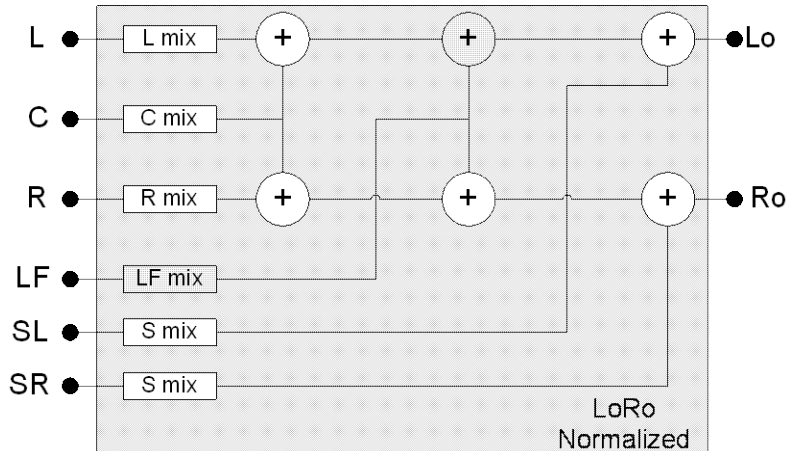
4.7 upMAX^{TM} Linear Acoustics Upmixer Option

This optional upMAX^{TM} Upmixer module supports under license the Linear Acoustic upMAX^{TM} 5.1 channel surround-field synthesizer. This processing creates downmix compatible Left, Right, Center, Surround and LFE channels from the two channel main input.

The **Operating Mode** pull-down box offers four different processing solutions:

- **PASS Mode**

Select the input channel pair to the L/R, C/LFE, Ls/Rs inputs with the pull-down menus. These channels are passed through unaltered and are assigned to CH9 to CH14 with the indicated mapping.

- **UPMIX Mode**

Select the input channel pair to the L/R input with the pull-down menu. The resulting 5.1 channels are assigned to CH9 to CH14 with the indicated mapping.

- **AutoMAX/AutoMAX-II^{TM} Mode**

Select the input channel pair to the L/R input with the pull-down menu. The resulting 5.1 channels are assigned to CH9 to CH14 with the shown mapping. Additionally the channels selected at the C, LFE, Ls and Rs inputs are summed with the outputs of the upmixing process.
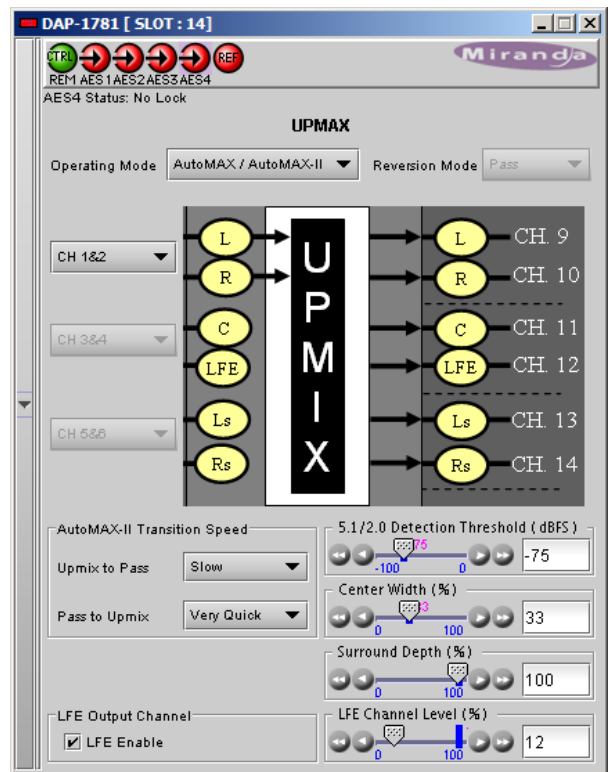
This mode also allows a 5.1 audio present at the input to pass through. It will auto switch between a stereo and a 5.1 audio source to provide a 5.1 output at all times.

- Set up the transition between the two modes to be unobtrusive by selecting transition speeds for each case – upmix-to-pass and pass-to-upmix – using the two AutoMAX-II Transition Speed pulldowns
- Use the 5.1/2.0 Detection Threshold slider to set the level at which some 5.1 channels are considered to be silent, identifying the input as 2.0

Note: The AutoMAX-II[TM] algorithm is supported by firmware version 1.3.1.0 and later. Firmware version 1.3.0.0 supports only the AutoMAX[TM] algorithm. The AutoMAX[TM] algorithm does not support the upmix-to-pass and pass-to-upmix transition speeds. The version number is available through the front panel menu Status-upMax.

- **Metadata Follow Mode & Reversion Mode**

This process may be useful for sources that switch between 5.1 and stereo. The **Coding Mode** parameter in the first program of the Dolby metadata will set the **Operating Mode** between *PASS* and *UPMIX*.

Note: In *Follow Metadata* mode, the metadata Generator will be automatically turned ON when the upMAX[TM] module is upmixing. The goal is to provide a valid metadata stream for the upmixed audio content. The Generator content must have been previously configured with valid 5.1 metadata parameters. The content of the Generator will be static except for the Dialnorm parameter of the first program that will be continually overwritten with the Dialnorm value in the Primary metadata source (when present). It is important to select an appropriate Backup Metadata source other than Generator, configured with 5.1 metadata values, in case the Primary source becomes absent. When the upMAX[TM] module is set to *Pass* mode by the incoming metadata stream, the Generator will be automatically turned OFF to let the incoming metadata stream pass through.

Metadata Follow Operating Mode					
First Program Coding Mode (ACMOD)	Reversion Mode	Last Valid Process	C/LFE, Ls/Rs Levels	upMAX Process	Metadata Source
3/2	-	-	-	PASS	Primary
2/0	-	-	-	UPMIX	Generator*
Other	-	-	-	PASS	Primary
Absent	PASS	-	-	PASS	Backup
Absent	UPMIX	-	-	UPMIX	Generator*
Absent	Last Valid	PASS	-	PASS	Backup
Absent	Last Valid	UPMIX	-	UPMIX	Generator*
Absent	Last Valid	AutoMAX	-	AutoMAX	Generator*
Absent	AutoMAX (rev 1.3.0.0)	-	-	AutoMAX	Generator*
Absent	AutoMAX-II (rev 1.3.1.0+)	-	Level > Threshold	PASS	Backup
Absent	AutoMAX-II (rev 1.3.1.0+)	-	Level < Threshold	UPMIX	Generator*

* Generator: the Coding Mode of the Program 1 should be set to 3/2 or 3/2L

Adjustments

The "surround field" can be adjusted with the **Center Width** control and the **Surround Depth** control. The bass enhancement signal for the LFE channel is derived from the Left, Center and Right channels. The **LFE Enable** checkbox and **LFE Channel Level** slider control the LFE output.

Latency

This upmix process increases the delay through the DAP-1781 by 155 samples (3 ms + 11 samples). It will be compensated as soon as the requested delay is larger than 5.5 ms.

**Note**: in mode UPMIX and AUTOMAX, the channels 15 and 16 are reserved for a future use and muted.

Note: when a non PCM signal, including AC-3 and Dolby-E, is detected at the L/R input, the six outputs of the upMAX[TM] module (channels 9 to 16) are muted.

4.8 Channel Status

4.8.1 Channel Status - Status AES1-4 & Status AES5-8 tabs

This tab displays the most relevant parameters coded within each incoming AES channel:

|	
USE	Displays PRO or Consumer
PCM	Coding of incoming data: Linear or Non-Linear.
Emphasis	Coding of the emphasis applied on the signal.
Freq. Mode	Indicates if the source is locked to a local reference signal.
Samp. Freq.	Value of the sampling frequency.
Chan. Mode	Describes the way the two channels are used.
User Bits	Utilization of the user bits.
Aux. Bits	Utilization of the auxiliary bits.
Word Len.	Coded quantization value.
Reference	Specifies if the source is a reference signal.
Source ID	"origin" signal message (4 ASCII characters).
Dest. ID	"destination" signal message (4 ASCII characters).
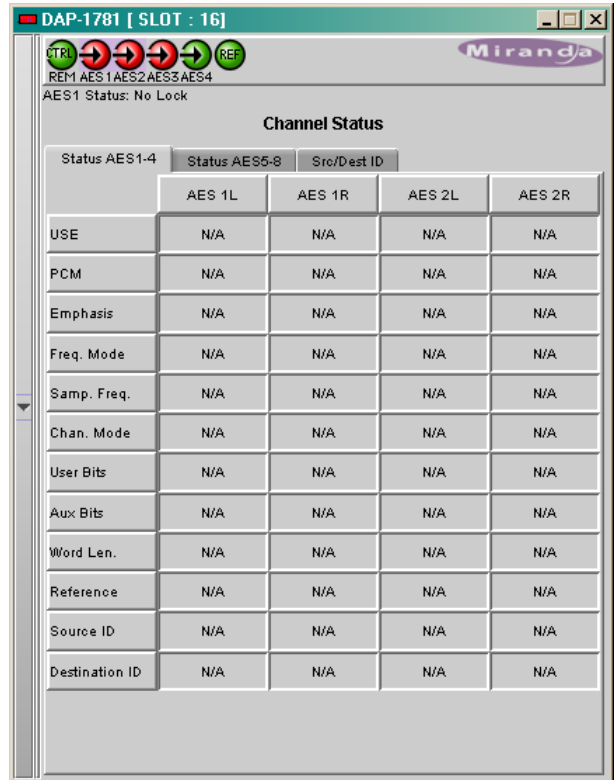
The Channel Status bit (C bit) is read at the card input for each channel, it will follow the routing of the audio throughout the card. When necessary it will be automatically updated to match the audio at the card outputs.

4.8.2 Channel Status – Src/Dest ID tab

This tab allows modification of the Source and Destination IDs.

Each entry is limited to four characters and must be terminated by a keyboard "Enter".
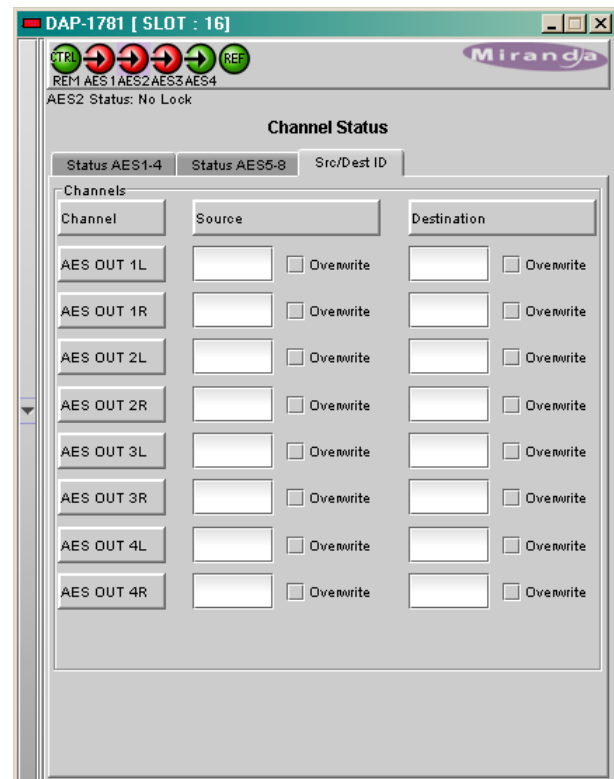
4.9   Audio Type

This Window indicates the audio type of each
channel at the input of the card, and at the A-BUS
inputs and outputs.

Detected audio types can be PCM, AC3 (Dolby
Digital), Dolby-E or NPCM (other non-PCM).
The input channels are available for the optional
Dolby decoder module input.

Input
The ***Card Input Channels*** 1 to 8 represent the card
digital inputs.

Input (Ext) – A-BUS In
This section corresponds to the A-BUS In channels,
originating from the embedded audio channels
demuxed in the video card.

Only channels 1-8 or 9-16 are input to the
processing; the choice is made in the ***Audio
Processing - CONFIG*** tab.

A-BUS Out Video (Embedded Channels)
Indicate the type the 16 post input processing
channels coming from the video card.

A-BUS Out A1 (A-BUS Channels Slave1)
Indicate the type the 16 post input processing
channels coming from the audio card Slave 1, or the
audio card Master in a two audio card system.

A-BUS Out A2 (A-BUS Channels Slave2)
Indicate the type the 16 post input processing
channels coming from the audio card Slave 2.

Output
The ***Card Output Channels*** 1 to 8 represent the
card digital outputs.

4.10 RALM tab

This Remote Audio Level Meters feature allows distant supervision of the audio levels present at the eight outputs of the DAP-1781.

4.10.1 RALM Connections tab

CH1&2, CH3&4, CH5&6, CH7&8 – each radio button turns the player ON or OFF for the pair of channels.

Reset Counter – reset the overload counter to zero. The counters are located on top of each meter. See Overload Cursor in the Meter Ballistics section for more information.

RALM Remote Control – To limit the data flow required by the meters, each pair of meters can be turned ON and OFF independently. Each checkbox controls the transmission for 2 channels of RALM data to the iControl server.

The *Speed* pull-down affects the refresh rate, the default value is fast.

4.10.2 RALM – Meter Ballistics Config tab

Type – select a type of meter from the pull-down list

When using a digital input on an analog peak meter, the test position is fixed at -24 dBFS. The 0 for the VU meter is fixed at -20 dBFS.

Upper Zone Limits – select the crossover level between the upper and middle zones of the meter (the range of values shown in the pull-down list depends on the meter type). The zone limits are in dBu for analog meters and in dBFS for digital meters

Lower Zone Limits – select the crossover level between the middle and lower zones of the meter (the range of values shown in the pull-down list depends on the meter type). The zone limits are in dBu for analog meters and in dBFS for digital meters

Color samples – the three samples show the currently-selected color for the upper, middle and lower zones of the meter.

Overload Counter - The overload cursor appears on the meter as an arrowhead in the meter scale. The two pulldown boxes set the position of the overload cursor on the left and right meters. If the audio level on that channel goes above the cursor, the Overload Counter at the top of the meter is incremented. The *Reset Counter* box is available on the *RALM - Connections* tab.

Phasemeter – this is a small meter that represents the phase correlation factor. Nominal position is in the center, which indicates also the absence of signal. The red side, up to the left end of the meter indicates the level of phase opposition and the green side, up to the right end indicates the level of phase amplitude.
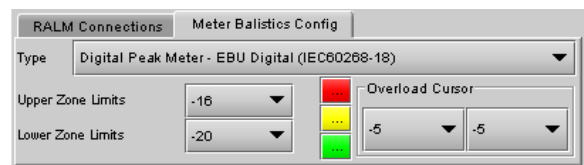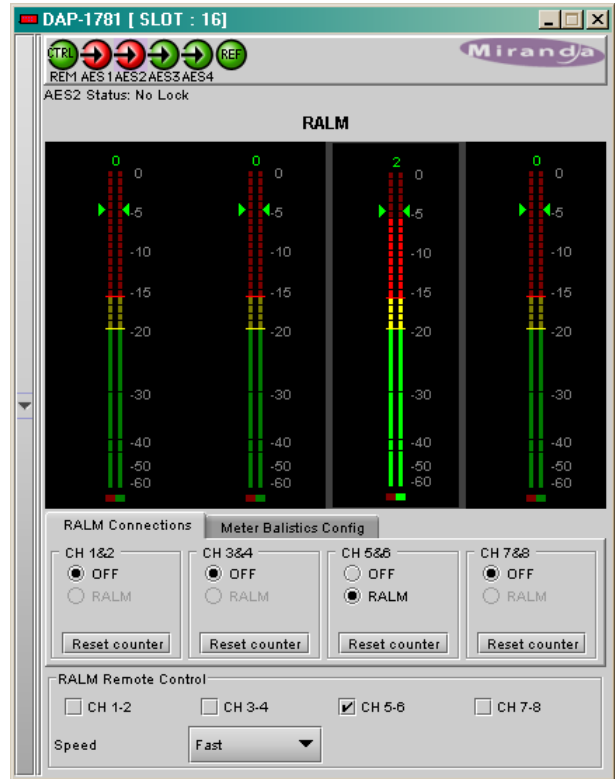
4.11 A-BUS

The DAP-1781 can be used stand alone or as a companion to provide additional audio channels for other Densité cards. The A-BUS (audio bus) links the DAP-1781 to the other cards and is used to configure the system and to display the presence of other installed cards.

A-BUS Config:

Select whether the A-BUS is to be disabled, and whether this DAP-1781 is Master, Slave 1 or Slave 2 in the A-BUS configuration.

- ***Not connected to Audio Bus*** – when the A-BUS is disabled, it is not possible to detect other attached cards in the system.
- ***Slave 1 of Video Card*** – used for a two-card system when the other card is a video processor.
- ***Slave 1 of Video Card, Slave 2 is present*** – used for a three-card system, with a video processor and another audio processor configured as Slave2.
- ***Slave 2 of Video Card, Slave 1 is present*** – used for a three-card system, with a video processor and another audio processor configured as Slave1.
- ***Slave 2 of Video Card, Slave 1 is present, Serial Mode*** – used for a three-card system, with a video processor and another audio processor configured as Slave1. The card Slave 2 is in Serial Mode.
- ***Master*** – the card is standalone, or used as a master for another audio processor configured as Slave. This mode is not available when a video card is attached to the A-BUS.
- ***Slave of Audio Master Card*** – used for a two-card system when the other card is a audio processor configured as Master.

Status:

- ***V Presence*** – turns green to monitor the presence of a video card in the A-BUS configuration.
- ***A2 Presence*** - monitors the presence of another audio card in the A-BUS configuration. The icon is labeled A2 if this card is Slave1, and is labeled A1 if this card is Slave2.

Tracking Delay: When a DAP-1781 is a slave of a video card, the variable delay applied to the video signal by the synchronization process is always applied to the audio signals. This tracking delay will also be applied to a Metadata signal extracted by the Dolby decoder module; the Metadata output will stay synchronized with its associated audio. **The Tracking delay is not applied to a Slave card in Serial Mode.**
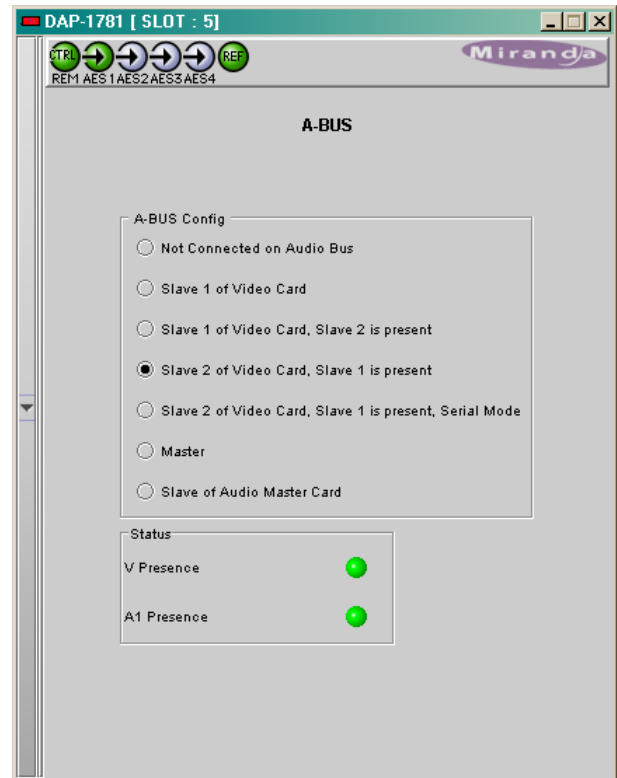
4.12 Reference Input

Reference – Desired:
Use a radio button to select a reference signal for the DAP-1781. The reference sources are placed by order of priority where A-BUS has the highest priority. The absence of the selected reference is an error condition.

- Select Auto in the header bar to automatically select the highest-priority reference present and valid.

Reference – Current:
This section indicates the current reference used by the DAP-1781. Many reference sources may be present and valid. When a valid reference is not present, the DAP-1781 reverts to Free-Run mode (this is an error condition).

Reference – Presence:
Five dedicated presence indicators display the valid reference sources: one for a reference card REF-17xx in slot 10 of the Densité frame, one for a reference card REF-1xxx in slot 20, and one for a valid AES1 input signal.

The URS is a single signal that is capable of distributing to all cards in a Densité frame a frequency reference and frame alignment references for all video and audio signals.

Frame Rates:
The Frame rate is indicated for the A-BUS and URS sources of reference, as both types may be related to a video frame rate.

When the external references are absent and the input signal to the Decoder is PCM, the ***Default Frame Rate*** is used to output the Metadata stream generated for a PCM signal. See ***Dolby***, ***PCM Control*** tab. This Default Frame Rate is also used by an optional Dolby-E encoder card when a video reference is absent.

Reference Error:
The DAP-1781 generates a Reference error (visible on the led located at the card edge) when the current reference signal is not the desired reference signal.

At the top of the page, the color of the Ref icon is also controlled by the A-BUS configuration.
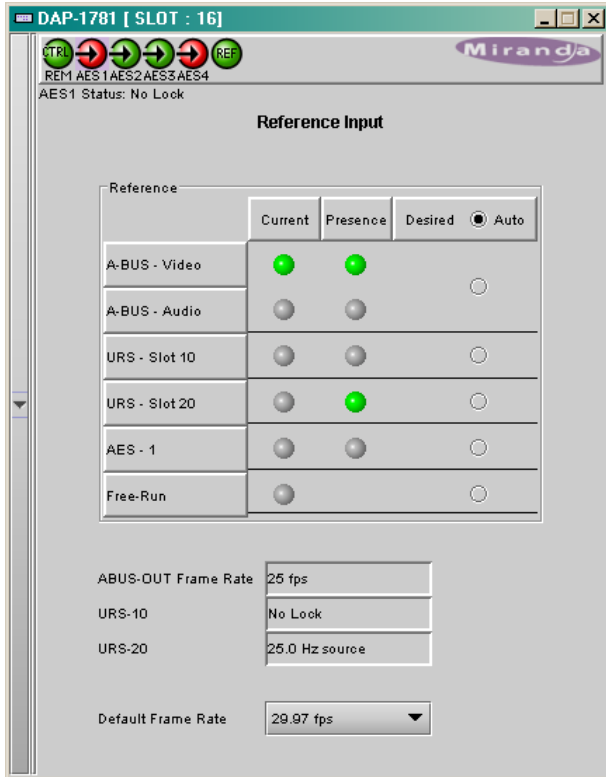
4.13 Rear Type

This tab shows the type of the rear panel: single or dual width, and digital inputs/outputs standard.

The 2 RU dual width rear panels and the 3 RU single width panels allow the installation of any optional Dolby module, either encoder or decoder.

The 2 RU single width rear panels are specialized for one type of an optional Dolby module.

4.14 Factory / Presets

4.14.1 Factory

The **Factory** profile is a read-only set of factory-selected values that can be used to return the DAP-1781 to a standard operating condition without affecting the **User Presets**.

- The DAP-1781 Menu in section 3.2 indicates the default values for all parameters.
- Card parameters and card alarms can be reset to their default values separately.
- The Generator Metadata parameters are included in the Factory Preset.

4.14.2 User Presets

The five **User Presets** are read-write data registers that allow you to save the contents of the Current state of the DAP-1781 for later recall.

Select any one of the five presets using the pull-down list. The name of the currently-selected User Preset is shown on the name bar.

The Generator Metadata parameters are included in the User Presets. Refer to Metadata - Control tab.

- Click **Load** to load the contents of the selected **User Preset** into the DAP-1781. All parameter settings and values will be replaced by the contents of the selected **User Preset**.
- Click **Save** to store the current parameter settings and values from the DAP-1781 into the selected **User Preset**. The existing contents of the preset will be overwritten.

4.14.3 GPI

The five GPI inputs can be provided only by a video processor card through the A-BUS link. When a contact closure to ground is present, the **State** will turn to green and, if **Enable** is checked, the GPI inputs 1 to 5 will perform a **Load User Presets** User1 to User5.
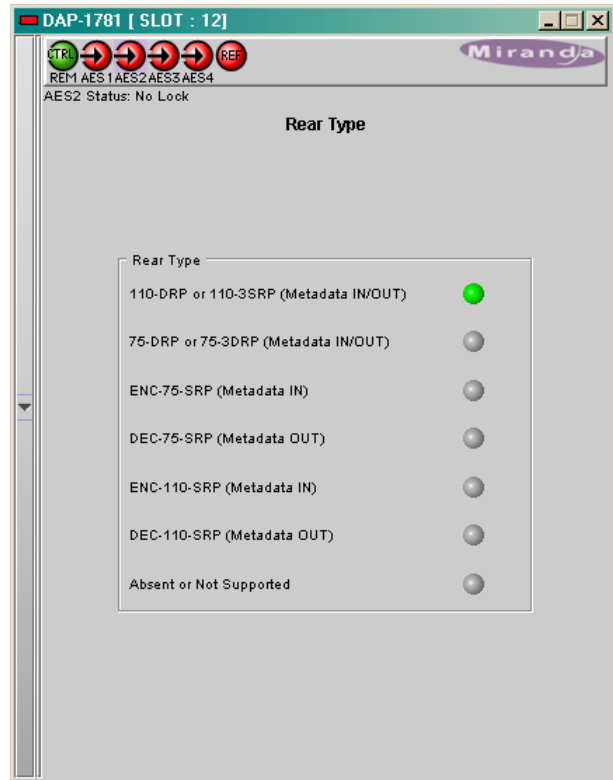
4.14.4 Profiles

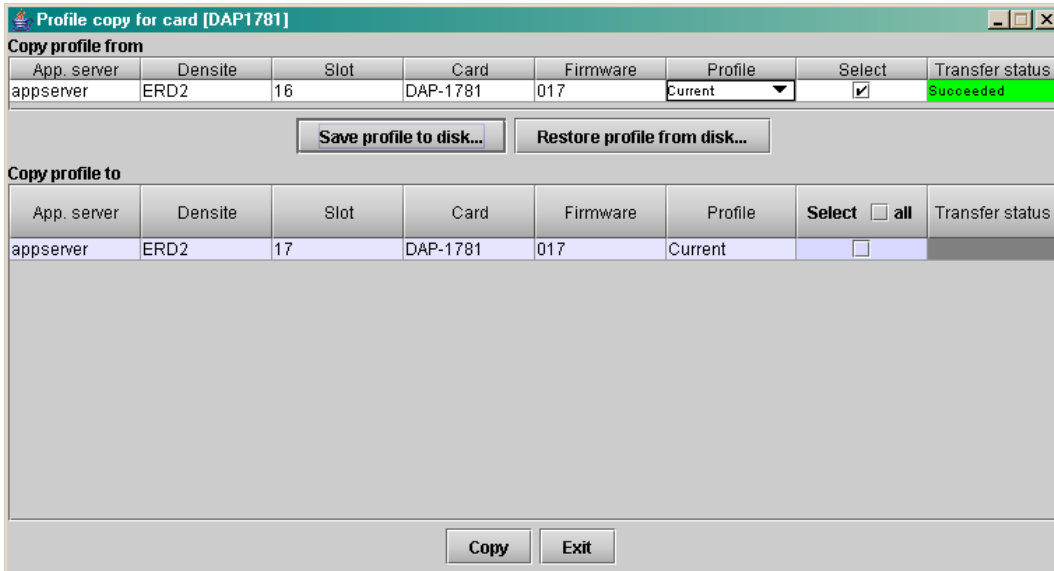Click the Profiles button at the bottom of the Factory/Presets panel to open a window allowing parameter settings to be copied from this DAP-1781 card to other DAP-1781 cards.

- • The **Copy Profile From** line shows the current DAP-1781.
- • The **Copy Profile To** table shows all other DAP-1781 cards available in the local iControl environment

Save Profile to Disk command:
This command is used to save a Profile as a configuration file on a disk. On the current DAP-1781, select a Profile with the pull down menu, click the **Save Profile to Disk** button, and follow the instructions to choose a folder and a file name. The transfer status is displayed at the end of the line.

Restore Profile from Disk command:
This command is used to restore a Profile into the current DAP-1781. Click the **Restore Profile from Disk** button, follow the instructions to choose a folder and a file name. The selected configuration file will be restored in its original Profile (i.e. a User3 Preset Profile saved to disk will be restored as a User3 Preset, not as a Current Profile).

Copy command:
Under the **Copy Profile From** title, click on the Profile entry to open a pull-down list with the available profiles: the **Current** one, the five **User Presets** and **All** profiles. Click on one to select the source profile.

Under the **Copy Profile To** title, click in the individual **Select** boxes to select one or more destination DAP-1781 cards, or click Select All to select all of them at once.
- • Those noted as not available (N/A) in the Transfer Status column cannot be selected.

Click the **Copy** button to copy the contents of the selected source profile into the same-named profile of the destination DAP-1781 cards. After the end of the **Copy** command, you have to clear the selections before a new copy process.

Note: the **All** profile is the only profile that contains the same data, including the Metadata User parameters, as the Restore point accessible from the Densité Controller Card.

4.15 Options

Three options are available for the DAP-1781:

- ***UP/DOWN MIXING***
  (DAP-1781-OPT-UDM)

- ***DYNAMIC PROCESSING***
  (DAP-1781-OPT-DP)

- ***LOUDNESS MANAGEMENT***
  (DAP-1781-OPT-LM)

Activate either option on the DAP-1781 card by entering the activation ***key*** into the ***Enter Key*** data box in its tab, and clicking the ***Enable Option*** button.

- The current status of the option is shown in the status box below the Enter Key data box.

See the text message at the top of the tab for information about purchasing an option and obtaining the activation key.

The optional hardware modules are now always enabled and do not need activation key:

- ***AC-3 & DOLBY-E Decoder Module***
  (MOD-DOLBY-DEC)

- ***DOLBY-E Encoder Module***
  (MOD-DOLBY-ENC-E)

- ***DOLBY DIGITAL (AC-3) Encoder Module***
  (MOD-DOLBY-ENC-D)

- ***upMAX^{TM} Upmixer Module***
  (MOD-LA-DUP-701)
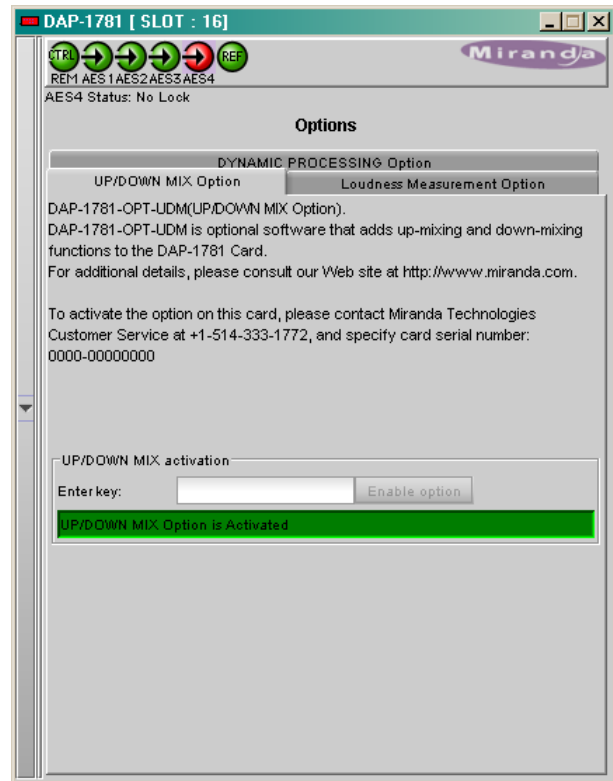
4.16 Alarms Configuration

Selecting the **Alarm config** tab opens a separate window for error status reporting. The alarm Configuration Panel shows all measured parameters and offers the following options for each:

Choose an alarm **Name**, use the pull-down box in the **Overall alarm** column to select the level associated to this alarm: **Disabled**, **Minor, Major** or **Critical**.

Check **Log events** to enable logging. The result is stored in a database managed with GSM in iControl Navigator. GSM is a dynamic register of all the system alarms, and is also an alarm provider for external applications.

In the bottom of the column **Status/Name**, the **Card LED** color follows the status of the physical card LED, as defined in the front panel menu Configure Alarm (see page 13).
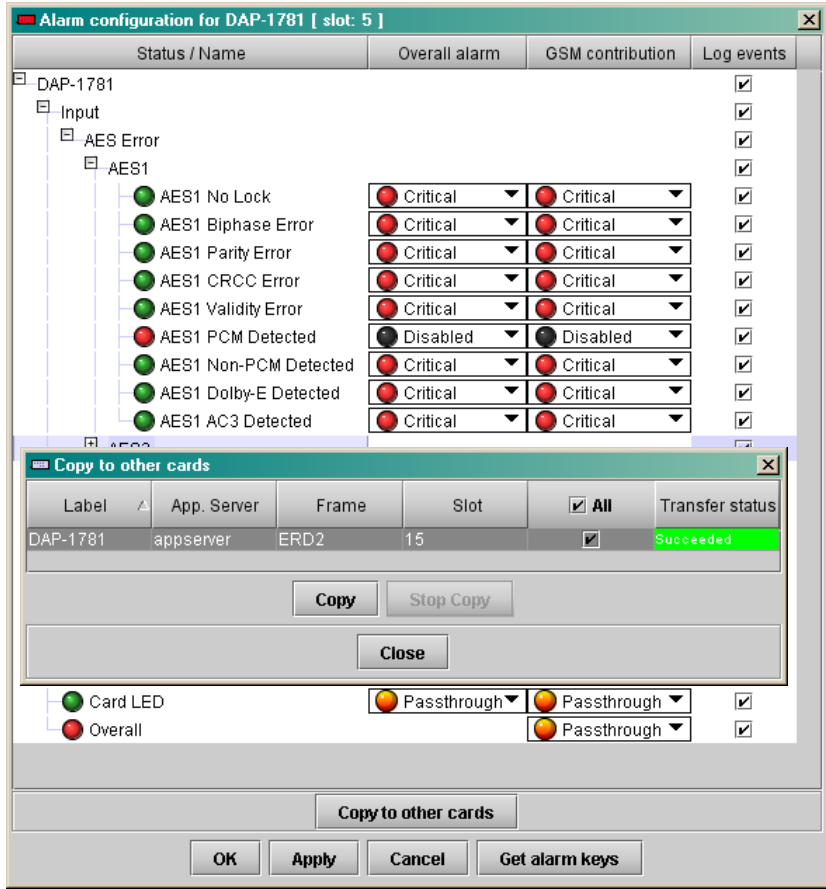
The Custom Alarms are reserved for specific firmware versions.

The overall Status is reflected by the color of the indicator attached to the card in iControl Navigator. It is also displayed in the upper left corner of the iControl Interface of the DAP-1781.

Activating **Copy to other cards** button opens a window which lists the similar cards, select the targets and push **Copy**. A click on the column title will sort the cards accordingly.

Each alarm provided by a Densité card has an associated value, or key, that serves as a unique identifier. An alarm's URI, for example, contains its key. The **Alarm Key** can also be useful when creating scripts.

The **Get alarm Keys** button is used to save a list of the card's alarms, the associated keys, as well as the currently configured Overall and GSM contributions in a .csv file that can be viewed in any text editor or spreadsheet application.

Refer to **iControl 3.X User Guide** for more information about **Alarms Configuration**.

4.17 Info

The Info panel provides information about the DAP-1781.

The boxes titled Label, Short Label, Source ID and Comments are editable – the user can enter their own information.

The Advanced button displays the name of the server within the iControl system, the frame in which it is installed, the slot occupied by the card and it's ID.

The Remote System Administration button at the bottom of the window opens a data entry box titled Joining Locators, which lists remote lookup services to which this DAP-1781 is registered.

> ***Add:*** Force the iControl service for this DAP-1781 to register itself on a user-specified Jini lookup service, using the following syntax:
>
> jini://<ip_address>
>
> where <ip_address> is the ip address of the server running the lookup service

5   Specifications

Digital Inputs (4)

Sampling freq.:	32 to 100 kHz
Quantization:	16 to 24 bits

AES3:

Level	0.2 to 7 Vpp
Input impedance	110 Ω balanced

AES3-id:

Level :	0.2 to 2 Vpp
Input impedance	75 Ω
Return loss	18 dB @ 12 MHz

Digital Outputs (4)

Sampling freq.	48 kHz
Quantization	24 bits
Intrinsic Jitter	5 mUI (700 Hz to 100 kHz)

AES3

Level	3.7 Vpp
Impedance	110 Ω

AES-3id

Level	1.0 Vpp
Impedance	75 Ω
Return loss	15 dB @ 6.144 MHz

Processing

Sampling frequency	48 kHz
Quantization	24 bits
Freq. response	± 0.03 dB (20 Hz to 20 kHz)
SNR	140 dB (A weighted)
THD+N	-130 dB (20 Hz to 10 kHz)
Crosstalk	-130 dB (20 Hz to 20 kHz)
Audio group delay	2.2 ms @ 48 kHz ISR
Data group delay	0.47 ms @ 48 kHz ISR
LtRt Downmix group delay	16.7 ms (801/48000 samples)
upMAX^{TM} group delay	3.23 ms @ 48 kHz ISR
Dolby-E encoding delay	1 video frame
Dolby-E decoding delay	1 video frame
Dolby Digital (AC-3) encoding delay	166 ms with Dolby firmware V1.0.1.4
	150 to 300 ms with next release, 187 ms default.
Dolby Digital (AC-3) decoding delay	32 ms (SMPTE340M-2000)

Miscellaneous

Tone generator	1 kHz sine wave interrupted on left channel (250 ms / 3 s) EBU R49
Signal presence threshold	from −72 to −48 dBFS (6 dB steps)
No signal delay	from 0 to 255 s (1 s steps)
Fixed delay	0 to 2.4 s Steps: ms (coarse) & sample (fine)
Tracking delay	0 to 8 video frames
GPI inputs (via A-BUS only)	The GPI information is transmitted to the DAP-1781 at the switch line. The User Preset Load command needs less than a frame (about 28 ms) to be completed. Note that this time will increase when a Dolby module is installed: about a frame for each modified parameter inside the Dolby module.

Metadata

Input

Level	RS-485
Format	asynchronous serial format
Data Rate	115.2 kbps.
Impedance	> 12 kOhm

Output

Level	RS-485
Format	asynchronous serial format
Data Rate	115.2 kbps.
Impedance	< 70 Ohm

Power

DAP-1781-xxx-DRP:	< 2.5 W < 4.1 W with an optional decoder module < 4.4 W with an optional encoder module < 3.1 W with an optional upMAX^{TM} module
DAP-1781-xxx-SRP:	< 2.0 W < 3.5 W with an optional decoder module < 3.7 W with an optional encoder module < 2.6 W with an optional upMAX^{TM} module

6 Document History

Document Version	Author Initial	Date	Assembly	Modifications
100	CSIX	2007-06-24	0769-0100-102 iControl 3.11 B154	Creation of the document
110	CSIX	2007-11-30	0769-0100-102 iControl 3.20 B103	upMAX™ Upmixer Option added, Internal Metadata path corrected, Metadata delay added.
200	CSIX	2008-04-18	0769-0100-206 iControl 3.20 B244	Added functions: Dolby Digital encoder, Dolby-E encoder, Metadata tab, Loudness management with LM100 interface, Auto-Mix, GPI, Custom alarms, Dolby-E guard band.
210	CSIX	2008-10-09	0769-0100-209 iControl 3.30 B173	Firmware 3.11, 3.12 Loudness Management: changed option name to …OPT–LM. Added note about A-BUS input in Slave2-Serial Mode. UpMax option: changed name to "MOD-LA-DUP-701"; ACMOD replaces PROG_CFG for reversion mode. Removed activation keys for hardware modules. Changed ON/OFF Dialogue Intelligence comment. Added alarms in Status LED and Report section. Modified Downmix parameter descriptions. Added processing delay for LtRt & LoRo downmixes, Dolby encoding and decoding processes. Added User Preset Load on GPI & link with Load metadata to generator. Metadata: the Input tab displays the parameters after the Primary/Backup selection Updated Default Dolby-E Metadata parameters. Added appendix D (Applications with optional cards) Added Dialnorm on/off in Downmix menu. Added AutoMAX in the upMAX Reversion mode. Added Input SRC controls. Added DRC control commands in the front panel menu
220	SC	2009-10-01	0769-0100-333 iControl 3.50	AutoMAX-II has been added. UP/DOWN MIX Option: Apply Dialnorm and Dialnorm Default values have been added in the Downmix tab. Dolby Decoder Option, Downmix type, LtRt is removed.
221	CSIX	2012-03-29	0769-0100-336 iControl 4.14	MOD-DOLBY-DEC replaced by MOD-DOLBY-DEC2

Appendix A – Dolby Digital Main Channel Output Functions

Coding Mode	Listening Mode	Main Channel Output Function
3/2	Full	All 3/2 channels
	3 Stereo	3 Stereo downmix of 3/2 channels
	Phantom	Phantom downmix of 3/2 channels
	Stereo	Lo/Ro downmix
	Mono	Lo+Ro
2/2	Full	All 2/2 channels
	3 Stereo	Default to Stereo mode
	Phantom	Default to Full mode
	Stereo	Lo/Ro downmix
	Mono	Lo+Ro
3/1	Full	All 3/1 channels
	3 Stereo	S mixed into L and R with smix coefficient
	Phantom	C mixed into L and R with cmix coefficient
	Stereo	Lo/Ro downmix
	Mono	Lo+Ro
2/1	Full	All 2/1 channels
	3 Stereo	S mixed into L and R with smix coefficient
	Phantom	Default to Full mode
	Stereo	Lo/Ro downmix
	Mono	Lo+Ro
3/0	Full	Default to 3 Stereo mode
	3 Stereo	All 3/0 channels
	Phantom	C mixed into L and R with cmix coefficient
	Stereo	Lo/Ro downmix
	Mono	Lo+Ro
2/0	Full	Default to Stereo mode
	3 Stereo	Default to Stereo mode
	Phantom	Default to Stereo mode
	Stereo	2/0 channels
	Mono	L+R
1/0	Full	Default to Mono mode
	3 Stereo	Default to Mono mode
	Phantom	Default to Mono mode
	Stereo	Default to Mono mode
	Mono	Mono center channel output
1+1	Full	Default to Stereo mode
	3 Stereo	Default to Stereo mode
	Phantom	Default to Stereo mode
	Stereo	L and R output
	Mono	L+R

Appendix B – Default Dolby-E Metadata Parameters

Program Config : 5.1.+ 2
Frame rate : current DAP-1781 frame rate.

Parameter	Program 1 (5.1)	Program 2 (2)
Data rate (datarate)	not specified	not specified
Bitstream mode (bsmod)	complete main	complete main
Audio coding mode or channel mode (acmod)	3/2	2/0
Center downmix level (cmixlev)	-3.0 dB	-3.0 dB
Surround downmix level (surmixlev)	-3.0 dB	-3.0 dB
Dolby Surround mode (dsurmod)	not Dolby Surround encoded	not Dolby Surround encoded
LFE channel (lfeon)	enabled	disabled
Dialogue level or "dialnorm" (dialnorm)	-27 dBFS	-27 dBFS
Audio production information (audprodie)	disabled	disabled
Mixing level (mixlevel)	105 dB SPL	105 dB SPL
Room type (roomtyp)	not indicated	not indicated
Copyright bit (copyrightb)	yes	yes
Original bitstream (origbs)	yes	yes
Extended bitstream information (xbsi1e, xbsi2e)	enabled	enabled
Preferred stereo downmix mode (dmixmod)	Lt/Rt	Lt/Rt
Lt/Rt center mix level (ltrtcmixlev)	-3.0 dB	-3.0 dB
Lt/Rt surround mix level (ltrtsurmixlev)	-3.0 dB	-3.0 dB
Lo/Ro center mix level (lorocmixlev)	-3.0 dB	-3.0 dB
Lo/Ro surround mix level (lorosurmixlev)	-3.0 dB	-3.0 dB
Dolby Surround EX mode (dsurexmod)	not Dolby Surround EX encoded	not Dolby Surround EX encoded
Dolby Headphone mode (dheadphonmod)	not indicated	not indicated
A/D converter type (adconvtyp)	standard	standard
DC filter (hpfon)	enabled	enabled
Lowpass filter (bwlpfon)	enabled	enabled
LFE lowpass filter (lfelpfon)	enabled	enabled
Surround phase shift (sur90on)	disabled	disabled
Surround 3 dB attenuation (suratton)	enabled	enabled
RF overmodulation protection (rfpremphon)	disabled	disabled
Line mode compression profile (compr)	film standard	film standard
RF mode compression profile (dynrng)	film standard	film standard

Appendix C – Metadata Input/Output Serial Port

Depending on the rear panel used, the DAP-1781 can have a Metadata In, a Metadata Out or both ports. These ports use RS-422/485 levels and operate at 115200 bps.

Metadata Source: DAP-1781

When the DAP-1781 is transmitting data, it is considered to be the RS-485/422 bus controller. The device receiving the metadata is the tributary.

Examples of tributary equipment:
Dolby DP569 Dolby Digital Encoder ("Metadata" port)
Dolby DP570 Dolby Multichannel Audio Tool ("Metadata Input" port)
Dolby DP571 Dolby E Encoder ("Metadata" port)

Metadata Source: Other equipment

When the DAP-1781 is receiving data, it is considered to be the RS-485/422 tributary. The device transmitting the metadata is the bus controller.

Examples of bus controller equipment:
Dolby DP570 Dolby Multichannel Audio Tool ("Metadata Output" port)
Dolby DP572 Dolby Digital / Dolby E Decoder ("Metadata" port)

DAP-1781 and Dolby LM100 Loudness Meter

The DAP-1781 is considered to be the RS-485/422 bus controller.

Appendix D – Examples of Applications with Optional Cards

Dolby-E or Dolby Digital (AC-3) encode

On the video card, set the Additionnal Frame Delay to match the encoder latency:
6 frames for AC-3,
1 frame for Dolby-E.

On the audio card, set the Fixed Delay, with a negative value, to compensate the tracking delay:
minus 6 frames for AC-3,
minus 1 frame for Dolby-E.

Upmix using DUP-701 Linear Acoustic

On the video card, set the Additionnal Frame Delay to 1 frame to match the upMax process latency.

On the audio card, the 1 frame tracking delay covers the upMax processing latency.

Support of Dolby LM-100

On the video card, set the Additionnal Frame Delay to match the encoder latency:
6 frames for AC-3,
1 frame for Dolby-E

On the audio card, set the Fixed Delay, with a negative value, to compensate the tracking delay:
minus 6 frames for AC-3,
minus 1 frame for Dolby-E

Dolby decode, Processing & Dolby Digital (AC-3) encode
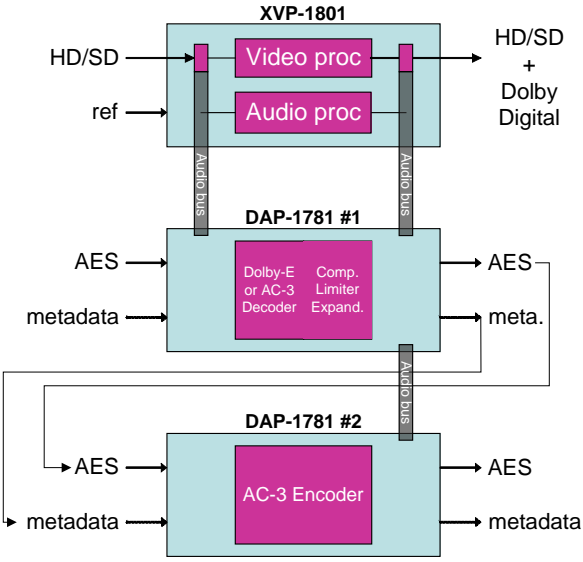
XVP-1801

HD/SD → | Video proc |
ref → | Audio proc |

→ HD/SD + Dolby Digital

Audio bus | Audio bus

On the video card, set the Additionnal Frame Delay to 7 frames to match the decode/ encode latencies.

DAP-1781 #1

AES → | Dolby-E or AC-3 Decoder | Comp. Limiter Expand. | → AES
metadata → | → meta.

Audio bus

The tracking delay is applied on this audio card. Set the Fixed Delay, with a negative value, to compensate the tracking delay: minus 7 frames.

DAP-1781 #2

→ AES → | AC-3 Encoder | → AES
→ metadata → | → metadata

The Dolby Digital encoded signal is sent to the XVP-1801 via ABUS. This card is in Serial mode.

Dolby decode, Internal or Third Party processing & Dolby-E encode

XVP-1801

HD/SD → | Video proc |
ref → | Audio proc |

→ HD/SD + Dolby-E

Audio bus | Audio bus

On the video card, set the Additionnal Frame Delay to 2 frames to match the decode/ encode latencies.

DAP-1781 #1

AES → | Dolby-E or AC-3 Decoder | Comp. Limiter Expand. | → AES
metadata → | → meta.

Audio bus

The tracking delay is applied on this audio card. Set the Fixed Delay, with a negative value, to compensate the tracking delay: minus 2 frames.

DAP-1781 #2

→ AES → | Dolby-E Encoder | → AES
→ metadata → | → metadata

The Dolby-E encoded signal is sent to the XVP-1801 via ABUS. This card is in Serial mode.

LINEAR ACOUSTIC upmix, Processing & Dolby Digital (AC-3) encode

XVP-1801

HD/SD → Video proc → HD/SD + Dolby Digital

ref → Audio proc

Audio bus

DAP-1781 #1

AES → LINEAR ACOUSTIC UpMax™ · Comp. Limiter Expand. → AES

metadata → → meta.

Audio bus

DAP-1781 #2

AES → AC-3 Encoder → AES

metadata → → metadata

> On the video card, set the Additionnal Frame Delay to 7 frames to match the process & encode latencies.

> The tracking delay is applied on this audio card. Set the Fixed Delay, with a negative value, to compensate the tracking delay: minus 7 frames.

> The AC-3 encoded signal is sent to the XVP-1801 via ABUS.
> This card is in Serial mode.

LINEAR ACOUSTIC upmix, Processing & Dolby-E encode

XVP-1801

HD/SD → Video proc → HD/SD + Dolby-E

ref → Audio proc

Audio bus

DAP-1781 #1

AES → LINEAR ACOUSTIC UpMax™ · Comp. Limiter Expand. → AES

metadata → → meta.

Audio bus

DAP-1781 #2

AES → Dolby-E Encoder → AES
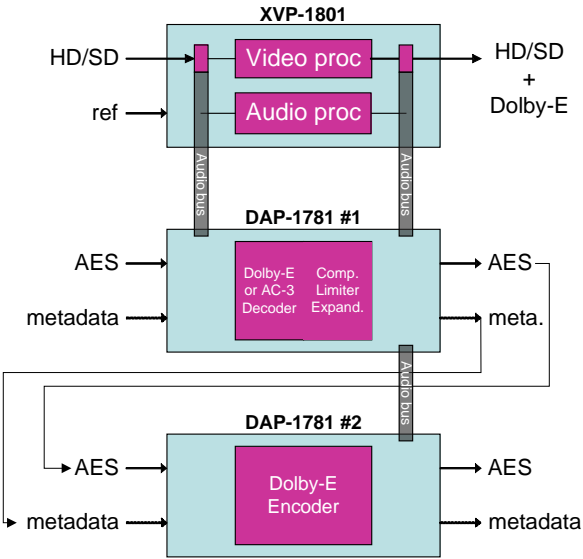
metadata → → metadata

> On the video card, set the Additionnal Frame Delay to 2 frames to match the process & encode latencies.

> The tracking delay is applied on this audio card. Set the Fixed Delay, with a negative value, to compensate the tracking delay: minus 2 frames.

> The Dolby-E encoded signal is sent to the XVP-1801 via ABUS.
> This card is in Serial mode.

Dolby decode, Downmix & Dolby Digital (AC-3) encode

XVP-1801

HD/SD → Video proc

ref → Audio proc

HD/SD + Dolby Digital

Audio bus

On the video card, set the Additionnal Frame Delay to 7 frames to match the process & encode latencies.

DAP-1781 #1

AES →

metadata →

Dolby Decoder   Downmix/ Upmix

→ AES

→ meta.

Audio bus

The tracking delay is applied on this audio card. Set the Fixed Delay, with a negative value, to compensate the tracking delay: minus 7 frames.

DAP-1781 #2

AES →

metadata →

AC-3 Encoder

→ AES

→ metadata

The AC-3 encoded signal is sent to the XVP-1801 via ABUS.
This card is in Serial mode.