LYNXTechnik AG
Broadcast Television Equipment

Reference Manual

P DM 5288 BO/DO

**SD / HD Multi-format AES Audio Embedder / Deembedder
With optical I/O**

**Revision: 1.3
January 2011**

This Manual Supports Device Revisions:	
P DM 5288 Firmware Revision	399
Control System GUI Release	4.8.2

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TECHNIK AG

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Contents

Warranty

LYNX Technik AG warrants that the product will be free from defects in materials and workmanship for a period of three (3) years from the date of shipment. If this product proves defective during the warranty period, LYNX Technik AG at its option will either repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, customer must notify LYNX Technik of the defect before expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by LYNX Technik, with shipping charges prepaid. LYNX Technik shall pay for the return of the product to the customer if the shipment is within the country which the LYNX Technik service center is located. Customer shall be responsible for payment of all shipping charges, duties, taxes and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure, or damage caused by improper use or improper or inadequate maintenance and care. LYNX Technik shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than LYNX Technik representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non LYNX Technik supplies; or d) to service a product which has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty servicing the product.

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Regulatory information

Europe

Declaration of Conformity

We   LYNX Technik AG
                   Brunnenweg 3
                   D-64331 Weiterstadt
                   Germany
Declare under our sole responsibility that the product

         TYPE: **P DM 5288 BO/DO**

To which this declaration relates is in conformity with the following standards (environments E1-E3):
    EN 55103-1 /1996
    EN 55103-2 /1996
    EN 60950-1 /2006
Following the provisions of 89/336/EEC and 73/23/EEC directives.

                      Winfried Deckelmann

Weiterstadt, January 2011

Place and date of issue   *Legal Signature*

USA

FCC 47 Part 15

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the 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 to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense

Getting Started

Most CardModules are installed into the rack frames and system tested in the factory. If this is an upgrade part or service exchange item then the module is supplied in a padded cardboard carton which includes the CardModule, rear connection plate and mounting screws.

Packaging

The shipping carton and packaging materials provide protection for the module during transit. Please retain the shipping cartons in case subsequent shipping of the product becomes necessary. Do not remove the module from its protective static bag unless observing adequate ESD precautions. Please see below.

ESD Warning

This product is static sensitive. Please use caution and use preventative measures to prevent static discharge or damage could result to module.

Preventing ESD Damage

Electrostatic discharge (ESD) damage occurs when electronic assemblies or the components are improperly handled and can result in complete or intermittent failure.

Do not handle the module unless using an ESD-preventative wrist strap and ensure that it makes good skin contact. Connect the strap to any solid grounding source such as any exposed metal on the rack chassis or any other unpainted metal surface.

Caution
Periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 Megohms.

Product Description

The P DM 5288 is a high quality 3GBit/s AES audio embedder and de-embedder suitable for use in SDTV applications and new HDTV applications, with support for a variety of HDTV formats.
The P DM 5288 BO and DO versions provide an optional video fiber optical input and output (Transceiver).

The eight audio ports can be individually configured by the user as audio inputs or outputs. Already embedded audio can be de-embedded internally, processed and routed through an audio mono crossbar in parallel to up to eight external audio inputs.

The module is multi-format (3GBit/s, HD and SD) and multimode in operation. The input video standard (and format) is detected and the module automatically switches its operation to the detected format.

The module can also be provided with support for balanced AES3 inputs or unbalanced AES3id inputs. The "D" and "DO" suffix provides a 25 pin SubD connection plate for balanced AES3 signals and the "B" and "BO" suffix provides a connection plate for AES3id signals on BNC connectors.

> *Note. The P DM 5288 is shipped as an 8 x AES Embedder (factory default). To configure audio ports as outputs (deembedders function), please use the local menu as described below (page 21) or the GUI application (c3_local) (see page 28).*

> *Note. Please check connected peripheral equipment before using the P DM 5288 to make sure the audio ports of the P DM 5288 is configured correctly, e.g. an output is not connected to an output of another device, this might damage the equipment.*

Key Features

- Support for SDTV, HDTV and 3GBit/s standards
- Optional video fiver optical input and output (Transceiver)
- Automatic video standard and format detection
- Audio ports can be individually configured as inputs or outputs
- Existing embedded audio can be deembedded
- Delete or replace existing embedded audio
- Mono audio crossbar
- Audio processing (e.g. mono gain)
- Individually selectable ON/OFF sample rate converters for each AES input
- Dolby E compatible (with SRC switched off)
- Embedded audio group selection
- Embedding into Black output video frame with no SDI input signal
- All audio inputs transformer isolated
- 4 x SDI outputs (except "B" versions)
- Selectable Horizontal and Vertical Video Blanking

Input Formats

The module has one multi-format serial digital input with automatic input detection. The module will detect the following input standards and configure the module automatically for operation in the connected format.

SDTV Formats	HDTV Formats	3GBit/s Formats
525 / 59.94Hz	1080i / 50Hz	1080p / 50Hz
625 / 50Hz	1080i / 59.94Hz	1080p / 59.94Hz
	1080i / 60Hz	1080p / 60Hz
	1080p / 23.98Hz	
	1080p / 24Hz	
	1080p / 25Hz	
	1080p / 29.97Hz	
	1080p / 30Hz	
	1080psf / 23.98Hz	
	1080psf / 24Hz	
	1080psf / 25Hz	
	720p / 23.98Hz	
	720p / 24Hz	
	720p / 25Hz	
	720p / 29.97Hz	
	720p / 30Hz	
	720p / 50Hz	
	720p / 59.94Hz	
	720p / 60Hz	

Output Formats

Same as the input format, or the pre-selected format, if no input is connected (see below)

Audio Embedding with No Video Input

With no SDI signal connected the module will switch to the last connected video standard (default) and will produce a black video output with the audio embedded.

If used in standalone mode with no SDI input connected the output standard can be changed from the default using the format selections provided in the GUI or local menus.

> **Note.** The modules are supplied set to *"default to the last connected video standard".* This will be 1080i / 50Hz for new modules. This can be cleared by connecting a different video input, or by selecting the required video format (using the selections provided) – waiting approx 10 seconds for the module LEDs to flash yellow three times and then switching it back to "*follow last input*". This will have the same effect.

If the SDI video input is removed during operation, then the embedder will continue to embed audio into a black video frame in the selected format until the video is restored.

> **Note.** *Settings will be written to flash RAM automatically after 10 seconds with no activity. This can will be indicated by the alarm LED flashing yellow three times. If power is removed before the settings have been stored the module will revert back to the previous settings when powered up*

Sample Rate Converters

Each AES input has selectable sample rate converters (default is on) , these will resample the audio to 48KHz required for embedding. If DolbyE / AC3 (or any other compatible encoded audio format) is to be embedded then the sample rate converter needs to be switched off or the audio will be corrupted / destroyed.

> **Note.** With the Sample rate converters switched OFF its important to make sure the AES audio is synchronous with the input SDI signal prior to embedding.

Audio Processing

All internal and external AES signals can be processed in a audio processing stage including mono gain, phase invert, overload and silence detection.

Audio Mono Crossbar

All AES signals (external and deembedded) are fed into a monaural audio crossbar where individual left and right audio channels can be re-assigned / swapped prior to embedding.

> **Note.** *The mono switching function is only accessible using the Module GUI via the control system. The local menu system and display only allows for switching of AES signals (stereo pairs)*

Audio Group Deletion

The P DM 5288 will detect any audio groups present in the SDI stream, and each group can be selected individually. The user has the choice of passing any existing embedded audio group(s) intact, replacing the audio group(s) or deleting the audio group(s).

Functional Diagram (P DM 5288 BO/DO)
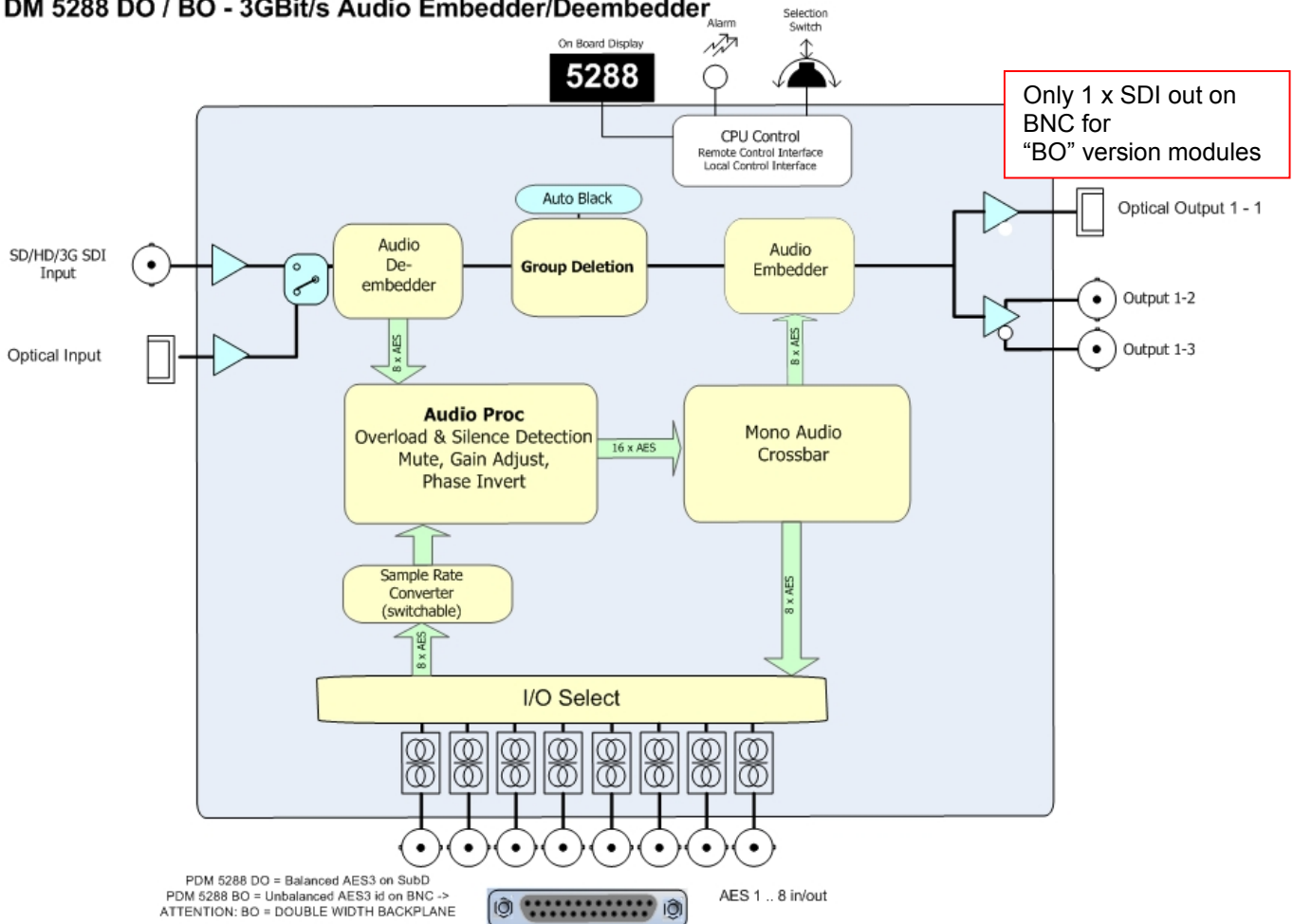
Note. The P DM 5288 is shipped as an 8 x AES Embedder (factory default). To configure audio ports as outputs (deembedders function), please use the local menu as described below (page 21) or the GUI application (c3_local) (see page 28).

Note. Please check connected peripheral equipment before using the P DM 5288 to make sure the audio ports of the P DM 5288 is configured correctly, e.g. an output is not connected to an output of another device, this might damage the equipment.

Module Layout
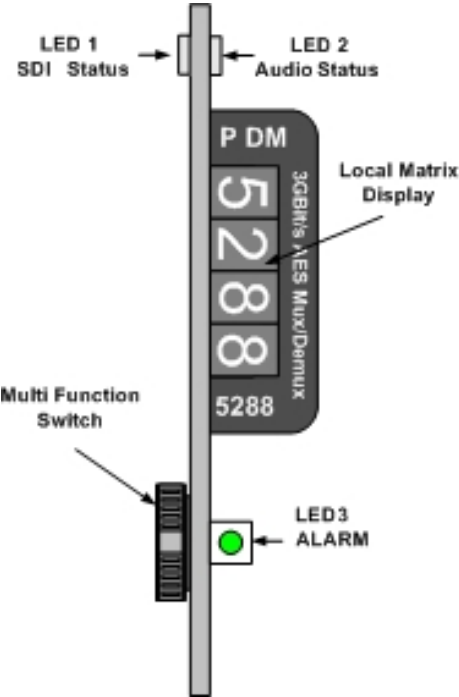
Module Front Panel
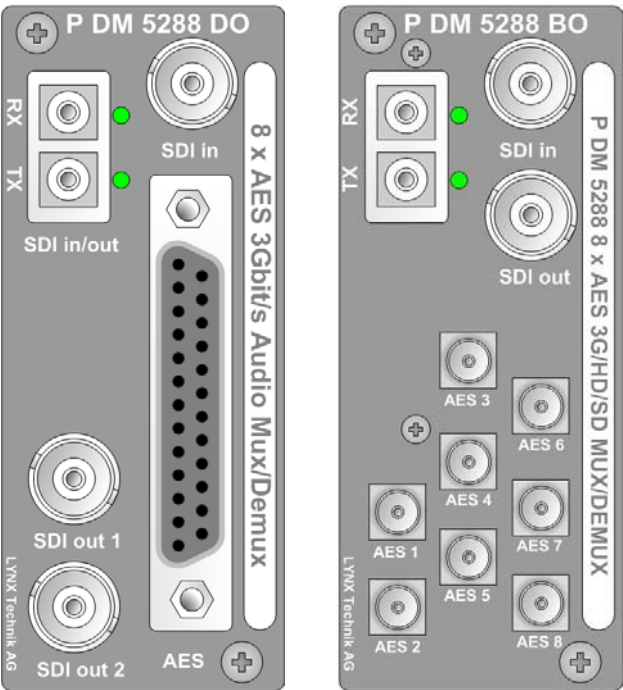
Module Rear Termination Panels
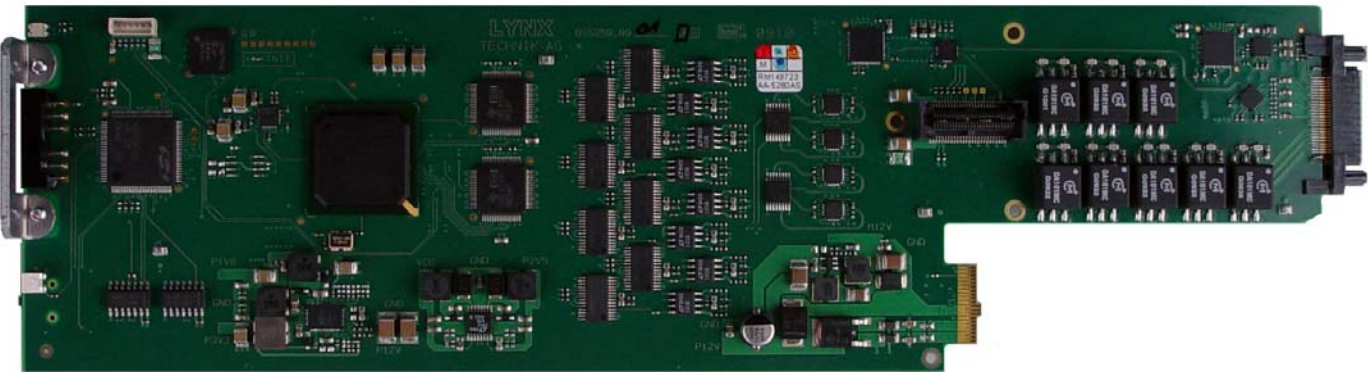
CardModule Layout

Connections

Video

The P DM 5288 use standard 75 Ohm BNC connectors. We recommend the use of high quality video cable for digital video connections to reduce the risk of errors due to excessive cable attenuation. Max cable lengths the module will support are shown below.

SDTV = 250m Belden 8281 (270Mbits/s)
HDTV = 140m Belden 1694A (1.4Gbits/s)
3GBit/S = 80m Belden 1694A (2.97Gbits/s)

> *Note. Due to the compact design of the connection plate it will be necessary to use a connection tool to secure the BNC video connectors.*

Audio

Unbalanced AES 3id

If using the "BO" suffix module then this is provided with a rear connection plate with 75 Ohm Mini - BNC (Samtec DIN7A) connections for AES audio. Connection is self explanatory.

Balanced AES3

If using the "DO" Suffix module then this is provided with a rear connection plate with a 25 pin female SubD connection for balanced AES 3 audio signals. Connector wiring is shown below.

Pin Number	Connection	Pin Number	Connection
1	AES 8 +	14	AES 8 -
2	AES 8 GND	15	AES 7 +
3	AES 7 -	16	AES 7 GND
4	AES 6 +	17	AES 6 -
5	AES 6 GND	18	AES 5 +
6	AES 5 -	19	AES 5 GND
7	AES4 +	20	AES 4 -
8	AES 4 GND	21	AES3 +
9	AES3 -	22	AES3 GND
10	AES 2 +	23	AES2 -
11	AES 2 GND	24	AES 1 +
12	AES1 -	25	AES 1 GND
13	n.c.		
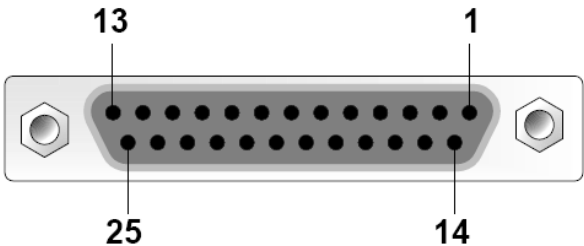
View looking INTO connector as seen on module

We recommend you use high quality screened (twisted pair) cable for the balanced audio connections. LYNX has an optional audio breakout cable which will bring out all audio connections to in line XLR connectors. Model number **R AC M 25-8** or **R AC F 25-8**

Optical Fiber

The P DM 5288 BO and DO provides LC/PC connectors for single mode fiber cables (option). The fiber interfaces can be selected from a variety of different SFP style modules. Also from all of the 18 CWDM wavelengths a SFP module can be selected.

Multimode fiber cables can be used also, but this will limit the max. fiber length to approx. 1km.

! **NOTE:** *Please take care that surfaces of fiber cables and LC connectors are always protected against scratching and dust if not fiber cables are connected. Dust and/or scratches will lead to high attenuation of the optical power transmitted.*

Installation

If this module was supplied as part of a system it is already installed in the rack enclosure. If the module was supplied as a field upgrade please follow the installation procedure below.

NOTE Observe static precautions when handling card. Please see ESD warnings on Page 6.

Each Card Module is supplied with a rear connection panel and two mounting screws. Please follow the following procedure for installation of the card module into the Series 5000 Card Frame.

1. Select a slot in the card frame where the CardModule will be located.

2. Remove the blank connection panel from the rear of the rack (if fitted)

3. Install the rear connection panel using the screws supplied. Do not tighten the screws fully

4. Slide the card module into the card frame and carefully check the CardModule connects to the rear connection plate. The card should fit easily and should not require excessive force to insert, if you feel any resistance, there could be something wrong with the rear connection panel location. Do not try and force the connection this may damage the connectors. Remove the rear connection panel and check alignment with the CardModule.

5. Insert and remove the CardModule a few times to ensure correct alignment and then tighten the two screws to secure the rear connection plate.

Settings and Control

The module has an integrated micro-controller, which enables the module to be configured and controlled locally using the multifunction switch and 4 character dot matrix display (or from remote using a GUI interface when using one of the optional controllers and control software).

Once set, all settings are automatically saved in non-volatile internal memory. (Flash RAM) The module will always recall the last used settings.
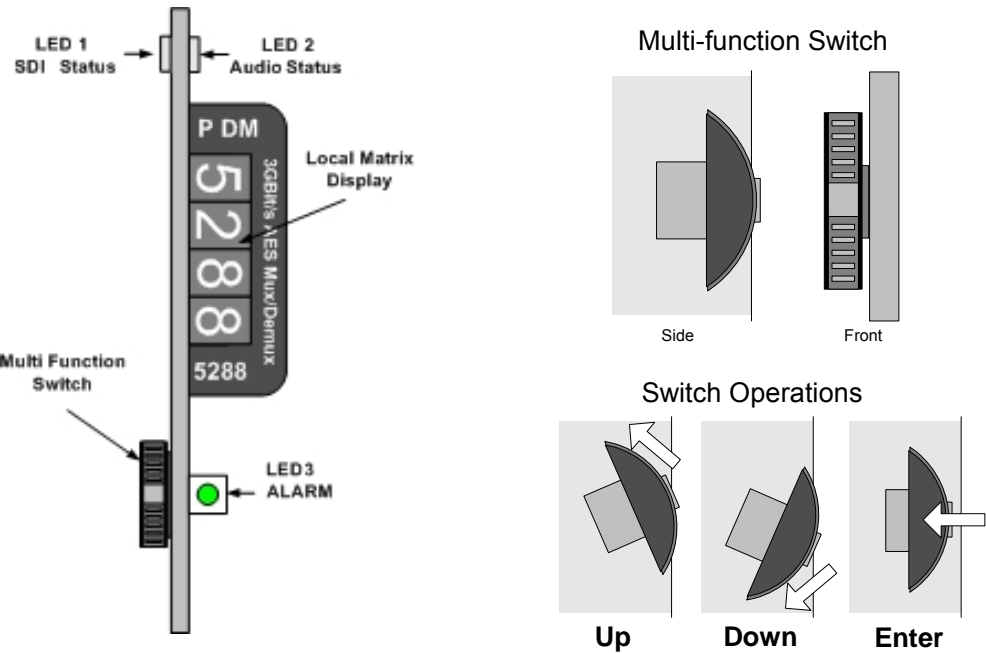
Multi Function Switch

The CardModule is equipped with a multi-function switch located on the front bottom edge of the card. (See above)

Using the Local Display Menus

Making local adjustments to the module is done using the multifunction switch and the integrated 4-character dot matrix display. The menu system is layered, and navigation through the system is done using the **UP** and **DOWN** functions of the switch. **ENTER** is used to move between menu levels and also enter a selection.

Switch Function	Operation
UP	Move UP within a level
DOWN	Move down within a level
ENTER	Change levels / Make selection

Menu Structure

The Menu structure is defined in the next table, and should be used when navigating through the system.

ENTER moves between levels
UP/DOWN moves between items within the level
When you enter a new setting the system will jump back one level in the menu system.

- The "back" selection in the menu structure will take you back one level when selected.

- When an item is selected which has several setting possibilities the first value displayed will be the value currently stored in the system. The order of the available settings for any menu item in the table supplied does not represent the order the settings will actually be displayed.

- If left unattended, the menu will default to the root display after a preset timeout.

Layer 1	Layer 2	Layer 3	Layer 4	Description
5288				*Root Display (5288 for PMX 5288)*
	GDEL			*Group Delete*
		GRP1		*Group 1*
			ON	*Delete Group 1*
			OFF	*Pass Group 1*
			back	
		GRP2		*Group 2*
			ON	*Delete Group 2*
			OFF	*Pass Group 2*
			back	
		GRP3		*Group 3*
			ON	*Delete Group 3*
			OFF	*Pass Group 3*
			back	
		GRP4		*Group 3*
			ON	*Delete Group 4*
			OFF	*Pass Group 4*
			back	
		back		
	EMBD			*Select Embedder Groups*
		GRP1		*Group 1*
			ON	*Selected (embedding)*

						OFF	De-selected (no embedding)
						back	
					GRP2		Group 2
						ON	Selected (embedding)
						OFF	De-selected (no embedding)
						back	
					GRP3		Group 3
						ON	Selected (embedding)
						OFF	De-selected (no embedding)
						back	
					GRP4		Group 4
						ON	Selected (embedding)
						OFF	De-selected (no embedding)
						back	
				back			
		XEMB					Audio Crossbar Embedder (only Stereo select)
				1.12			Group 1 AES Select (channels 1,2)
						AES1..8	Assign external AES input 1..8
						1d12..1d34	Assign embedded group1 (channels1-2 or 3-4)
						2d12..2d34	Assign embedded group2 (channels1-2 or 3-4)
						3d12..3d34	Assign embedded group3 (channels1-2 or 3-4)
						4d12..4d34	Assign embedded group4 (channels1-2 or 3-4)
						back	
				1.34			Group 1 AES Select (channels 3,4)
						AES1..8	Assign external AES input 1..8
						1d12..1d34	Assign embedded group1 (channels1-2 or 3-4)
						2d12..2d34	Assign embedded group2 (channels1-2 or 3-4)
						3d12..3d34	Assign embedded group3 (channels1-2 or 3-4)
						4d12..4d34	Assign embedded group4 (channels1-2 or 3-4)
						back	
				2.12			Group 2 AES Select (channels 1,2)
						AES1..8	Assign external AES input 1..8
						1d12..1d34	Assign embedded group1 (channels1-2 or 3-4)
						2d12..2d34	Assign embedded group2 (channels1-2 or 3-4)
						3d12..3d34	Assign embedded group3 (channels1-2 or 3-4)
						4d12..4d34	Assign embedded group4 (channels1-2 or 3-4)

						back	
					2.34		*Group 2 AES Select (channels 3,4)*
						AES1..8	*Assign external AES input 1..8*
						1d12..1d34	*Assign embedded group1 (channels1-2 or 3-4)*
						2d12..2d34	*Assign embedded group2 (channels1-2 or 3-4)*
						3d12..3d34	*Assign embedded group3 (channels1-2 or 3-4)*
						4d12..4d34	*Assign embedded group4 (channels1-2 or 3-4)*
						back	
					3.12		*Group 3 AES Select (channels 1,2)*
						AES1..8	*Assign external AES input 1..8*
						1d12..1d34	*Assign embedded group1 (channels1-2 or 3-4)*
						2d12..2d34	*Assign embedded group2 (channels1-2 or 3-4)*
						3d12..3d34	*Assign embedded group3 (channels1-2 or 3-4)*
						4d12..4d34	*Assign embedded group4 (channels1-2 or 3-4)*
						back	
					3.34		*Group 3 AES Select (channels 3,4)*
						AES1..8	*Assign external AES input 1..8*
						1d12..1d34	*Assign embedded group1 (channels1-2 or 3-4)*
						2d12..2d34	*Assign embedded group2 (channels1-2 or 3-4)*
						3d12..3d34	*Assign embedded group3 (channels1-2 or 3-4)*
						4d12..4d34	*Assign embedded group4 (channels1-2 or 3-4)*
						back	
					4.12		*Group 4 AES Select (channels 1,2)*
						AES1..8	*Assign external AES input 1..8*
						1d12..1d34	*Assign embedded group1 (channels1-2 or 3-4)*
						2d12..2d34	*Assign embedded group2 (channels1-2 or 3-4)*
						3d12..3d34	*Assign embedded group3 (channels1-2 or 3-4)*
						4d12..4d34	*Assign embedded group4 (channels1-2 or 3-4)*
						back	
					4.34		*Group 4 AES Select (channels 3,4)*
						AES1..8	*Assign external AES input 1..8*
						1d12..1d34	*Assign embedded group1 (channels1-2 or 3-4)*
						2d12..2d34	*Assign embedded group2 (channels1-2 or 3-4)*
						3d12..3d34	*Assign embedded group3 (channels1-2 or 3-4)*
						4d12..4d34	*Assign embedded group4 (channels1-2 or 3-4)*
						back	

				back	
		SRC			*Sample Rate Converters*
			AES1		*Sample Rate Converter 1*
				ON	*ON*
				OFF	*Bypass (OFF)*
				back	
			AES2		*Sample Rate Converter 2*
				ON	*ON*
				OFF	*Bypass (OFF)*
				back	
			AES3		*Sample Rate Converter 3*
				ON	*ON*
				OFF	*Bypass (OFF)*
				back	
			AES4		*Sample Rate Converter 4*
				ON	*ON*
				OFF	*Bypass (OFF)*
				back	
			AES5		*Sample Rate Converter 5*
				ON	*ON*
				OFF	*Bypass (OFF)*
				back	
			AES6		*Sample Rate Converter 6*
				ON	*ON*
				OFF	*Bypass (OFF)*
				back	
			AES7		*Sample Rate Converter 7*
				ON	*ON*
				OFF	*Bypass (OFF)*
				back	
			AES8		*Sample Rate Converter 8*
				ON	*ON*
				OFF	*Bypass (OFF)*
				back	
			back		
		XAES			*Audio Crossbar extern AES (only Stereo select)*

				AES1		*Group 1 AES Select (channels 1,2)*
					AES1..8	*Assign external AES input 1..8*
					1d12..1d34	*Assign embedded group1 (channels1-2 or 3-4)*
					2d12..2d34	*Assign embedded group2 (channels1-2 or 3-4)*
					3d12..3d34	*Assign embedded group3 (channels1-2 or 3-4)*
					4d12..4d34	*Assign embedded group4 (channels1-2 or 3-4)*
					back	
				AES2		*Group 1 AES Select (channels 3,4)*
					AES1..8	*Assign external AES input 1..8*
					1d12..1d34	*Assign embedded group1 (channels1-2 or 3-4)*
					2d12..2d34	*Assign embedded group2 (channels1-2 or 3-4)*
					3d12..3d34	*Assign embedded group3 (channels1-2 or 3-4)*
					4d12..4d34	*Assign embedded group4 (channels1-2 or 3-4)*
					back	
				AES3		*Group 2 AES Select (channels 1,2)*
					AES1..8	*Assign external AES input 1..8*
					1d12..1d34	*Assign embedded group1 (channels1-2 or 3-4)*
					2d12..2d34	*Assign embedded group2 (channels1-2 or 3-4)*
					3d12..3d34	*Assign embedded group3 (channels1-2 or 3-4)*
					4d12..4d34	*Assign embedded group4 (channels1-2 or 3-4)*
					back	
				AES4		*Group 2 AES Select (channels 3,4)*
					AES1..8	*Assign external AES input 1..8*
					1d12..1d34	*Assign embedded group1 (channels1-2 or 3-4)*
					2d12..2d34	*Assign embedded group2 (channels1-2 or 3-4)*
					3d12..3d34	*Assign embedded group3 (channels1-2 or 3-4)*
					4d12..4d34	*Assign embedded group4 (channels1-2 or 3-4)*
					back	
				AES5		*Group 3 AES Select (channels 1,2)*
					AES1..8	*Assign external AES input 1..8*
					1d12..1d34	*Assign embedded group1 (channels1-2 or 3-4)*
					2d12..2d34	*Assign embedded group2 (channels1-2 or 3-4)*
					3d12..3d34	*Assign embedded group3 (channels1-2 or 3-4)*
					4d12..4d34	*Assign embedded group4 (channels1-2 or 3-4)*
					back	
				AES6		*Group 3 AES Select (channels 3,4)*

Menu	Description
AES1..8	*Assign external AES input 1..8*
1d12..1d34	*Assign embedded group1 (channels1-2 or 3-4)*
2d12..2d34	*Assign embedded group2 (channels1-2 or 3-4)*
3d12..3d34	*Assign embedded group3 (channels1-2 or 3-4)*
4d12..4d34	*Assign embedded group4 (channels1-2 or 3-4)*
back	
AES7	*Group 4 AES Select (channels 1,2)*
AES1..8	*Assign external AES input 1..8*
1d12..1d34	*Assign embedded group1 (channels1-2 or 3-4)*
2d12..2d34	*Assign embedded group2 (channels1-2 or 3-4)*
3d12..3d34	*Assign embedded group3 (channels1-2 or 3-4)*
4d12..4d34	*Assign embedded group4 (channels1-2 or 3-4)*
back	
AES8	*Group 4 AES Select (channels 3,4)*
AES1..8	*Assign external AES input 1..8*
1d12..1d34	*Assign embedded group1 (channels1-2 or 3-4)*
2d12..2d34	*Assign embedded group2 (channels1-2 or 3-4)*
3d12..3d34	*Assign embedded group3 (channels1-2 or 3-4)*
4d12..4d34	*Assign embedded group4 (channels1-2 or 3-4)*
back	
back	
TEST	*Test Standard (black video o/p on no input)*
STD	*Select SDI video standard for test signal*
LAST	*Auto (follow last input)*
525	*525 / 59.94Hz*
625	*625 / 50Hz*
60Hz.720p	*720P / 60Hz*
59Hz.720p	*720P / 59.94Hz*
50Hz.720p	*720P / 50Hz*
30Hz.720p	*720P / 30Hz*
29Hz.720p	*720P / 29.97Hz*
25Hz.720p	*720p / 25Hz*
24Hz.720p	*720p / 24Hz*
23Hz.720p	*720p / 23.98 Hz*
60Hz.1080i	*1080i / 60Hz*
59Hz.1080i	*1080i / 59.94Hz*

				50Hz.1080i	*1080i / 50Hz*
				30Hz.1080p	*1080p / 30Hz*
				29Hz.1080p	*1080p / 29.97Hz*
				25Hz.1080p	*1080p / 25Hz*
				24Hz.1080p	*1080p / 24Hz*
				23Hz.1080p	*1080p / 23.98Hz*
				25Hz.1080sF	*1080psF / 25Hz*
				24Hz.1080sF	*1080psF / 24Hz*
				23Hz.1080sF	*1080p / 23.98Hz*
				59Hz.1080p	*1080p / 59.94Hz*
				60Hz.1080p	*1080p / 60Hz*
				50Hz.1080p	*1080p / 50Hz*
				back	
			AUTO		
				ON	*Activate AUTO Black*
				OFF	*Deactivate AUTO Black*
				back	
			back		
		BLNK			*Horizontal and Vertical Blanking*
			HBLK		*Horizontal Blanking*
				ON	
				OFF	
				back	
			VBLK		*Vertical Blanking*
				ON	
				OFF	
				back	
			back		
		I/O			*Configure AES ports as Input or Output*
			AES1		
				IN	*AES 1 configured as Input*
				OUT	*AES 1 configured as Output*
				back	
			AES2		
				IN	*AES 2 configured as Input*
				OUT	*AES 2 configured as Output*

				back	
			AES3		
				IN	*AES 3 configured as Input*
				OUT	*AES 3 configured as Output*
				back	
			AES4		
				IN	*AES 4 configured as Input*
				OUT	*AES 4 configured as Output*
				back	
			AES5		
				IN	*AES 5 configured as Input*
				OUT	*AES 5 configured as Output*
				back	
			AES6		
				IN	*AES 6 configured as Input*
				OUT	*AES 6 configured as Output*
				back	
			AES7		
				IN	*AES 7 configured as Input*
				OUT	*AES 7 configured as Output*
				back	
			AES8		
				IN	*AES 8 configured as Input*
				OUT	*AES 8 configured as Output*
				back	
			back		
		RSET			*Restore factory defaults*
			NO		
			YES		
		back			

Note. *When the crossbar is assigned using the local control menu above it functions as an AES crossbar. The GUI crossbar as used from remote is a mono crossbar. Any left and right channel assignments made using the mono crossbar are removed when a AES channel is assigned using the local controls (left and right channels revert to as there are on the input to the crossbar)*

LED Status Indicators

The P DM 5288 has LED indicators on the edge of the card that serve as alarm and status indication for the module. Function is described below.

SDI Status LED 1

LED Color	Indication
Green	SDI Present and Locked
Yellow	SDI Detected but format not supported (no embedding takes place)
Red	SDI not present / invalid SDI input

AES Status LED 2

LED Color	Indication
Green	All AES is present and OK
Yellow	One or more AES groups are missing an AES signal (Embedder enabled) or one "not used" AES channel is async. to SDI with the SRC bypassed (AES async event enabled)
Red	Embedded group missing both AES or embedded group has one AES async. with the SRC in bypass
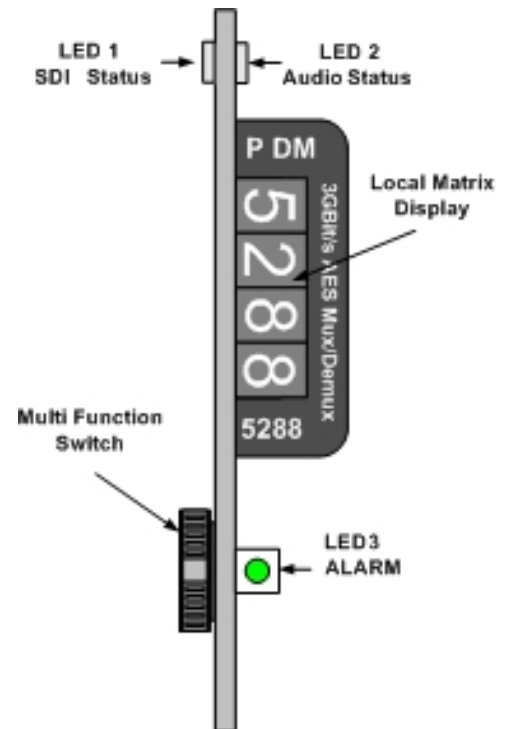
Alarm LED 3

LED Color	Indication
Green	**NORMAL** : SDI and AES OK
Yellow **	**WARNING** : The SDI or AES LED is YELLOW but no error condition exists or Testsignal is active while AES Status LED is NOT RED
Red	**ERROR** : The SDI or AES LED is RED indicating a serious error condition

*** Note*
The Alarm LED will occasionally flash yellow during normal operation (black then a triple yellow flash). This is indicating the module is updating the stored settings in flash ram and is normal. No error condition exists and this function does not affect normal module operation.

Using the "Locate" function from the module GUI in the control system can also cause the Alarm LED to flash yellow (black then a triple yellow flash) this is used as a tool to physically locate a module in a system and does not indicate a fault condition.

Control System GUI

All LYNX CardModules support a computer interface which allows setting the modules parameters using a simple GUI interface. Access to all standard features (and in some cases) extended features is possible using this interface.

Access to the GUI requires the use of the optional LYNX control system

> *Note. Any settings made using the control system overrides any local settings made on the module. All settings are stored in internal flash ram and will survive power cycles and long term storage.*
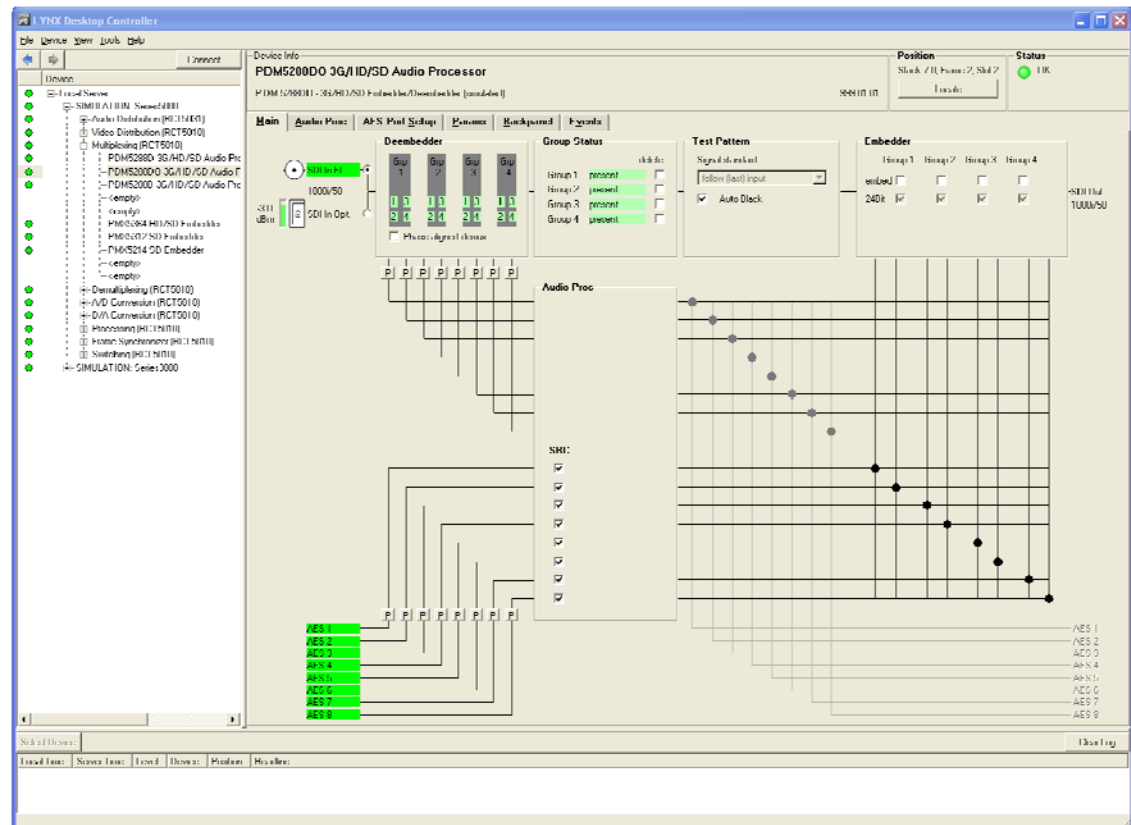
The GUI screenshots below are for the P DM 5288 module.

The above screenshot shows the complete module GUI. The Device info area contains information about the module including name and firmware revision. If used as part of a larger system (using the LYNX central control system) the modules position and physical location is displayed above the "locate" button.

> *Note. The Locate function us a tool used to quickly identify a module in larger systems. Selecting "locate" will flash the module alarm LED yellow. (does not effect module operation). This function will be automatically stopped (timeout)*

The first screen you see when the module is selected is the *Main* tab this is a graphical representation of the modules function and signal flow (left to right). Clicking on processing boxes where shown will link to other GUI screens with controls for these specific functions.

The area at the bottom of the screen is the error log. Any fault condition will be time stamped and entered into the log.

There are a number of Tabs associated with each Module which splits up the modules settings into a number of separate screens. The primary GUI screens and functions are described below.

Main Tab

This screen is the main GUI interface and is presented first when the module is displayed in the GUI. The layout replicates module function and the signal flow if from left to right. Selections are made using onscreen sliders, radio buttons, drop down selections and checkboxes.
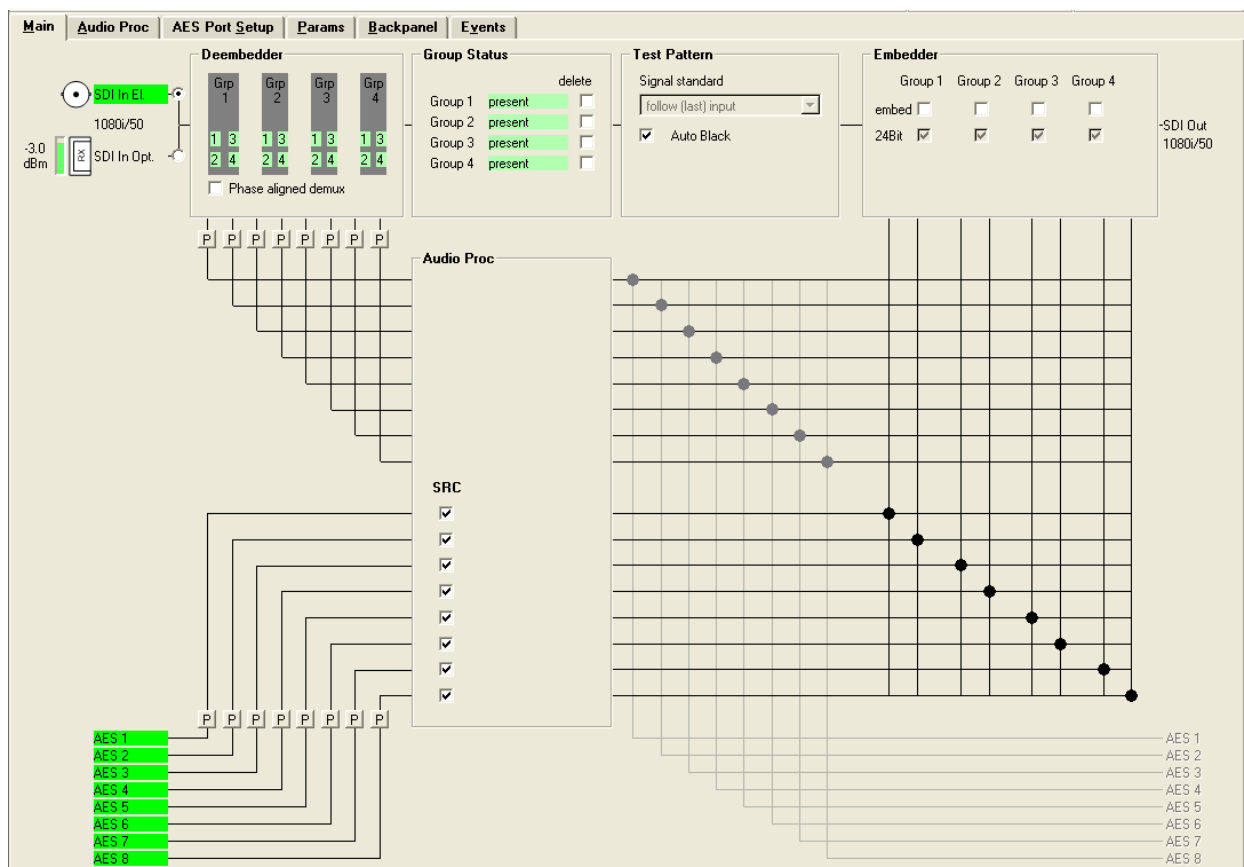
Input Detection

On the left the SDI input (Switchable in between BNC and fiber input, if fitted) and the AES inputs are detected.
The standard / format of the SDI signal is displayed on screen in green (if format is not supported color = Yellow and if input is missing the color = Red).

If a valid and synchronous AES signal is detected the AES input detection turns green, a valid, but asynchronous AES signal is indicated in yellow, a missing AES signal will be indicated in red.

AES ports, which are configured as outputs are greyed out in the input section.

Group Status

Any embedded audio is detected and the status is displayed in the Group Status area. If embedded audio is present it will highlight green. It is possible to delete each incoming audio group individually at this stage using the delete checkbox.

> *Note. If the audio is not deleted but the group is selected for embedding then the existing audio will be over written.*

Test Pattern Signal Standard

This selection is grayed out when a valid input signal is detected. When there is no input (or an invalid input signal) then the selection made in this drop down box will determine the output standard of the "Black" audio sync frame for the embedder.

Default is "follow last input" which is recommended for most applications. If the video input is removed then the embedder will continue to function (with a minimal interruption to the audio embedding process) by outputting embedded audio in a black "audio sync" frame.

With no input selected it is possible to preset the output format by making a selection from the drop down selections.

Sample Rate Converters

Each AES input has a selectable sample rate converter (SRC ON/OFF). The converter should be **switched off** if any DolbyE / AC3 or otherwise compressed or encoded bit stream is connected or the encoded audio will be destroyed.

Audio Crossbars

Each AES input as well as each deembedded AES signal passes into a mono crossbar where each individual left and right channel is split from the AES inputs and made available for mapping into any of the available crossbar outputs for activated AES outputs and the embedder feeds.

Embedder

The crossbar provides 8 AES outputs combined into 4 AES groups which can be embedded into the SDI input stream. Group selection is possible using the group select checkbox.
> *Note. If an existing embedded group has not been deleted but is selected for embedding then the existing audio will be overwritten*

If an HDTV input signal is detected then only signals with 24 Bit audio will be embedded. If an SDTV signal is detected then you can select in between 20 and 24 Bit embedding.

AES Outputs

If AES ports are configured as outputs the selection matrix for the respective cross points will be activated. Also the respective AES outputs will be highlighted.

If AES ports are configured as inputs the respective cross points and the AES outputs are greyed out.

AES Processing Tab

All AES signals (external and deembedded AES) can be individually processed
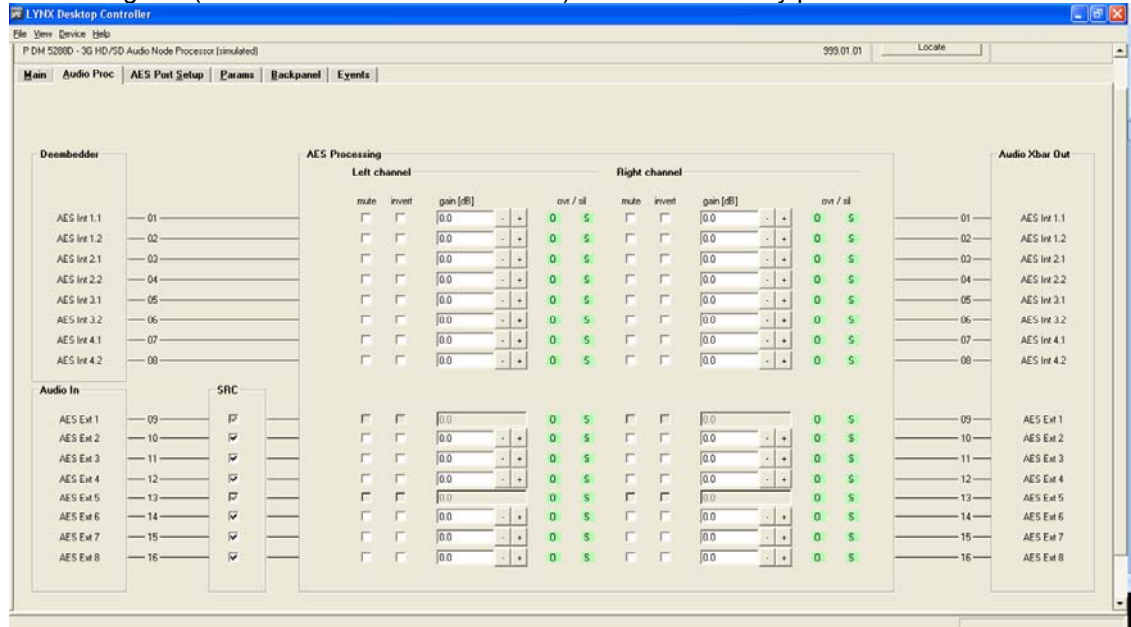
The following functions are provided:
- Left and Right MUTE
- Left and Right PHASE INVERT
- Left and right GAIN (0dB .. -66.3dB)
- Overload and Silence detection for Left and Right

AES Port Setup

In this tab the AES ports can be configured. The configuration is locked automatically when the tab is closed and the selections to configure the individual ports are greyed out. To change a configuration the check box "Unlock AES-Port Settings" has to be activated.
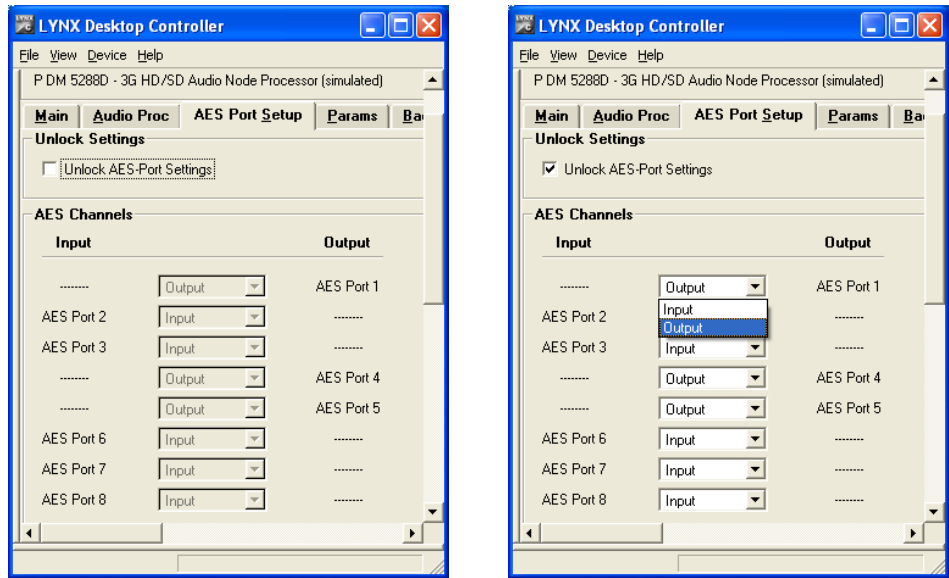
Note. *The P DM 5288 is shipped as an 8 x AES Embedder (factory default).*

Note. *Please check connected peripheral equipment before using the P DM 5288 to make sure the audio ports of the P DM 5288 is configured correctly, e.g. an output is not connected to an output of another device, this might damage the equipment.*

Events Tab
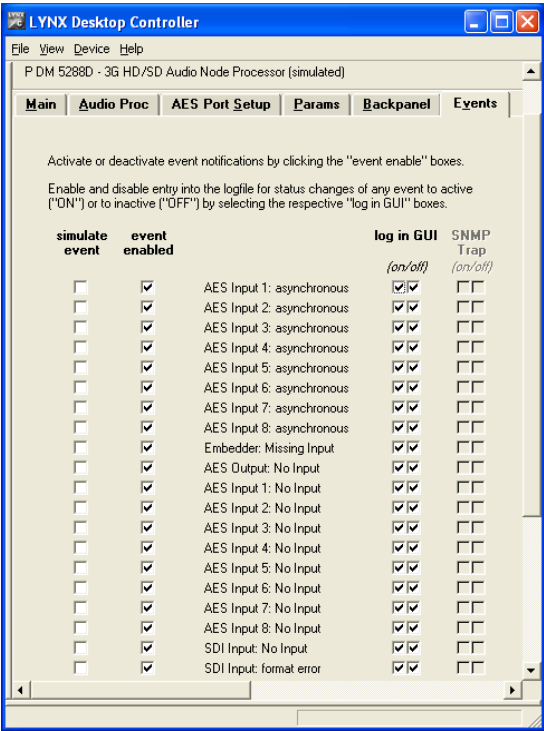
The Events Tab is where the module alarming and error notifications are configured for the module.

The GUI has an integrated error log, which is a simple text log file stored in the controller PC. This will record an event and timestamp it. The log can be seen at the bottom of the GUI screen and can be scrolled through using the scrolling bar.

Log in GUI Function

Events are selectable, you can chose if you want to record a particular event in the log (or not) or configure it to only record one side of the event. (*For example you might want to log when a SDI input is removed but do not want to log when it comes back*). The ON/OFF trigger can be configured for each of the available events shown in the list and is setup using the checkboxes provided.

Event Enabled

By default all alarm conditions are activated (checked), by de-selecting a specific alarm condition I this column you are telling the module to ignore this condition completely. It will not color the alarm LED, log and event in the GUI or send a SNMP trap. This is useful if for example you never have anything connected to AES input 4 and want the card to ignore this input condition completely then you would simply de-select "AES 4 Input: No input" and it will be ignored.

SNMP Support

If the system is using a RCT 5031 Master Controller and the SNMP option is installed then the "SNMP Trap" columns become available.

Here you can configure for which events you would like to transmit a "SNMP trap" over the network. (This has no impact or influence over the internal error log maintained by the LYNX control system)

(Internal LYNX error logging and external SNMP traps can be configured independently).

Common GUI Controls

There are a number of GUI controls and commands which are common for all modules in the control system. These are explained below.

Right click on any module in the tree will bring up a sub-menu of available commands (see below). **Note.** This menu can also be selected using the GUI drop down menus by clicking on *"Device"*
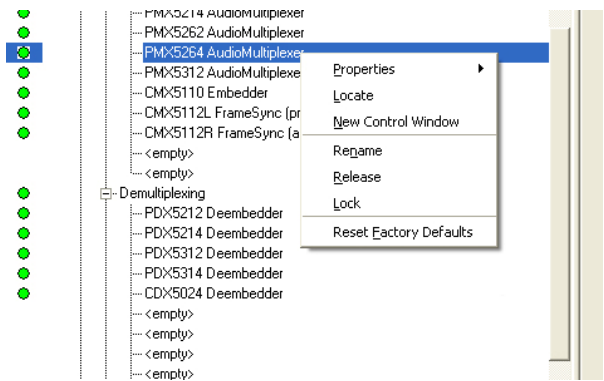

Properties

This will bring up a dialog which shows device specific properties about the module selected. *(**Note**. this is just an example and the module type and data shown is not indicative of the module specified in this manual)*
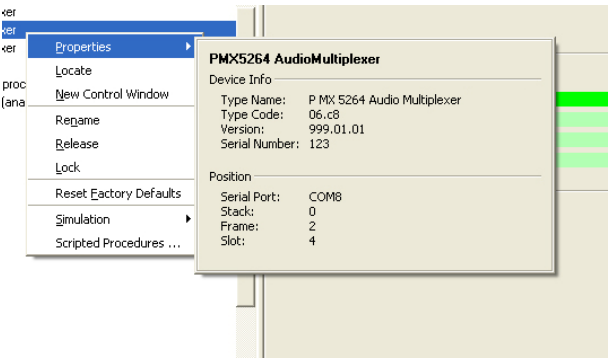
Locate

This feature is useful if you need to physically locate a module in a larger system quickly (for removal or maintenance purposes) When Locate selected this will flash the module alarm LED yellow. This function does not impact normal module operation and will timeout after a short time period.

This feature can also be invoked from the main GUI screen using the "locate" button in the top right hand side of the screen (see below)
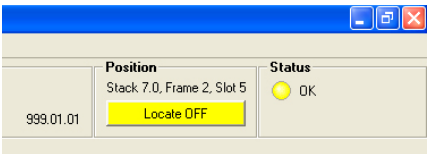
New Control Window

Selecting this will open up a new control window with selected the module GUI contained within. This window can be minimized to the taskbar for fast access and is useful if this GUI is something you will need to refer to often.

Rename

It is possible to rename everything in the control system selection tree, this includes all rack names and the individual module names. The descriptions supplied are default descriptions the system applies. To rename a device simply select the device in the tree, right click and then select "rename" the dialog below will be displayed
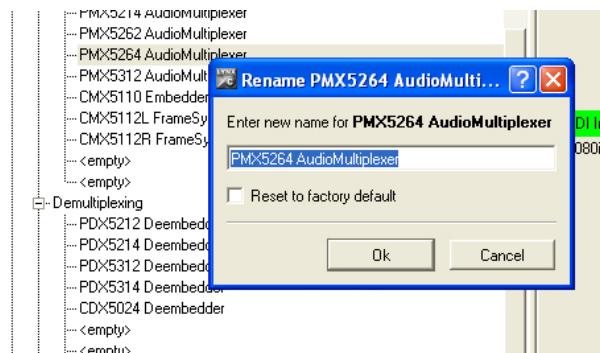

Simply type in the name you wish to assign to this device and press OK. If you wish to restore the default name simply select "Reset to Factory Default" and press OK

Note: *The names are stored inside the flash memory of the R CT 5031 controller (if installed) or the hard disk of the connected Computer, if a R CT 5021 is in operation.*

Release

During normal operation if there is no activity on the module GUI for approx ten seconds then any changed settings are automatically written to flash ram in the module. You can store the settings immediately by using the release command. When the settings have been stored you will see the confirmation dialog below.
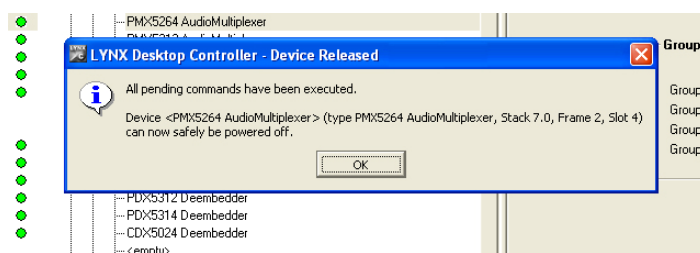
It is recommended you use the release function before removing any module from the rack to ensure the latest settings have been stored prior to module removal (if a module is removed before the normal 10 second timeout then the settings will not be stored)

Lock

Selecting this will lock the device to prevent any accidental changes being made to the modules settings. The module status can be seen but all the controls will be grayed out. To unlock simply deselect the lock control from the menu.

Reset Factory Defaults

If you are unsure of the settings, or have managed to set the module into a strange mode of operation and wish to recover the factory defaults then this can be done by selecting reset factory defaults. You will be asked to confirm this operation with the dialog below

Specifications

Video Input	
Signal Type	Serial Digital Video (SDI) SMPTE 292M, 259M, 424 M with automatic input standard and format detection
Supported Formats	See page 8
Input Imedance	75 Ω BNC
Input Level	0.8V
Return Loss	>15dB (270Mbits); >10dB (1.485Gbits)

OPTIONAL: Video Input (Fiber)	
Signal Type	SMPTE 297M-2006
No. of inputs	1
Connector	LC/PC (single mode transmit/receive – duplex connection)
Wavelength	1260nm – 1620nm (-19dBm sensitivity)

Digital Video Outputs	
Signal	4 x Serial Digital Video (SDI) SMPTE 292M, 259M, 424M (D Version) 1 x Serial Digital Video (SDI) SMPTE 292M, 259M, 424M (B Version)
Output Imedance	75 Ω
Output Level	0.8V pp +/- 10%
Return Loss	> 15dB (1.5 Ghz)
Connection	BNC
Jitter	< 0.2 UI (Timing Jitter); (270MHz) < 0.2 UI (Alignment Jitter); < 1.0 UI (Timing Jitter); (1.485GHz) < 0.3 UI (Alignment Jitter); < 2.0 UI (Timing Jitter); (2.97GHz)

OPTIONAL: Video Outputs (Fiber)	
Signal Type	SMPTE 297M-2006
No. of outputs	1
Connector	LC/PC (single mode transmit/receive – duplex connection)
Wavelength	Standard: 1310nm (non-CWDM), other wavelengths for CWDM as option
Transmission power	Standard: 1310nm (non-CWDM):-5dBm, other wavelengths for CWDM as option: -1dBm

AES Inputs/Outputs	
Signal	P DM 5288 B : Unbalanced AES 3 id P DM 5288 D: Balanced AES 3
Connectors	P DM 5288 B: BNC; P DM 5288 D: 25 Pin Female SubD
Impedance	P DM 5288 B: 75 Ω ; P DM 5288 D: 110 Ω
Coupling	Transformer (isolated)
Input Level	P DM 5288 B: 1 V p-p nominal P DM 5288 D: 4 V p-p nominal
Added Jitter (SRC ON)	< 2ns

Performance	
Sampling	Each input AES channel has independently selectable sample rate converters (SRC ON / OFF). When ON AES will be re-sampled to 48KHz
DolbyE / AC3 signals	With SRC OFF encoded bit streams can be transparently embedded
Audio Group Deletion	Existing groups pass transparently or they can be deleted and/or replaced with new embedded audio (user selectable)
Audio Group Selection	Map AES inputs into any of the 4 embedded audio groups
Audio Crossbar	Mono crossbar allows for individual (left and right) channel mapping (*Note. Mono crossbar only accessible via control system GUI, local control provides a AES (stereo pair) crossbar functionality*)
Audio Sync Frame	With no SDI input the audio is embedded into a black video sync frame (last connected video standard, or a user selected standard).

Electrical	
Operating Voltage	+ 12 VDC
Power Consumption	*5W / 6W with optical I/O*
Safety	IEC 950 / EN 60950 / VDE 0805
Mechanical	
Size	283mm x 78mm
Weight	CardModule 120g, connector plate 70g
Ambient	
Temperature	5ºC – 40ºC Maintaining Specifications
Humidity	90% non condensing

Service

Parts List

Due to the very dense design and high level of integration there the module is not user serviceable. Please contact LYNX for repairs or to request an exchange unit.

Technical Support

If you are experiencing problems, or have questions please contact your local distributor for further assistance.

Technical support is also available from our website.

Please do not return products to LYNX without an RMA. Contact your authorized dealer or reseller for more details on our return process.

More detailed product information and product updates may be available on our web site:

www.lynx-technik.com

Contact Information

Please contact your local distributor; this is your local and fastest method for obtaining support and sales information.

LYNX Technik can be contacted directly using the information below.

Address   LYNX Technik AG
                     Brunnenweg 3
                     D-64331 Weiterstadt
                     Germany

Website   www.lynx-technik.com

E-Mail   info@lynx-technik.com

LYNX Technik manufactures a complete range of high quality modular products for broadcast and Professional markets, please contact your local representative or visit our web site for more product information.