Series | 5000®

Reference Manual

PDM 5348 O

12G-SDI Analog Audio Embedder / De-Embedder

Revision 1.1 – May 2025

This Manual Supports Device Revisions:	
PDM 5380 Firmware Revision	1249
LynxCentraal	1.8.0
APPolo Server Release	8.22.0

LYNXTechnik AG®

Broadcast Television Equipment

Content

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: **PDM 5348 O**

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 2014/30/EU and 2014/35/EU directives.

Weiterstadt, Nov 2024 Winfried Deckelmann

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.

ESD Warning

This product is static sensitive. Please use caution and use preventative measures to avoid static discharge that could damage the card 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 PDM 5348-O is a high-quality 12G-SDI analog audio embedder and de-embedder suitable for use in 4K, UHD, HD and SD.

The four stereo audio ports can be individually set as audio inputs or outputs. Embedded audio can be processed in parallel of up to eight external audio inputs.

The module is multi-format and multimode in operation. The input video standard and format are automatically detected.

The module provides 2x 12G-SDI outputs so it can be used as a multi-format 1 to 2 re-clocking distribution amplifier.

The module provides support for balanced analog audio inputs or outputs on a 25-pin D-Sub connection plate.

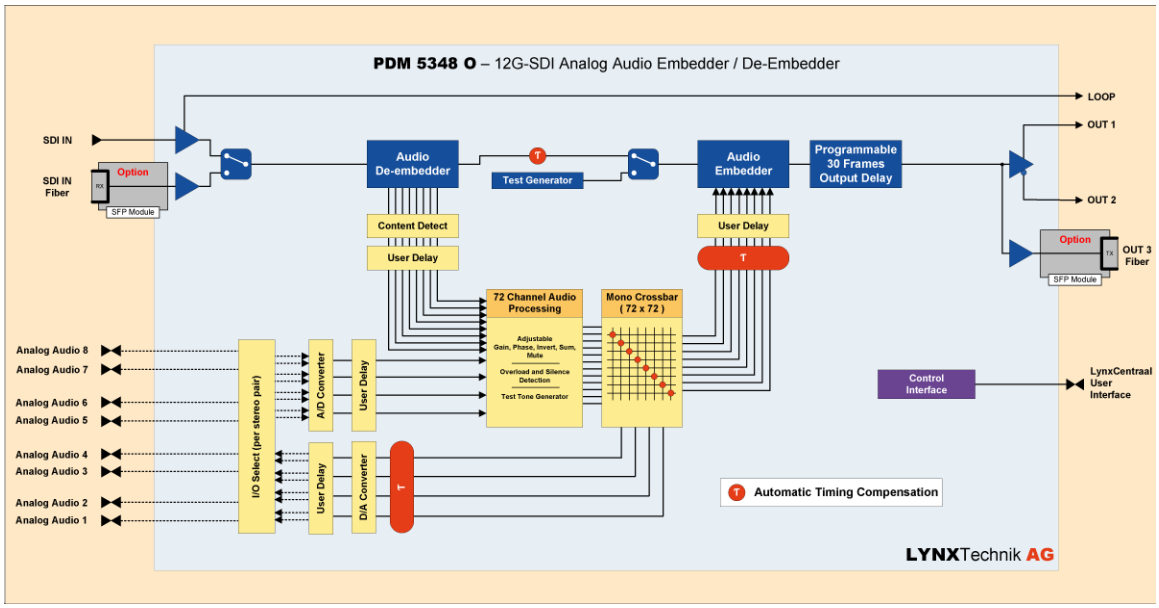
The PDM 5348-O provides an optional optical fiber interface (RX/TX).

Note: *Please check connected peripheral equipment before using the PDM 5348-O to make sure the audio ports of the PDM 5348 are configured correctly, e.g. an output is not connected to an output of another device, this might damage the equipment.*

Key Features

- Support for 4K, UHD, HD and SD video formats on 12G-SDI, 3G-SDI and 1.5G-SDI standards.
- Automatic video standard and format detection
- Audio ports can be individually configured as inputs or outputs
- Existing embedded audio can be de-embedded
- Delete or replace existing embedded audio
- Mono audio crossbar
- Audio processing (mono gain, test tone, mute, phase invert, mix, overload and silence detection)
- Video delay up to 30 frames in steps of frames, lines and pixels
- Audio delay up to 1.3sec in steps of audio samples
- Embedded audio group selection
- Embedding into test pattern output video frame with no SDI input signal
- 2x 12G-SDI outputs
- Selectable Horizontal and Vertical Video Blanking
- Optional optical interface (RX and/or TX)

Functional Diagram



Note: *The PDM 5348 O is shipped as a 4-x analog stereo audio Embedder (factory default). Use LynxCentraal to configure audio inputs and outputs.*

Supported Video Input Standards

Input Video 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 input stage automatically for operation in the connected format.

Currently this module supports 4:2:2 YCbCr 10bit signals.

SMPTE 292M (1.5G-SDI)	720p						50	59.94	60
	1080i						50	59.94	60
	1080p	25	29.97	30					
SMPTE 424M (3G-SDI)	1080p						50	59.94	60
SMPTE 2081 (6G-SDI)	2160p	25	29.97	30					
SMPTE 2082 (12G-SDI)	2160p				47.95	48	50	59.94	60

Output Video Formats

Output Video formats are identical to Input Video Formats.

Video and Audio Delay

The SDI signal can be delayed up to 30 frames in steps of frames, lines and pixels. The delay adjustment is applied after the embedding stage, i.e. the embedded audio is delayed by the same amount.

Audio can be adjusted in various ways (see GUI section of this manual). The audio delay is always in reference to the video delay and can be negative to the video, depending on the video delay. Max. audio delay is 1.3s in steps of single audio samples.

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 test pattern video output with the audio embedded.

The test pattern can be selected using the LynxCentraal.

Note: *It is possible to disable this automatic generation of an output SDI signal. When this function is disabled, and no SDI input is connected, the SDI output will not generate any signal at all.*

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 switch 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 test pattern 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 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 to the previous settings when powered up*

Audio Processing

All internal and external audio signals can be processed in an audio processing stage including mono gain, phase invert, overload and silence detection, stereo mix down as well as test tone, which can be set via the crossbar.

Audio Mono Crossbar

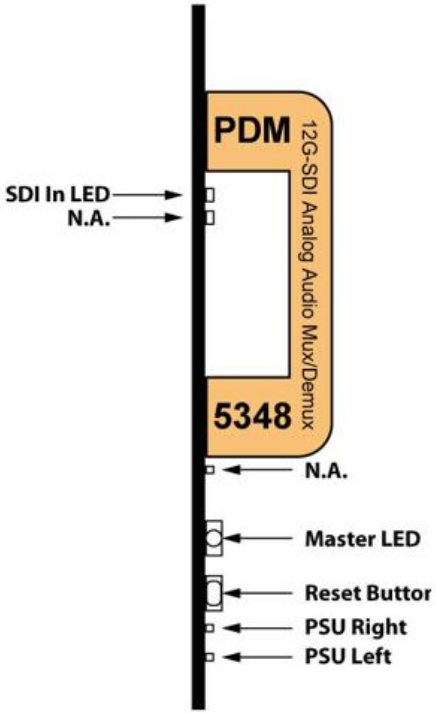
All audio signals (external and de-embedded) are fed into a monaural audio crossbar where individual left and right audio channels can be re-assigned / swapped before embedding.

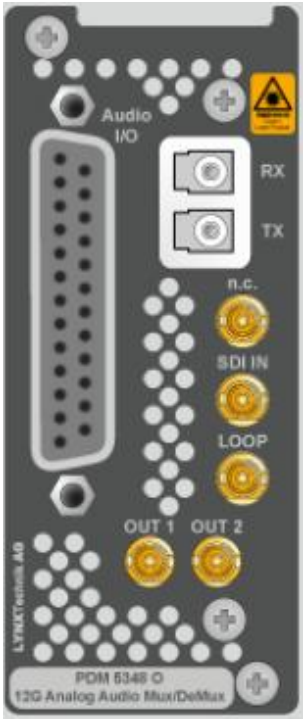
Note: *The mono-switching function is only accessible using the Module GUI via the control system. The local menu system and display only allow for switching of stereo pairs*

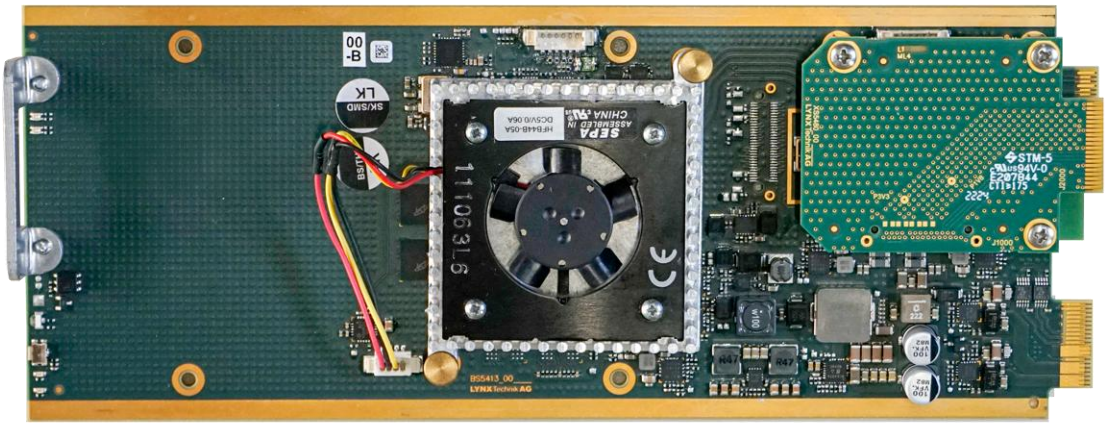
Audio Group Deletion

The PDM 5380 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).

Module Layout







Connections

Video

The PDM 5348 uses 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. The maximum 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)
12GBit/s	60m	Belden 4794-R (11.88Gbits/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

The module is provided with a rear connection plate with a 25-pin female Sub-D connection for balanced audio signals. The connector wiring is shown below.

Pin Number	Connection	Pin Number	Connection
1	Audio 4R +	14	Audio 4R -
2	Audio 4R GND	15	Audio 4L +
3	Audio 4L -	16	Audio 4L GND
4	Audio 3R +	17	Audio 3R -
5	Audio 3R GND	18	Audio 3L +
6	Audio 3L -	19	Audio 3L GND
7	Audio 2R +	20	Audio 2R -
8	Audio 2R GND	21	Audio 2L +
9	Audio 2L -	22	Audio 2L GND
10	Audio 1R +	23	Audio 1R -
11	Audio 1R GND	24	Audio 1L +
12	Audio 1L -	25	Audio 1L GND
13	n.c.		

It is recommended to use a high-quality screened (twisted pair) cable for balanced audio connections. LYNX Technik provides optional audio breakout cables which will bring out all audio connections to in-line XLR connectors. Model number RAC M 25-8 or RAC F 25-8

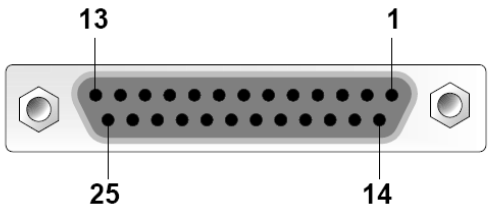


Figure 1:SubD25 Audio connector (looking into connector from back of module)

Optional Fiber

The PDM 5348-O provides LC/PC connectors for single-mode fiber cables (option). The fiber interfaces can be selected from a variety of different SFP-style modules. From the 18 CWDM wavelengths an 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 the surfaces of fiber cables and LC connectors are always protected against scratching and dust if 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 the card. Please see ESD warnings on Page 7.*

This module has a single-width rear connection panel, it will occupy one slot of a standard Series 5000 Card Rack. This is to accommodate the additional connections needed for this module and to provide adequate space for cooling in the rack. Up to ten PVD 5400 modules can be accommodated in a single Series 5000 rack frame.

Note: *When using this module, the RFR 5018 Fan Front Rack Frame should be used, which provides additional airflow into the rack.*

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

We recommend you power the rack down before installing any additional modules into an existing card frame.

1. Select a free slot space in the card frame where the CardModule will be located.
2. Remove the blank connection panels 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 to 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.

6. Power up the rack and check the module LED's illumination. Check the module is automatically logged into the control system device tree
   (It may take a few seconds for the control system to "discover" the new module)

Note: *The use of the optional control system is mandatory for the control and setup of this module. If you do not have the control system, then please contact your LYNX representative for details on how to upgrade your installation with the LYNX control system.*

Settings and Control

The PDM 5348 has an integrated microcontroller, which enables the module to be configured and controlled via remote when using one of the optional controllers and LynxCentraal software.

Once set, all settings are automatically saved in non-volatile internal memory. (Flash RAM) The module will always recall the settings used before powering down.

Auto Store

If no parameters are changed for 10 seconds, then the current settings will be written into the flash memory automatically. This can be seen by the channel status LEDs flashing yellow three times.

Reset Button

If this button is pressed for 5 seconds all parameters will be reset to their factory default settings. To confirm this reset, the device will blink all LEDs once (OFF – ON – OFF) and then return to their normal state.

Alarm/LED Status Indicators

The PDM 5348 module has integral LED indicators, which serve as alarm and status indications for the module. The function is described below.

SDI Status

This LED indicates the status of the SDI input signal

LED Color	Indication
Green	SDI present and ok
Yellow	SDI ok, but unsupported standard, no embedding takes place
Red	No valid SDI standard

Alarm Indicator

There is also a single alarm LED on the lower edge of the module. This is visible through the card frame front cover and provides a general indication of the module status.

LED Color	Indication
Green	External Audio Output: All audio output pairs have two audio channels Embedder: Each selected embedded group has all four possible audio channels.
Yellow	External Audio Output: - At least one of the audio output pairs is missing one audio channel Embedder: - At least one of the selected embedded groups is missing one, two and/or three of the possible four audio channels.
Red	Fan Failure - Over Temperature - Wrong backplane

Power Indication

There are two LEDs on the lower edge of the module indicating the presence of the two power supply voltages (main power supply and redundant power supply).

LED 1	Indication
Green	Power from Main PSU ok
off	No power from Main Power Supply

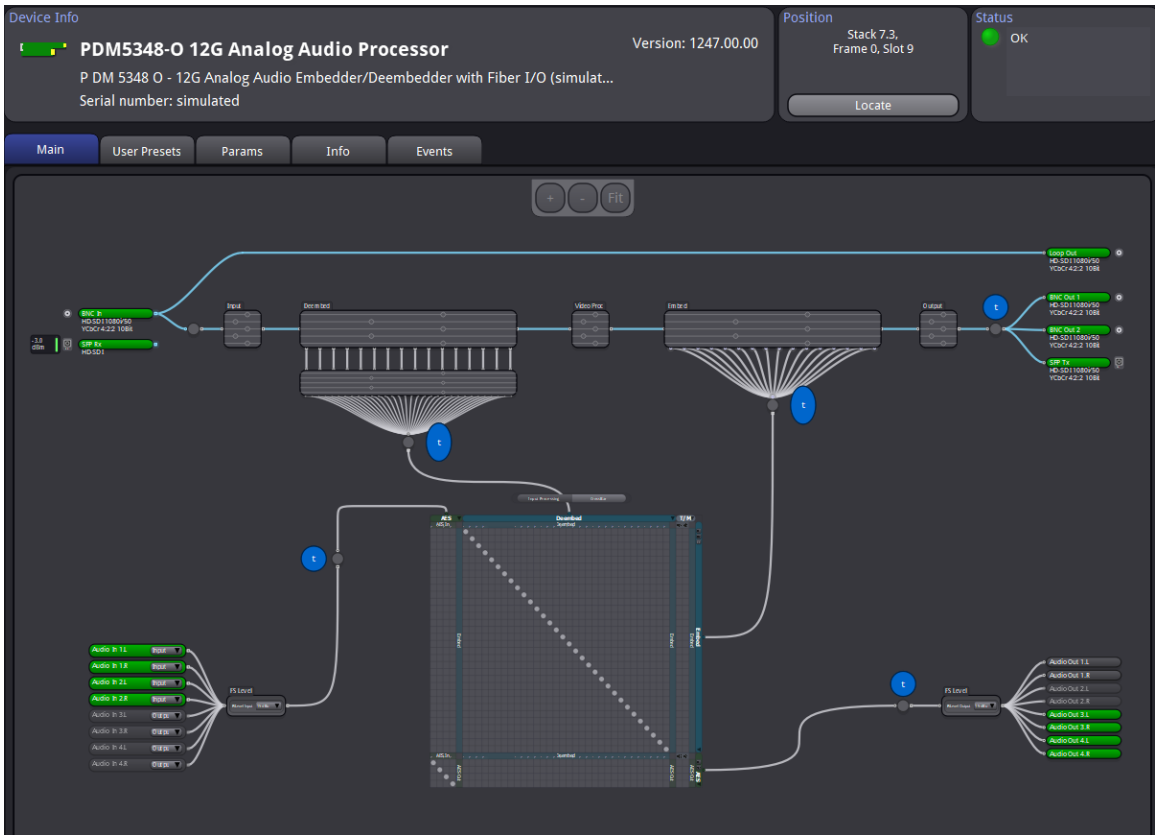
LED 2	Indication
Green	Power from Redundant PSU ok
off	No power from Redundant PSU

Control System GUI

All LYNX Card Modules support a computer interface that allows setting the module 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 override 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 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 module's position and physical location are displayed above the “locate” button.

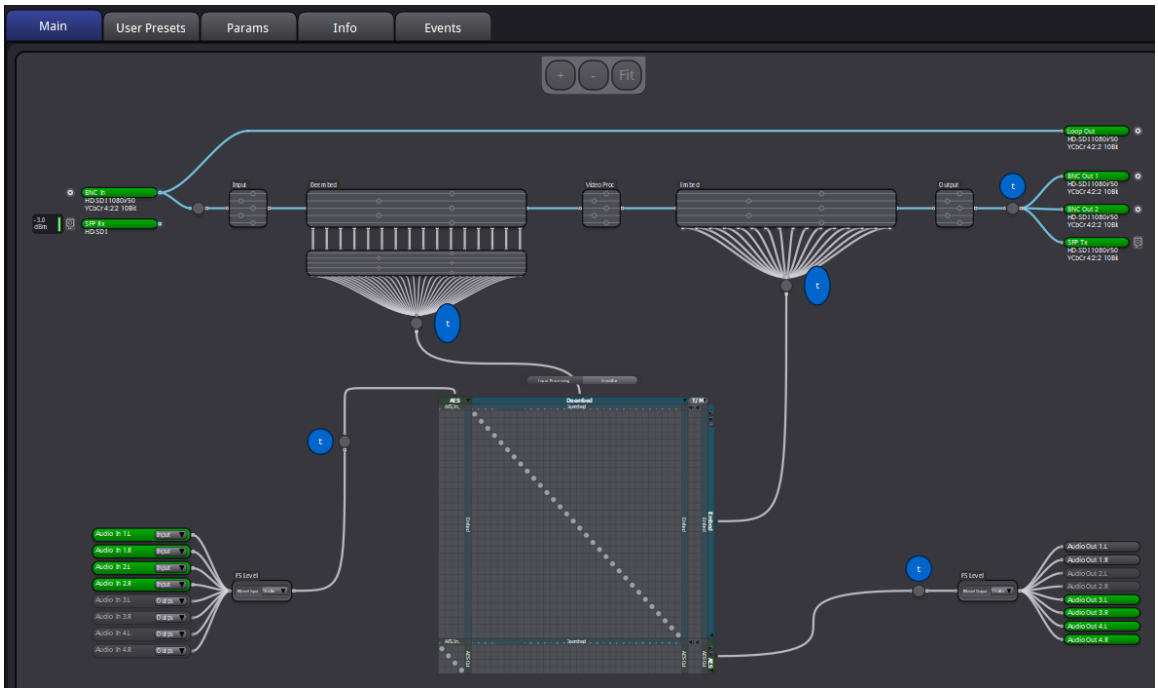
Note: *The Locate function is a tool used to quickly identify a module in larger systems. Selecting “locate” will flash the module alarm LED yellow. (does not affect module operation). This function will be automatically stopped (timeout)*

The first screen you see when the module is selected is the ***Main*** tab. This is a graphical representation of the module's 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.

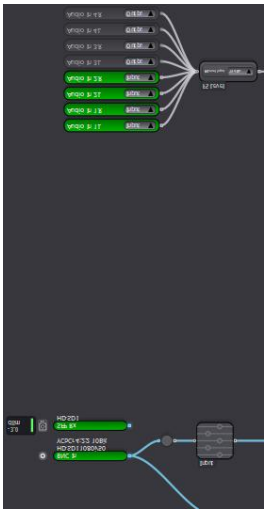
There are several Tabs associated with each Module which split up the module’s settings into several separate screens. The primary GUI screens and functions are described below.

Main Tab

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



Input Detection



On the left the SDI input and the Audio inputs are detected.

The standard / format of the SDI signal is displayed on screen in green (if format is not supported then the color is YELLOW and if input is missing the color is RED).

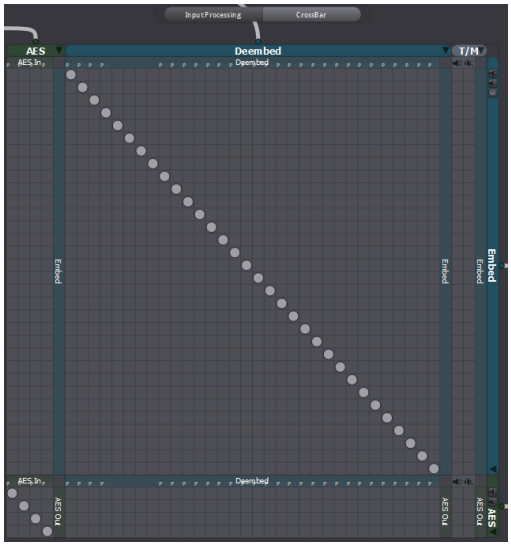
If a valid audio signal is detected the audio input detection turns GREEN, and a missing audio signal will be indicated in RED.

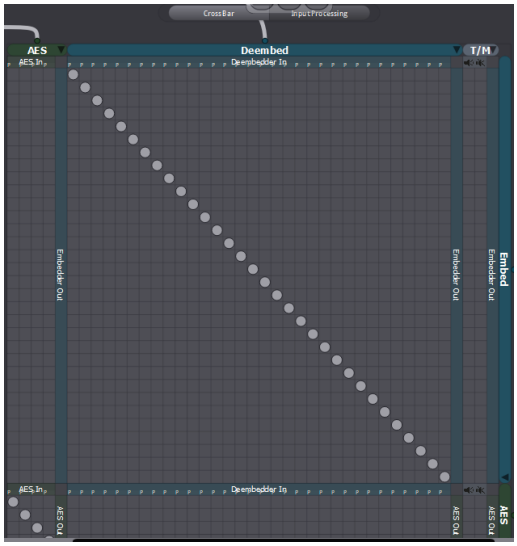
Audio ports that are configured as outputs are greyed out in the input section.

Note: *Input and output signals can be renamed by the user. Simply right-click on the signal name and specify a user-defined signal name*

Audio Crossbars

Each audio input as well as each de-embedded 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 audio outputs and the embedder feeds.





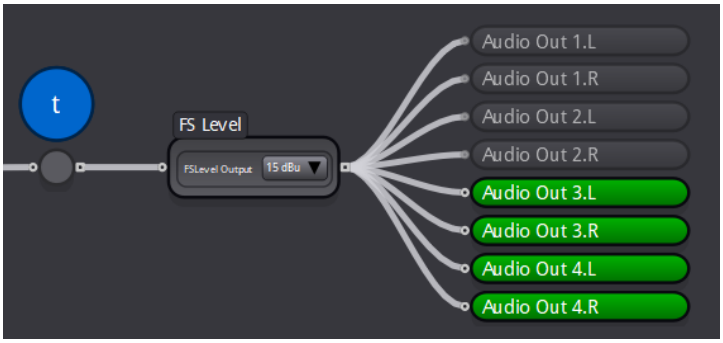
Embedder

Eight external mono audio channels can be converted to 4AES channels which can also be rounded in the crossbar.

Note: *If an existing embedded group has not been deleted but is selected for embedding then the existing audio will be overwritten*

Audio Outputs

If audio ports are configured as outputs, the Crosspoints in the crossbar allow the user to set them in advance before changing the port direction. This ensures flexibility in configuring the audio routing regardless of the current port configuration.



Full-Scale level for A/D and D/A conversion

The required audio full-scale levels can be adjusted for the input A/D conversion and the output D/A conversion. To avoid level changes through conversion, the full-scale level of the input and output conversion should be set to the same level.

AES Processing Tab

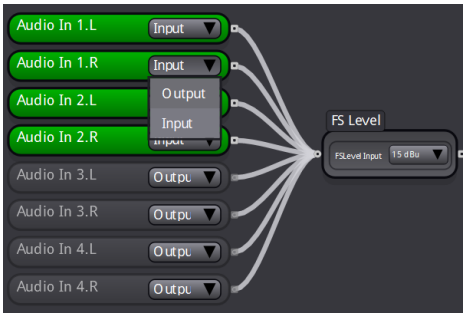
All audio signals (external and de-embedded AES) can be individually processed.

The following functions are provided:

- Left and Right MUTE
- Left and Right PHASE INVERT
- Left and Right Mix
- Left and right GAIN (+18dB … -66.3dB)
- Overload and Silence detection for Left and Right

Audio Port Setup

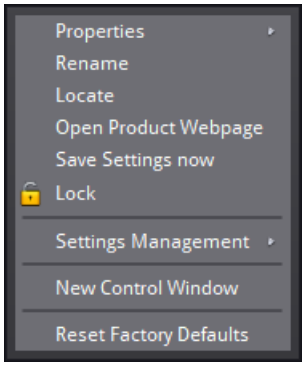
In this tab the ports can be configured. Configuration is for audio stereo signals (Left and Right). The configuration is locked automatically when the tab is closed and the selections to configure the individual ports are greyed out. To change a configuration the check box “Unlock Audio Port Settings” must be activated.



Note: *The PDM 5348 O is shipped as a 4x Stereo Audio Embedder (factory default).*

Note: *Please check connected peripheral equipment before using the PDM 5348 O to make sure the audio ports are configured correctly, e.g. an output is not connected to an output of another device, this might damage the equipment.*

Common GUI Controls



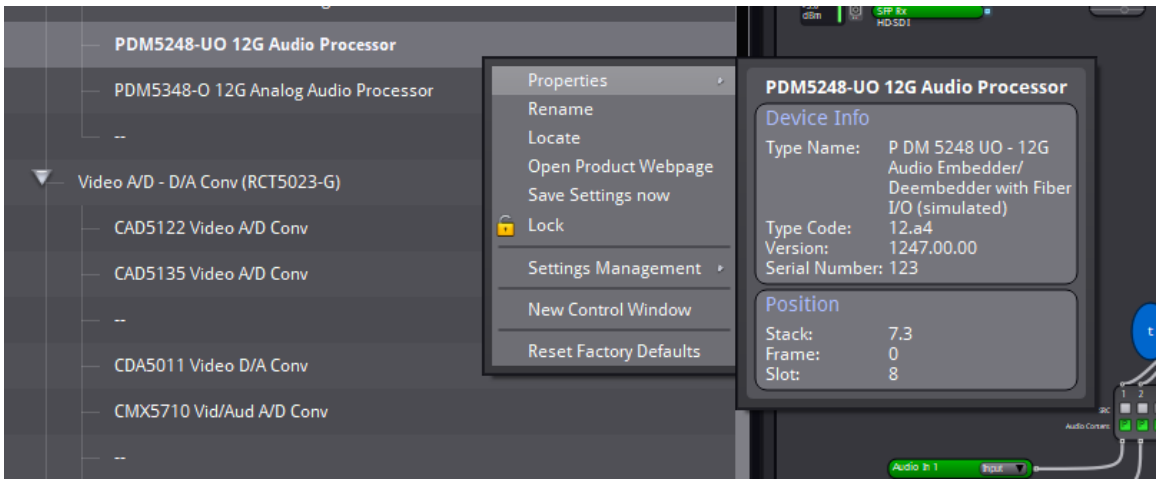
There are several GUI controls and commands which are common for all modules in the control system. These are explained below.

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

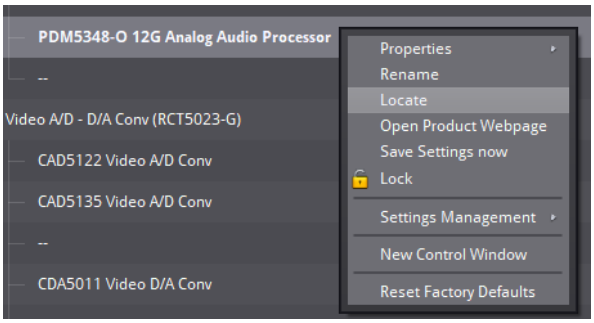
This will bring up a dialog that shows the device-specific properties of the module selected.



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 is selected this will make the module alarm LED flash yellow. This function does not impact normal module operation and will timeout after a short period.

This feature can also be invoked from the main user interface using the "locate "button on the top right-hand side of the screen.

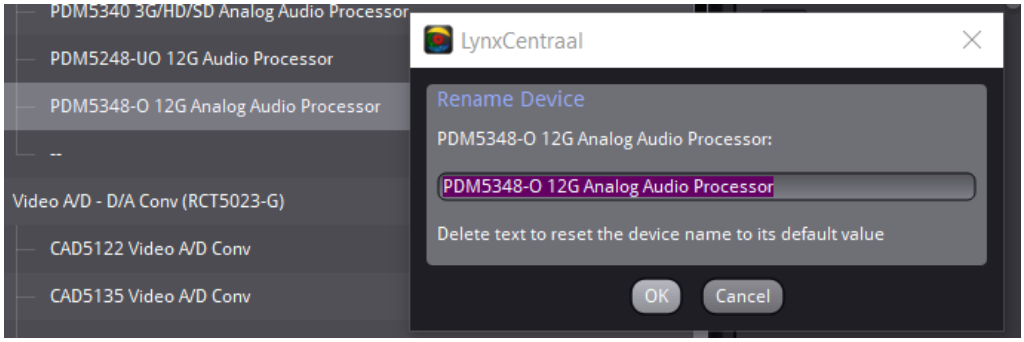


New Control Window

Opens a new control window for the selected module. This window can be minimized to the taskbar for faster access.

Rename

It is possible to rename individual items in the control system selection tree, this includes all rack names and individual module names. 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 RETURN. To restore the default name, delete the content in the text field and press RETURN

Note: *The names are stored inside the flash memory of a LYNX server (if installed) or the hard disk of the connected Computer.*

Save Settings Now

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 “save settings now” command. When the settings have been stored you will see the confirmation dialog below.

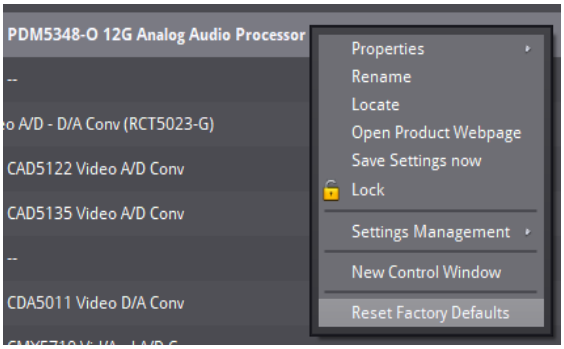
It is recommended you use the “save settings now” function before removing any module from the rack to ensure the latest settings have been stored prior to module removal (if a module is removed before the normal 10 second timeout, then the settings will not be stored)

Lock

Selecting this will lock the device to prevent any accidental changes being made to the module’s 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



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.

There is one consumable part used on this module which is the cooling fan. A service kit is available to exchange the fan. Ordering information below.

Part type: ***Cooling Fan Service Kit Series 5000 CardModules***

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.

www.lynx-technik.com

Please do not return products to LYNX without an RMA. Please contact your authorized dealer or reseller for more details.

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

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.