

Series | 5000[®]

Reference Manual

PDM 5388 0

3G-SDI Analog Audio Embedder / De-Embedder

Revision 1.0 – June 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

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Getting Started

Most Series 5000 card modules are installed in a rack frame and system-tested in the factory. If this is an upgrade card or service exchange item then the module is supplied in a padded cardboard box which includes the card module, rear connection plate and mounting screws.

Packaging

The shipping box and packaging materials provide protection for the card during transit. Please retain the shipping box in case subsequent shipping of the product is necessary. Do not remove the card(s) from their protective static bag without observing adequate ESD precautions.

ESD Warning



This product is sensitive to electrostatic discharge (ESD). Improper handling of electronic assemblies or components may result in permanent or intermittent damage.

Do not handle the module without using an ESD-preventive wrist strap. Ensure the strap is in direct contact with the skin and properly connected to a reliable ground, such as exposed metal on the rack chassis or any other unpainted, grounded metal surface.

Caution

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

Product Overview

Description

The PDM 5388 O is a versatile 8-Channel analog audio embedder/de-embedder which can be used to address a variety of audio issues in broadcast. The card module supports 3G-SDI formats up to 1080p60 with an optional fiber I/O.

The module can be switched between an 8-Channel embedder or an 8-Channel de-embedder, or a combination of both. 16 channels of audio are always de-embedded from the SDI input and passed into an audio processing stage. In embedder mode, 8 channels of external audio are passed into the audio processing stage. Audio processing includes adjustable gain, phase invert, and mute for all 24 channels as well as a selectable mono mix-down function for each left and right pair.

The processed audio is passed onto a 24 x 24 output crossbar where the audio for the embedder, and external outputs can be mapped.

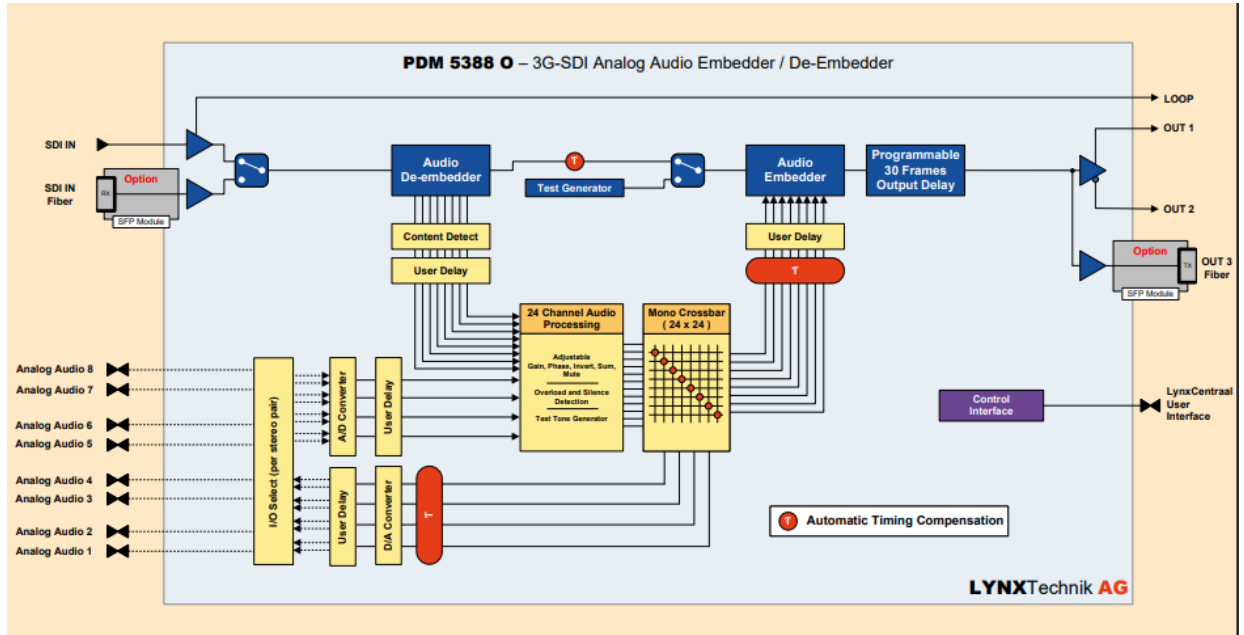
The card module handles up to 30 frames of programmable output delay.

Note: Please check connected peripheral equipment before using the PDM 5388-O to make sure the audio ports of the PDM 5388 are configured correctly, e.g. an output is not connected to an output of another device, this might damage the equipment.

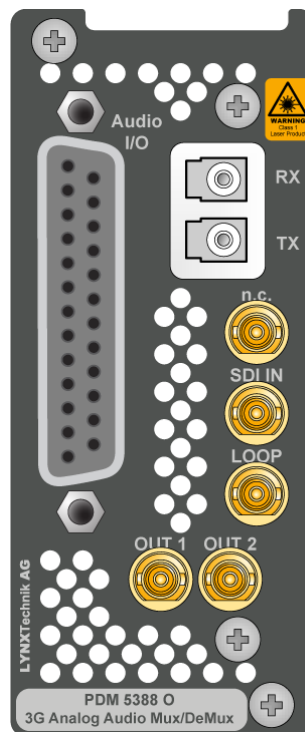
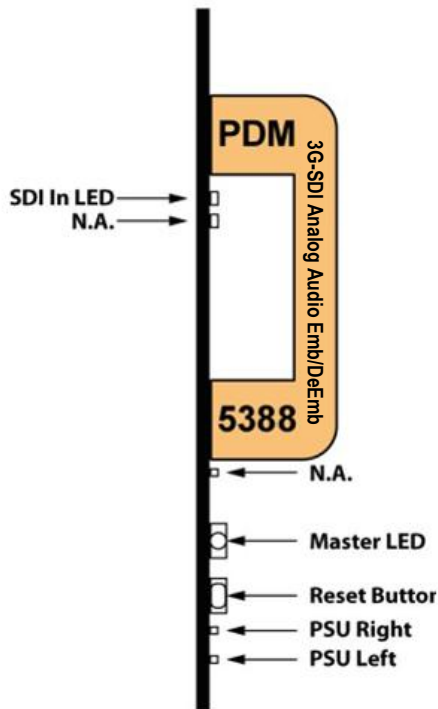
Key Features

- Supports 3G/1.5G/SD-SDI Formats
- Optional fiber I/O
- Switch between 8 Channel Embedder or De-Embedder
- 24-Channel audio processing: Gain, Phase, Invert, Mute, Mono mix down and Silence detection
- 24x24 Mono Output Crossbar for Embedded and External Audio
- Video Test Patterns for transmission fallback when SDI input is missing
- Dolby E synchronizer for guard band alignment
- Up to 30 frames of programmable delay
- Up to 10 seconds of audio delay
- Monitor and Control using the powerful and intuitive APPolo control system
- Full SNMP support when used with master controller option.
- Hot Swappable
- 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
- Selectable Horizontal and Vertical Video Blanking

Functional Diagram



Module Layout



Video Connections

The PDM 5388 uses standard 75 Ohm BNC connectors. The maximum cable lengths supported by the card module are shown below.

SDTV	250m	Belden 8281 (270Mbits/s)
HDTV	140m	Belden 1694A (1.4Gbits/s)
3G-SDI	80m	Belden 1694A (2.97Gbits/s)

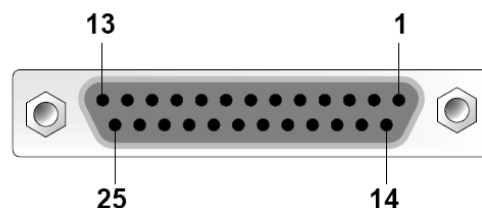
Note: *is recommended to use a connection tool to secure the BNC video connectors.*

Audio Connections

25-pin female D-Sub connection for balanced I/O audio signals.

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 adapt the 25 pin D-Sub to in-line XLR connectors. Model number RAC M 25-8 or F 25-8



to
RAC

25 D-Sub Audio connector
(looking into connector from back of module)

Optional Fiber SFP

The PDM 5388-O card module is equipped with an SFP cage that can accommodate a 3G-SDI SFP. A wide range of 3G-SDI Single-mode dense or coarse wavelength Transceiver SFPs can be purchased from Lynx Technik.



Installation

The card uses a single-width rear connection panel and occupies one slot in a standard Series 5000 rack frame. A maximum of ten card modules can be installed in a single rack frame.

Each card module is supplied with a rear connection panel and mounting screws. Follow the steps below to install the module into the Series 5000 Rack Frame.

Recommendations:

- Power down the rack before installing additional modules into an existing frame whenever possible.
- Use the RFR 5018 Rack Frame with Front Fans to provide additional airflow within the rack enclosure.

Installation Procedure:

1. *Choose a free slot in the rack frame to install the module.*
2. *Remove the blank rear connection panel from the selected slot, if fitted.*
3. *Install the supplied rear connection panel using the screws provided. Do not fully tighten the screws at this stage.*
4. *Carefully slide the card module into the rack frame and verify that it connects to the rear connection plate.
The module should insert smoothly without excessive force. If you feel any resistance, the rear connection panel may be misaligned. Do not force the card into position, as this may damage the connectors.*
5. *Insert and remove the card module a couple of times to confirm proper alignment. Once aligned correctly, tighten the two screws to secure the rear connection plate.*
6. *Power up the rack and verify correct LED illumination. Check that the card is automatically detected and added to the control system device tree.
Detection by the control system may take a few seconds after power-up.*

Supported Audio/Video Formats

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.

This card module supports 4:2:2 YCbCr 10bit input and outputs.

3G-SDI	2048x1080p						47.95	48	50	59.94	60
	1920x1080p								50	59.94	60
1.5G-SDI	2040x1080p	23.98	24	25	29.97	30					
	1920x1080p	23.98	24	25	29.97	30					
	1920x 1080PsF	23.98	24	25	29.97	30			50	59.94	60
	1920x1080i								50	59.94	60
	1280x720p	23.98	24	25	29.97	30					
SD-SDI	720x625i								50		
	720x525i									59.94	

Level B-DL Support for 3G-SDI formats

Output Video Formats

Output Video formats are identical to Input Video Formats.

Settings and Control

This Series 5000 card module can be remotely configured and controlled when using the optional RCT controller card and Lynx Centraal or APPolo Control Server applications.

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

Auto Store

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

Reset Button

Press and hold down this button for 5 seconds to reset all parameters to their factory default settings. The card LEDs will blink all at once (OFF–ON–OFF) to confirm the reset.

LED Status Indicators

LED	Color	Meaning
Input 1	Green ●	SDI input present
	Yellow ●	SDI present but unsupported format
	Yellow (Blinking) ●	Locate device
	Red ●	SDI input missing
Input 2	Green	N/A
	Yellow	N/A
	Yellow (Blinking) ●	Locate device
	Red	N/A
Master	Green ●	Card health is OK
	Yellow ●	- One of the audio output pair is missing an audio channel - The embedded groups are missing one or more audio channels.
	Yellow (Blinking) ●	Located device
	Red ●	- Fan Failure - Over Temperature - Wrong backplane
Power 1	Green ●	Power from Main PSU OK
	Off ●	No power from Main Power Supply
Power 2	Green ●	Power from Redundant PSU OK
	Off ●	No power from Redundant PSU



NOTE: If a Power LED is OFF while its corresponding PSU is working, contact support to get the board's power input fuse checked.

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). 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 embedded audio.

The test pattern can be changed or disabled via LynxCentraal.

When used in standalone mode with no SDI input the output video standard can be set using the format selections provided in LynxCentraal.

Note: The modules are supplied with the last video standard defaulting to 1080i 50Hz.

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

Audio Processing

All internal and external audio signals can be processed in an audio processing unit configured via the crossbar. This includes mono gain, phase invert, overload and silence detection, stereo mix down and test tone.

Mono Crossbar

All audio signals (external and de-embedded) are fed into a monaural audio crossbar where individual audio channels can be processed.

Audio Group Deletion

The PDM 5388 detects embedded SDI audio groups automatically. Existing audio groups can be passed through unchanged, replaced, or deleted as required.

Lynx Centraal User Interface

Overview

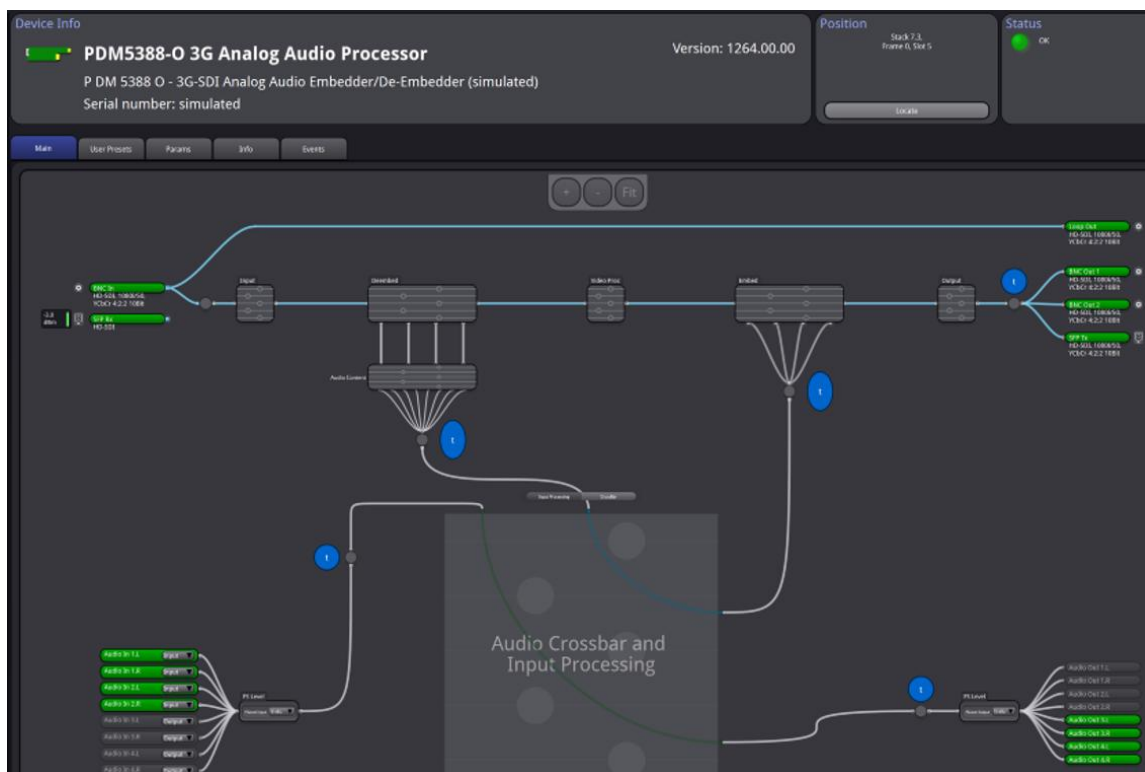
All LYNX Card Modules support LynxCentraal control system for setup, configuration, and monitoring. It provides access to all standard and advanced parameters.

Settings are stored in an internal flash RAM and are retained during power cycles and long-term storage.

Any settings changed via LynxCentraal override the dip switch settings from the board.

The UI shown below represents the complete control interface for the card module. The **Device Info** section at the top of the window displays general information, including the card module name and firmware revision. The **Position** section indicates the module's slot position and physical location within the installation. The **Locate** button provides a quick way to identify a specific card module within a rack frame. When activated, the card's alarm LED flashes yellow to help locate the module. This function does not affect the card operation and automatically deactivates after a timeout period.

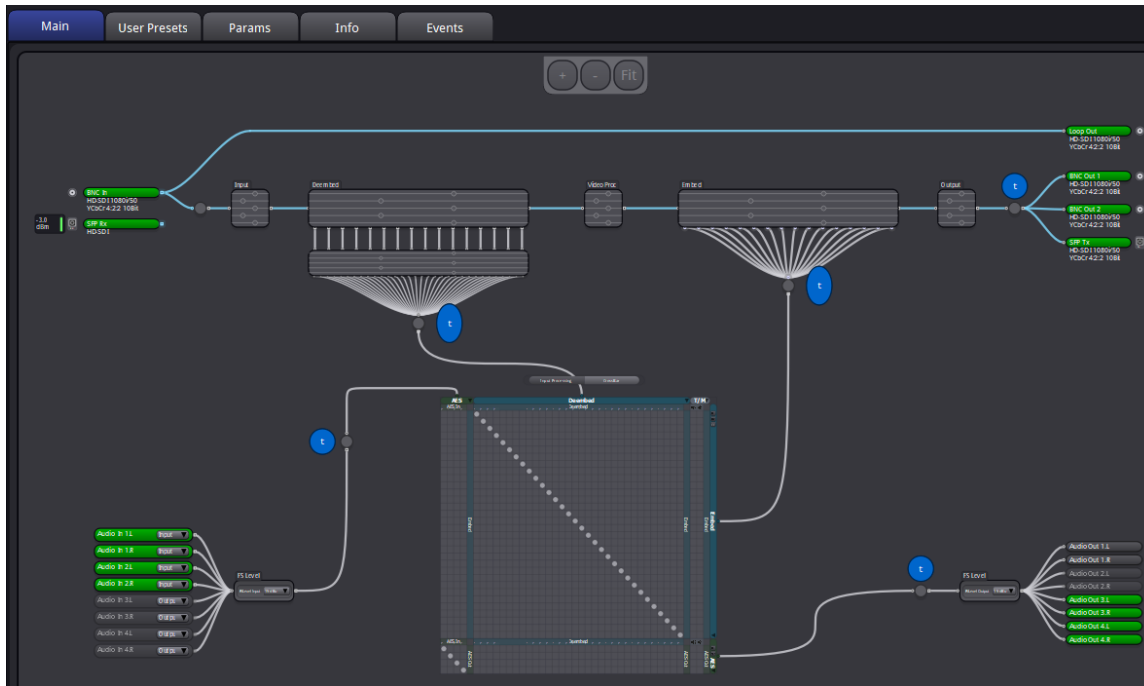
The "Event Log" at the bottom of the screen displays timestamped errors and warnings. The same information can be found in the APPolo Control System's log files.



Main

The “Main” tab provides a graphical overview of the module’s functionality with audio and video signal paths displayed from left to right. Module settings can be adjusted using on-screen controls.

The display can be zoomed in or out using the mouse wheel or the navigation controls located in the upper corner of the MAIN tab. As the view is enlarged, additional details within the individual function blocks become visible.



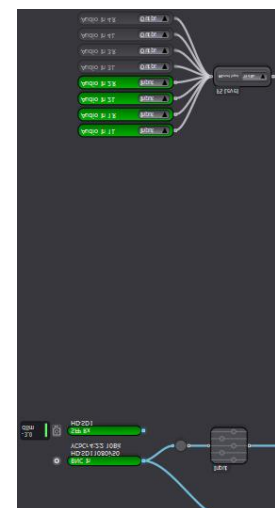
Inputs

The input interfaces are shown on the left-hand side of the flexGUI, while the output interfaces are displayed on the right-hand side.

The SDI video format is displayed in green when supported, yellow when present but unsupported and red when not present.

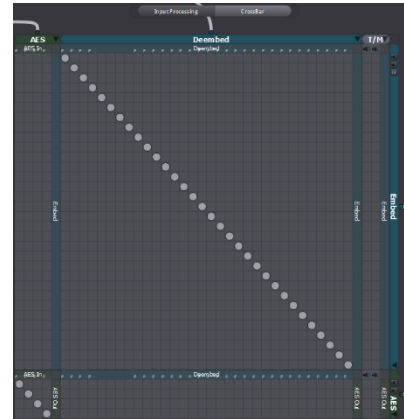
Audio ports that are configured as outputs are greyed out in the input section.

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



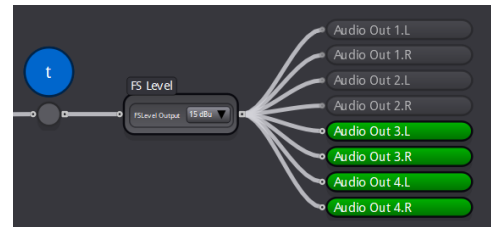
Audio Crossbars

Each audio input and de-embedded AES signal is routed through a mono crossbar, where the left and right AES channels are independently available for routing to any active audio output or embedder input. Newly embedded audio will overwrite any existing audio channels in the selected embedded audio group.



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 full-scale audio levels for both input A/D conversion and output D/A conversion can be adjusted as required. To maintain consistent audio levels through the conversion process, the input and output full-scale settings should be configured to the same value.

AES Processing

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



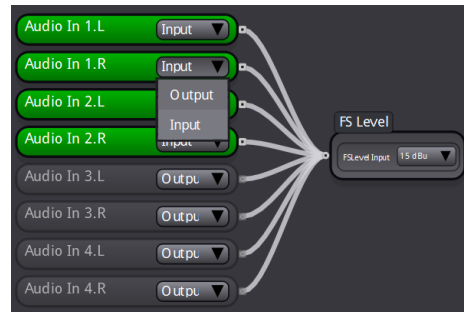
The following functions are provided:

- 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

This part of the UI handles the configuration of the Stereo audio I/O ports.

The PDM 5388 O factory configuration is for 4x stereo inputs and 4x stereo outputs. Before connecting peripheral equipment, verify that all audio ports are configured correctly. For example, connecting one output to another device's output may damage the equipment.



Events

The Events tab is used to configure alarm and error notifications for the card module. All events generated by the device can be individually disabled, allowing non-relevant events to be ignored. Disabled events are not reported to the APPolo control system, are not recorded in log files, and do not affect the device's local LED indicators.

By default, all events are enabled. When a monitored condition becomes critical, for example loss of input signal, the corresponding event changes to an ACTIVE state. This state change generates a message in the APPolo Control System, which is stored in the APPolo Server log file.

When the condition returns to normal (the input signal is restored) a second message is generated and logged in both the APPolo Event System and the server log file.

These event messages can be displayed in the APPolo GUI Event Log, located in the lower section of the GUI and accessible through the View menu. Display of these messages in the GUI can be enabled or disabled independently for:

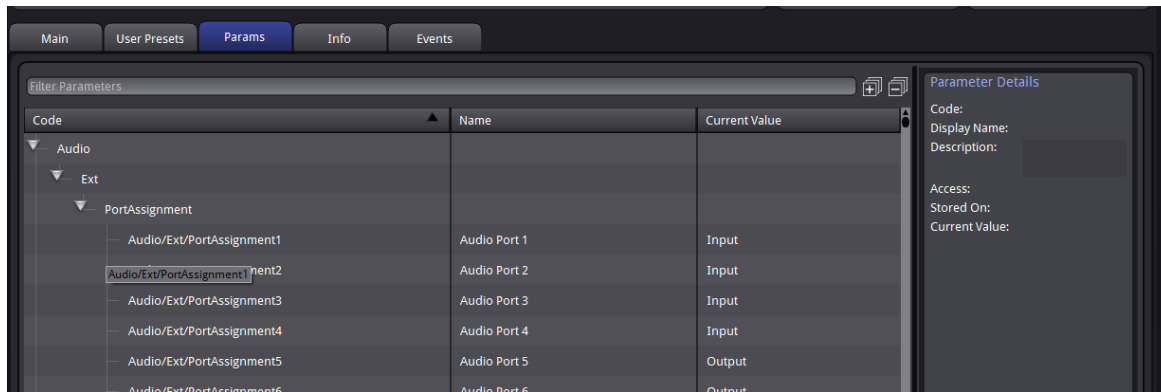
- "Event becomes Active" messages
- "Event no longer Active" messages

The APPolo Server can generate SNMP traps for any event in the APPolo Event System.

Params

The Params tab provides a complete list of available control parameters for the card module. Every switch, setting, and function available throughout the UI has a corresponding parameter in this tab.

The Parameters tab includes advanced configuration options that are accessible exclusively through the parameter list, providing refined control of the device's operation.



Each parameter is defined by the following attributes:

- **Code**
A unique identifier assigned to the parameter. The code may include slash characters (/) to provide a hierarchical structure within the complete parameter set. When referencing a parameter, the full code string including all slashes must always be used.
- **Name**
A user-friendly name used as the default label on the GUI and within CustomControl panels.
- **Access**
Indicates whether the parameter is read-only or read-write. For certain parameters, the access status may change dynamically depending on the state of other parameters. For example, parameter A may normally operate in an automatic mode and therefore appear as read-only. If a separate boolean parameter B is used to disable the automatic mode and switch operation to MANUAL, parameter A will automatically change to read-write access.
- **Current Value**
Displays the current value assigned to the parameter. If the parameter has read-write access, this value can be modified by the user.
- **Description**
Provides a textual explanation of the parameter's function and behavior.

A Filter is available to speed up navigation through large parameter sets. The filter performs a text-based search across all attributes, including the parameter code, name, description, and current value, allowing only matching entries to be displayed.

All the device functions can be controlled and monitored through the parameters listed in the **Params** tab.

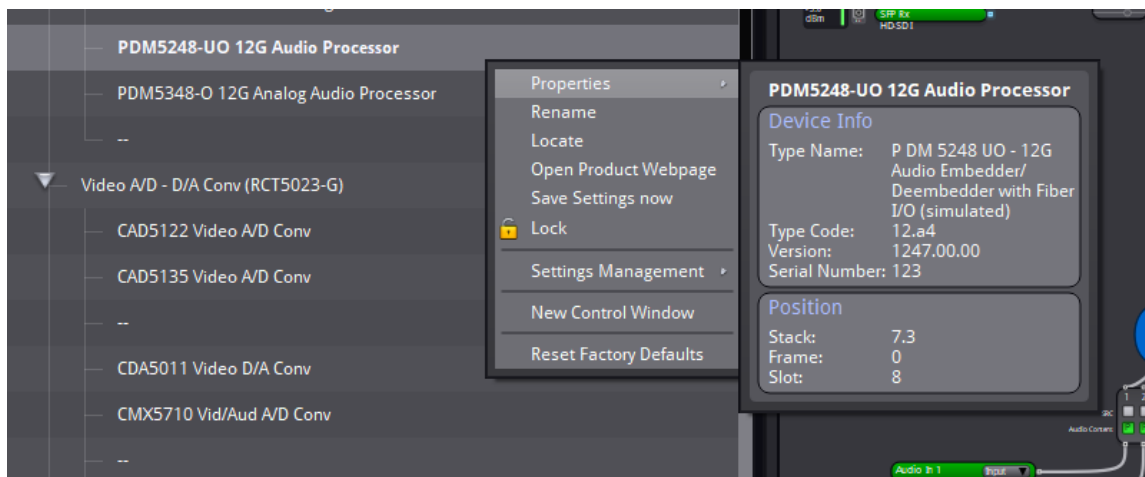
- The CC Author feature connects the individual elements of a custom-made Design to real device parameters by their Code.
- The LynxCentral Auto automation rules access the individual Parameters (for both Conditions and Actions) by their Code.
- The LYNX Remote API can list, read and write individual parameters by Code.
- SNMP Control provides one OID (numerical address in the MIB) per individual parameter. The exact mapping is provided in the MIB files.
- See the APPolo Quick Start Guide for details: <https://lynx-technik.com/software-applications/#APPoloControlServerSection>

To find a parameter's code name in the GUI, right-click its control and select "Parameter Details."

Common User Interface Controls

Several Control System functions and commands are common to all LYNX devices.

Right-click on any device in the Device Tree shows a contextual menu with the following options:



Device Properties

The first entry in the Device menu opens a sub-menu page that shows the selected device-specific properties.

Locate

Quickly locate a card module by making its alarm LED flash yellow. This function does not impact normal module operation and will time out after a short period.

New Control Window

Open a separate window with the controls for the current card module.

Rename

It is possible to rename individual items such as Rack Frames and card modules in the Device Tree. The original name can be restored by removing the custom name from the rename field (save it as an empty name).

NOTE: The names are stored inside the flash memory of a LYNX server add-on board (if installed) or the hard disk of the connected Computer Lynx Centraal runs on.

Save Settings Now

To reduce write operations, settings are written 10 seconds after the last modification. During this process, all local LEDs flash yellow three times.

If a card is removed or powered down before the save process is completed, the most recent changes are lost.

Use the "Save Settings Now" command to store the current configuration **immediately** to the card module memory. This is recommended before removing a device or shutting down the rack power.

Lock

Selecting this option locks the device to prevent accidental changes to its settings. The device status remains visible, but all controls are disabled and grayed out. To unlock the device, deselect the lock option from the menu.

Reset Factory Defaults

This function resets all device parameters to the manufacturer default state. All custom settings are removed. The operation cannot be undone.

Settings Management

The full configuration of a device can be copied to an internal clipboard and applied to another device of the same type. It can also be saved as a local file for basic single-device backup.

Warranty

LYNX Technik AG guarantees 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 a defect occurs during this warranty period, LYNX Technik AG, at its discretion, will either repair the product at no charge for parts and labor, or provide a replacement in exchange for the defective product.

To receive service under this warranty, customers must notify LYNX Technik of the defect before the warranty period expires and coordinate appropriate service arrangements. Customers are responsible for properly packaging and shipping the defective product to the service center specified by LYNX Technik, with all shipping costs prepaid. If the return shipment is within the same country as the LYNX Technik service center, LYNX Technik will cover the cost of returning the repaired or replacement product to the customer. For returns to any other location, the customer is responsible for all shipping costs, duties, taxes, and any additional fees.

This warranty does not cover defects, failures, or damage resulting from improper use, or inadequate maintenance or care. LYNX Technik is not obligated to provide service under this warranty in the following cases: (a) damage caused by installation, repair, or servicing attempts by anyone other than authorized LYNX Technik personnel; (b) damage resulting from misuse or connection to incompatible equipment; (c) malfunctions or damage caused by the use of non-LYNX Technik supplies; or (d) products that have been modified or integrated with other equipment, where such modification or integration complicates or extends the time required for servicing.

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Technical Support

Spare Parts

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

A replacement service kit is available for the cooling fan;

Part: "Cooling Fan Service Kit – Series 5000 CardModules"

Support and Returns

If you experience any issues or have questions, please contact your local distributor or reseller.

Technical support, including a comprehensive online knowledge base, is available on the [LYNX Technik Support](#) website.

Please do not return products without first obtaining an RMA (Return Merchandise Authorization) number. Contact your authorized dealer or reseller for RMA instructions.

Additional product information is available at www.lynxtechnik.com.

Free firmware updates are available through [Lynx Centraal](#).

Contact Information

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

LYNX Technik can be contacted directly using the information below.

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