LYNXTechnik AG®

Broadcast Television Equipment

Reference Manual

P VD 5810 D

P VD 5810 U

SD/HD/3G Multi-format Frame Synchronizer with Full Embedded and External AES Audio Support

Revision 2.1 – February 2015

This Manual Supports Device Revisions:	
P VD 5810 Firmware Revision	626
Control System GUI Release	8.1.0

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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 two (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.

THIS WARRANTY IS GIVEN BY LYNX TECHNIK WITH RESPECT TO THIS PRODUCT IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. LYNX TECHNIK AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. LYNX TECHNIK`S RESPONISIBILITY TO REPAIR AND REPLACE DEFECTIVE PRODUCTS IS THE SOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR BREACH OF THIS WARRANTY. LYNX TECHNIK AND ITS VENDORS WILL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTIAL, OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER LYNX TECHNIK OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

Regulatory information

Europe

Declaration of Conformity

We LYNX Technik AG
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Germany

Declare under our sole responsibility that the product

TYPE: **P VD 5810 D; P VD 5810 U**

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, October 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 their 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 MOhms.

Product Description

The P VD 5810 Module is a high performance SD/HD/3GBit/s frame synchronizer / line synchronizer with full embedded and external AES audio support. Basic functionality is a single channel multi format frame synchronizer

Eight AES ports are provided which can be switched by the user individually as AES inputs or outputs. These AES ports are provided as balanced AES3 audio inputs or outputs on a 25 pin SubD connector (P VD 5810 D) and as unbalanced AES3id audio inputs or outputs on 75Ohm MiniDIN connectors (P VD 5810 U).

All deembedded and external AES signals can be processed in an audio processing stage incl. mono gain, stereo downmix, mute, overload and silence detection as well as a 1kHz test tone generator.

DolbyE processing is included in the audio processing stage, i.e. one encoded DolbyE stream can be synchronized to the Reference Signal and the Guard Band is automatically aligned

Input Video Formats

The module has a 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.

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

Output Video Formats

The module provides one SDI output signal, distributed to two BNC connectors. See the following table for a list of supported SDI output formats.

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

The output format frequency (or frame rate) is determined by the connected reference signal and the output will remain fixed to this reference regardless of the connected input signal.

For input signals mismatched the connected reference frame rate, the synchronizer will show this as an asynchronous source (indicated by a yellow status indication in the GUI) and any output signal derived from this “async” source can show video disturbances (see below “Reference Lock”)

Input Reference Signal

The module has a very flexible input reference stage which facilitates the use of either SDTV analog bi-phase sync (i.e. black burst) or HDTV analog tri-level sync. The reference input is “cross lock” compatible so an SDTV reference can be used to frequency lock HDTV signals (and vice versa). The connected reference is auto detected and the synchronizer automatically configures the output to the frame rate of the connected reference signal.

Supported reference signal formats are shown below.

SDTV Analog Bi-Level Sync	HDTV Analog Tri-Level Sync
525 / 59.94Hz	1080i / 50Hz
625 / 50Hz	1080i / 59.94Hz
	1080i / 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

Reference Lock

If the input frame rate, the output frame rate and the frame rate of the reference signal are equal, exactly half of each other or double of each other then all modes of the

P VD 5810 operates with no limitations:

- All 25 Hz and 50 Hz input formats will be synchronized to any 25 Hz or 50 Hz reference signal (from the tables above). The output frame rate can be any format with a frame rate of 25 Hz or 50 Hz.
- All 30 Hz and 60 Hz input formats will be synchronized to any 30 Hz or 60 Hz reference signal (from the tables above). The output frame rate can be any format with a frame rate of 30 Hz or 60 Hz.
- All 29.97 Hz and 59.94 Hz input format will be synchronized to any 29.97 Hz or 59.94 Hz reference signal (from the tables above). The output frame rate can be any format with a frame rate of 29.97 Hz or 59.94 Hz.
- All 23.98 Hz input formats will be synchronized to any 23.98 Hz reference signal (from the tables above). The output frame rate can be any format with a frame rate of 23.98 Hz.
- All 24 Hz input formats will be synchronized to any 24 Hz reference signal (from the tables above). The output frame rate can be any format with a frame rate of 24 Hz.

NOTE: If the frame rate of the reference signal is not equal, double or half of the input/output frame rate, then all functions still are available except the video delay as the frame rate of the output video does not match the frame rate of the reference signal.

The video output remains frequency locked to the Reference signal. In this case a synchronized DolbyE signal *will not match* the required guard band of the video output signal.

NOTE: If the input frame rate, the output frame rate and the frame rate of the reference signal do not match then the module will perform a rudimentary frame rate conversion with drop and repeat frames. This mode of operation is not a recommended or specified functionality for the P VD 5810, and unwanted artifacts may occur.

Frame Synchronization

The algorithms used for frame synchronization are extremely robust and very tolerant of poor input signals. The Synchronizer uses “Flywheel” functionality. This allows the module to recover from any missing sync pulses on the input signal(s) by predicting where they should be and then re-inserting them.

If no converters are active, the frame synchronizer passes the video in the connected input format.

The Synchronizer can also be switched into a Line Synchronizer Mode (see page 24)

Video Processing

Proc Amp Functions

The SDI output channel has an associated video processing amp which provides user adjustable Gain, Saturation, Black Level and Hue levels.

Aperture Correction

An adjustable horizontal aperture corrector is available. This can be used to add (or remove) image sharpness as required.

Test Patterns

The SDI output channel contains a test pattern generator which provides a wide selection of test patterns.

The selected test pattern is also available as one of the modes that the synchronizer will switch to when excessive video TRS errors are encountered. Possible synchronizer actions when the input video errors become excessive are:

- Freeze Field 1
- Freeze Field 2
- Freeze Frame
- Selected Test Pattern
- Black

Programmable Video Output Delay

The SDI output channel has a programmable video output delay which can be set between 0 and 62 frames (max). The adjustment is available in pixel, line and full frame increments.

This adjustment will delay the SDI video output relative to the connected reference by the delay setting specified. (+ fixed delay)

NOTE: The Synchronizer has fixed frame delays depending on the signal path and selected function (see below). The 0 > 12 frame user adjustment is additional delay relative to the fixed delays.

Audio Processing

The module will de-embed the complete audio payload from the incoming SDI stream (4 AES groups = 8 AES streams = 16 mono channels), and passed to the AES audio processing infrastructure, along with up to 8 external AES inputs.

The type of audio (PCM, DolbyE or Audio Data) is detected by the module automatically.

PCM Audio using the sample rate converters will be free from any audio interference (“pops and clicks”) when frames are dropped or repeated by the frame synchronizer.

NOTE: If an encoded DolbyE audio signal is detected by the module the associated SRC and the following audio processing will be switched off automatically. For asynchronous DolbyE streams, the DolbyE functionality should be enabled on the respective path. See page 32 for details.

Automatic Audio Synchronization & Channel Assignment (ASCA)

The P VD 5810 Frame Synchronizer provides comprehensive audio routing capabilities, including a dedicated DolbyE synchronizer and also individual mono crossbars for the embedder and external output. While this provides the greatest level of flexibility it can also be cumbersome for basic applications which just need the audio passed through the system transparently (The same embedded audio configuration on the input is required on the synchronized output).

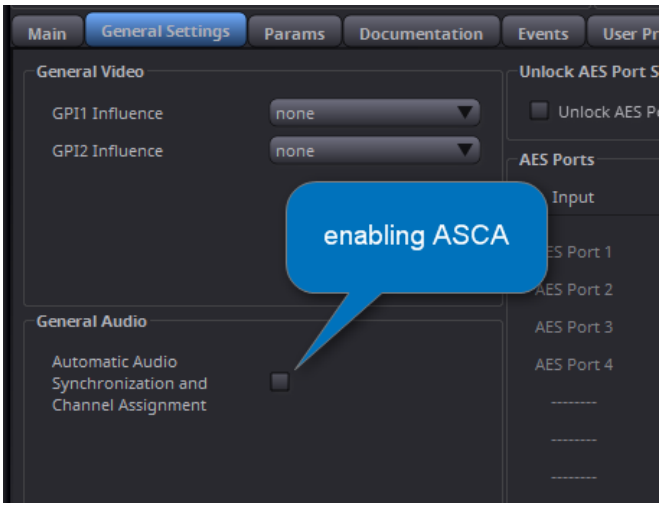

Figure 1: ASCA

The Automatic Audio Synchronization and Channel Assignment (ASCA) function has been introduced to address this, and once enabled will ensure the incoming embedded audio streams are synchronized and then routed to the appropriate embedded group in the SDI output.

NOTE: External AES inputs are not supported while the ASCA function is enabled The ASCA function is by default OFF which required manual configuration of the audio crossbars

The ASCA function is enabled and configured on the “General Settings” tab using the LYNX Desktop Controller (control system)

Working Principle

The ASCA function will do the following things (if enabled)

- All manual operation of the audio crossbars and processors is disabled.
- External audio inputs cannot be used.
- All embedded audio streams (from the deembedder) will be re-embedded into the same audio groups at the SDI output. Other audio groups (which are not present in the SDI input) will NOT be embedded in the SDI output.
- If one of the embedded AES streams is detected to be a DolbyE encoded stream, then the integrated DolbyE synchronizer capability will be assigned to this channel. If more than one DolbyE stream should be detected on the input, then the integrated DolbyE synchronizer will be assigned to the first one.

Limitations:

1. Audio Disturbances

Whenever the ASCA function is re-configuring the audio-channels, the configuration process will possibly generate audible disturbances in some of the audio output channels

(embedded or AES) of the same video program. Such re-configuration will be triggered by any change of the appropriate input configuration (video, embedded audio). Therefore this function is recommended to be used in environments, in which the incoming signal configuration does not change while a programming stream is being processed. I.e. it can be used for automatic pre-setup only.

2. Flexibility: Crossbars and processing

Using the ASCA function imposes the following limitations to the audio infrastructure:

- Internal audio processing (mute, gain, invert, …) is disabled and set to neutral
- Takes full control over all internal audio-crossbars (input and output), except the crossbar configuring the external AES output channel assignment.

Accordingly, the effected audio-crossbars and audio processing parameters will be grayed out and set to read-only in the control system.

3. Persistence of user settings

After turning the ASCA function ON, audio-infrastructure settings (crossbars, SRCs, Embedders) are modified by an automatic process. When the ASCA function is then turned OFF again, previous settings are *not* automatically restored. As a consequence, turning the ASCA ON and OFF can result in a modified audio-infrastructure (crossbars, processing).

4. External AES input not usable

Turning the ASCA function ON will allocate all available DolbyE synchronization resource to the signals de-embedded from the video input. The external AES Inputs cannot be used at all.

The external AES Outputs are not controlled by ASCA, i.e. the "AES output" crossbar is still active (not grayed out).

GPI Function

The two GPI inputs (**G**eneral **P**urpose **I**nterface) which are switch input functions (contact closure) can be used to perform a number of functions. The influence of these inputs can be set by the user. See section GPI Influence on page 35 for details.

Functional Diagram

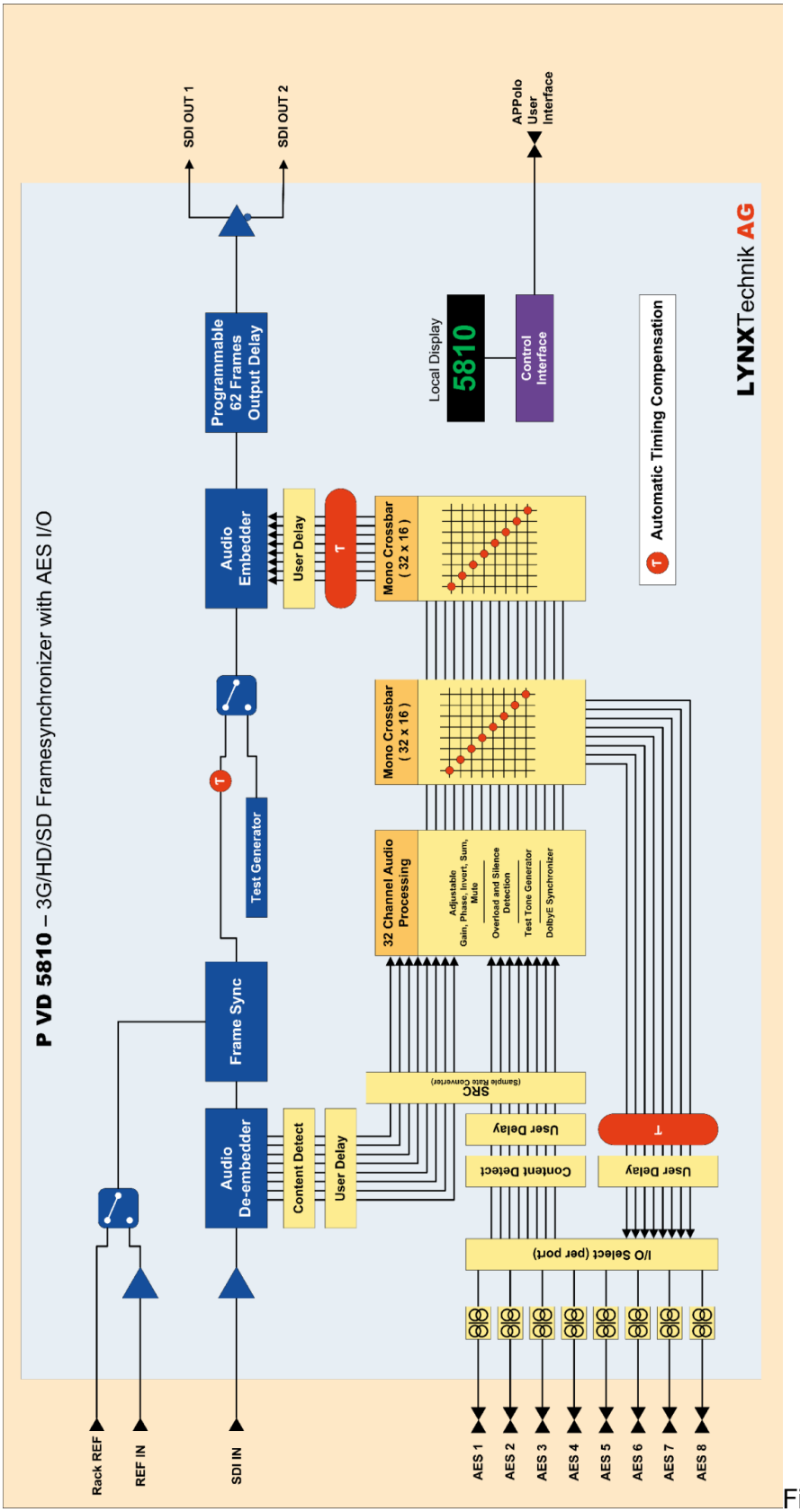

Figure 2: Functional Diagram

Module Layout

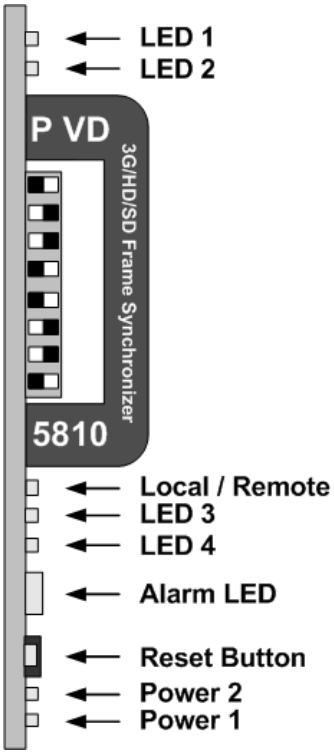

Figure 5: Card Edge

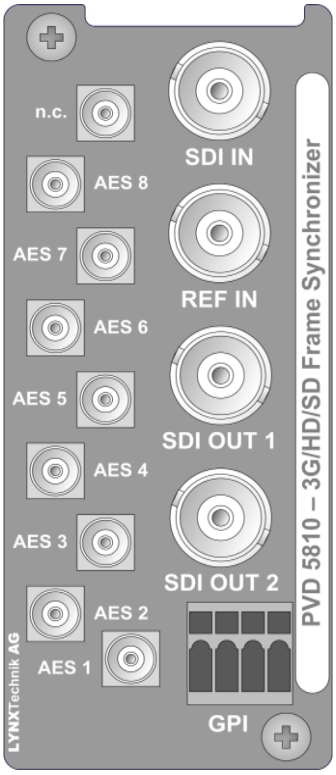

Figure 4:
Rear Termination Panel
P VD 5410-U

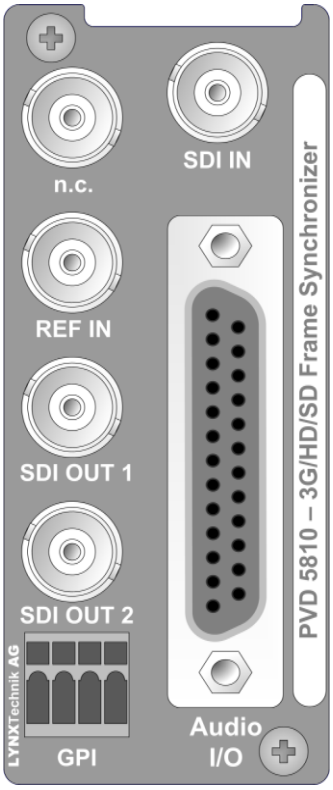

Figure 3:
Rear Termination Panel
P VD 5810-D

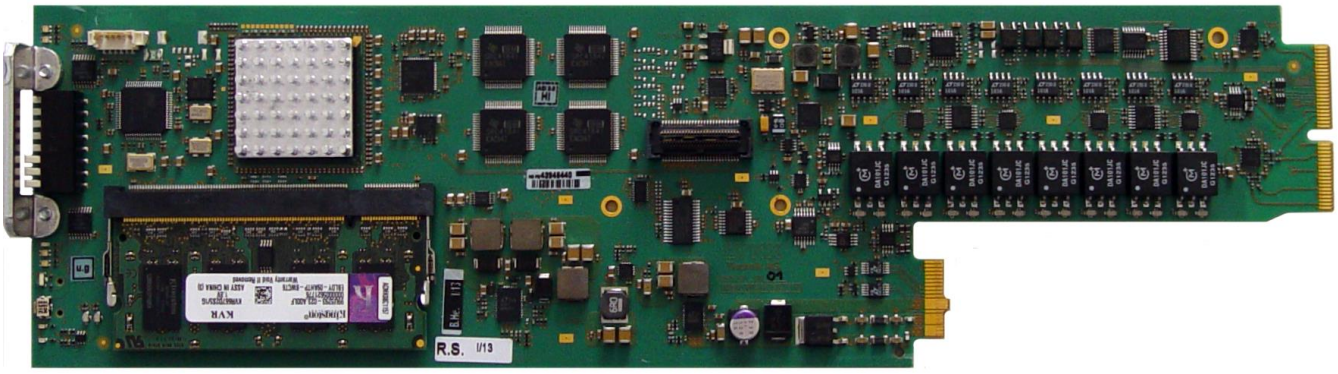

Figure 6: Board Layout

Connections

Video

The P VD 5810 uses standard 75 Ohm BNC connectors for SDI connectivity. 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

The module provides for both Unbalanced (AES3id on MINI DIN connectors) and Balanced (AES3) external audio connections.

The **P VD 5810 U** versions provides MiniDIN (DIN1.0/2.3) connections for unbalanced AES3id

The **P VD 5810 D** versions provides a SubD25 connector for balanced AES3 (pin layout see table below and Figure 7)

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	AES 4 +	20	AES 4 -
8	AES 4 GND	21	AES 3 +
9	AES 3 -	22	AES 3 GND
10	AES 2 +	23	AES 2 -
11	AES 2 GND	24	AES 1 +
12	AES 1 -	25	AES 1 GND
13	n.c.		

It is recommended to use high quality screened (twisted pair) cable for the balanced audio connections. LYNX Technik provides optional audio breakout cables 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

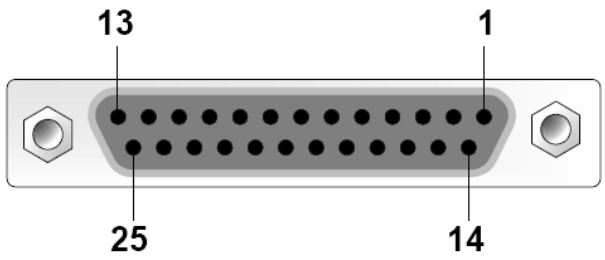

Figure 7: SubD25 Audio connector
(looking into connector from back of module)

GPI Connections

There are two independent GPI (General Purpose Interface) Input contacts. Each GPI contact can be used to signal an external condition into the device. Each GPI is passive ("disabled" or "OFF") by default. It can be set to active ("enabled" or "ON") by providing an external low-resistance connection between the provided GND and the GPI pin 1 resp. 2 (see Figure 8 for details on the pinning).

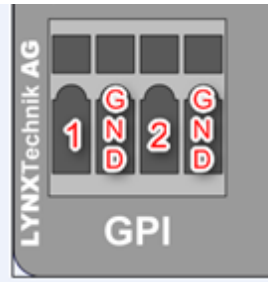

Figure 8: GPI Connections

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 7.

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.

NOTE. This module should be installed in the R FR 5012 RackFrame with a Fan Front Cover, to ensure sufficient airflow into the RackFrame.

We recommend you power the RackFrame down before installing any additional modules into an existing RackFrame.

1. Select a free two 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 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.
6. Power up the rack and check the module LED's and matrix display illuminate. 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)*

Settings and Control

The P VD 5810 has an integrated micro-controller, which enables the module to be configured and controlled locally via the dip-switch or from remote 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 settings used prior to power down. See section “Save Settings Now” on page 39 for more details.

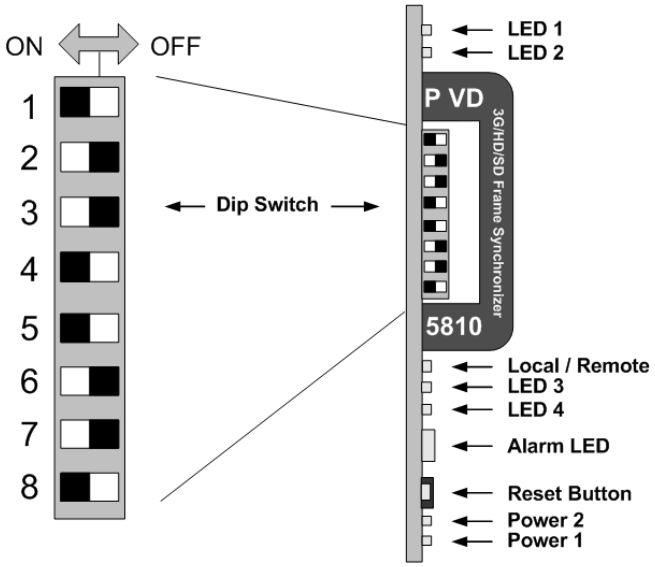

Figure 9: Card Edge switches and LED positions

DIP Switch Settings

Switch	Setting	Function
1	ON	Enable Local Adjustment
	OFF	Disable Local Adjustment
2	ON	Audio Embedder for Group 1 active
	OFF	No Embedding for Audio Embedder Group 1
3	ON	Audio Embedder for Group 2 active
	OFF	No Embedding for Audio Embedder Group 2
4	ON	Audio Embedder for Group 3 active
	OFF	No Embedding for Audio Embedder Group 3
5	ON	Audio Embedder for Group 4 active
	OFF	No Embedding for Audio Embedder Group 4
6	ON	Erase content in H-Blanking interval
	OFF	Content in H-Blanking interval preserved
7	ON	Erase content in V-Blanking interval
	OFF	Content in V-Blanking interval preserved
8		n.a.
		n.a.

DIP Switch 1 enables local adjustments. Setting it to ON enables the setting of the other DIP switches to configure the module. Setting it to OFF will prevent any local DIP switch settings from taking effect.

*NOTE: It is recommended to set DIP switch #1 to **OFF** to prevent from accidental changes to the stored module configuration if the switches are moved.*

DIP Switch 2 configures the audio embedder for embedded Group 1. Setting it to ON enables the embedder: Group 1 will be embedded, replacing the previous content of Group 1 (if any). Setting it to OFF disables the embedder for Group 1.

DIP switch 3 configures the audio embedder for embedded Group 2. Setting it to ON enables the embedder: Group 2 will be embedded, replacing the previous content of Group 2, if any. Setting it to OFF disables the embedder for Group 2.

DIP switch 4 configures the audio embedder for embedded Group 3. Setting it to ON enables the embedder: Group 3 will be embedded, replacing the previous content of Group 3, if any. Setting it to OFF disables the embedder for Group 3.

DIP switch 5 configures the audio embedder for embedded Group 4. Setting it to ON enables the embedder: Group 4 will be embedded, replacing the previous content of Group 4, if any. Setting it to OFF disables the embedder for Group 4.

DIP Switch 6 enables blanking of the complete horizontal blanking interval (all HANC data will be removed from SDI). Note that Audio Embedding (Group 1-4) also modifies the HANC space by adding / replacing data.

DIP Switch 7 enables blanking of the complete vertical blanking interval (all VANC data will be removed from SDI).

Factory Preset Condition

The P DA 5288 is delivered programmed and preset for the following mode of operation:

Switch 1	**ON**	Local Adjustment Enabled
Switch 2	**ON**	Embedders for Group 1 enabled
Switch 3	**ON**	Embedders for Group 2 enabled
Switch 4	**ON**	Embedders for Group 3 enabled
Switch 5	**ON**	Embedders for Group 4 enabled
Switch 6	**OFF**	HANC data passes unmodified (except Audio Groups)
Switch 7	**OFF**	VANC data passes unmodified

Auto Store

The current settings are stored to the local Flash RAM 10 seconds after the last modification. As a confirmation, the Alarm LED flashes three times, see below. See section “Save Settings Now” on page 39 for more details.

Reset Button

If this button is pressed for 5 seconds, all internal parameters will be reset to their factory default values. 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

LED 1: REF Status

LED Color	Indication
Green ●	Reference Signal present and ok
Yellow ●	Reference Present, but not used *(Module is set to free run with no lock to external reference)*
Red ●	Reference cannot be detected

LED 2: SDI Status

LED Color	Indication
Green ●	SDI input ok
Yellow ●	SDI Frame Rate Mismatch *(Mismatch between the fixed output frame rate and the SDI input. Conversion taking place)*
Red ●	SDI input missing

NOTE: LED 3 and LED 4 are not used (always OFF).

Alarm LED

The (slightly larger) General Alarm LED is visible through the RackFrame's front cover.

LED Color	Indication
Green ●	Normal Operation
Yellow ●	• Frequency mismatch (see LEDs 1 and 2 above) • Some audio input (ext. or embedded) is missing one or more channels
Red ●	• SDI missing • REF missing • Some audio input (ext. or embedded) is missing all channels
Yellow flashing ●●	"Locate Device" activated from Control System
triple yellow flash ●●●●●	Saving current configuration to local flash-RAM

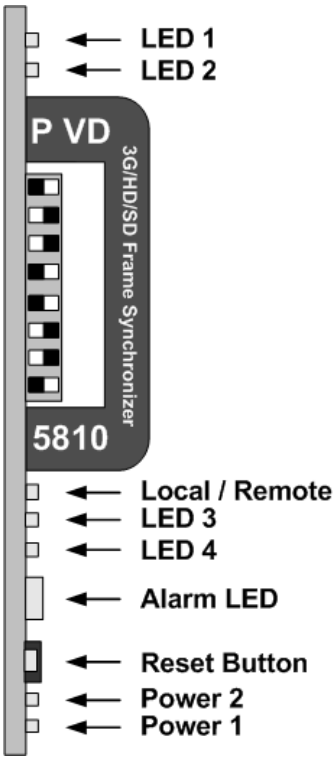

Figure 10: Card Edge LEDs

Power LEDs

Power 1	Indication
Green ●	Power from Main PSU ok
Off ●	No power from Main Power Supply
Power 2	**Indication**
Green ●	Power from Redundant PSU ok
Off ●	No power from Redundant PSU

NOTE: If one of the Power LEDs should be OFF while the corresponding PSU is working correctly, then please contact technical support for a verification of the board's power input fuse.

Local/Remote LED

LED Color	Indication
Green ●	Local control via DIP switches active, all settings according to local DIP switches
Off ●	Current DIP settings may have been overwritten through remote control

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. The complex nature and extensive user settings provided on the P VD 5810 requires the use of the 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.

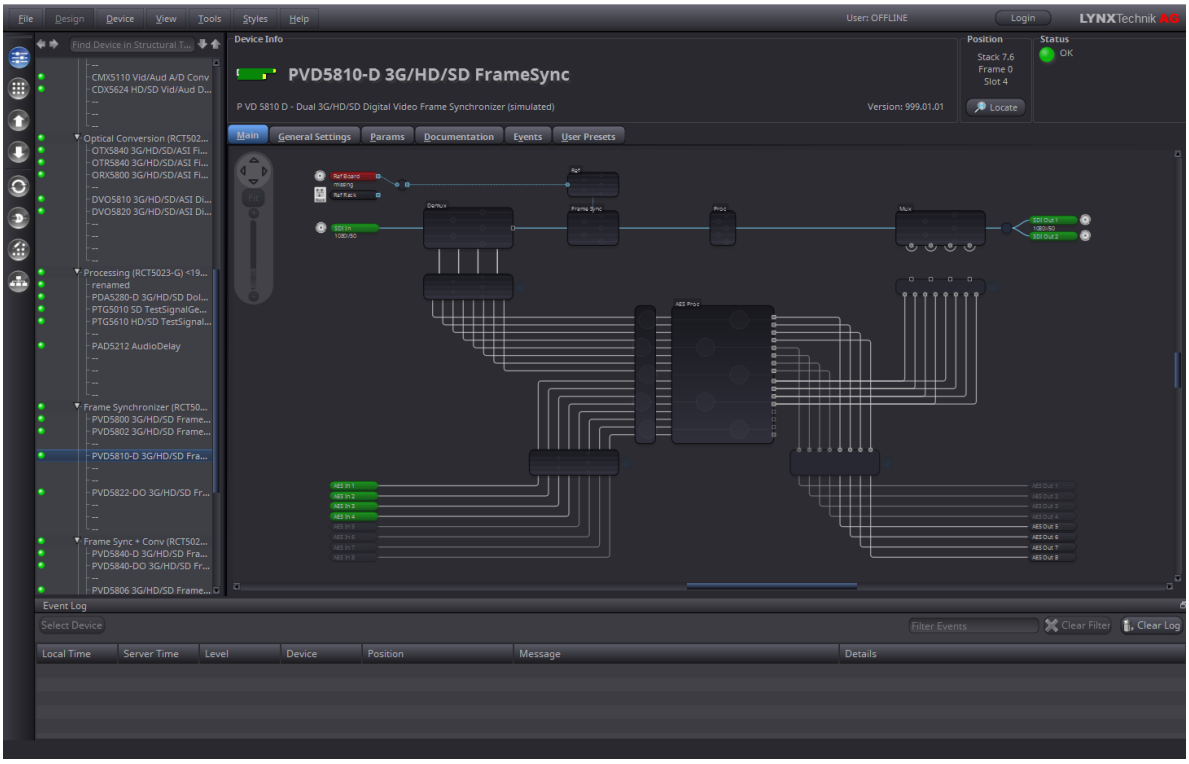

Figure 11: P VD 5810 in APPolo GUI

Figure 11 shows the complete module GUI. The “Device Info” area across the top contains information about the module including name and firmware revision. The “Position” area displays the modules position and physical location. This is useful if the device is installed as part of a larger installation.

NOTE: The Locate button (in the “Position” area) is a useful tool to quickly identify a module in larger systems. Activating “Locate” will flash the module’s alarm LED in yellow color. (this does not affect the module’s operation in any way). This function will be stopped automatically (timeout).

The “Error Log” at the bottom of the screen displays an individual timestamp’ed message for any error or warning condition in the system. The same information can always be found in the APPolo Control System’s textual logfiles.

The primary GUI screens and functions are described in the following sections.

Overview

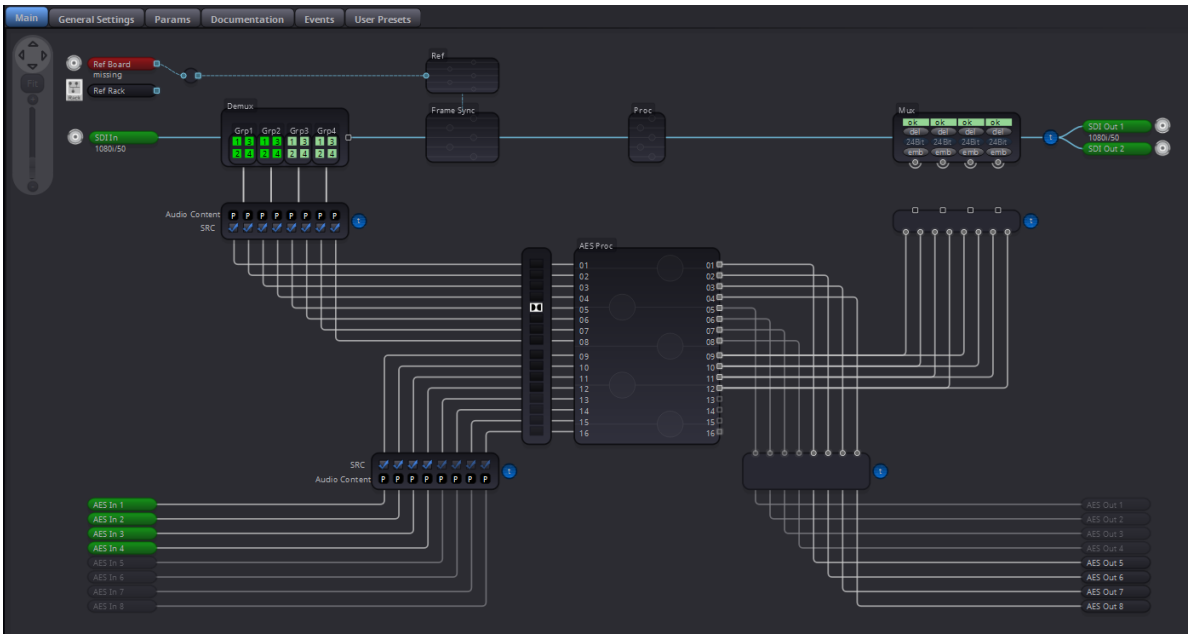

Figure 12: P VD 5810 MAIN Tab

The MAIN Tab (Figure 12) visualizes the module's functionality. The audio and video signals are presented flowing from left to right. Selections are made using onscreen sliders, radio buttons, drop down selections and checkboxes. The screen can be zoomed in/out using the mouse-wheel or the navigation tool in the top left corner of the screen. When zooming closer, the contents of the individual boxes will become visible.

Video Path

The SDI video input on the left delivers its signal first to an Audio Deembedder (for extraction of all contained audio channels) and then to the Synchronizer, where the timing of this signal is re-synchronized to the current REF signal.

After that, the synchronized SDI stream is processed in the "Video Proc" stage, before embedded audio can be deleted, overwritten or simply embedded in the Embedder block. The resulting signal is delivered to the SDI output (two BNC connectors). Further details can be found in the following sections.

Audio Routing

All 8 AES channels are deembedded from the SDI input. In addition, up to 8 external AES inputs can be used. This makes a total of up to 16 AES inputs that can be processed and then assigned to any one of the outputs (SDI embedder and up to 8 external AES outputs). Further details can be found in the following sections.

NOTE: there are a total of 8 external AES ports. Each of the port can be configured to be an input or an output port. See page 34.

flexGUI path highlighting and signal patching

The flexGUI shows all current signal connections as lines (i.e. it does not show any signal lines that are actually unused dead ends). Hovering the mouse pointer over any such signal line will highlight the complete signal path that leads to this point. This illustrates clearly where the particular signal is coming from. Similarly, the downstream path is highlighted to show where this signal is going to.

To re-connect a signal (change the routing) you can think of a signal line as a patch-cable that has to be connected to the desired source. Hovering the mouse-pointer over a flexible signal will show a handle. Grab the handle (click-and-hold) with the left mouse button and drag-and-drop it to the new desired source. More details are shown below.

Reference Source Selection

The complete P VD 5810 processing clock is derived from one single Reference signal. This reference signal can be derived either from a digital source (SDI Input 1) or from an Analog REF signal (Figure 13). If the REF Source type is set to Analog, then a second switch (Figure 14) selects between the BNC connector on the module's local Backpanel and the Rack-Reference (distributed to all slot-positions in the RackFrame).

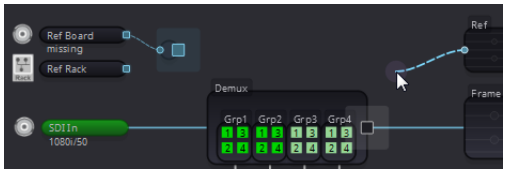

Figure 13: Selecting Digital vs. Analog Reference mode

NOTE: selecting a digital reference from the SDI input is useful for applications where the P VD 5810 is used as a video delay line.

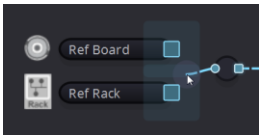

Figure 14:
Analog REF Source

Frequency Pre-select

This is where the frame synchronizer output frequency (or frame rate) is selected. This can be fixed into a frame rate which will never change to maintain this constant output frame rate at all times regardless of the connected reference signal, or any disturbance to the connected reference signal. This will prevent the output frame rate and format automatically "tracking" the connected reference standard should this change. The output video signal will maintain the fixed to the video frame rate but the video will be disturbed if the input reference signal changes.

It is also possible for the synchronizer to configure the output frame rate based upon the connected reference. This is the default setting for the module. Possible settings are:

- Even (24, 25, 30 or 50 Hz)
- Odd (23,98, 29,97 or 59,94 Hz)
- Follow (last) reference *(default)*

NOTE: The synchronizer is supplied from the factory with the last stored reference as 50Hz. With no reference connected, it is possible to change the last stored reference to something else. Simply select the desired fixed frequency and then re-select "follow last reference". Now the module will use this new setting through a power cycle. This value will <u>not</u> be restored to 50Hz following a "Restore Factory Defaults" operation. Instead, the stored setting is preserved.

SDI Synchronization

The SDI input can be configured to work in one of three different modes of video synchronization.

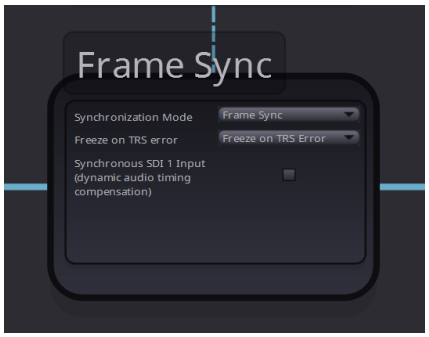

Figure 15: GUI Framesync

Frame Sync This is the default mode. In this mode, an internal video buffer always holds one complete frame of video. This complete frame of video can be used for repeated delivery to the output (frame-repeat) in case of an underflow of input data (framesync roll-over). Optionally, the last good input frame can also be repeated to the output in case of TRS errors in the input signal.

As a consequence of holding one full frame of video at all times, this mode requires an absolute minimum of 1 frame of total processing time (input to output). Additional total proc.time is added by several other factors.

Line Sync (H) This mode is only applicable for synchronous input signals. It can be used to achieve minimum total proc.time. The input signal is buffered for 1 line to correct timing differences within 1 line. The absolute minimum total proc.time is 1.5 lines. The output signal is aligned to the next possible H-pulse from the Reference.

Line Sync (V) In this mode, the video input will also be stored in a video buffer. After this minimum proc.time has passed by, the output of the same video frame from the buffer starts at the next available V-pulse from the reference. The total proc.time equals the offset between SDI and REF. A minimum processing time of approx. 1.5 lines applies.

NOTE: Both Line Sync modes can be applied to synchronous input signals only. I.e. they must not be applied to an input signal that is (potentially) not genlocked to the REF input.

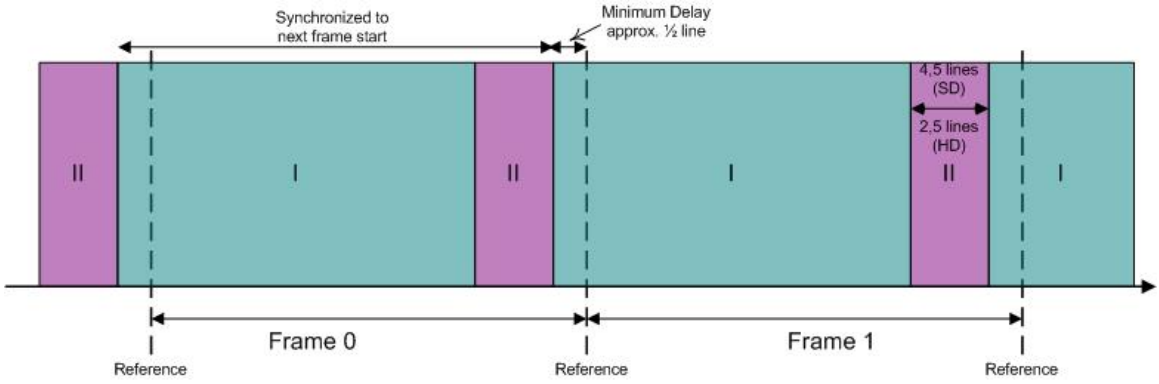

Figure 16: input timing windows

For distortion free switching in front of the P VD 5810, e.g. in a router, all signals have to be in area “I” or all signals in area “II”.

Area “II” is a window for line synchronization of 2.5 lines (HD) and 4.5 lines (SD).

Area “I” is an extension of the standard line synchronization to allow for “infinite” line synchronization. As this extended functionality is buffered differently, distortion free switching is only possible within these two areas.

To adjust the timing of video signals relative to the reference to avoid larger delays the video output delay function can be used (see page 28). This shifts the video signal into the required area. This adds the manually adjusted delay, but avoids the additional frame delay, e.g. if a signal is in the area of the minimum delay.

Freeze Mode

This is where the reaction of the synchronizer is defined in the case of excessive video errors (TRS Errors). The output can be configured to freeze (“Freeze on TRS Error”) or pass the input signal transparently when excessive errors are encountered. If configured to pass video transparently (“Transparent”) then all video content errors and disturbances are passed from the input to the output. The TRS (“Timing Reference Signal”, aka “sync framing”) is, however, always restored correctly on the output.

NOTE: The synchronizer is very robust in its ability to handle poor quality input signals but there may be occasions where excessive errors cannot be recovered by the synchronizer. This is generally qualified by TRS errors. TRS means “Timing Reference Signals” and is a sequence of digital values embedded in the SDI data streams. If the frame synchronizer cannot recover these errors, then the channel will freeze the video until the errors can be recovered. One function of the synchronizer is to repair any bad TRS values ensuring a stable and technically correct video stream is delivered on the outputs.

Synchronous SDI Input (minimum audio delay)

The checkbox for “Synchronous SDI Input” should be activated ONLY when the SDI input is really synchronous to the REF (no frequency differences, or “wandering” over time).

If activated the embedded audio to video delay at the output is always minimal. This is achieved by automatically compensating any delay offset between input and REF in the audio path. Beware: If this function should, by mistake, be activated on a non-synchronous input signal (i.e. where that offset changes over time), then the automatic timing compensation in the audio path would constantly be re-adjusted. This would result in audible disturbances.

Video Processing

Aperture Correction

Horizontal aperture correction is provided for each output channel, which can be used to sharpen or soften the video signal. (This is sometimes required for down converted video signals as the filtering process rolls off the high frequency very slightly). If adjusted in the positive direction this will increase sharpness, if adjusted in the negative direction this will soften the image.

There is a check box to switch aperture correction ON and OFF. Setting Aperture correction to “OFF” has the same effect as setting in the numerical value to zero.

Figure 17: Video Output Processing

Clip CR/Cb Headroom

If activated all Luminance (Y) values below 64 and above 940, and all Chrominance (Cr,CB) values below 64 and above 864 will be clipped.

H and V Blanking

A checkbox selection is provided for H (Horizontal) and V (Vertical) blanking. When selected the video output will have new blanking applied in both of these areas (which will overwrite any information in the vertical and horizontal blanking intervals).

Output if no input

This selection defines the behavior of the respective SDI output signal if no input signal is present on the connected input channel. Choices are:

- Freeze repeat the last good input picture *(see “Freeze Mode” below)*
- Black show a full-field black picture
- Test Pattern show the pre-selected test-pattern *(see “Test Pattern” below)*

Freeze Mode

This selection determines the exact content that shall be delivered on the SDI output, if the signal has to be shown in “freeze” state. there are two possible reasons why an SDI output can go into “freeze”: See “Freeze on TRS Error” (page 25) and “Output if no Input” (above). Possible settings are:

- Freeze Field 1
- Freeze Field 2
- Freeze Frame

NOTE: In a progressive video standard, this selection has no effect.

Test Pattern Pre-select

A wide range of patterns is provided which can be selected using the drop down selection provided. The pre-selected pattern can explicitly be switched ON (see below). This same pre-selected pattern will be used if the “Output if no Input” mode is set to “Test Pattern” (see above). The following patterns are provided:

- Full field Black
- Full field White
- Full field Yellow
- Full field Cyan
- Full field Green
- Full field Magenta
- Full field Red
- Full field Blue
- 15% Grey (full field)
- 75% Color bars
- 75% Color bars over Red
- Pathological PLL/EQ

Test Pattern Standard

The P VD 5810 can be used a standalone test. In this case, this setting can be used to select the exact video format that shall be generated from the SDI output. By default, the output standard will follow the last input standard. If this setting is modified from its default, it will fall back to the default setting as soon as a regular input standard is connected again.

Otherwise, the selection is limited to those video standards that use the exact same framerate as the reference signal, or half or double that frame rate.

Test Pattern Enable

This checkbox simply switches on the pre-selected test Pattern. When activated, the whole processing box will appear in yellow background color.

Video Adjustments

Four sliders are provided to allow for the adjustment of individual video parameters. Separate sliders are provided for

- Video Brightness (gain)
- Saturation
- Pedestal (Black level)
- Hue

Default (null) settings are 0% (this is the default). Sliders can be quickly returned to the factory null (or transparent) settings by double-clicking onto the slider handle.

Timing and Delays

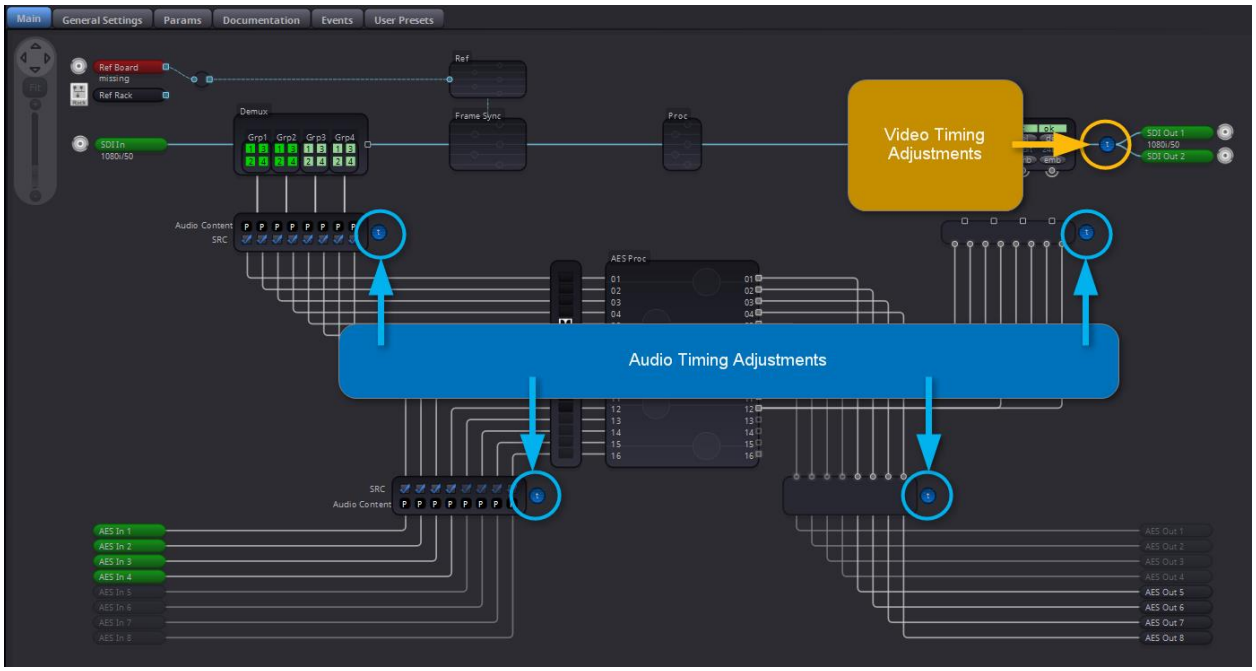

Figure 18: Audio and Video Timing Adjustments

Different internal processing paths for audio and video signals require different internal processing times. Independently from these internal processing delays, a sophisticated algorithm will make sure that all signals that are received on the input will be delivered from the outputs in the exact same relative timing.

As an example, embedded audio streams, which are separated from the video by the audio-deembedder near the input, and which are then routed on internal channels that are independent and separate from the video infrastructure, will be embedded back into the video after they have been timing-adjusted to match the processing delay of the video path.

NOTE all audio processing algorithms in the device require a total processing time of about 3ms. The video processing path, consisting of Synchronizer (compensating the offset between SDI and REF) and the Framestore (in Framesync mode) can sum up to a total processing delay of multiple video frames. Consequently, the audio paths which lead to the video embedder contain an internal compensation delay of the equivalent amount of milliseconds, so that the embedder joins video and audio signals in perfect lip-sync relationship.

Video Timing Adjustments

By default, the video output delivers its SDI stream with a correct H/V alignment to the REF signal. A manual additional User Delay can be applied to the SDI output, offering an additional delay of up to a maximum of 64 additional video frames. This manual user video delay is adjustable in one of two dimensions:

- User Delay in Frames, Lines, Pixels.
  The equivalent amount of Milliseconds will be calculated (depending on the current video standard) and displayed as read-only value.

- User Delay in Milliseconds.
  The equivalent amount of Frames, Lines and Pixels will be calculated (depending on the current video standard) and displayed as read-only values.

When the current video standard changes (e.g. because a different source signal is detected at the input), then the manual delay settings in the current dimensions are kept constant, while the corresponding other dimension might change their current values (depending on the current video standard).

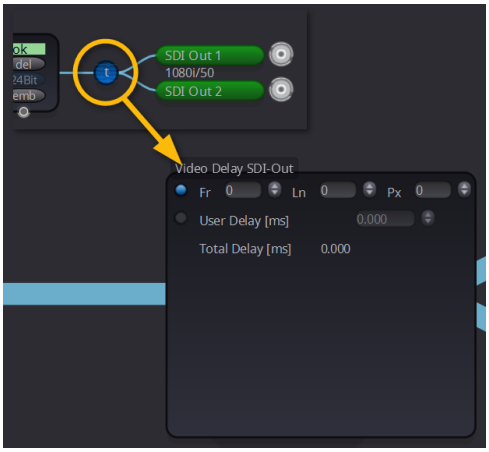

Figure 19: Video Output Delay

NOTE: Adjusting the Video Output delay always delays embedded audio contents together with the video content. It is NOT possible to influence the relative timing between audio and video contents with these controls. Relative audio-video timing (aka lip-sync) can only be influenced while audio and video are still kept on independent paths. See "Audio Timing Adjustments" below.

Audio Timing Adjustments

Audio signals are, by default processed as fast as possible. The minimum processing delay across the complete internal infrastructure is approx. 3ms. When an individual audio signal is embedded into the SDI output stream, then the audio content is implicitly delayed by the appropriate amount of time, so that the relative timing (lip-sync) between the affected audio and video content on the input (as these signals reached the device) is replicated on the output.

Additional User Audio Delay can be applied to any internal audio stream. This can be used to correct for mismatched relative audio timing (lip-sync), e.g. by delaying an early-audio signal by the appropriate amount of milliseconds (i.e. when video is later than audio). Such user delay will simply be added to the internal audio delay that is applied anyway "under the hood" (to compensate for video processing, see above).

Even a late-audio situation (when video is earlier than audio) can be corrected by entering negative values as user audio delay. These negative values will then be subtracted from the internal audio compensation delay (see above).

Input vs. Output Delay

User Audio Delay values can be manipulated in the context of Audio Inputs (next to the Audio Inputs on the left side of the GUI) as well as the Audio Outputs (audio destinations on right side of GUI). Technically, there is no difference between these two locations. Internally, both values will be added up, and the resulting total delay will be applied (i.e. it makes no difference if a signal is delayed in the context of the input or the output, or even both).

The main difference is the presence of the audio crossbar between those two locations.

The general recommendation is to correct for input-related timing problems with the controls that are located at the inputs. And output-related timing adjustments (e.g. compensating for a problem downstream) shall be corrected with the output-related controls. Following this rule will make it easy to operate the audio crossbars later, without having to re-adjust the timing compensation afterwards.

NOTE: The P VD 5810 provides the tools to correct for a timing problem in audio-video (lip-sync) relations. The measurement or verification of such lip-sync problems has to be done by use of external equipment.

Audio Infastructure

The complete audio payload of 8 AES per SDI is deembedded from the SDI input stream. In addition, up to 8 external AES inputs can be applied to the module. All of these AES streams are supplied to the internal audio infrastructure.

Phase Aligned Deembedding

The SDI Audio Deembedder deembedds all of the contained Audio Groups (up to four Groups) simultaneously. When the deembedder detects a new SDI stream (e.g. after connecting the signal or after a change of video standard), then the deembedding process starts for all groups, and all groups will be deembedded with correct phase alignment between all channels.

There is, however, a particular situation in which a phase aligned deembedding across all deembedded groups is NOT guaranteed by default: Consider the following example scenario:

1. SDI contains audio groups 1 and 2 (audio groups 3 and 4 are not present in the SDI stream). Both groups are deembedded with a correct phase aligment between all of their AES streams, as explained above.
2. While SDI stream is being received without interruption, audio group 3 is added by the upstream embedder. I.e. the HANC content is re-arranged dynamically, and another additional audio group appears, which has not been present initially.
3. The SDI Audio Deembedder will start to de-embed the content of the additional group and deliver the AES content, as usual. The content of new group 3, however, is not guaranteed to be phase-aligned with the content of groups 1 and 2 (which had been there before already).

I.e. if the content of the HANC space is re-arranged to accommodate for an additional audio group while other audio groups remain present, the additional groups are, by default, not guaranteed to be deembedded phase-aligned to the previous content.

Such phase-aligned deembedding can optionally be guaranteed, even in the above case. This can be achieved by enabling the Parameter “DeembPhaseSync” on the “Params” tab (page 36). As a consequence, all deembedding will be re-initialized on a re-arrangement of the HANC content. In the above scenario, there would be an audible disturbance in the contents of groups 1 and 2 when group 3 appears in the HANC.

NOTE The Params-Tab contains another parameter with a similar name: “DeembPhaseSyncVerify”. This parameter is ON by default and it guarantees phase alignment within a stereo-pair. This is not the same as guaranteeing phase alignment across groups, as explained above.*

Audio Content Detection

For every input AES channel, the content type is automatically detected and displayed in the APPolo GUI by a single upper-case Letter. The following indications are supported:

P PCM stream (transparent stereo)

E DolbyE encoded stream

D Other encoded data (e.g. AC-3)

<none> If no letter is displayed at all, then this AES channel does not currently carry any data.

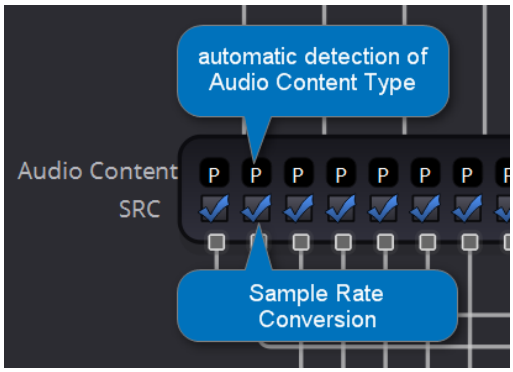

Figure 20: Content Detection and SRC

NOTE: Automatic Content Detection can be overwritten by manual decision (click onto the box with the letter 'P'). This is, however, only recommended for testing purposes. I.e. in order to achieve best possible signal integrity, it is strongly recommended to leave the Content Detection algorithm in "automatic" mode.

Sample Rate Conversion

A Sample Rate Converter (SRC) is provided per each AES input stream. The SRC will re-sample the input to a 48kHz samping rate as derived from the current REF source. SRCs are enabled by default (checkbox in APPolo GUI is set to active). If the content type has been detected as anything but PCM (letter 'P', see above), then the SRC operation will automatically be bypassed. I.e. it is NOT possibile to destroy an encoded bitstream (such as DolbyE or AC-3) by accidentally leaving the SRC activated.

NOTE: If the input AES stream is already sampled at 48kHz, but if that sampling rate has not been genlocked to the same REF, then the use of the built-in SRC's is mandatory to achieve the correct sampling structure for the internal processing.

Audio Processing

The Audio Processing block provides access to the detailed audio processing functionality. The following functions are available per mono-channel.

Gain Adjustment	[-66.3dB … +18dB]
Phase Inversion	[on / off]
Mute	[on / off]
Mono Downmix	per output mono-channel: enable the addition of the other (sibling) mono-channel as a simple (a+b)/2 downmix.
Overlevel Detection	a yellow warning indication will be displayed, if the signal content reaches the potential digital clipping (code values reach 0xFFF).
Silence Detection	a yellow warning indication will be displayed if the signal content is detected as silent (<60dB) for more than 10 sec)
Test Tone	A 1000 Hz Test Tone can be generated and applied to both mono channels at the same time. If enabled, the AES input stream is ignored and NOT delivered at the output.

NOTE: all AES processing is automatically disabled (neutralized) when the content type is NOT PCM audio. This guarantees that an encoded bitstream (such as DolbyE or AC-3) is not disturbed by such processing.

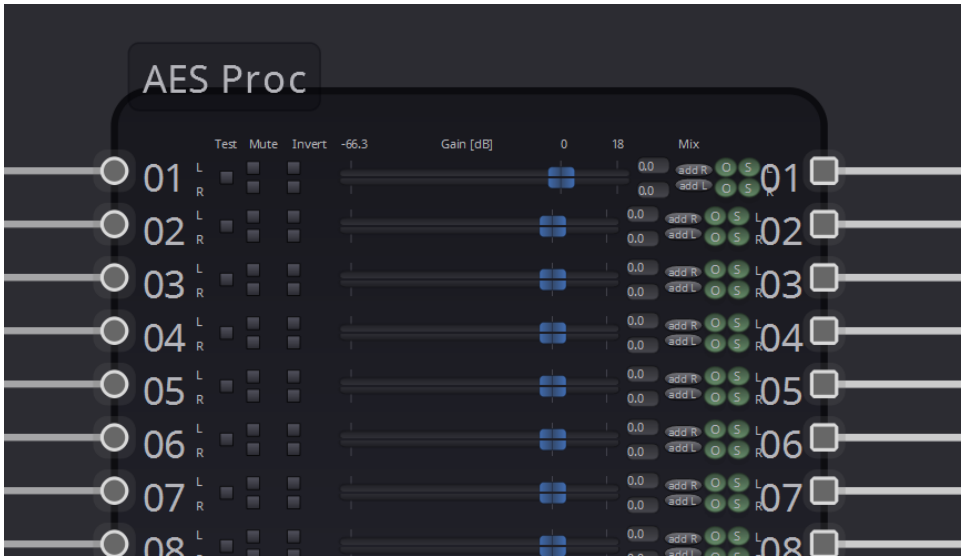

Figure 21: AES processing

DolbyE

The P VD 5810 provides automatic processing and correct synchronization of DolbyE encoded AES streams. As mentioned above, DolbyE contents can be detected as such. For DolbyE streams, all AES processing (such as SRC, gain/phase adjustment etc.) is disabled.

It is recommended to enable the DolbyE Synchronizer capability on the audio path that contains a DolbyE encoded bitstream. As a result, this audio path has additional capabilities to process DolbyE bitstreams in appropriate ways (see below).

NOTE: Enabling the DolbyE capability on any audio path does NOT take away any of its standard capabilities, which are required for processing of PCM streams though. I.e. PCM streams are not at all influenced by enabling the DolbyE capability on one of the internal audio paths.

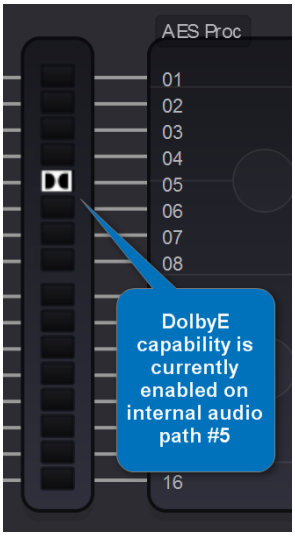

Figure 22: enabling DolbyE capability

DolbyE Frame-Synchronization: Similar to a Video-framesync, the DolbyE framesync drops or repeats a complete DolbyE frame at the point of roll-over (i.e. when the incoming asynchronous data would lead to a buffer overflow/underflow). The repeating / dropping of frames happens at the exact same moment for DolbyE audio frames as for video frames. This guarantees correct lip-sync even if DolbyE content is processed independently from the SDI path.

DolbyE Guardband Alignment: The AES path delay for DolbyE encoded streams will make sure that the DolbyE bitstream is embedded into the SDI stream with correct timing alignment of the Dolby Guardband.

NOTE: see here for more information on DolbyE Guardband Alignment: http://www.dolby.com/us/en/technologies/dolby-e-preferred-alignment.html

Audio Crossbars

After going through the audio processing stage, each internal audio stream is delivered to the output audio crossbar. Here, each of the possible audio destinations (embedder and external output) can select from all of the available signals. The output can be connected to a new source by simply clicking onto an existing connection and dragging and connecting the open handle to the desired source signal (Figure 23).

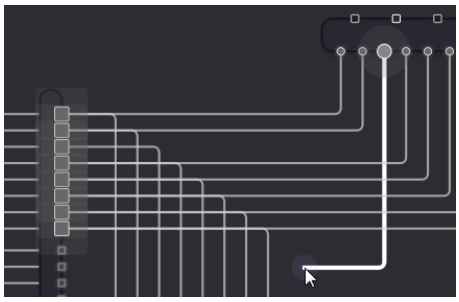

Figure 23: Audio Crossbar Operation

One single white line in this diagram represents a stereo-connection (containing a left and a right channel). If required, the left and right signals can be connected independently (to perform mono-switching). Access to the individual mono-channels is given by clicking the Right Mouse Button onto a white AES line and then selecting “Show Stereo Channels” from the menu (Figure 24)

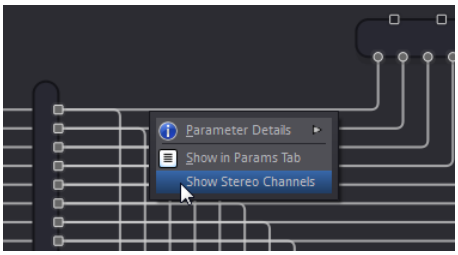

Figure 24: Audio Mono Crossbar

Embedder

Audio can be passed transparently or all four embedded audio-groups can be (re-) embedded into the SDI output. An existing embedded group can also be removed from the SDI stream, even without embedding anything. (Re-) embedding a group will implicitly remove this same group from the input SDI stream, if applicable.

An embedded audio-group can only be embedded as a complete group containing two AES streams. If you want to replace only one out of the two AES streams in the SDI, you need to feed the other AES stream from the Deemedder (on the left) through the audio-processing block and the output crossbar to the Embedder, and re-embed it together with that other (new) AES content into the same group. This will, technically, replace the complete embedded group in the SDI stream.

Embedding audio into an HD-SDI and 3G-SDI stream will always be done in 24bit resolution. When embedding into SD-SDI, 24bit embedding is activated by default, but can be de-activated (reducing the embedding to 20bit). This may be required to satisfy some non-standard-compliant SDI deembedder.

AES Port Setup

The P VD 5810 provides a total of eight external AES ports. Each of these ports can be configured to be an AES input (receiver) or an AES output (source). By default, i.e. when delivered from the factory, AES ports 1 through 4 are configured as AES inputs, while AES ports 5 through 8 are configured as outputs.

This default port configuration can be modified at any time. An explicit un-locking of these configuration switches is required to prevent from accidental changes to these fundamental configuration settings.

A modified AES port configuration will NOT be reset by a “Reset to Factory Default” operation (see page 39).

NOTE: Please make sure NOT to configure an AES port as an output, while an external signal source might send a signal into that port. This misconfiguration might potentially result in permanent damage of hardware components.

User Presets

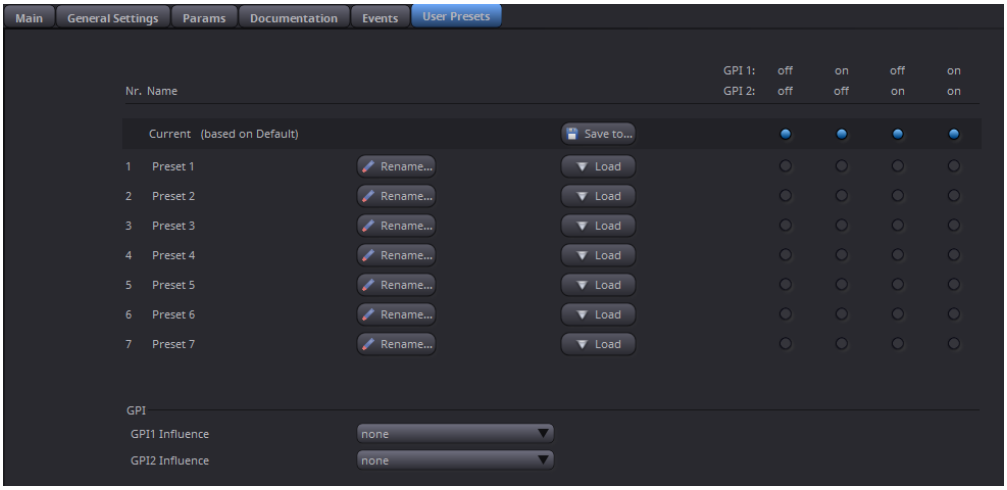

Figure 25: User Presets Tab

The User Presets Tab provides the ability to store and recall seven different sets of User Presets. Each such User Preset contains a current value for all settings (parameters) of the complete device. Restoring a User Preset means to apply these current values to all parameters at once. I.e. it is not possible to restore a User Preset and thereby modify only a subset of the internal parameters.

All User Presets are stored in on-board flash-RAM, where they are preserved even during long periods of no power supply.

Saving a User Preset

The current configuration of the complete device is stored into one of the User Presets by following these steps:

1. On the “User Presets” Tab, click the button “Save To” to open the dialog shown in Figure 26
2. Select one of the User Preset slots (click button to the right). Optionally: rename the User Preset. (max 8 characters).
3. Click “Save”

Figure 26: Saving a User Preset

Loading a User Preset

An existing User Preset can be restored into the Current Settings of the complete device by following these steps:

1. On the “User Presets” Tab, click the “Load …” button next to the User Preset.
2. In the next dialog, confirm that this is what you want.

Activating User Presets by GPI

External GPI contacts can be used for quick activation of User Presets by following these steps:

1. In the right columns, specify the required GPI polarities for the User Preset.
2. Set the GPI influence of GPI1 and/or GPI2 to “switch user presets”. The presets are now activated based on the polarity of the GPI inputs.
3. The active Preset is indicated by the highlighted background bar in the respective line.

The current configuration of a Preset can only be modified by the procedure explained above. If one of the stored Presets is activated by GPI, all control parameters for the P VD 5810 are read-only.

NOTE: Only the complete device configuration can be loaded using User Presets. I.e. it is not possible to restore a User Preset and thereby modify only a subset of the internal parameters. For more fine-grained control to individual parameters by GPI, please refer to LYNX APPolo AutoControl / GPI Control (look at http://appolo.lynx-technik.com)

GPI Influence

The P VD 5810 has two local GPI contacts that can be used for various functions. The drop-down selections named “GPI Influence” on page “General Settings” can be used to specify their function. By default, the “GPI Influence” is “None” for both GPIs.

The following selections are available:

None	*(default)*
Freeze Input 1	All outputs that are connected to SDI Input 1 will show the same repeated still image while GPI is active.
Switch user presets	(see section “Activating User Presets by **GPI**”, page 35)

Device Event Tab

The Events Tab is where the module alarming and error notifications are configured for the module. Any of the possible Events that the device can generate can be disabled here, which will declare such Events as irrelevant. Once an Event has been disabled in this Events-Tag, the Event will not be reported to the APPolo control system, it will not be logged in the logfiles, and it will not even influence the local LEDs of the device.

For all Events that are enabled (which is the default): as soon as the monitored condition becomes critical (e.g. input signal lost), the Event becomes ACTIVE. This change of state generates a message in the APPolo Control System. This message is stored in the APPolo Server logfile. Later, when the condition is not critical anymore (e.g. input signal present again), another message is logged in the APPolo Event System, and also saved in the logfile.

Additionally, these messages can be displayed in the APPolo GUI's Event Log (bottom part of the APPolo GUI, enabled from the "View" menu). This can, however be disabled by removing the checkboxes from the "Log in GUI" columns (separately for "Event becomes Active" and "Event not active anymore" messages.

Similarly, an SNMP trap can be generated from the APPolo Server for any message in the APPolo Event System. Refer to the LYNX Remote Control Guide for more information on SNMP (available from http://appolo.lynx-technik.com)

Parameters

The "Params" tab lists all available control parameters of the complete device. Every switch and function in any other part of the GUI is actually just a graphical control of a parameter listed on this page. There are, however, a number of parameters for more detailed control that are only accessible in this list of parameters on the "Params" tab.

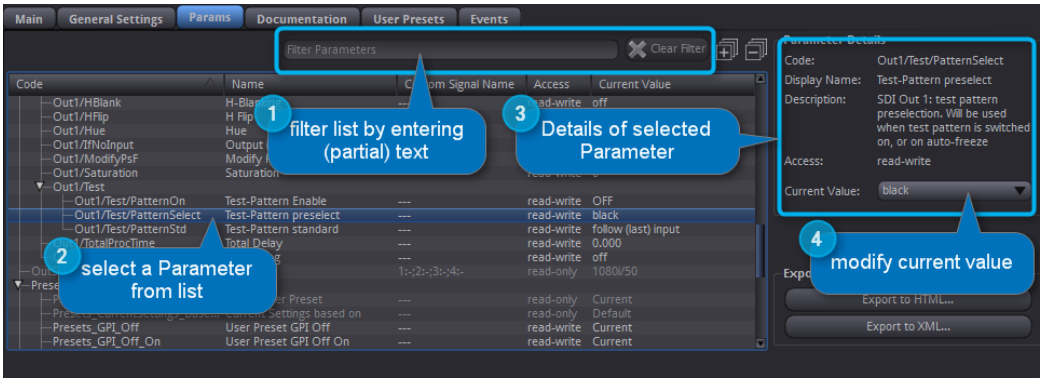

Figure 27: Param Tab

All parameters are defined by the following aspects:

- Code: This is a unique code to identify the parameter. The Code can contain the slash-character '/', to provide some structure to the total collection of parameters. The Parameter Code is always to be specified as the complete text string (i.e. including all slashes).
- Name: a human readable short parameter name, which is used as the default text label in most parts of the GUI, as well as in any CustomControl Panel.

- Access: read-write or read-only accessibility. Note that for some parameters, the accessibility status may potentially change, depending on the current value of other parameters. E.g. the value of parameter A might be controlled automatically by default, so the accessibility of A will be displayed as “read-only”. But a boolean parameter B might be provided to switch off the automatic behavior. So when parameter B is set to MANUAL, then parameter A would dynamically change to “read-write”.
- Current Value: This is the current value of the parameter. If Accessibility is “read-write” (see above), then the Current Value can be modified.
- Description: a textual explanation of the behavior of the individual parameter.

You can use the “Filter” function (located above the actual list of parameters) to show only a subset of the complete list, based on textual filtering. The filter will actually search in any part of the parameter definition, including the parameter code, the textual description and even the Current Value.

NOTE: In theory, it would be possible to manage and monitor the complete functionality of the P DA 5288 by accessing the relevant parameters on this tab only. All the other tabs in the GUI are only provided to provide better explanations and overview.

All Control is through Parameters

As stated above, the complete behavior of any LYNX Device can be controlled and monitored through the parameters listed on the “Params” tab. All other parts of the LYNX APPolo Control System use these Parameter to take access to any aspect of the Device.

- The LYNX CustomControl feature connects the individual elements of a custom-made Design to real device parameters by their Code.
  See http://appolo.lynx-technik.com/ -> CustomControl for details.
- The LYNX AutoControl automation rules access the individual Parameters (for both Conditions and Actions) by their Code.
  See http://appolo.lynx-technik.com/ -> AutoControl for details.
- The LYNX RemoteIF API addresses individual Parameters by Code.
  See http://appolo.lynx-technik.com/ -> RemoteControl for details.
- The LYNX SNMP Control provides one OID (numerical address in the MIB) per individual Parameters. The exact mapping of Parameter Code to OID is provided in the MIB files.
  See http://appolo.lynx-technik.com/ -> RemoteControl for details.

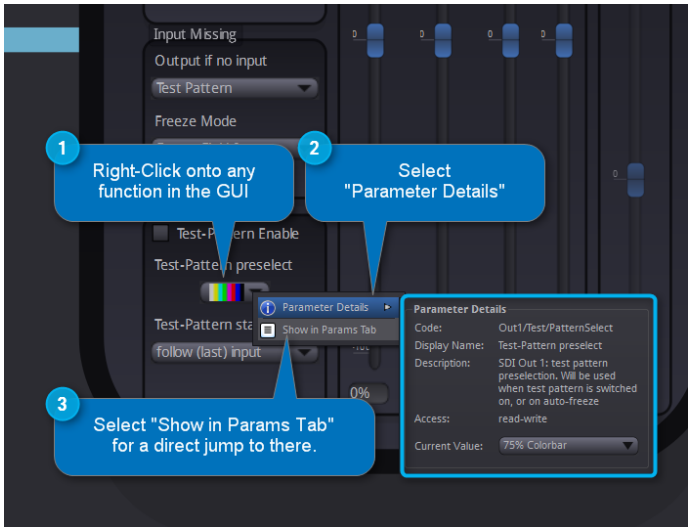

Figure 28: Parameter Details from GUI

Finding the Parameter Code name for a given Parameter in the graphical GUI is made easy by clicking the Right-Mouse-Button onto the graphical control anywhere in the GUI and then selecting the “Parameter Details” option (see Figure 28).

General GUI functions

There are a number of functions and commands of the LYNX APPolo Control System which are common for all LYNX devices.

A click with the Right-Mouse-Button on any module in the DeviceTree will generate the same menu that is available from the “Device” menu. This menu provides the following options:

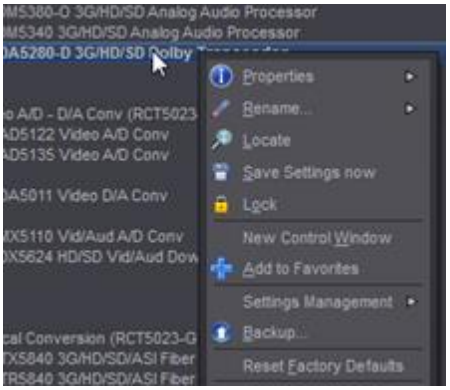

Figure 29: Device Menu from Tree

Device Properties

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

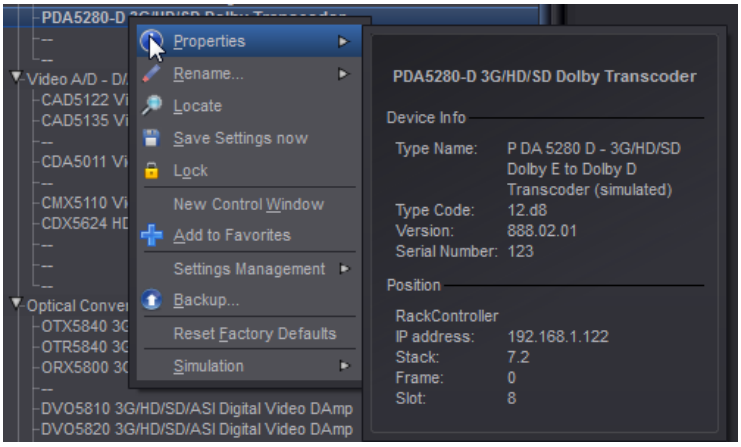

Figure 31: Device Properties Menu

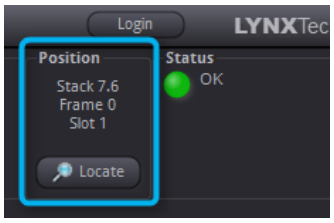

Figure 30: Locate Position

Locate

This function 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.

New Control Window

Selecting this option will open up a separate GUI window showing just the controls for the current module. This new window can be used to arrange multiple devices on your desktop or similar.

Rename

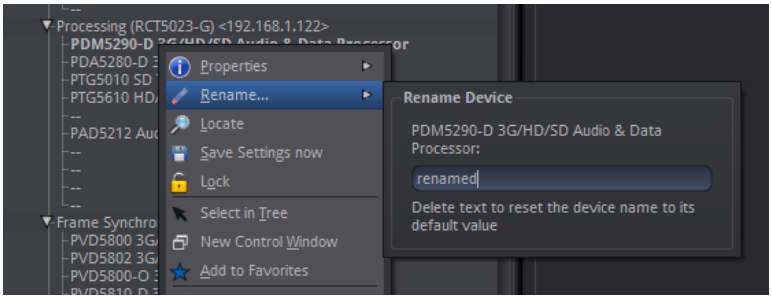

Figure 32: Rename Device

It is possible to rename individual items (RackFrames and individual devices) in the APPolo Device Tree. The default name of a device is the LYNX product name. This name can be modified at any time. The original (default) name can be restored by simply removing the custom name from that renaming-field (save this as an empty name).

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

Save Settings Now

Any modification to any parameter of a device is immediately propagated from the APPolo GUI to the hardware device (card) and made effective. The current settings are saved in a local FlashRAM of the device, so that the device will continue to work in the exact same configuration after a power-cycle. But in order to reduce the number of write-operations on the physical FlashRAM, the actual storage of a modified configuration into the FlashRAM is only executed approximately 10 seconds after the last change to any setting in the whole card. This operation is visualized on the board by all local LEDs flashing three times in yellow color.

Consequently, if you remove a card from a system BEFORE the last changes have been saved to FlashRAM, those last changes will not be available on the next power-up.

The “Save Settings Now” operation in this menu can force the current configuration of this device to be stored to the local FlashRAM now. If in doubt, this function should be executed before a device is physically removed from the system, or before electrical power is shut down.

Lock

Selecting this will lock the device to prevent from 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

Executing this function will reset all the individual settings of all parameters of the device back to the predefined state that has been defined by the manufacturer. All custom adaptions will be lost. This operation cannot be undone.

Settings Management

The complete current configuration of one device can be copied into an internal “clipboard” and pasted onto a different device of the same type. Alternatively, the complete current configuration can be stored to a local file (as a very simple single-device backup).

Specifications

Video Inputs (BNC)	
Signal Type	Serial digital video SMPTE 292M, 344M, 259M-C, 424 M
Input standards	See table on page 9
No. of inputs	1
Connector	BNC
Impedance	75 Ohm
Cable Equalization	Up to 250m Belden 8281 (270MHz) Up to 140m Belden 1694A (1.485GHz) Up to 80m Belden 1694A (2.97GHz)
Return Loss	> 15 dB (270MHz) > 10dB (1.485GHz)
Reference Input	
Signal Type	Analog Bi-level / Tri-level (auto detect) cross lock compatible. Standards see table on page 11
No of inputs	1 x External or internal rack reference (selectable)
Connection	BNC
Impedance	75 Ohm
Video Outputs (BNC)	
Signal Type	Serial digital video SMPTE 292M, 344M, 259M-C, 424 M
Output standards	See table on page 10
No. of outputs	2
Connector	BNC
Impedance	75 Ohms
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)
Amplitude	800mV ± 10%
Return Loss	> 15 dB (1.485GHz); 10dB (2.97GHz)
Overshoot	< 10%
Video Processing	
Delay adjustment range	Up to 62 frames of programmable delay in pixel / line / frame increments or in ms
Video adjustments	Gain / Saturation / Hue / Black Level
Aperture correction	Horizontal only, adjustable
Test Patterns	Full field Black, Full field White, Full field Yellow, Full field Cyan, Full field Green, Full field Magenta, Full field Red, Full field Blue, 15% Grey (full field), 75% Color bars, 75% Color bars over Red, Pathological PLL/EQ
AES Audio Inputs / outputs	
Signal	P VD 5810 U = AES3 id un-balanced on Mini DIN connectors P VD 5810 D = AES3 balanced on SubD 25 connector
No. of inputs / outputs	8 x AES ports
Coupling	Transformer
Audio Processing	
De-embedder	De-embed all audio (4 audio groups = 8 AES)
Audio delay	Audio is delayed to match the video delay and will automatically track the frame synchronizer. User adjustment of up to 10 seconds (in ms) is provided
Audio Embedder	Independent embedder applies 4 audio groups (8 AES) into output channel. User selectable. Audio signals can be transparently passed through or re-embedded in new order.
Test Tone	1 x 1kHz test tone generator, individually switchable per audio channel
Operating Modes	
Frame Sync	SD / HD / 3GBit/s Multi-rate Frame/Line Synchronizer
Control	
Local Controls	Local DIP switches for setting “basic” module parameters.

Remote Control	Comprehensive remote control and status monitoring supported when used with a LYNX Controller option. The use of the control system is recommended for this module
External GPI	Two GPI inputs. GPI influence configured in control system.
Electrical Specifications	
Operating Voltage	12 VDC
Power Consumption	10 W max.
Safety	IEC 60950/ EN 60950/ VDE 0805
Mechanical	
Size	283mm x 78mm
Weight	CardModule 200g, connector plate 150g
Rack space	Requires 1 slot in rack frame (max 10 modules per frame)
Ambient	
Temperature	5°C to 40°C Maintaining specifications
Humidity	90% Max 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. There is one consumable part used on this module which is the cooling fan. A service kit is available to exchange the fan.

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

Technical Support

If you are experiencing problems, or have questions please contact your local distributor, authorized dealer or reseller for more details. Please do not return products to LYNX without an RMA.

For FAQs and Technical support visit **http://support.lynx-technik.com**

General product information is available on **http://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.

LYNXTechnik **AG**

Broadcast Television Equipment