

Reference Manual

P VD 5802

P VD 5802 S

Dual Input SD/HD/3G Multi-format Frame Synchronizer

Revision 2.1 – November 2016

This Manual Supports Device Revisions:	
P VD 5802 Firmware Revision	762
Control System GUI Release	8.8.0

Information in this document is subject to change without notice. No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical for any purpose, without express written permission of LYNX Technik AG.

LYNX Technik AG may have patents, patent applications, trademarks, copyrights or other intellectual property rights covering the subject matter in this document. Except as expressly written by LYNX Technik AG, the furnishing of this document does not give you any license to patents, trademarks, copyrights or other intellectual property of LYNX Technik AG or any of its affiliates.

LYNX Technik AG
Brunnenweg 3
D 64331 Weiterstadt
Germany
www.lynx-technik.com

Contents

Contents	2
Regulatory information	5
<i>Europe</i>	5
Declaration of Conformity	5
<i>USA</i>	5
FCC 47 Part 15.....	5
Getting Started	6
<i>Packaging</i>	6
<i>ESD Warning</i>	6
Preventing ESD Damage.....	6
Product Description	7
<i>Input Video Formats</i>	8
<i>Output Video Formats</i>	9
<i>Input Reference Signal</i>	10
<i>Reference Lock</i>	11
<i>Frame Synchronization</i>	11
<i>Video Processing</i>	12
Proc Amp Functions	12
Aperture Correction.....	12
Test Patterns.....	12
Programmable Output Delay.....	12
Audio Processing.....	13
DolbyE Audio Signals.....	13
Switch video inputs with GPI (GPI 1 only)	14
Freeze input with GPI	14
User Presets – GPI Switch.....	14
GPI Connections.....	15
<i>Functional Diagrams</i>	16
<i>Module Layout</i>	17
Connections	17
<i>Video</i>	17
<i>GPI Connections</i>	17
Installation	18
Settings and Control	19
<i>Switch Settings</i>	20
Switch Function Detail	20
Factory Preset Condition.....	20
Auto Store	20
Reset Button	20
Alarm/LED Status Indicators	21

REF Status (LED1)	21
Power Indication	22
Local/remote LED	22
Control System GUI	23
Main Tab	24
Input Select	24
REF in Select	24
Frame Sync Adjustments	25
Frequency Pre-select	25
TRS Error	26
Synchronization Mode	26
Synchronous SDI Input (minimum audio delay)	27
Video Proc	28
Aperture Correction	28
Clip YCrCb Headroom	28
H Flip	28
Blanking	28
Expected Input Standard	28
Input missing	29
Freeze Mode	29
Test Pattern Pre-select	29
Test Pattern Standard	29
Test Pattern Enable	29
Video Adjustments	30
Timing Adjustments	30
User Presets Tab	31
To save a preset	31
To load a saved preset	32
Setting GPI control of Preset selections	32
GPI Influence	32
Events Tab	33
Log in GUI Function	33
Event enabled	33
SNMP Support	33
Specifications	34
Service	35
Parts List	35
Technical Support	35
Contact Information	35

Warranty

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

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

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

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 RESPONSIBILITY 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, INCIDENTAL, 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 Brunnenweg 3 D-64331 Weiterstadt Germany
<i>Declare under our sole responsibility that the product</i>	
TYPE: P VD 5802; P VD 5802 S	
<i>To which this declaration relates is in conformity with the following standards (environments E1-E3):</i>	
EN 55103-1 /1996	
EN 55103-2 /1996	
EN 60950-1 /2006	
<i>Following the provisions of 89/336/EEC and 73/23/EEC directives.</i>	
	Winfried Deckelmann
Weiterstadt, May 2014	
<i>Place and date of issue</i>	<i>Legal Signature</i>

USA

FCC 47 Part 15

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

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

Getting Started

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

Packaging

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

ESD Warning



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

Preventing ESD Damage

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

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

Caution

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

Product Description

The P VD 5802 Module is a high performance SD/HD/3Gbit/s frame synchronizer / line synchronizer including a video processor stage providing some fundamental video processing functions.

The P VD 5802 is a single channel frame synchronizer with dual input. The inputs can also be switched with the GPI contacts on the rear connection panel.

The P VD 5802 has a terminal block for wiring of the GPIs, the P VD 5802 S has a 3 Pin WECO type connector.

All embedded audio signals are deembedded from the SDI input signal and synchronized in parallel to the video and then re-embedded into the SDI output signal. The video delay is also compensated in the audio path.

Dolby E processing is included in the audio path, i.e. one encoded Dolby E stream can be synchronized to the Reference Signal and the Guard Band is automatically aligned. Allocation of this Dolby E synchronizer is automatically done.

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.

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 (Level A)	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 on two BNC connectors. Supported output video formats are:

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 (Level A)	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 outputs to the frame rate of the connected reference signal.

Supported reference signals 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 5802 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 Dolby E signal **will not match** the required guard band of the video output signal.

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.

The synchronizer can also be switched into a Line Synchronizer Mode (see page 26)

Video Processing

Proc Amp Functions

The output channel has an associated video processing amp which provides user adjustable **Gain** / **Saturation** / **Black Level** and **Hue** using on screen sliders.

Aperture Correction

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

Test Patterns

The output processor provides a test pattern generator with a wide range of test pattern to choose from.

The selected test pattern is also available as one of the modes 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 Output Delay

The SDI output has a separate programmable video output delay which can be set (independently) between 0 and 62 frames (max). The adjustment is available in pixel, line and full frame increments or can be switched to a ms increment entry.

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

Audio Processing

The module will de-embed the complete audio payload from the incoming SDI stream signal, i.e. 4 AES groups = 8 AES = 16 audio channels per channel.

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

The audio is fed through sample rate converters (SRC's) where the audio is re-sampled and synchronized.

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.

DolbyE Audio Signals

The PVD 5802 is transparent to any embedded DolbyE bit streams:

- a) If the input is synchronous,
- b) If the input is asynchronous – one Dolby E synchronizer is provided, which synchronizes the Dolby E signal to the reference signal and automatically aligns the guard-band. Allocation to the audio signal which contains the Dolby E signal is automatically done.

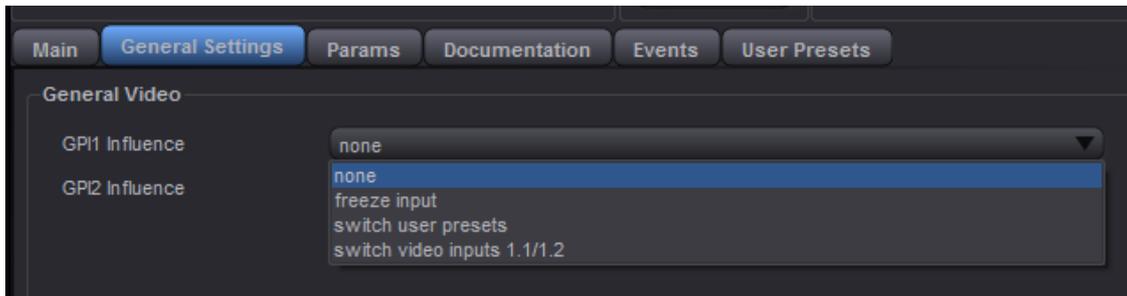
Note: *Synchronization and auto guard band alignment only works correctly if the frame rates of the video input/output matches the reference signal (see above "Reference lock)*

Note: *The synchronization resources are limited on each module. All Audio signals have sample rate converters (SRC), but there is only one DolbyE frame-synchronizers (DE-FS) available.*

*In the event that the available synchronization resources for Dolby E Streams are exceeded, the remaining audio content will be passed through **un-synchronized** and a warning will be visible in the control system GUI.*

GPI Function

The two GPI inputs (**General Purpose Interface**) 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 using the control system on the Sync Tab.



Switch video inputs with GPI (GPI 1 only)

If this mode of the GPI influence is selected then the following functions will be performed:

- With GPI open the SDI 1.1 input is selected
- With GPI closed the SDI 1.2 input is selected.

Freeze input with GPI

If this mode of the GPI influence is selected then the following functions will be performed:

- With GPI open the module processes all input signals as usual
- With GPI closed the input will be frozen (volatile freeze, i.e. frozen frame is not retained through power cycle)

In the case of an activated freeze the module processing performs all functions on the frozen frame.

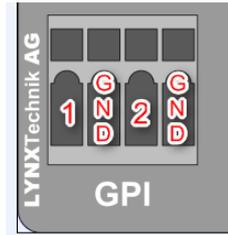
User Presets – GPI Switch

User Presets allow the user to store 7 additional sets of module settings (snapshots) in addition to the current settings in module flash RAM. The GPI can then be configured to toggle between any 2 or 4 of the 8 stored presets by selecting “*switch user presets*” as the GPI influence setting. (Refer to the *User Presets* section in the GUI part of this manual for more details)

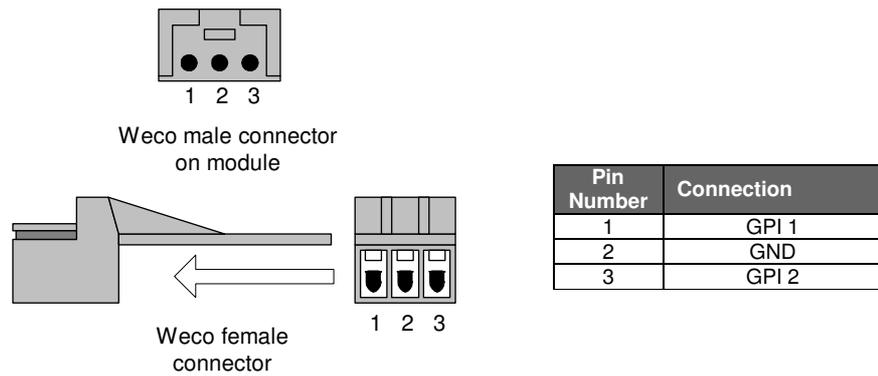
GPI Connections

The pinning of GPI contacts are shown in the pictures below.
 An external connection (shortcut) in between GND and the respective GPI contact (1 or 2) will activate the GPIs

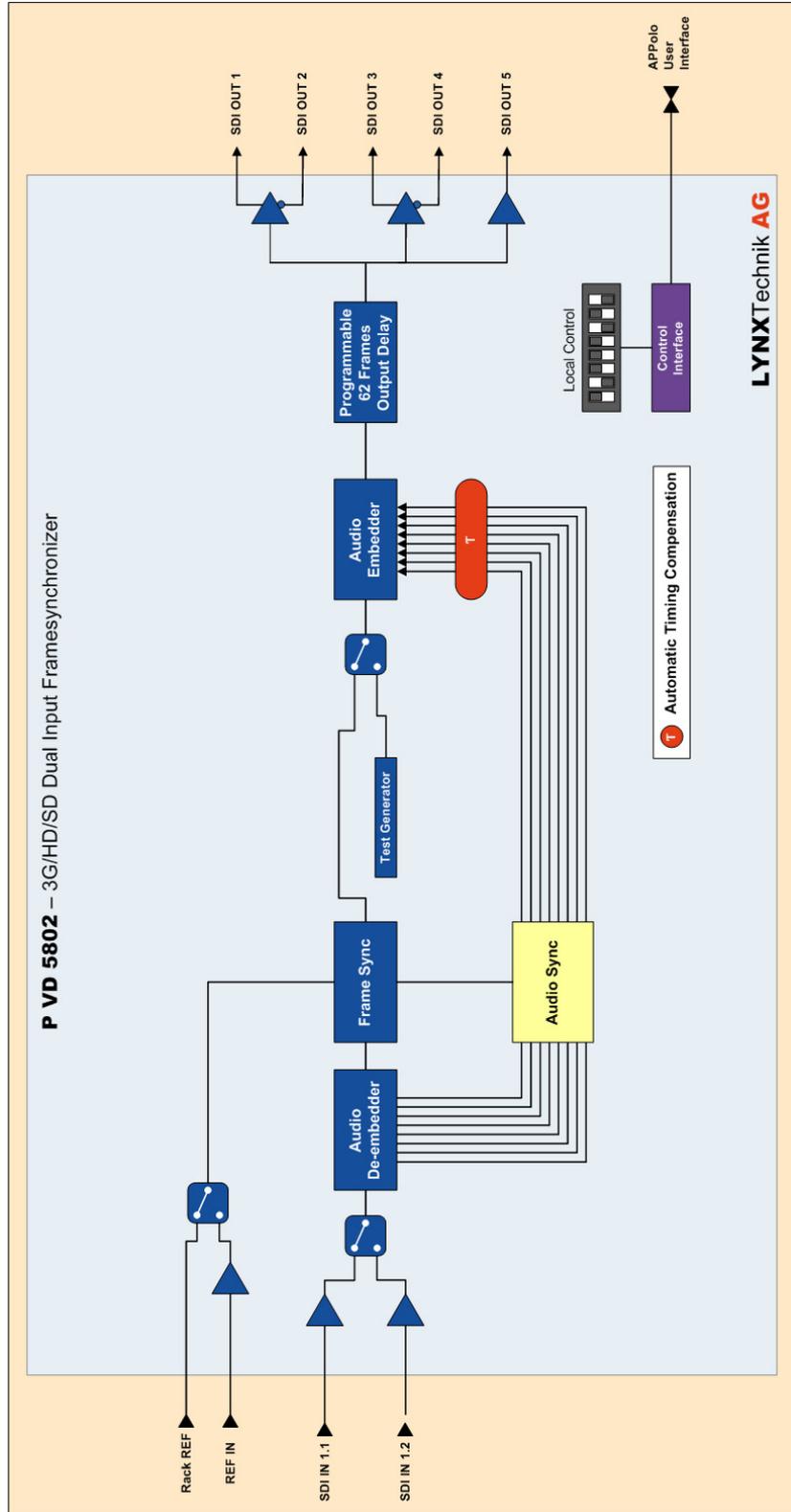
- Terminal block on rear connection panel of P VD 5802:



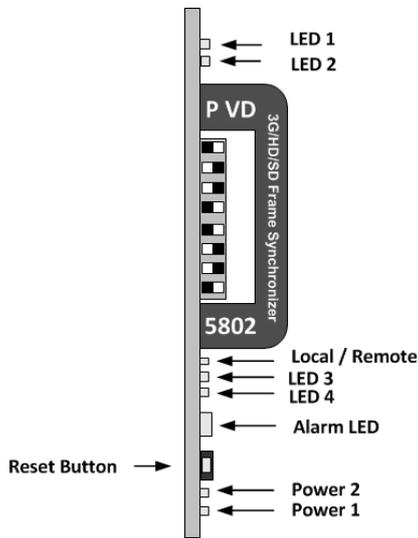
- WECO 3 pin connector on rear connection panel of P VD 5802 S



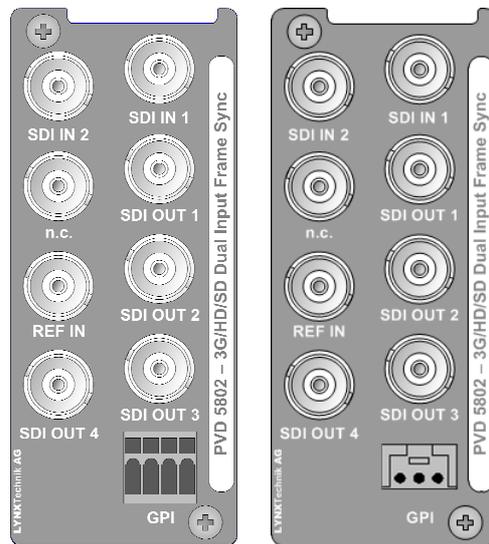
Functional Diagrams



Module Layout



Module Front



Module Rear Termination Panels

Connections

Video

The P VD 5802 uses standard 75 Ohm BNC connectors. We recommend the use of high quality video cable for digital video connections to reduce the risk of errors due to excessive cable attenuation. 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.

GPI Connections

Please see GPI connection on page 15 above

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.

This module has a single width rear connection panel, meaning it will occupy one slot of a standard Series 5000 Card Rack. This is to accommodate the additional connections needed for this module and to also provide adequate space for cooling in the rack. Up to ten P VD 5802 modules can be accommodated in a single Series 5000 rack frame.

NOTE. When using this module the **R FR 5012 Fan Front Rack Frame** should be used, which provides additional airflow into the rack.

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

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

1. Select a free slot space in the card frame where the CardModule will be located.
2. Remove the blank connection panels from the rear of the rack (if fitted)
3. Install the rear connection panel using the screws supplied. Do not tighten the screws fully
4. Slide the card module into the card frame and carefully check the CardModule connects to the rear connection plate. The card should fit easily and should not require excessive force to insert - if you feel any resistance, there could be something wrong with the rear connection panel location. **Do not** try and force the connection 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 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)

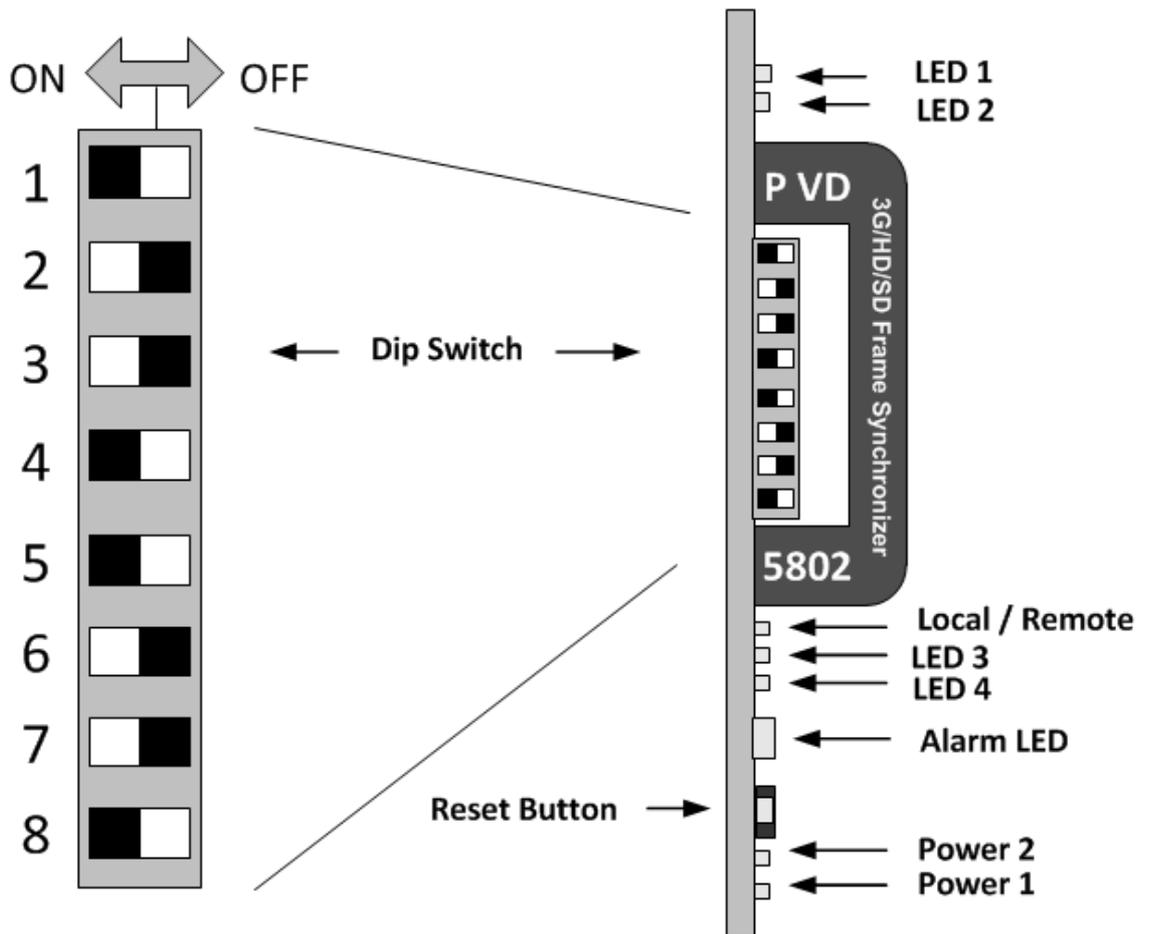
NOTE. The use of the optional control system is **mandatory** for the control and setup of this module. If you do not have the control system, then please contact your LYNX representative for details on how to upgrade your installation with the LYNX control system.

Settings and Control

The P VD 5802 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.

PCB Front View



Switch and LED locations

Switch Settings

Below the switch settings for the 8-position dip-switch are defined.

Switch	Setting	Function
1	ON	Enable Local Adjustment
	OFF	Disable Local Adjustment
2		Not used
3		Not used
4		Not used
5		Not used
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		Not used

Switch Function Detail

Dip Switch 1

This switch is used to enable or disable local adjustments. Set to **ON** enables the setting of the other dip switches to configure the module. Set to **OFF** will prevent any switch settings taking effect.

Dip Switch 6

If this Dip Switch is set to ON all content in the horizontal blanking intervals will be erased
If set to OFF the content in the horizontal blanking intervals will be preserved

Dip Switch 7

If this Dip Switch is set to ON all content in the vertical blanking intervals will be erased
If set to OFF the content in the vertical blanking intervals will be preserved

Factory Preset Condition

The P VD 5802 is delivered programmed and preset for the following mode of operation:

- Switch 1 **ON** Local Adjustment Enabled
- Switch 6 **OFF** Content in H-Blanking interval preserved
- Switch 7 **OFF** Content in V-Blanking interval preserved

If this is the required mode of operation, then no adjustments are necessary.

Auto Store

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

Reset Button

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

Alarm/LED Status Indicators

The P VD 5802 module has integral LED indicators, which serve as alarm and status indication for the module. Function is described below.

REF Status (LED1)

This LED indicates the status of the Reference signal

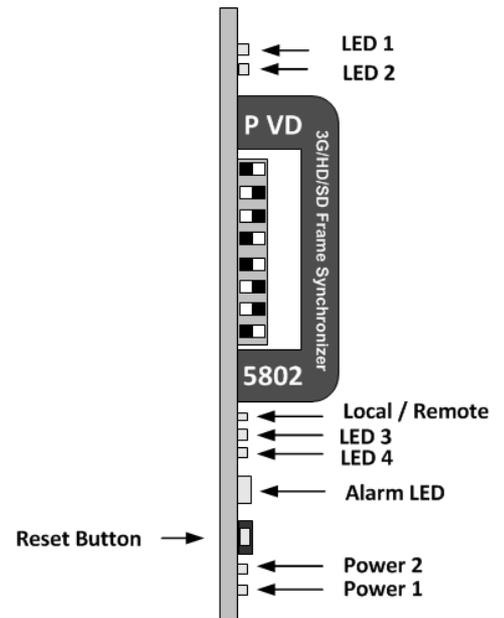
LED Color	Indication
Green	REF present and ok
Yellow	REF missing, but not required (self-lock on SDI input) REF ok, but not matching a fixed frequency setting (odd/even)
Red	REF missing

SDI Status (LED2)

This LED indicates the status of the audio input signals

LED Color	Indication
Green	SDI input ok
Yellow	SDI input not matching a fixed frequency setting (odd/even)
Red	SDI input missing

LED3 and LED 4 are not used for this module



Alarm Indicator

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

LED Color	Indication
Green	SDI input ok
Yellow	frequency mismatch (see LEDs 1 and 2 above)
Yellow flashing	Locate device activated from GUI
Black, triple yellow flash	Save settings to flash of on-board microcontroller
Red	SDI or REF missing

Power Indication

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

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

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

Local/remote LED

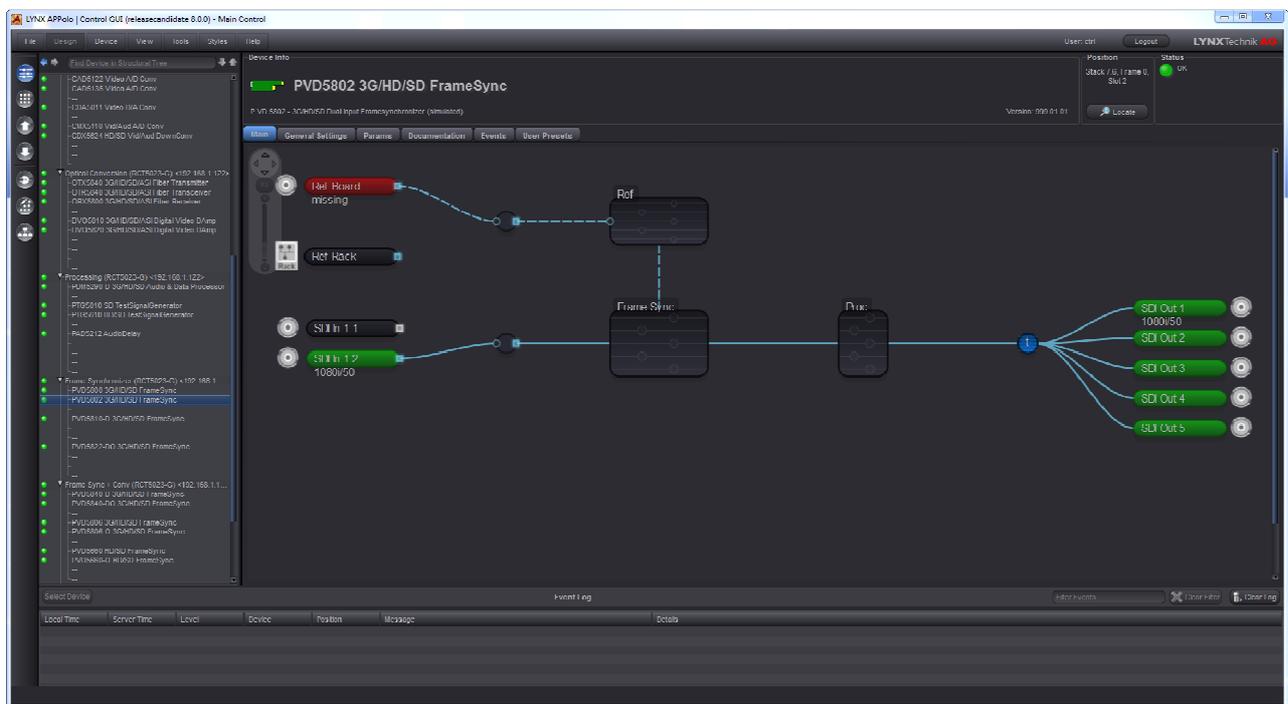
LED Color	Indication
Green 	Local control via DIP switches active, all settings according to local DIP switches
off	Current settings may be overwritten through remote control

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. Due to the complex nature and extensive user settings provided on the P VD 5802 **we recommend** 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.

The following GUI screenshots and descriptions shown below describe the settings and adjustments possible for the P VD 5802 CardModule.



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

Note. The Locate function is a tool used to quickly identify a module in larger systems. Selecting "locate" will flash the module alarm LED yellow. (This does not affect module operation)

Main Tab

The first screen displayed when the module is selected is the **Main Tab** this is a graphical representation of the modules overall function and signal flow (left to right). Clicking on the processing boxes or zooming into the main tab will show more controls for these specific functions.

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



This screen is the main interface and is presented first when the module is displayed in the GUI. The layout replicates module “block” functions and signal flow from left to right. The primary purpose of this screen is to show the overall signal flow through the module and allow easy navigation to other areas. Input standards and formats are auto detected and displayed in the GUI. Parameters will be annunciated in different colors to show status (green = good, red = problem, yellow = caution, etc.).

Input Select

On the left side the SDI input (SDI In 1.1 or SDI In 1.2) can be selected. Hovering over the line will show a bubble. Grab the bubble and move the line to the other input



REF in Select

In the same way the source for the reference input can be selected. Either from the rear connection panel of the module (RefBoard) or from the Reference input of the rack frame (RefRack).

The reference for the frame synchronizer can also be derived from the digital inputs. This is useful for applications where the P VD 5802 is used as a video delay line.

Frame Sync Adjustments

The first area covers some General setup parameters for the frame sync operation.

Frequency Pre-select

This is where the frame synchronizer output frequency (or frame rate) is selected. This can be jammed 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 “jammed” 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*

Also, this value will not be restored to 50Hz following a “Restore Factory Defaults” operation, the stored setting is preserved.

The “Current Frequency” area in the GUI is showing the frequency the frame synchronizer is running in currently (useful if the *follow last reference* selection is made)

TRS Error

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 errors transparently (“Transparent”) then all video errors and disturbances are passed from the input to the output.

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. Selections for each channel are as follows:

- Freeze on TRS errors
- Transparent



Synchronization Mode

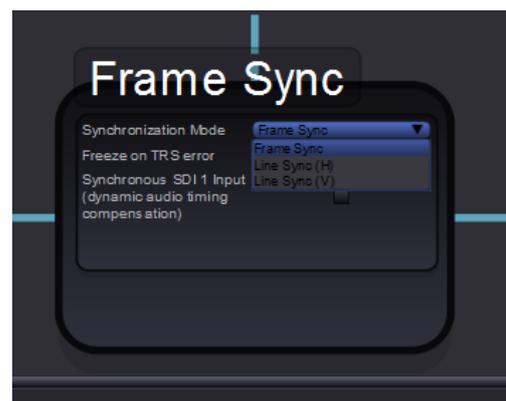
Three different modes of synchronization can be selected:

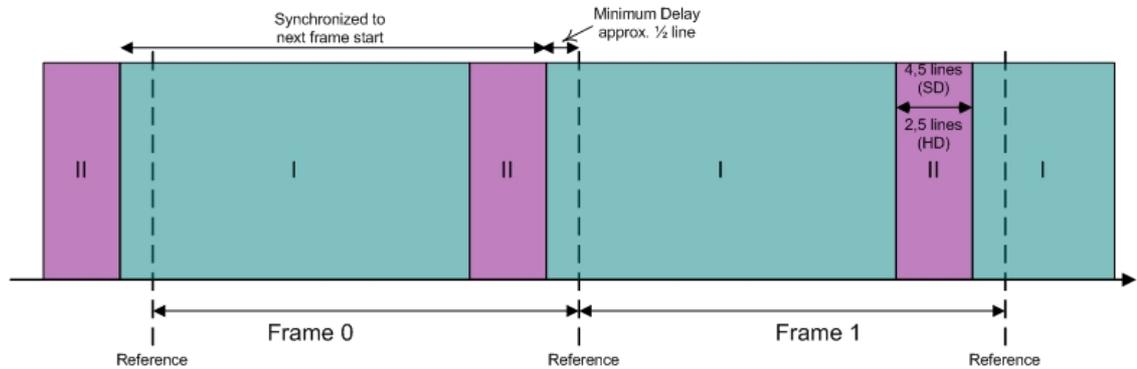
Frame Synchronization: The input signal is always buffered for 1 frame. TRS errors can be hidden with a freeze frame of the last valid frame. Also repeat frames in case the input clock is lower than the reference clock will be generated from the last buffered frame. Delay input to output is always minimum 1 frame plus the timing difference of input signal to Reference.

Line Sync (H): In case of clock synchronized signals the Line synchronizer H mode can be activated to achieve minimum delay. The input signal is buffered for 1 line to correct timing differences within 1 line. A minimum delay of approx. ½ line before the start of the next line has to be maintained to compensate for the processing delay of the P VD 5802.

Line Sync (V): In this mode the synchronizer delays the input signal towards the next frame start to achieve horizontally and vertically aligned pictures. The delay is then the timing difference of the input signal to the Frame Pulse of the Reference. This results in frame aligned signals without the additional 1 frame delay of the frame synchronizer mode.

A minimum delay of approx. ½ line before the start of the next frame has to be maintained to compensate for the processing delay of the P VD 5802.





For distortion free switching in front of the P VD 5802, 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 63). 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.

Synchronous SDI Input (minimum audio delay)

If activated the embedded audio to video delay at the output is always minimal. This should be used for clock synchronized signals only, because the audio is automatically delayed to compensate for the AV delay, which can cause audio disturbances with asynchronous sources.

Video Proc

This is where the individual video processing functions are set for the video signal.



Aperture Correction

Horizontal aperture correction is provided, 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 button to switch aperture correction ON and OFF and an adjustment range.

The numerical adjustment range provided is + 80 to -30.

Note. *Aperture correction OFF is the same as a Zero setting in the adjustment range*

Clip YCrCb 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 Flip

A checkbox selection is provided for H (Horizontal) flip. When selected, the video will be flipped horizontally. This is useful e.g. for virtual studio applications to have a mirrored picture for the speaker.

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).

Expected Input Standard

If this parameter is set to a specific standard (not "any" which is the default value), the device will, at all times, output a stable video with exactly this standard, as long as an input signal is detected. If the input video is identical to the selected video standard, the input video signal will be passed to the output. If however the input detects any other standard, the module will output a test pattern instead. The pattern type is defined by the parameter "Test Pattern Select".

Input missing

Here the behavior of the device can be selected if no input is present. The possible settings are:

- Off
- Freeze
- Black
- Test Pattern

Freeze Mode

When the synchronizer encounters excessive TRS errors it can be set to freeze or pass the video transparently (selected in the Video Proc). If Freeze is selected then the behavior of the freeze function is selected using the drop down selections. These are:

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

The Freeze Mode selection is also used when Freeze was chosen in the previous parameter "Output if no Input".

Test Pattern Pre-select

A wide range of patterns is provided which can be selected using the corresponding drop down selection. The pre-selected pattern will be used if the freeze mode is set to "Test Pattern" and will also be the pattern used if "Test Pattern ON" is selected. Patterns provided are:

- 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

With no input signal connected the module can be used as a standalone test generator. Using this selection it is possible to configure the test pattern into any of the supported standards, or it can be set to follow the last input standard. Settings provided are:

- Follow last input (default)
- Fixed standards (half, same or double or current reference frame rate)

Test Pattern Enable

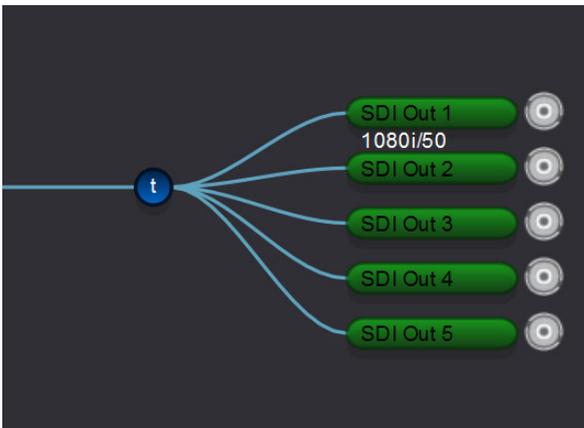
This checkbox simply switches on the pre-selected Test Pattern. An activated test pattern will be indicated on the **Main** Tab with the Video Proc container highlighted in yellow.

Video Adjustments

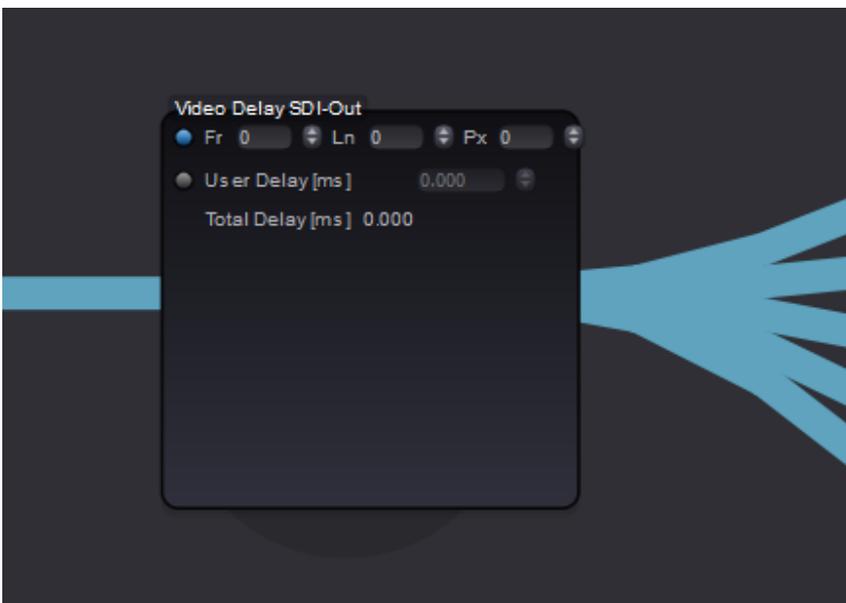
Four on screen sliders are provided to allow for the adjustment of individual video parameters. Separate sliders are provided for video Brightness (gain), Saturation, Black level and Hue.

Default (null) settings are 0%. Sliders can be quickly returned to the factory null (or transparent) settings by double clicking the slider.

Timing Adjustments



Double Clicking on the small (blue) bubble with the “t” inside will show the timing adjustments for the SDI outputs as shown below.

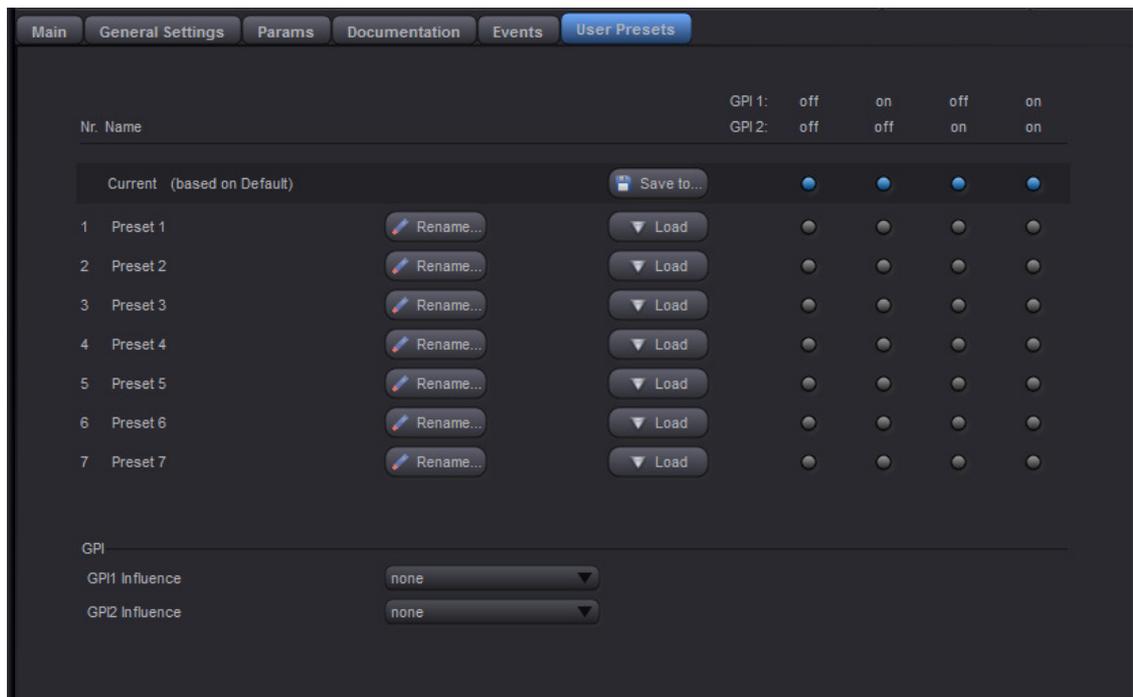


The output delay can be adjusted for the SDI output either in frames, lines and pixels or in ms. The total delay can be up to 62 frames.

Adjusting the output delay will also delay the audio being embedded in the SDI output.

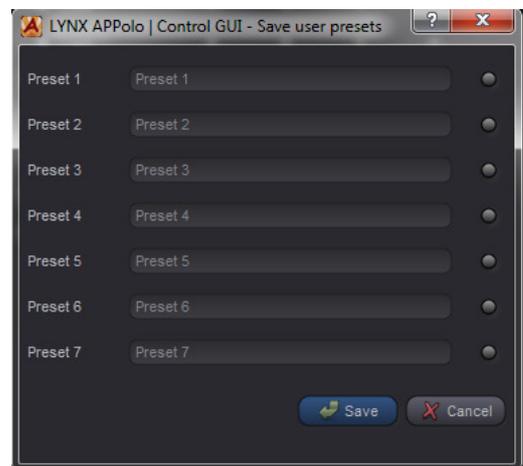
User Presets Tab

This Tab allows the user to store and recall 7 sets of additional module presets (settings), and also configure GPI switching between any two or four of the 7 stored presets and / or the current module settings (8 in total). The presets are stored in module flash ram and will survive power cycles.



To save a preset

1. First make all the module settings required using the various settings provided for the module.
2. Click the button “Save to...” to get the following dialog:
3. Use the radio button to select the preset location you wish to save the settings to and type in the desired name.
4. Click “Save” and all the current module settings are stored in the named preset.
5. Use the “rename” button to rename any stored preset.



To load a saved preset

To load a saved preset into the module simply click on the “Load” button adjacent to the preset, this will show the dialog shown below asking you to confirm your selection (as this will overwrite any current stored module settings).



Setting GPI control of Preset selections

In some cases it is desirable to switch quickly between two sets of stored presets, this can be achieved using the external GPI trigger.

1. Next to each preset there are four radio buttons which allow for the selection of GPI switching.
2. Simply select any of the stored presets and the required GPI polarities.
3. Set the GPI influence to “switch user presets”. The presets are now toggled based upon the polarity of the external GPI input signal.
4. The active Preset is indicated by the dark bar around the preset.

Note: *If a preset (except “Current”) is active, all control parameters for the P VD 5802 are greyed out.*

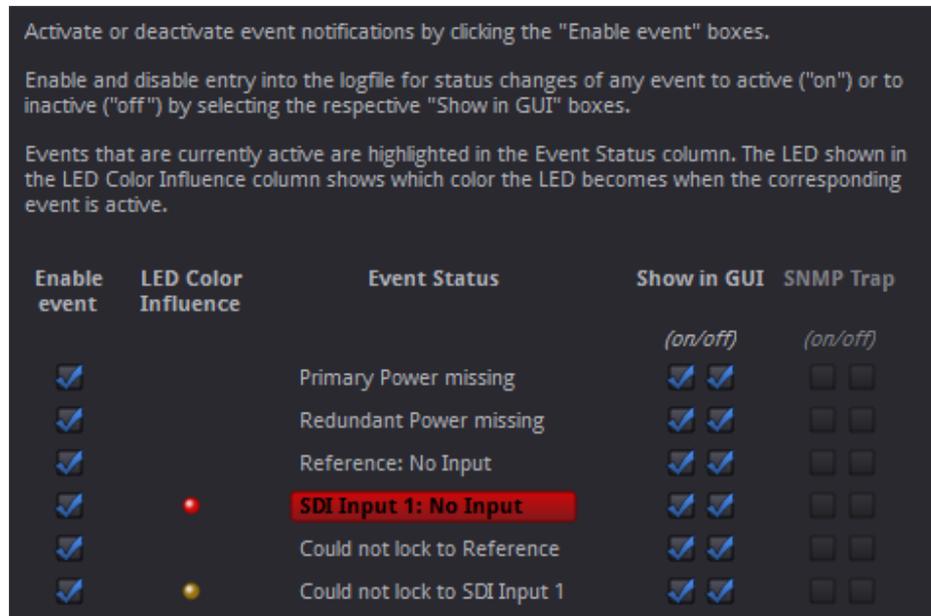
GPI Influence

The drop down box for GPI influence is used to set the function of the GPI input. The possible settings are:

- None
- Freeze input
- Switch user presets
- Switch video inputs 1.1/1.2 (for GPI1 only)

Events Tab

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



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

Log in GUI Function

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

Event enabled

By default all events are activated (checked). By de-selecting a specific alarm condition in this column you are telling the module to ignore this condition completely. It will not color the alarm LED, log an event in the GUI or send an SNMP trap. This is useful if for example you never have anything connected to AES input 1 and want the card to ignore this input condition completely you would simply de-select "AES Input 1 No Input" and it will be ignored.

SNMP Support

If the system is using a LYNX Server and the SNMP option is installed then the "SNMP Trap" columns become available.

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

Note. *In case of a simulated module, the tab has a further column: "Simulate event". A simulated event is part of the GUI simulator and allows us to force a particular error condition for testing and demonstration purposes.*

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	2
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) > 10 dB (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	5
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)
Return Loss	> 15 dB (1.485GHz); 10dB (2.97GHz)
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
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	9 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. Ordering information below.

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

Technical Support

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

Technical support is also available from our website.

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

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

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