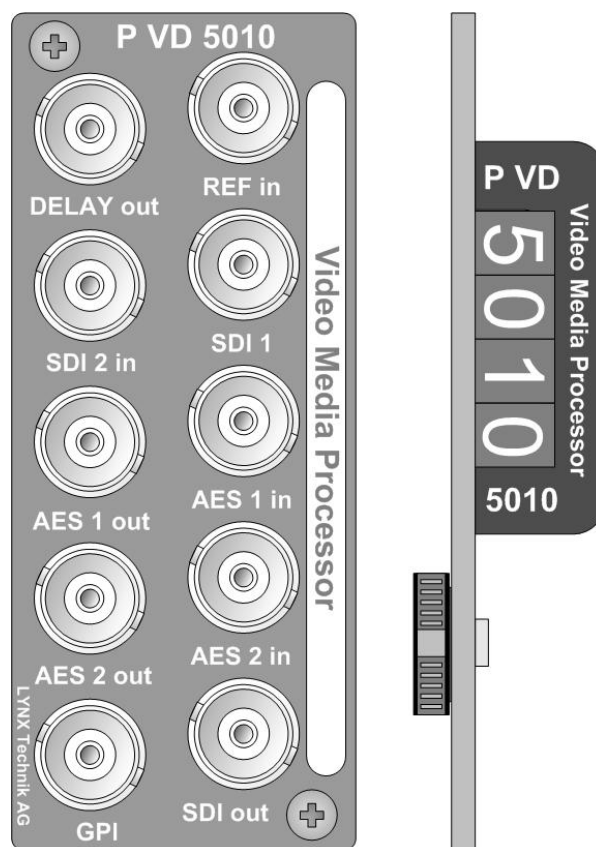


Version 2.0

Reference Manual

P VD 5010 B Video Media Processor (Frame Synchronizer with Audio Processing)

Series 5000
CardModule



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LYNX Technik AG warrants that the product will be free from defects in materials and workmanship for a period of two (2) year 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.


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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 5010 B	
<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 /2001	
<i>Following the provisions of 89/336/EEC and 73/23/EEC directives.</i>	
	Winfried Deckelmann
Weiterstadt, June 2004	
<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

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Getting Started

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.

Product Description

The P VD 5010 B is a high quality frame / line synchronizer designed primarily for broadcast and professional applications.

The two available SDI inputs can be synchronized to external sync with a delay of up to a maximum of 8 frames adjustable in 37ns increments. Minimum delay in Framesynch mode is 1 Frame, in Linesynch mode less than 1 μ s. SDI Inputs can be switched into the processor seamlessly, also via a GPI. A separate delay output is provided for external audio delay processing. From both SDI inputs 2 AES audio groups can be extracted, separately processed and embedded again to avoid audio clicks due to the video frame synchronization. In addition 2 external AES inputs and outputs are provided and can be processed and embedded into the SDI output signal

The P VD 5010 B features a wide range of available adjustments (via optional Rack Controller). Basic adjustments are possible using the local multi-function switch and integrated display.

CardModules are installed in the series 5000 card frame that can accommodate up to 10 CardModules. All modules are hot swappable and Options include full redundant power and a range of controller options.

Key Features

- Selectable frame or line synchronization mode of operation
- Dual standard operation (525/625)
- Delay of up to 6 frames max in 37ns increments
- Two SDI inputs with seamless (interference free) changeover via GPI
- The two SDI inputs can be switched frame accurately via GPI
- SDI inputs with active loop through
- Two SDI outputs provided
- Delay output pulse for external audio delay processor
- Internal deembedding of two audio groups (4 x AES) with Channel Swap, Mute etc. and embedding of processed audio groups into SDI stream
- 2 x AES input and 2 x AES output
- Local DIP-switch, push buttons and LED's for local control and status monitoring
- Microprocessor controlled with local display and menu driven user interface
- Flash Ram storage for settings
- Remote control interface

Functional Diagram

Figure 1 below is the basic functional diagram for the P VD 5010 CardModule. The audio path is shown in detail as separate diagram.

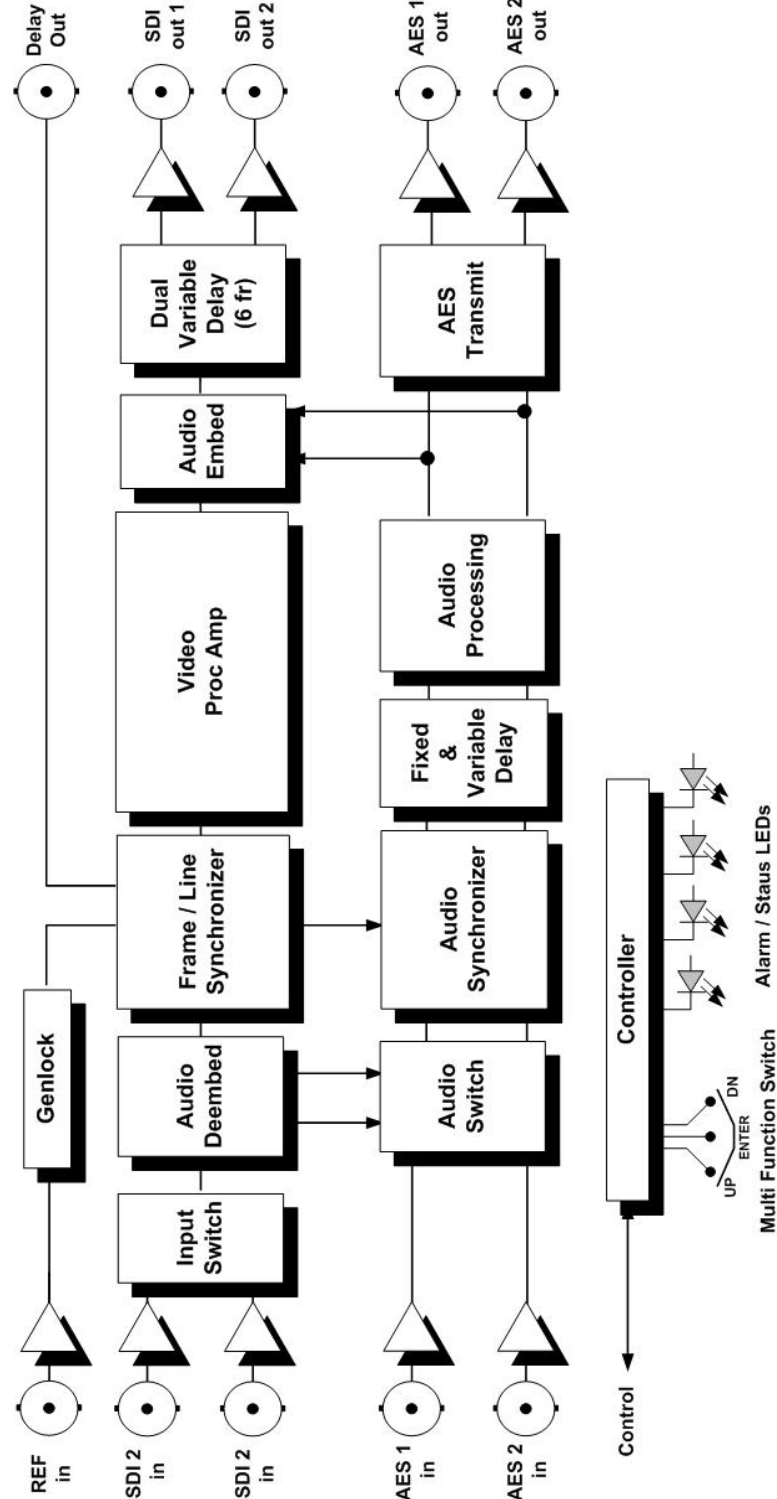


Figure 1- P VD 5010 B Functional Diagram

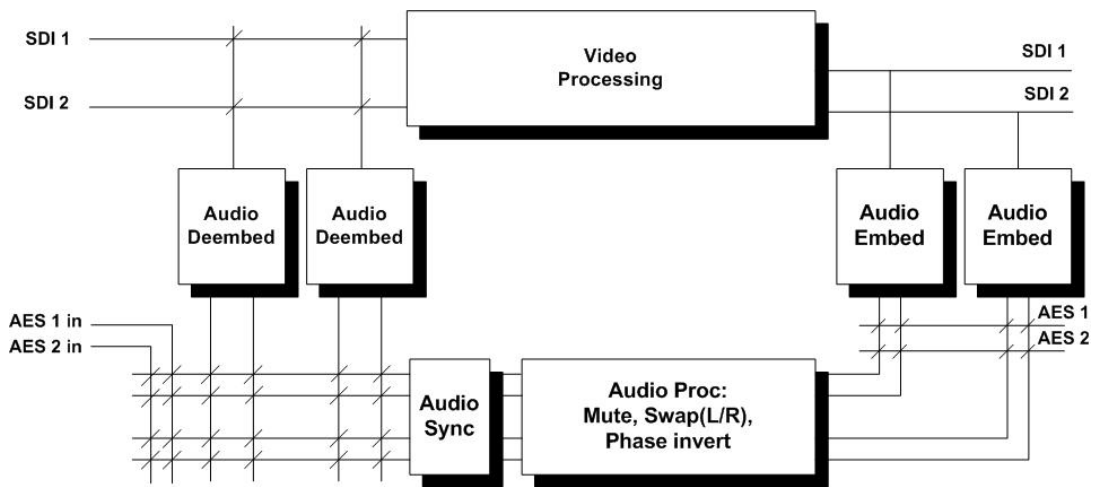


Figure 1.1: Audio Processing

Module Layout

Figure 2 shows the physical layout of the P VD 5010 CardModule and also the connection panel which is fitted to the rear of the rack.

PCB Layout

Rear Connection Panel

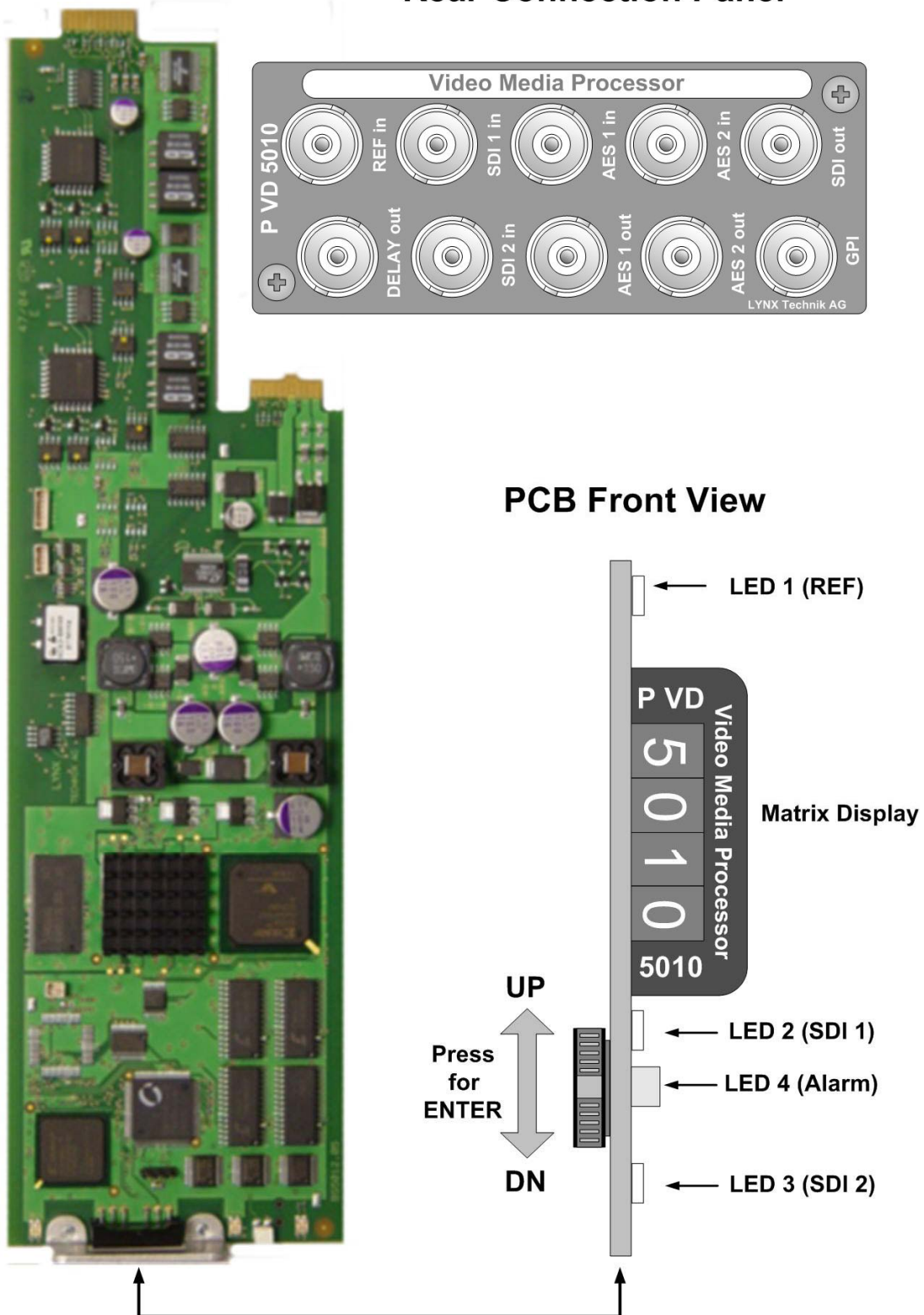


Figure 2: Physical layout P VD 5010 B

Connections

The P VD 5010 B CardModule is configured with standard 75 Ohm BNC connectors. Connection is self-explanatory. We recommend the use of high quality cables for digital video and audio connections to reduce the risk of interference or errors due to excessive cable attenuation. Some guidelines for max cable length are shown below.

250m (820 feet) Belden 8281 (270Mbits/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.

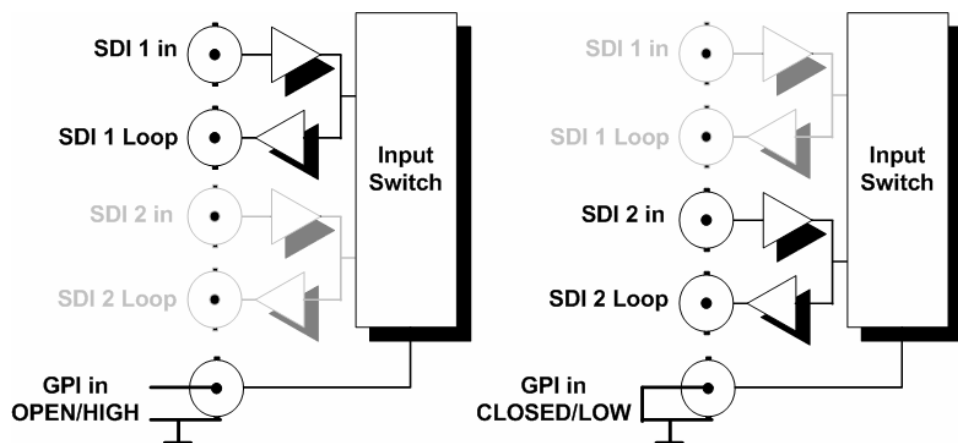
GPI

There is a GPI (General Purpose Input) on the P VD 5010 CardModule. Connection is made through a BNC connector.

With the GPI connection either the inputs can be switched or the P VD 5010 can be switched to FREEZE mode.

Switching the inputs with the GPI:

If there is no connection (OPEN/HIGH) between signal input and GND, IN1 is selected. If signal input is connected to GND (CLOSED/LOW), IN2 is selected.

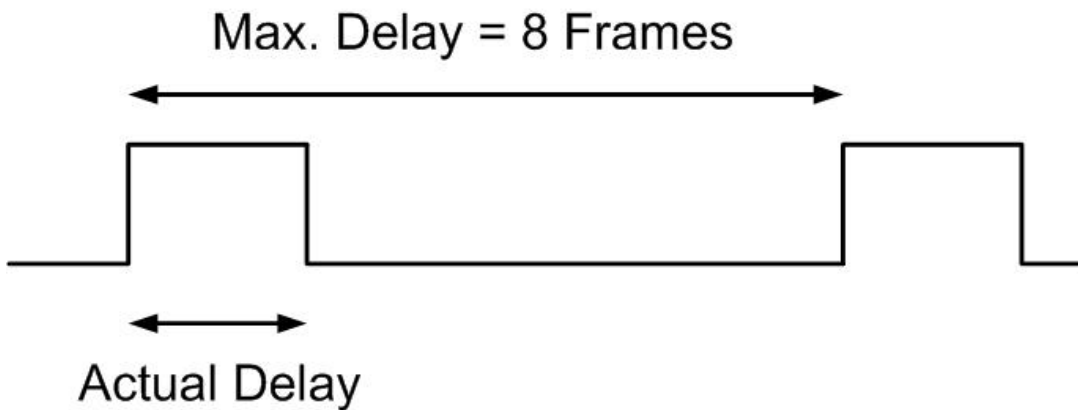


Switching to Freeze mode:

If there is no connection (OPEN/HIGH) between signal input and GND, the P VD 5010 is in normal operation. If signal input is connected to GND (CLOSED/LOW), the P VD 5010 will switch to FREEZE.

Audio Delay Pulse

The Audio Delay Pulse is connected through a BNC connector with TTL levels and needs 75 Ohm termination.



Min. Delay in Frame Synch Mode is 1 Frame

Min. Delay in Line Synch Mode is $< 1\mu\text{s}$

Audio Delay – synchronous mode

When the frame sync is used in normal asynchronous mode it is possible for the frame sync to drop or add frames to keep in sync (which is normal). Under these circumstances simply dropping frames of audio would result in audible clicks and pops. We overcome this by loosely tracking the audio to the video within an audio delay window of ± 0.5 frame with respect to video.

If you have a synchronous input to the frame sync, then there is a new mode to switch the frame sync into a audio / video delay line function [expert tab, selection "synchronous"] In this mode the ± 0.5 frame window is removed and the audio is perfectly in time with the video.

Installation



Caution

The CardModule is shipped in a protective anti-static bag. Please take suitable precautions to avoid static discharge onto any part of the PCB or components when handling module or serious damage could result.

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

- a) Select a slot in the card frame where the CardModule will be located
- b) Remove the blank connection panel from the rear of the rack (if fitted)
- c) Install the rear connection panel using the screws supplied. Do not tighten the screws fully
- d) Slide the card module into the card frame and carefully check the CardModule easily 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. Remove the rear connection panel and check alignment with the CardModule.
- e) Insert and remove the CardModule a few times to ensure correct alignment and then tighten the two screws to secure the rear connection plate

Settings and Control

The P VD 5010 has an integrated micro-controller, which enables the module to be configured and controlled locally using the multifunction switch and 4 character dot matrix display, or from remote 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

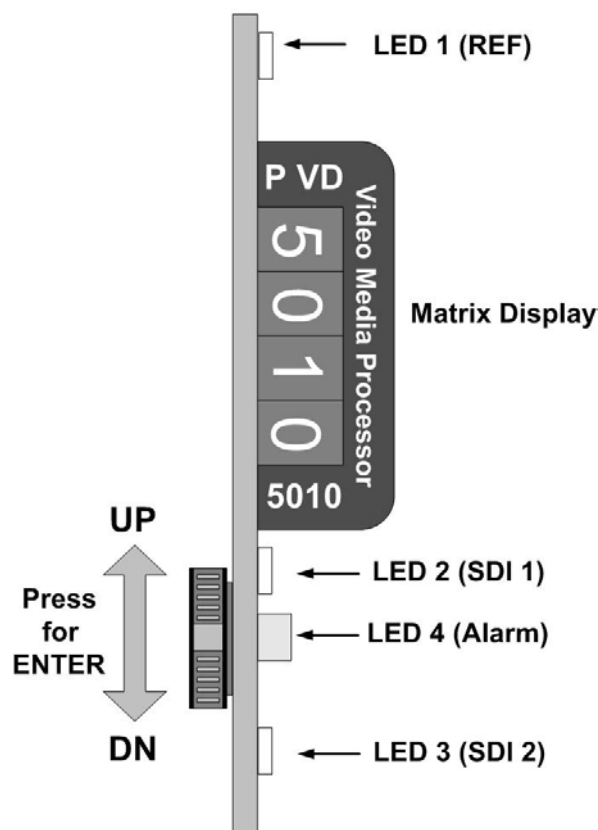
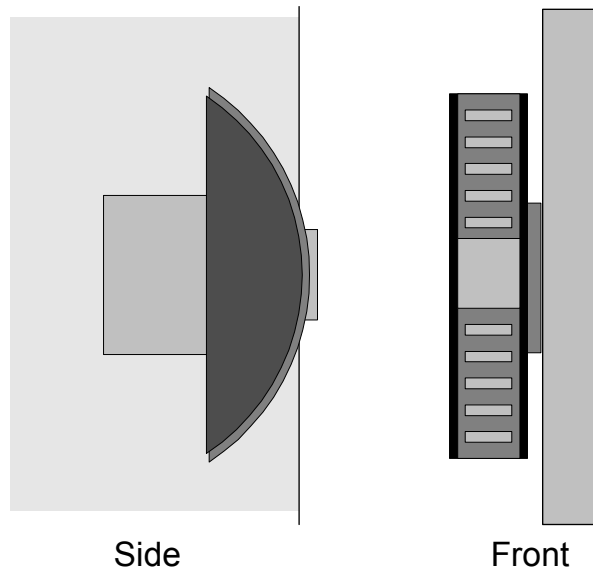


Figure 3 – Switch and Display Location

Multi Function Switch

The CardModule is equipped with a multi-function switch located on the front bottom edge of the card (refer to figure 3)

Multi-function Switch



Switch Operations

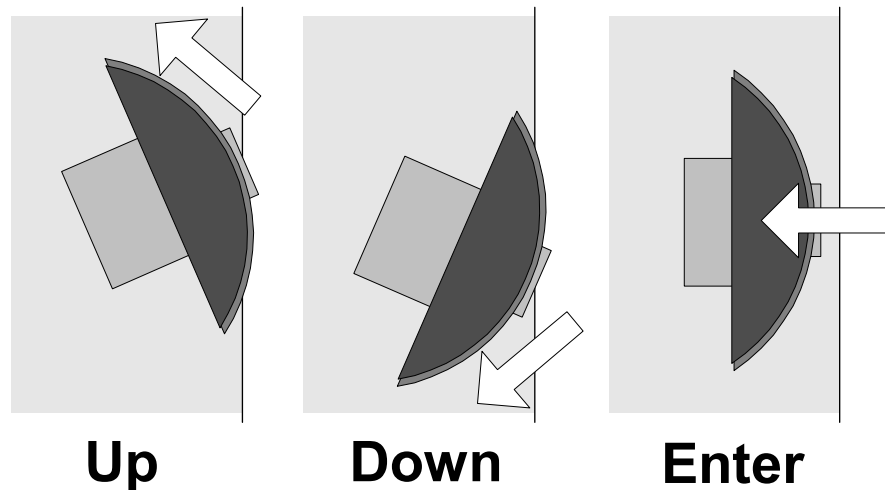


Figure 4 – Switch Operation

Using the Local Display Menus

Making local adjustments to the module is done using the multifunction switch and the integrated 4-character dot matrix display (figure 3). The menu system is layered, and navigation through the system is done using the **UP** and **DOWN** functions of the switch. **ENTER** is used to move between menu levels and also enter a selection.

Navigation

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

Menu Structure

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

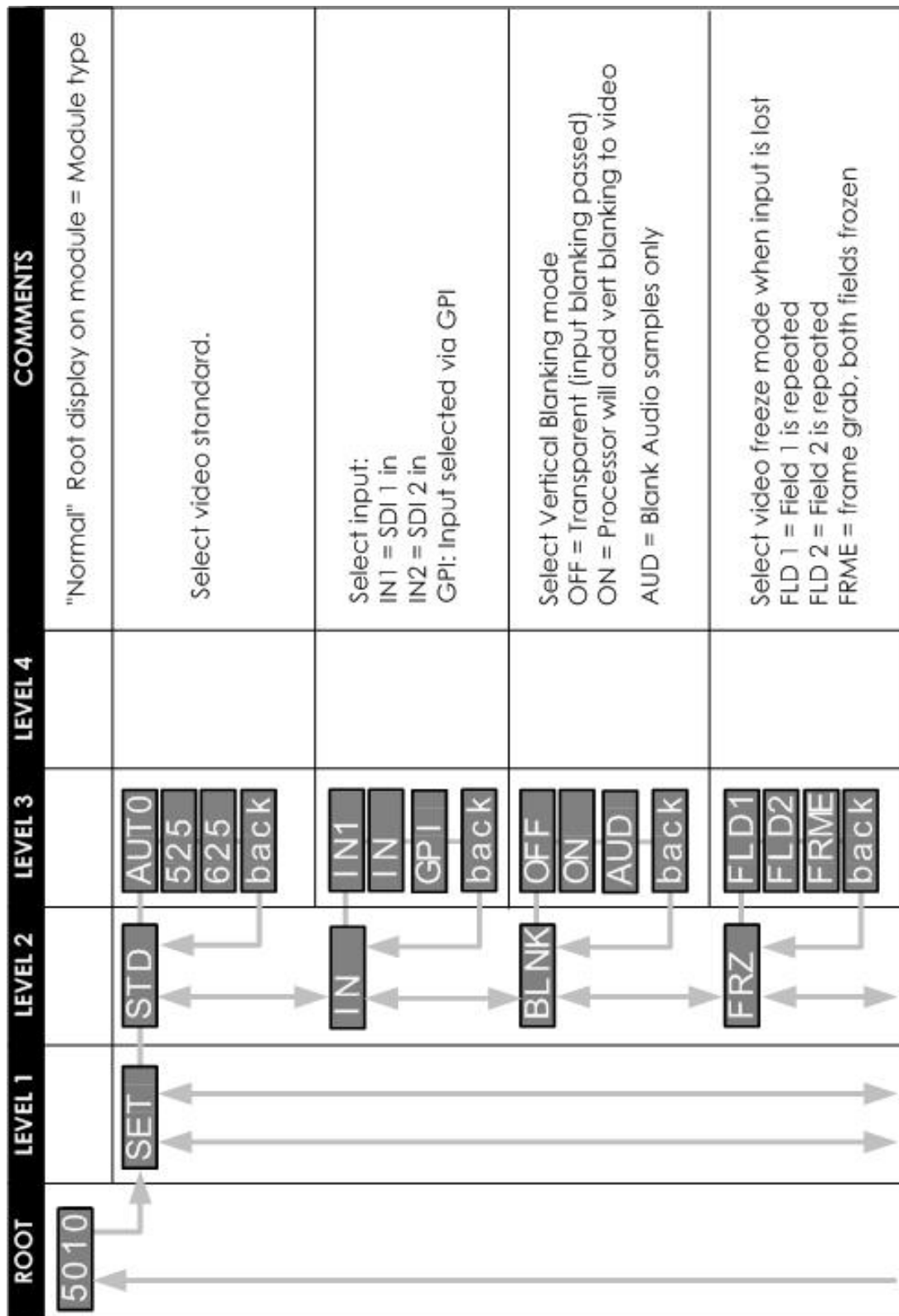
Notes / Tips.

ENTER moves between Levels

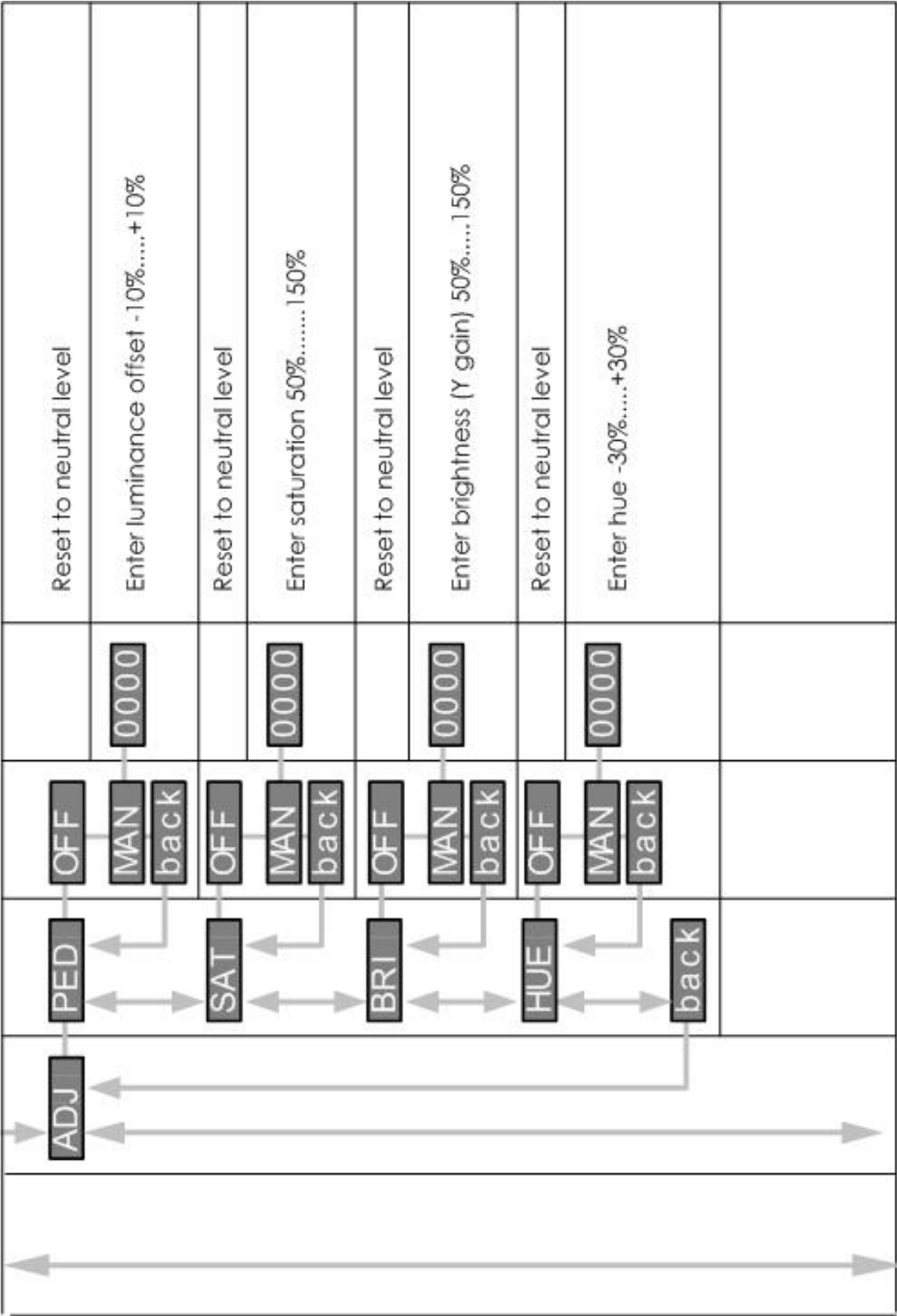
UP/DOWN moves between items within the level

When you enter a new setting the system will jump back one level in the menu system.

- The “back” selection in the menu structure will take you back one level when selected.
- When an item is selected which has several setting possibilities the first value displayed will be the value currently stored in the system. The order of the available settings for any menu item in the table supplied does not represent the order the settings will actually be displayed.
- If left unattended, the menu will default to the root display after a preset timeout.



			<div>MODE</div> <div>FRMa</div> <div>LINE</div> <div>FRMs</div> <div>back</div>	<div>Select Mode of operation for Synchronizer</div> <div>FRMa: Frame Synchronizer Mode</div> <div>for asynchronous SDI inputs</div> <div>LINE: Line Synchronizer Mode</div> <div>FRMs: Frame Synchronizer Mode</div> <div>for synchronous SDI inputs</div>
			<div>GENL</div> <div>EXT</div> <div>INT</div> <div>back</div>	<div>Use external reference</div> <div>Use internal (rack) reference</div>
			<div>GPI</div> <div>FRZ</div> <div>IN</div> <div>back</div>	<div>Select GPI function:</div> <div>FRZ: FREEZE activated by GPI</div> <div>IN: Input switch with GPI</div>
			<div>back</div>	
			<div>DELAY</div> <div>PIXL</div> <div>0000</div>	<div>Enter pixel delay 0...1711 (525) 0...1727 (625)</div>
			<div>LINE</div> <div>0000</div>	<div>Enter line delay 0...524 (525) 0...624 (625)</div>
			<div>FRME</div> <div>0000</div> <div>back</div>	<div>Enter frame delay 0...6 frames</div>



Factory Preset Condition

The P VD 5010 is delivered programmed and preset for the following mode of operation:

Mode	Frame Synchronizer
Input	Input 1
Standard	Auto
Blanking (VBI)	Transparent
Freeze mode	Frame
Reference	External
Line delay (CH A)	0000
Pixel delay (CH A)	0000
Frame delay (CHA)	0000
Line delay (CH B)	0000
Pixel delay (CH B)	0000
Frame delay (CHB)	0000
Pedestal	default (OFF)
Saturation	default (OFF)
Brightness	default (OFF)
Hue	default (OFF)
GPI	OFF

Audio Processing:

Deembedder 1	SDI1 Group 1
Deembedder 2	SDI1 Group 2
Audio Input Select	Embedder1, Embedder2
AES outputs	mute
Embedder 1	SDI Group1
Embedder 2	SDI Group2
Audio Processing	OFF

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

These settings can be recalled at any time by selecting reset from the menu system.

Auto Store

If no parameters are changed for 10 seconds then the current settings will be written into flash memory automatically, this can be seen by the alarm LED flashing yellow four times.

Alarm/LED Status Indicators

The P VD 5010 module has integral LED indicators, which serve as alarm and status indication for the module. Function is described below.

Status Indicators

3 status LED`s are provided on the PCB, LED 1, LED 2, LED 3 (Figure 2)

LED	Color	Indication
1	Green	Ref = 525/60 Hz
	Yellow	Ref = 625/50 Hz
	Red	External Ref = invalid or missing
2	Green	SDI 1 Input = 525/60 Hz
	Yellow	SDI 1 Input = 625/50 Hz
	Red	SDI 1 Input = invalid or missing
3	Green	SDI 2 Input = 525/60 Hz
	Yellow	SDI 2 Input = 625/50 Hz
	Red	SDI 2 Input = invalid or missing

Alarm Indicator

There is also a single alarm LED on the lower edge of the module LED 4. This is visible through the card frame front cover and provides a general indication of the module status.

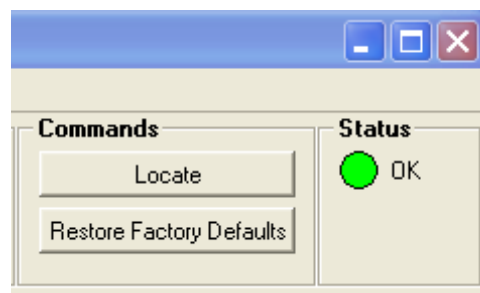
LED Color	Indication
Green	REF and selected SDI input present
Yellow	REF present, SDI present, but not selected
Red	No SDI input

LED **OFF** indicates power is lost, or there is a power supply fault.

Locate Function

For larger systems which may have multiple cards of the same type in a single rack, or multiple rack systems on a large central control system we have added a useful utility which will help to visually locate a suspect module quickly (When used in conjunction with the optional control system and software)

Once the specific module has been selected on the control system there is a locate button on the top of the GUI:



Locate Function in Control System

When Locate is selected the status indicator on the GUI and the alarm LED will flash yellow in the following continuous sequence.

3 short flashes.... Pause.... 3 short flashes ...

Use of the locate function will not interfere with the normal operation of the module.

For more details on this feature please check the documentation supplied with the controller software.

Specifications *(P VD 5010 B)*

Video Inputs

Signal	2 x SDI inputs - selectable (SMPTE 259M-C)
Connection/Impedance	BNC/75 Ohms
Cable Length	250 m; Belden 8281 (270Mbit/s)
Return Loss	> 15dB (270 MHz)

Reference Input

Signal	Composite analog sync, 525/60Hz or 625/50Hz
Detection	Automatic
Connection/Impedance	BNC/75 Ohms

Video Outputs

Signal	2 x SDI (SMPTE 259M-C)
Connection/Impedance	BNC/75 Ohms
Return Loss	> 15dB (270 MHz)
Jitter	< 0.2 UI

Audio Inputs

Signal	2x AES3-id balanced transformer isolated inputs
Connection/Impedance	BNC 75 Ohms
Return Loss	>25dB (32KHz to 100KHz)

Audio Outputs

Signal	2 x AES3-id unbalanced transformer isolated
Connection/Impedance	BNC 75 Ohms
Output Level	1.0v p-p (nominal)

Delay Output

Signal	TTL pulse duty cycle = delay from input to output
Connection	BNC, 75 Ohm

Operating Modes

Line	Line Synchronizer
Frame	Frame Synchronizer

Performance

Adjustment range	Min delay to 8 frames max in 37ns increments; Min Delay: Frame Synch Mode: 1 Frame Line Synch Mode: 1 μ s
Control	Local display and multi-function switch ; remote when using a controller and LYNX control SW.

Electrical Specifications

Operating Voltage	12 VDC
Power Consumption	9 W
Safety	IEC 60950/ EN 60950/VDE 0805

Mechanical

Size	283mm x 78mm
Weight	Card module 120g, connection panel 50g

Ambient

Temperature	5°C to 40°C Maintaining specifications
Humidity	Max 90% non condensing

Supplied Accessories

Documentation	P VD 5010 B Reference Manual
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Available Options

Below is a list of related products for the P VD 5010 D CardModule. Please refer to product brochures or our web site for more detailed information.

Model	Description
R FR 5010	Series 5000 Rack Frame (empty) with single power supply
R PS 5010	Redundant power supply for the R FR 5010 Card Frame
R CT 5020	Rack controller for the R FR 5010 Card Frame
R CT 5030	Master controller with TCP/IP Interface for the R FR 5010 Card Frame
R CT 5010	Rack Bus Extension for the R FR 5010 Card Frame. In combination with R CT 5020/5030

Parts List

Due to the very dense design and miniature surface mount technology the module is not field serviceable. The information for a replacement assembly is below.

P VD 5010 B CardModule (complete)

Description	Media Processor
Model Number	P VD 5010 B
Part Number	6.155.008.261

Sub Assemblies:

P VD 5010 B Processing Board only (BS 5012 B)

Part Number	6.155.007.300
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Rear Conn. Panel for P VD 5010 B (MA 5001_B)

Part Number	6.155.008.371
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Service

If you are experiencing problems, or have questions concerning your P VD 5010 B CardModule please contact your local distributor for assistance.

We offer a fixed cost service exchange program for defective Series 5000 CardModules out of Warranty. Please contact your distributor or check our web site for details on this program.

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

www.lynx-technik.com

You will also find links to contact us directly for assistance.

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

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