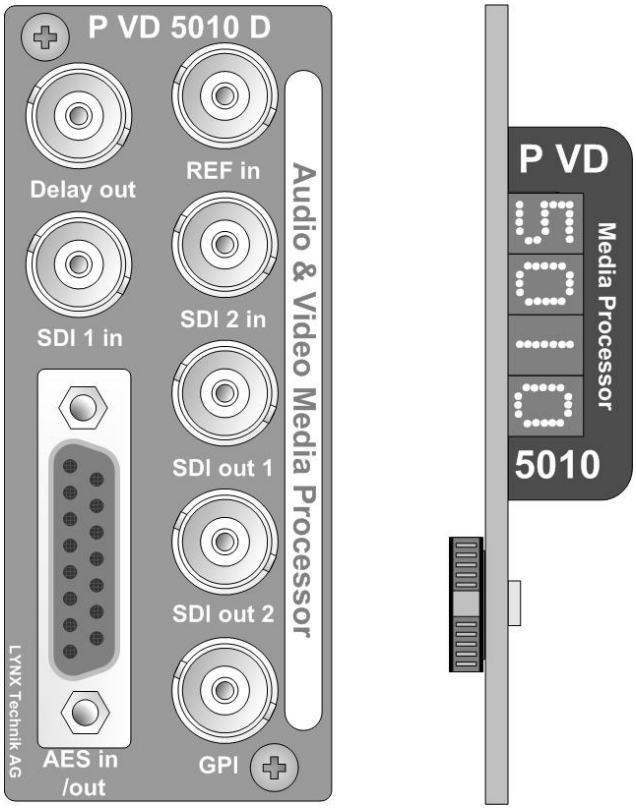
Version 1.2

Reference Manual

P VD 5010 D Video Media Processor

(Frame Synchronizer with Audio Processing)

Series 5000 CardModule



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

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Regulatory information

Europe

Declaration of Conformity

We LYNX Technik AG
Brunnenweg 3
D-64331 Weiterstadt
Germany

Declare under our sole responsibility that the product

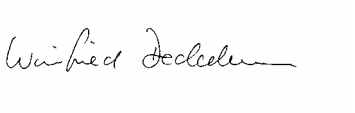
TYPE: P VD 5010 D

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 /2001

Following the provisions of 89/336/EEC and 73/23/EEC directives.

Winfried Deckelmann



Weiterstadt, June 2004

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 his own expense

Contents

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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 D 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 µs. 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 D 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.

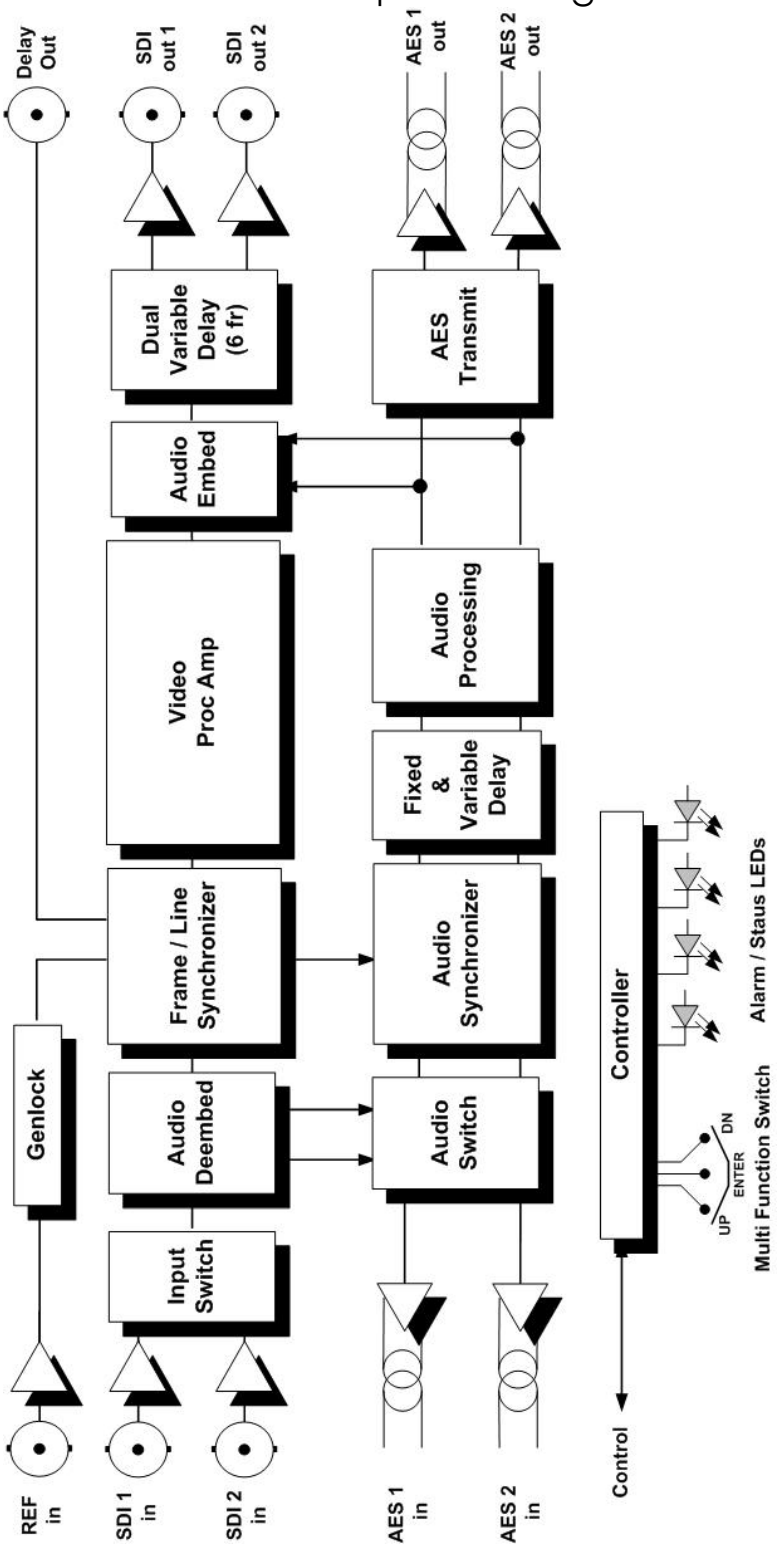


Figure 1- P VD 5010 D Functional Diagram

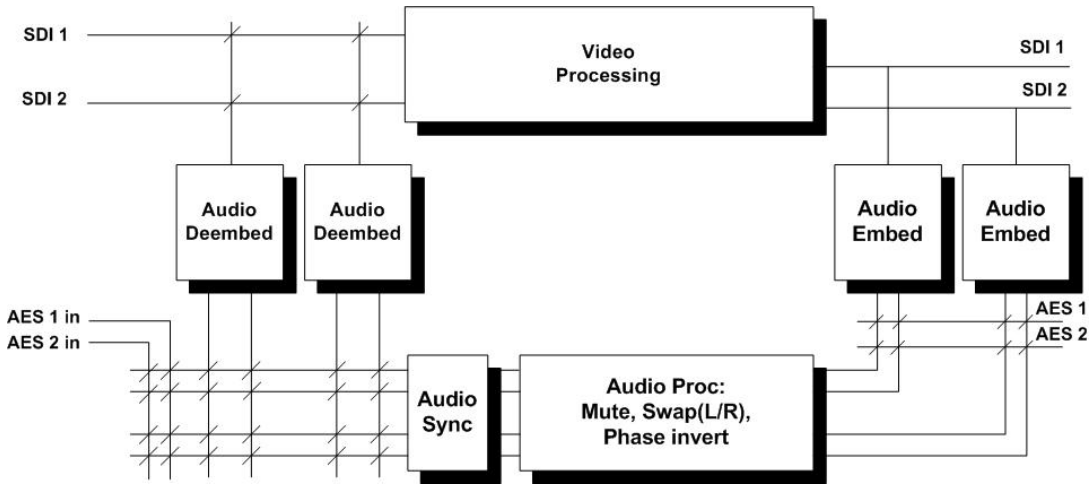


Figure 1.1: Audio Processing

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.

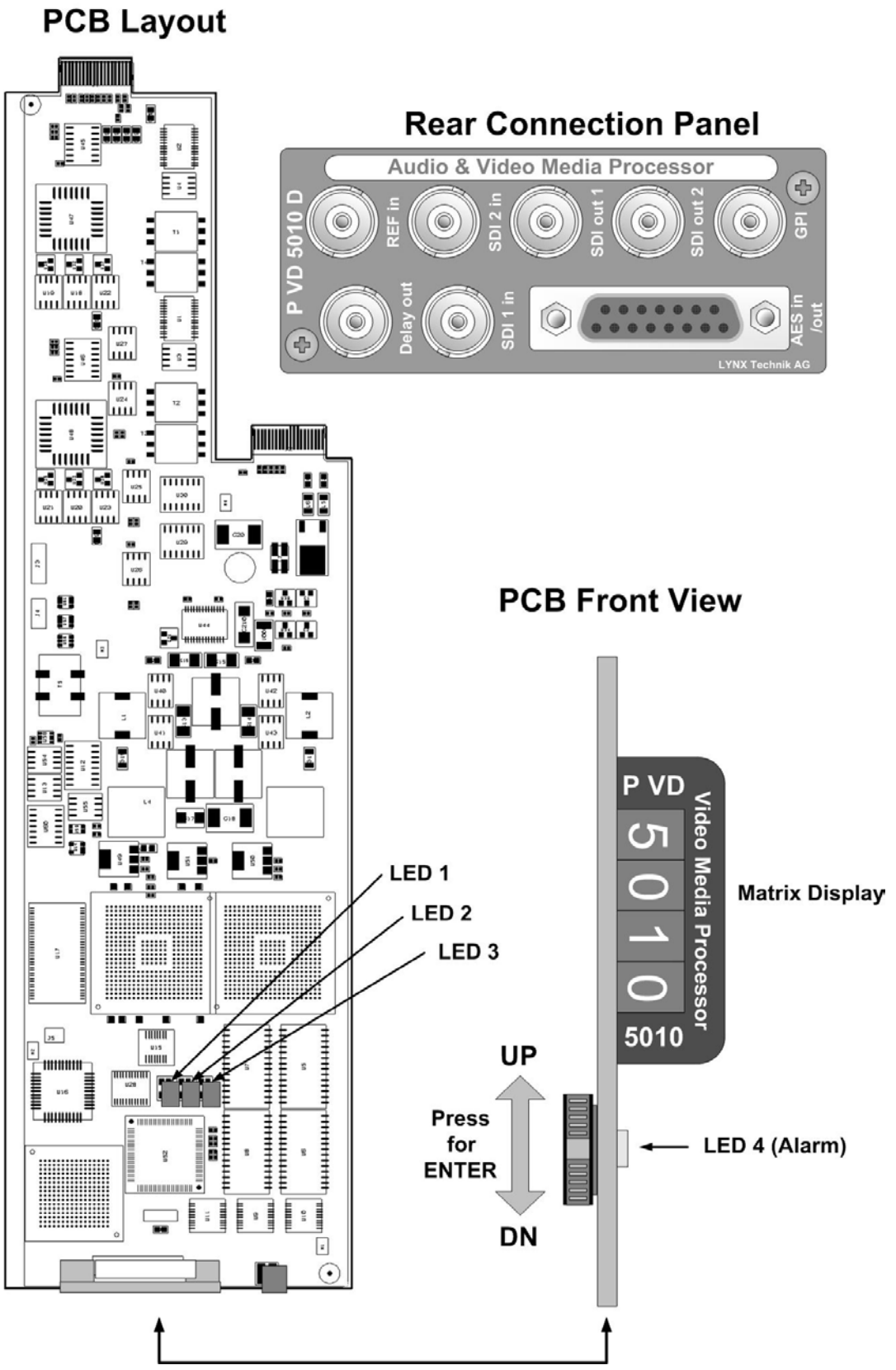


Figure 2: Physical layout P VD 5010 D

Connections

Video Connections

The P VD 5010 D 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.

Audio Connections

The P VD 5010 D CardModule is configured for Sub D connections. These connectors should be wired in accordance with the table below. Please use high quality screened cable to prevent the introduction of noise and interference to the audio signals (twisted pair suitable for balanced audio signals).

Audio Connector (balanced)

SubD 15-pin female connector

Pin Number	Connection	Pin Number	Connection
1	+ AES OUT 2	9	- AES OUT 2
2	GND AES OUT 2	10	+ AES OUT 1
3	- AES OUT 1	11	GND AES OUT 1
4	+ AES IN 2	12	- AES IN 2
5	GND AES IN 2	13	+ AES IN 1
6	- AES IN 1	14	GND AES IN 1
7		15	
8			

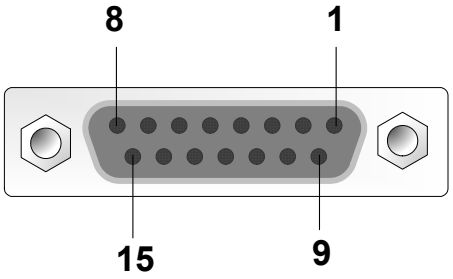
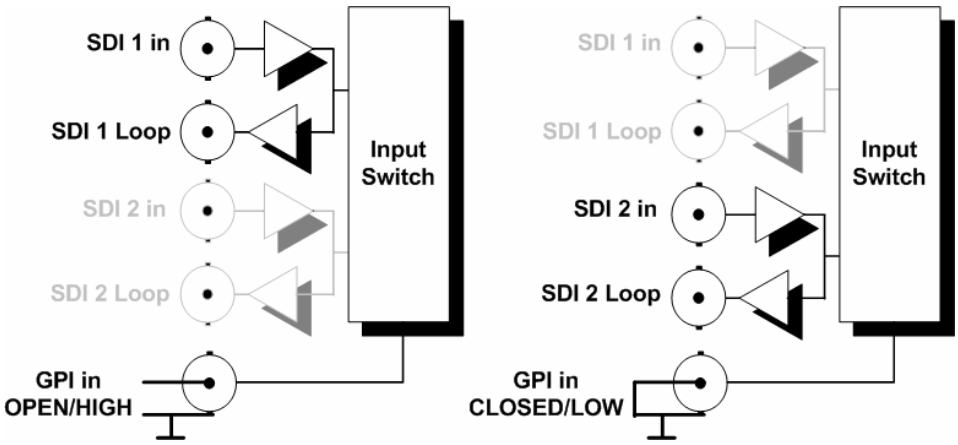


Figure 3 - Audio connection detail

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.

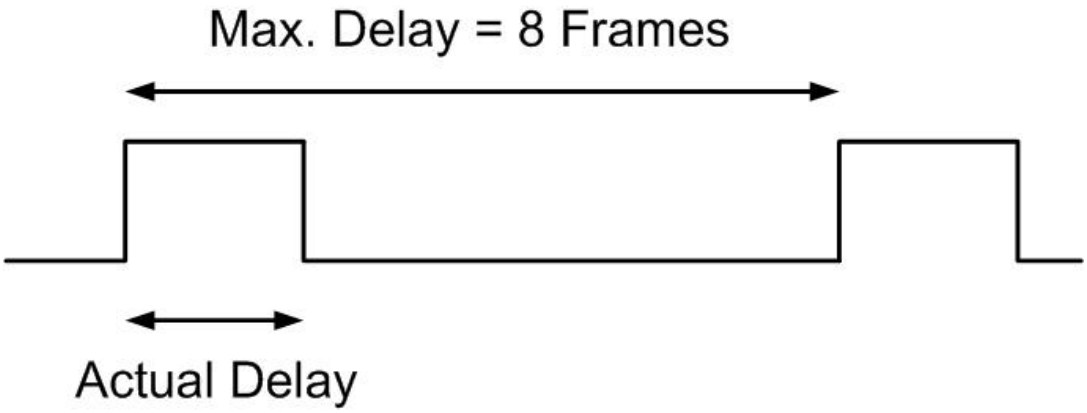
Switching the inputs with the GPI:
If there is no connection (OPEN/HIGH) between signal input and GND, IN1 is selected. If signal input is connected to GND (CLOSED/LOW), IN2 is selected.



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 < 1µs

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 D 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.

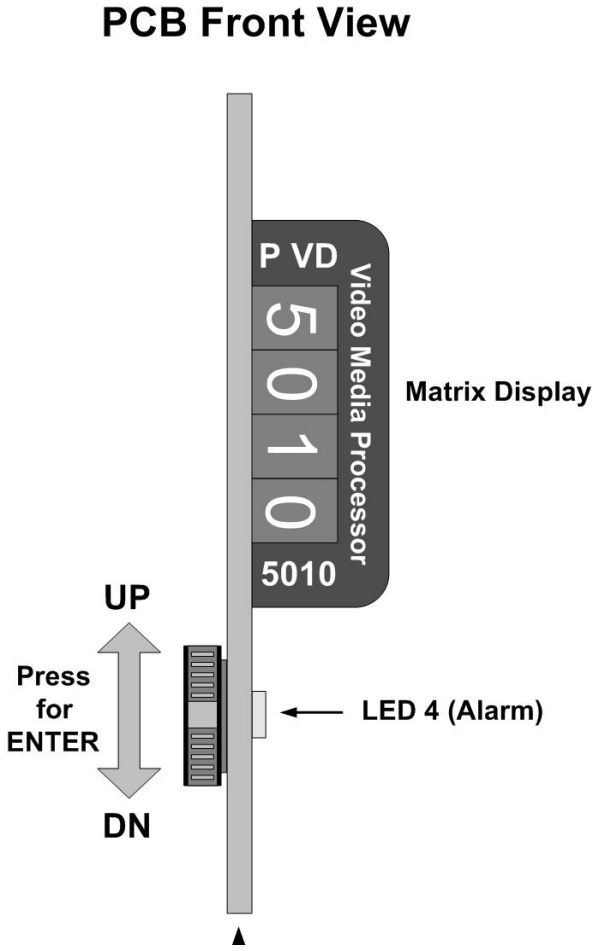


Figure 3 – Switch and Display Location

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)

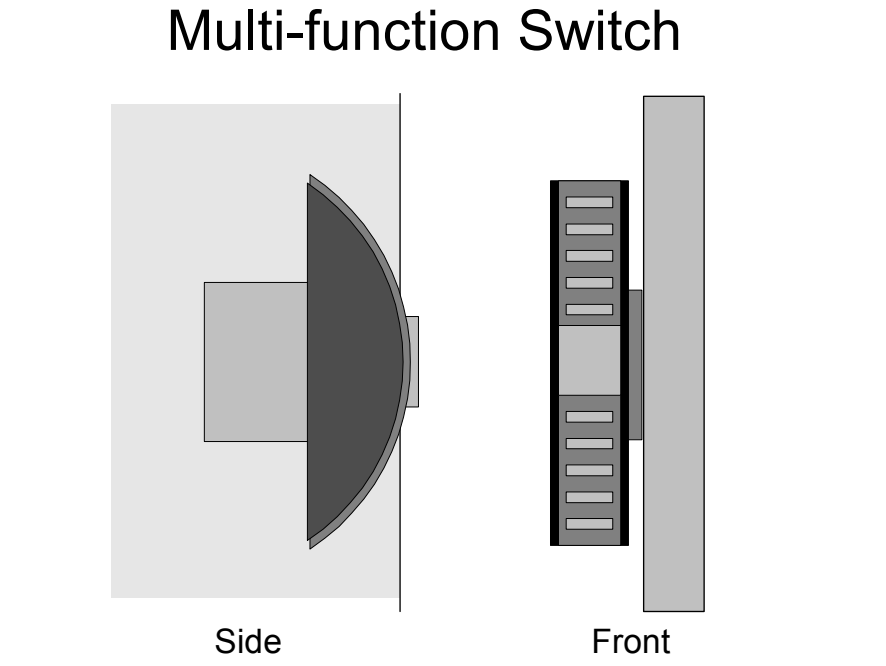


Figure 4 – Switch Operation

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

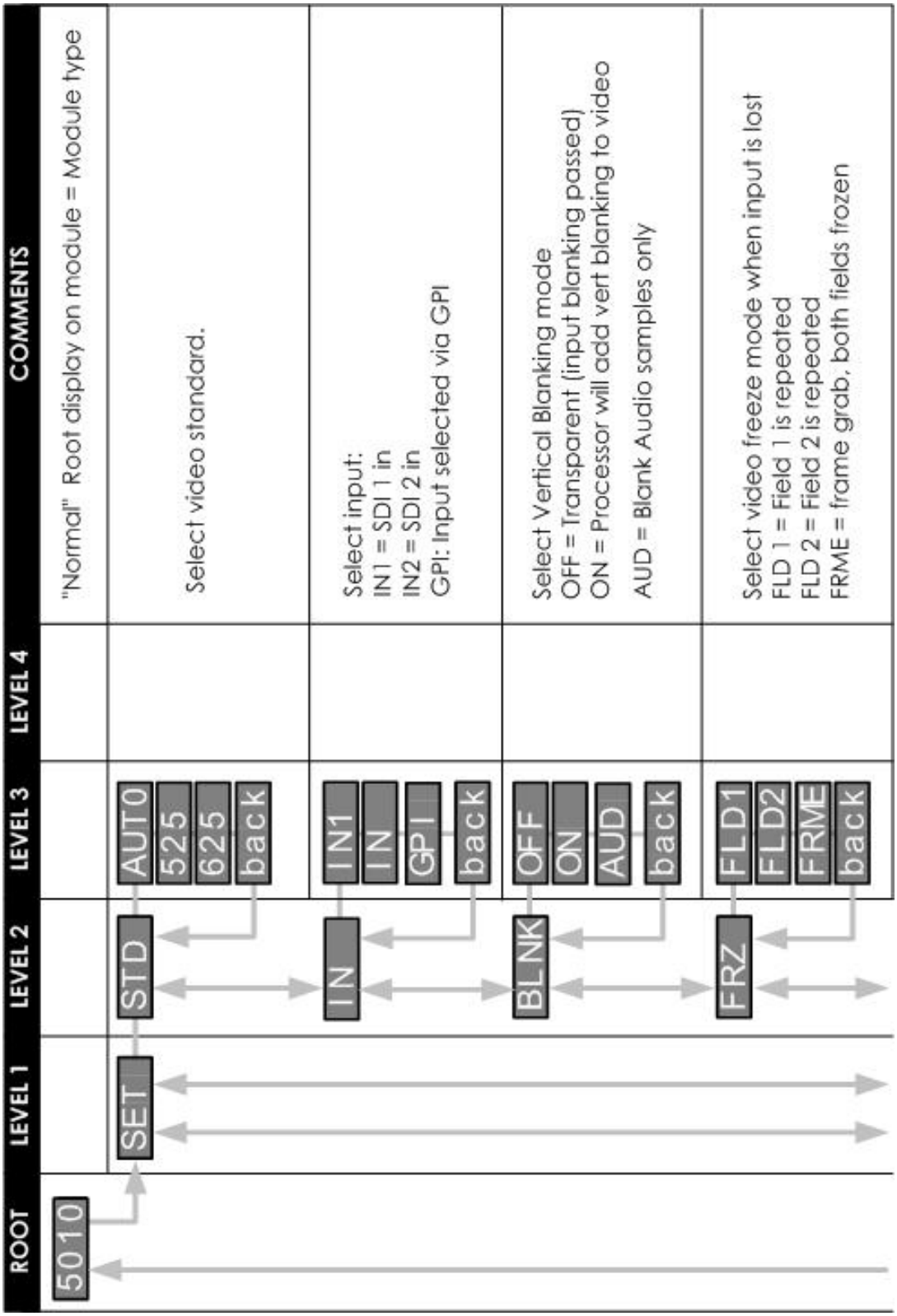
Switch Function	Operation
UP	Move UP within a level
DOWN	Move down within a level
ENTER	Change levels / Make selection

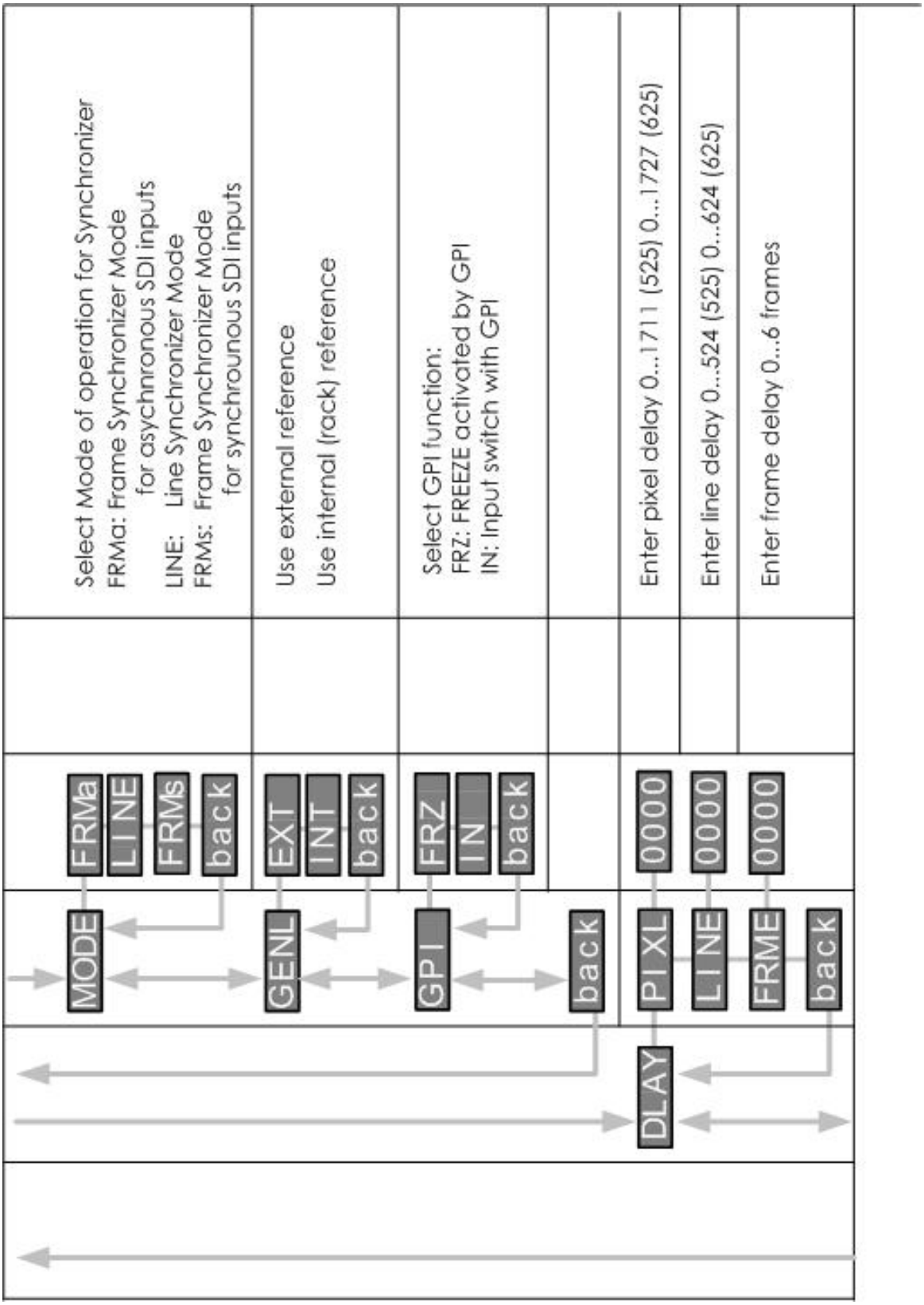
Menu Structure

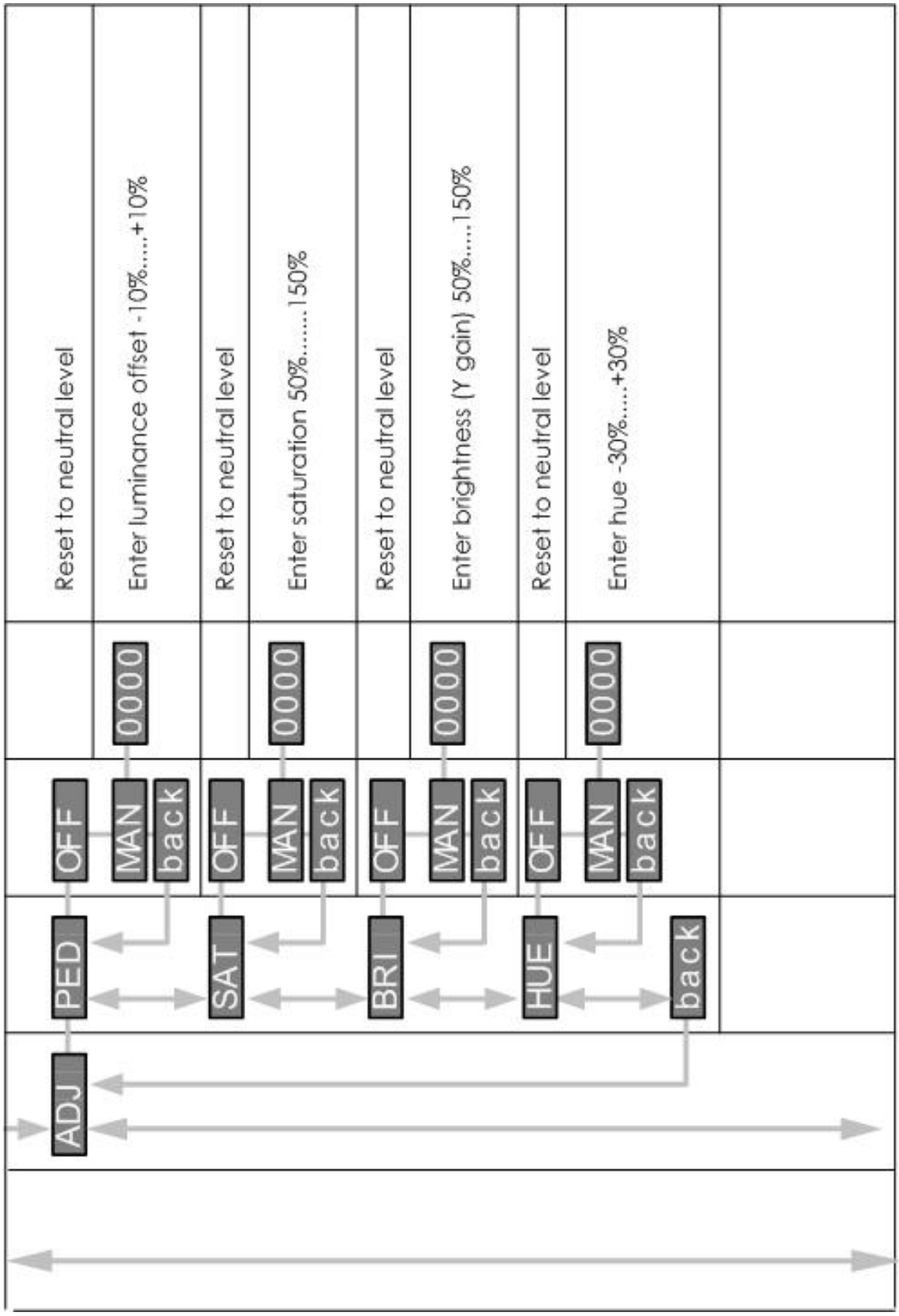
The Menu structure is defined in the next table, and should be used when navigating through the system.

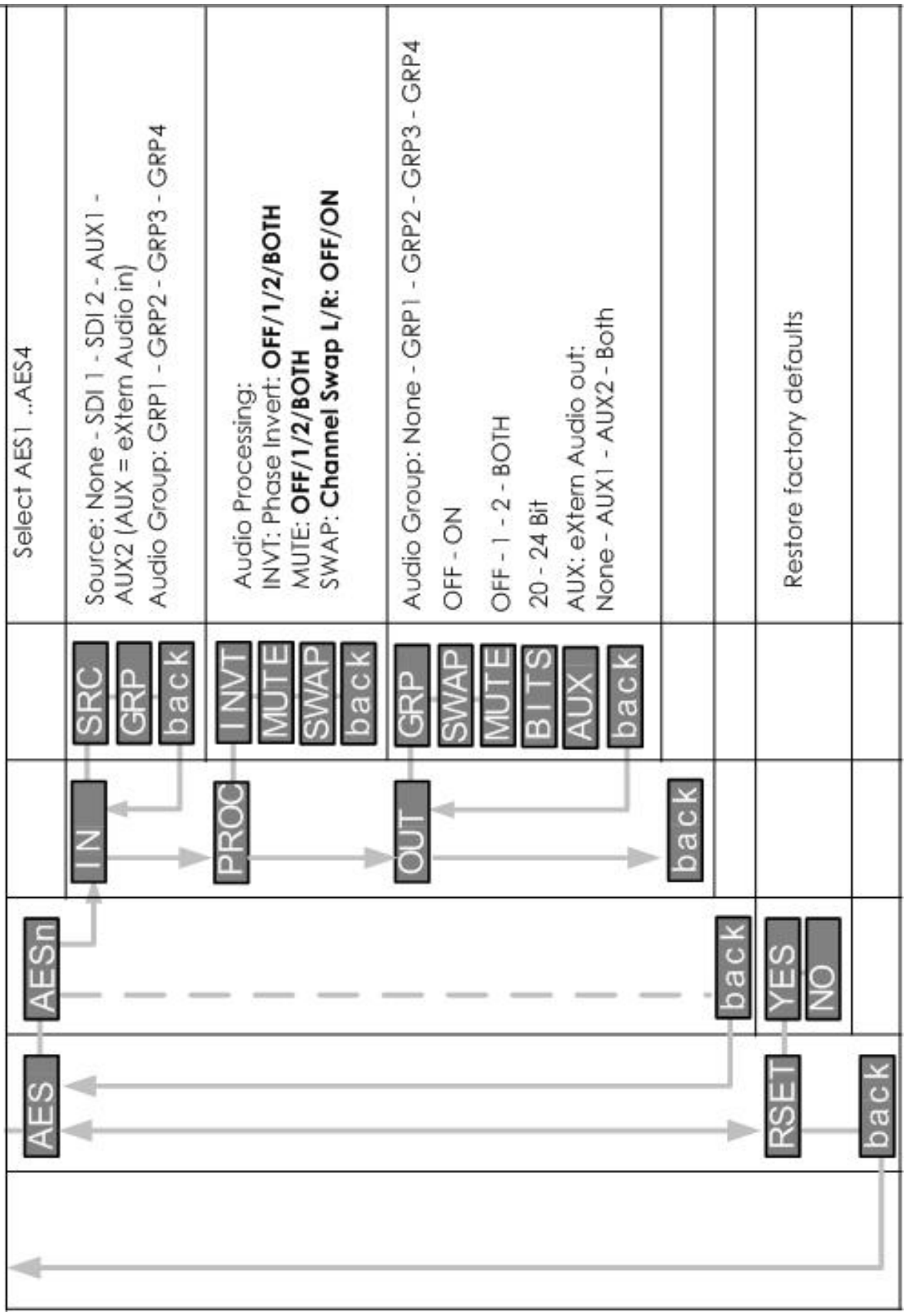
Notes / Tips.
ENTER moves between Levels
UP/DOWN moves between items within the level
When you enter a new setting the system will jump back one level in the menu system.

- 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 he settings will actually be displayed.
- If left unattended, the menu will default to the root display after a preset timeout.


ROOT
LEVEL 1
LEVEL 2
LEVEL 3
LEVEL 4
COMMENTS
5010
SET
STD
AUTO
525
625
back
IN
IN1
IN
GPI
back
BLNK
OFF
ON
AUD
back
FRZ
FLD1
FLD2
FRME
back
"Normal" Root display on module = Module type
Select video standard.
Select input:
IN1 = SDI 1 in
IN2 = SDI 2 in
GPI: Input selected via GPI
Select Vertical Blanking mode
OFF = Transparent (input blanking passed)
ON = Processor will add vert blanking to video
AUD = Blank Audio samples only
Select video freeze mode when input is lost
FLD 1 = Field 1 is repeated
FLD 2 = Field 2 is repeated
FRME = frame grab, both fields frozen


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


ADJ
PED
OFF
MAN
back
0000
Reset to neutral level
Enter luminance offset -10%.....+10%
SAT
OFF
MAN
back
0000
Reset to neutral level
Enter saturation 50%.....150%
BRI
OFF
MAN
back
0000
Reset to neutral level
Enter brightness (Y gain) 50%.....150%
HUE
OFF
MAN
back
0000
Reset to neutral level
Enter hue -30%.....+30%
back


Select AES1 ..AES4
Source: None - SDI 1 - SDI 2 - AUX1 - AUX2 (AUX = eXtern Audio in)
Audio Group: GRP1 - GRP2 - GRP3 - GRP4
Audio Processing:
INVT: Phase Invert: OFF/1/2/BOTH
MUTE: OFF/1/2/BOTH
SWAP: Channel Swap L/R: OFF/ON
Audio Group: None - GRP1 - GRP2 - GRP3 - GRP4
OFF - ON
OFF - 1 - 2 - BOTH
20 - 24 Bit
AUX: eXtern Audio out:
None - AUX1 - AUX2 - Both
Restore factory defaults
AES
AESn
IN
PROC
OUT
SRC
GRP
back
INVT
MUTE
SWAP
back
GRP
SWAP
MUTE
BITS
AUX
back
back
back
RSET
YES
NO
back

Factory Preset Condition

The P VD 5010 D 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 D 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	Normal Operation
Red	Board Failure

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 D)*

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 balanced transformer isolated inputs
Connection/Impedance	SUB D/110 Ohms
Return Loss	>25dB (32KHz to 100KHz)
Audio Outputs	
Signal	2 x AES3 balanced transformer isolated outputs
Connection/Impedance	SUB D/110 Ohms
Output Level	4.0v 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 µs
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 D Reference Manual

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 5010	**Rack Bus Extension for the R FR 5010 Card Frame. In combination with R CT 5020**

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 D CardModule (complete)

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

Sub Assemblies:

P VD 5010 Processing Board only (BS 5012 L)

Part Number	6.155.007.795

Rear Conn. Panel for P VD 5010 D (MA 5005)

Part Number	6.155.008.371

Service

If you are experiencing problems, or have questions concerning your P VD 5010 D 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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Notes