LYNXTechnik AG

Broadcast Television Equipment

Reference Manual

P VD 5600

SD/HD Multi-rate Frame Synchronizer

Revision 2.0 - August 2007

This Manual Supports Device Revisions:	
P VD 5600 Firmware Revision	198
Control System GUI Release	3.12.2

LYNX

TECHNIK AG

Contents

Warranty

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.

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.

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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 5600**

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, March 2007

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

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 5600 is a high performance SD/HD frame. Firmware options provide the ability to easily add integral Down Conversion, SDTV Aspect Ratio Conversion capability is part of the basic unit.

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 / 59.94Hz
625 / 50Hz	1080i / 60Hz
	1080i / 50Hz
	720P / 59.94Hz
	720P / 60Hz
	720P / 50Hz

Output Video Formats

The module provides four SDI outputs, user assignable in two sets of two outputs; these sets can be mapped independently to any of the internal channels. Supported output video formats are:

SDTV Formats	HDTV Formats
525 / 59.94Hz	1080i / 59.94Hz
625 / 50Hz	1080i / 60Hz
	1080i / 50Hz
	720P / 59.94Hz
	720P / 60Hz
	720P / 50Hz

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 signals (except module is locked to signal input format). For mismatches in the input to output frame rates (standards) the module will perform a very basic internal format standards conversion to ensure frame rate continuity is always maintained on the module outputs.

For down conversion functionality an additional firmware option is required. Without this option installed the frame synchronizer passes the video in the connected input format.

Basic function (with down conversion option installed)

With a 59.94Hz Reference Signal Connected (Bi-level or Tri-level)

Input Format	Output
525 / 59.94Hz	525 / 59.94Hz
1080i / 59.94Hz	1080i / 59.94Hz
720P / 59.94Hz	720P / 59.94Hz

With a 50Hz Reference Signal Connected (Bi-level or Tri-level)

Input Format	Output
625 / 50Hz	625 / 50Hz
1080i / 50Hz	1080i / 50Hz
720P / 50Hz	720P / 50Hz

With a 60Hz Reference Signal Connected (Bi level or Tri level)

Input Format	Output
525 / 59.94Hz	525 / 60Hz (adding frames / fields)
1080i / 59.94Hz	1080i / 60Hz (adding frames / fields)
1080i / 60Hz	1080i / 60Hz
720P / 59.94Hz	720P / 60Hz (adding frames)
720P / 60Hz	720P / 60Hz

Connected Reference Signals

The module has a very flexible input reference stage which facilitates the use of either SDTV analog bi-phase sync (i.e. Black) or HDTV analog tri-level sync. The reference input is "cross lock" compatible so a SDTV reference can be used to frequency lock HDTV signals (and visa versa). The connected reference is auto detected and the synchronizer automatically configures the three available 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 / 59.94Hz
625 / 50Hz	1080i / 60Hz
	1080i / 50Hz
	720P / 59.94Hz
	720P / 60Hz
	720P / 50Hz

Frame Synchronization

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

Audio Processing

There is no audio processing provided in this module. If the embedded audio signals have to be preserved in the video outputs the P VD 5630 should be used. This module provides full audio processing for embedded and external audio signals.

DOWN Conversion Option

With the addition of the F/W option to add conversion capability to the frame synchronizer the following features are provided. *(The addition of this option does not require re-programming it's a simple option code to enable the extended functions)*

Down Conversion

The module has a selectable independent down converter and this will convert the connected HD input standard into a SDTV output signal. Modes supported are as follows:

4:3 Letterbox

This takes the 16:9 aspect ratio of the input HD signal and fits it into the 4:3 SD aspect ratio screen with black bars at the top and bottom of the image.

4:3 Center Cut

This mode cuts the center portion of the 16:9 input signal and fills the 4:3 SD aspect ratio screen.

4:3 Stretch to Fill

This mode takes the 16:9 input signal and distorts (vertically stretches) the image to fit the available 4:3 SD aspect ratio space.

16:9 HDTV Source

4:3 Center Cut

4:3 Letterbox

4:3 Stretch to fill

SDTV Aspect Ratio Conversion

Each channel has a selectable independent SDTV Aspect Ratio converter and this will convert the connected SD input standard either from a 4:3 input signal to a 16:9 output or a 16:9 input signal to a 4:3 output signal.
Modes supported are as follows:

Conversion from 16:9 Input Aspect Ratio to 4:3 Output Aspect Ratio

4:3 Letterbox

This takes the 16:9 aspect ratio of the input signal and fits it into the 4:3 SD aspect ratio screen with black bars at the top and bottom of the image.

4:3 Center Cut

This mode cuts the center portion of the 16:9 input signal and fills the 4:3 SD aspect ratio screen.

4:3 Stretch to Fill

This mode takes the 16:9 input signal and distorts (vertically stretches) the image to fit the available 4:3 SD aspect ratio space.
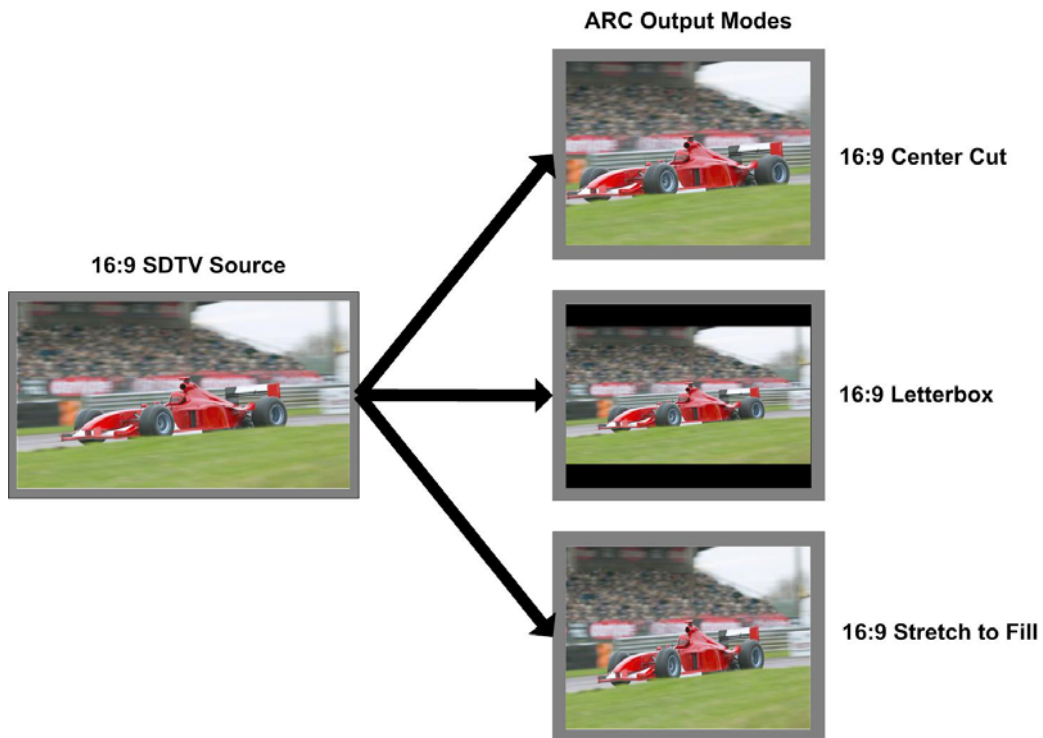
Conversion from 4:3 Input Aspect Ratio to 16:9 Output Aspect Ratio

16:9 PillarBox

This takes the 4.3 aspect ratio of the input signal and fits it into the 16:9 SD aspect ratio screen with black bars at the left and right of the image.

16:9 Center Cut

This mode cuts the horizontal center portion of the 4:3 input signal and fills the 16:9 SD aspect ratio screen.

16:9 Stretch to Fill

This mode takes the 4:4 input signal and distorts (horizontally stretches) the image to fit the available 16:9 SD aspect ratio space.
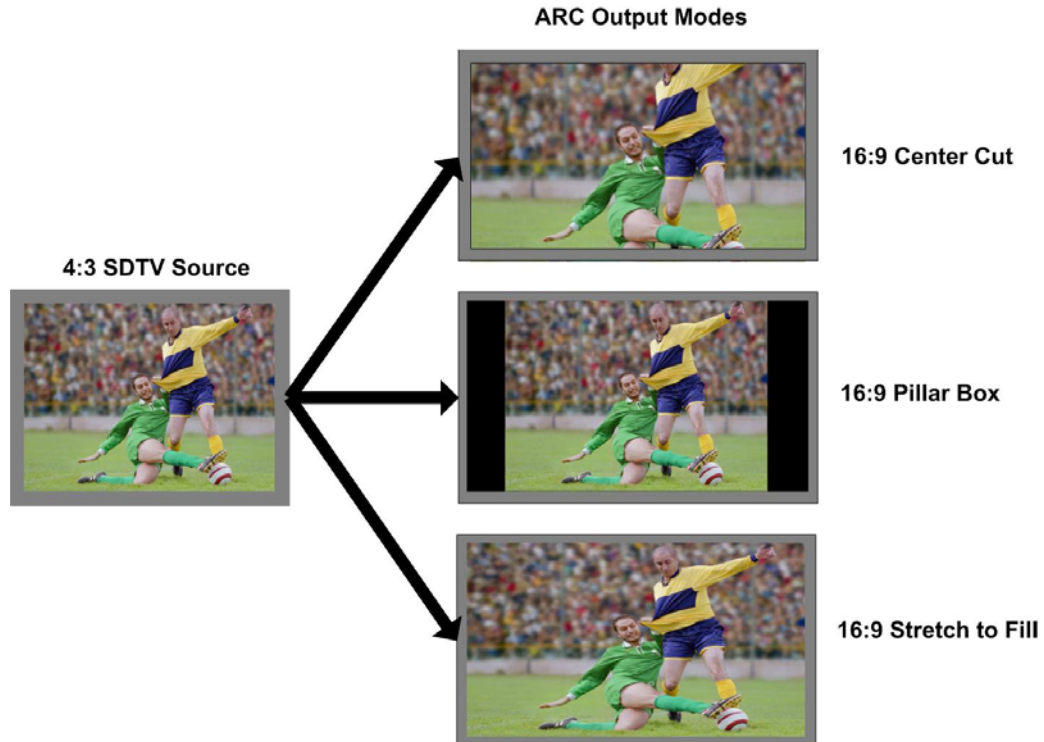
Color Space Conversion

The Conversion options also provide integrated color space conversion capability which will automatically compensate for the conversion of the wider 709 HD color space into the more narrow 601 SDTV color space ensuring legal color reproduction. *(Color space conversion is supplied as part of the UP/DOWN/CROSS conversion option)*

> **NOTE.** *Color space conversion can be bypassed or set to only process chrominance if desired.*

Video Processing

Proc Amp Functions

Each of the two output channels has an associated video proc amp which provides user adjustable *Gain* / *Saturation* / *Black Level* and *Hue* using on screen sliders.

Aperture Correction

An adjustable horizontal aperture corrector is provided for each of the two output channels. This can be used to add (or remove) image sharpness as required.

> *Note. When using the down converter the filtering process results in a very slight loss of high frequency information (which is normal), the aperture corrector can be used to compensate for this slight loss.*

Test Patterns

Each of the two output channels has its own independent test pattern generator which provides a wide selection of test patterns which can be switched into each output. *(The Test pattern will follow the selected output standard selected for each channel).*

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 Video Delay

Each of the two SDI outputs has separate programmable video delays which can be set (independently) between 0 and 5 frames (max). The adjustment is available in pixel, line and full frame increments.

> **Note** *The Synchronizer (including the conversion options, if installed) has a fixed one frame delay. The 0 > 5 frame user adjustment is additional delay relative to the fixed one frame delay.*

This adjustment will delay the video output relative to the connected reference by the delay setting specified. (+ 1 frame fixed delay)

Functional Diagram

A functional diagram of the PVD 5600 is shown below:

NOTE. *Some functions are not shown or are shown as "not implemented yet". These features will be added at a later date. The module is fully programmable so these features can be easily added to existing modules via firmware upgrades.*

Delay Out

Output 1 - 1

Output 1 - 2

Output 2 - 1

Output 2 - 2

Programmable Video Delay (5 Frames max)

Programmable Video Delay (5 Frames max)

Video Proc
Gain, Hue
Ped, Sat.
Aperture Corr.
Color Space
Conversion

Video Proc
Gain, Hue
Ped, Sat.
Aperture Corr.
Color Space
Conversion

FAN

Output MUX

Selection Switch

CPU Control
Remote Control Interface
Local Control Interface

Test Pattern Generator

ARC

Down Converter
Integrated Firmware
OPTION

ALARM

Signal Routing

5600
On Board Display

Dual Frame Sync

Frame Sync Channel 1

GPI Input

Rack Ref

Ref loop

Ref IN

Loop out

SD/HD SDI Input 1

Module Layout

Module Front Panel

Module Rear Termination Panel

Cooling Fan

CardModule Layout

Note. Cooling fan operation is monitored and alarmed with the module alarm LED and also within the LYNX control system.

Connections

Video

The PVD 5600 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)

> *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.*

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 5.*

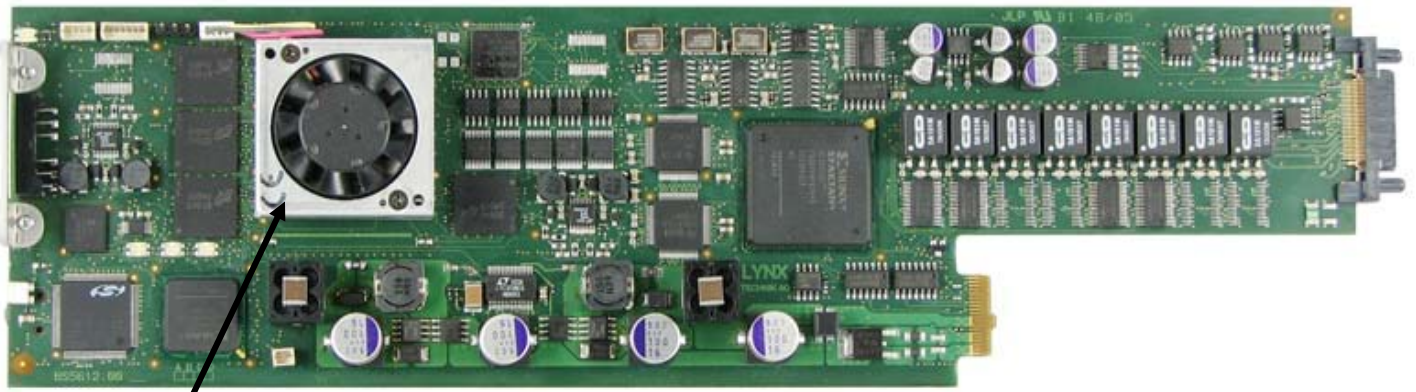This module has a double width rear connection panel, meaning it will occupy two slots of a standard Series 5000 Card Rack. This is to accommodate the additional connections needed for this module and to also provide adequate space for cooling in the rack. Up to five P VD 5600 modules can be accommodated in a single Series 5000 rack frame.

> **NOTE.** *When using this module we highly recommend the use of the **R FR 5011 Fan Front Rack Frame** which provides additional airflow into the rack. If you plan to install this module into empty slots in an existing rack with no fan front cover - then please purchase the **R FR 5001 Fan Front update kit.***

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 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)*

> **NOTE.** *The use of the optional control system is **<u>mandatory</u>** 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 rack with the LYNX control system.*

Settings and Control

The P VD 5600 module 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 using a GUI interface when using one of the optional controllers and control software.

! **NOTE.** *This module is extremely compact and flexible with hundreds of possible user settings. It is not practical to make all these settings available on the local dot matrix display. The use of the control system is __mandatory__ to access the vast array of settings possible. Please refer to the GUI section of this manual for details on the control provided. Some basic module settings are possible via the local controls, which are detailed below.*

Once set, all settings are automatically saved in non-volatile internal memory. (Flash RAM) The module will always recall the last used settings.
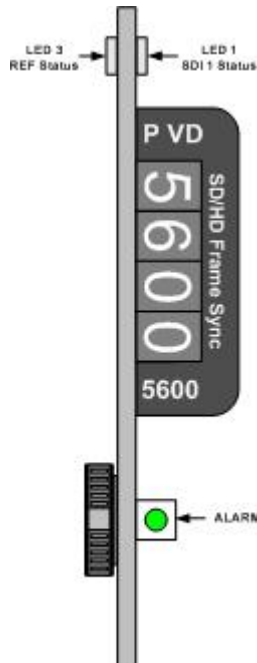
Multi-function Switch
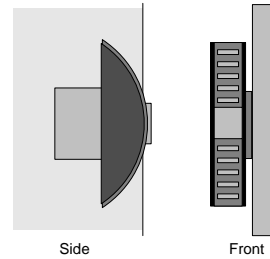
Switch Operations

Up **Down** **Enter**
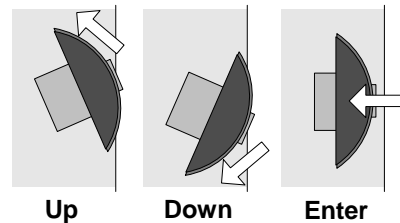
Multi Function Switch

The CardModule is equipped with a multi-function switch located on the front bottom edge of the card. (See above)

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. 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.

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 can be used to help navigating through the menu system.

ENTER moves between levels

UP/DOWN moves between items within the level

When a new setting is entered 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 short timeout.

LEVEL 1	LEVEL 2	LEVEL 3	Notes
P VD 5600			*Root Display*
	REF		*Reference Selection*
		EXT	*Reference taken from module rear connection panel*
		INT	*Reference taken from common rack reference*
		back	
	FPS		*Output frame rate selection*
		60	*All outputs jammed to 60Hz frequency frame rate**
		59	*All outputs jammed to 59.94Hz frequency frame rate**
		50	*All outputs jammed to 50Hz frequency frame rate**
		AUTO	*Output frame rate is derived from connected reference (default)*
		back	
	RSET		*Reset Factory Defaults*
		NO	
		YES	*Reset factory defaults*
		back	
	back		

LED Status Indicators

The P VD 5600 module has LED indicators that serve as alarm and status indication for the module. Function is described below.

SDI Status LED 1

LED Color	Indication
Green	SDI Present and OK
Yellow	SDI Frame Rate Mismatch *(Mismatch between the fixed output frame rate and the SDI input. Conversion taking place)*
Red	No SDI 1 Signal Connected

Ref Status LED 3

LED Color	Indication
Green	Reference Present
Yellow	Reference Present, but not used *(Module is set to free run with no lock to external reference)*
Red	Reference not present – but required (Module is set to "lock to reference")

ALARM LED

LED Color	Indication
Green	Normal Operation
Red	Problem with SDI input
Red Flashing	Cooling Fan Failure

Note. *The Alarm LED can be seen with the rack front cover fitted*
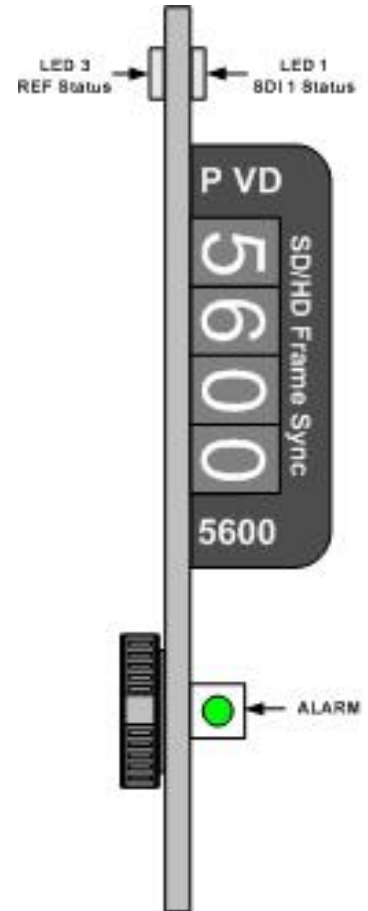
Control System GUI

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 PVD 5600 **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.*

The following GUI screenshots and descriptions shown below describe the settings and adjustments possible for the PVD 5600 CardModule.
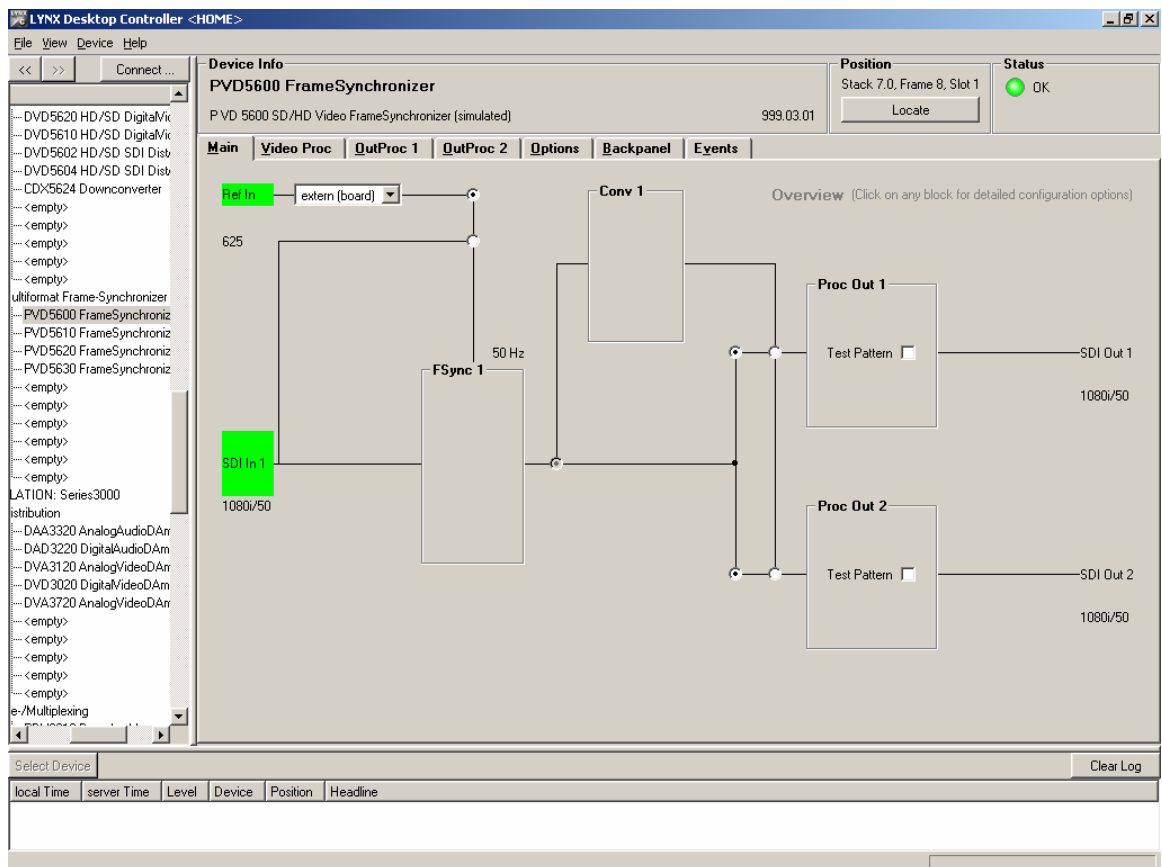

The above screenshot shows the complete module GUI. The Device info area contains information about the module including name and firmware revision. If used as part of a larger system (using the LYNX central control system) the modules position and physical location is displayed above the "locate" button.

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

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 will link to other GUI screens with 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.

There are a number of "Tabs" along the top of the screen which splits up the module settings into a number of logical displays. The various GUI screens and primary functions are described below.

Main Tab

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.
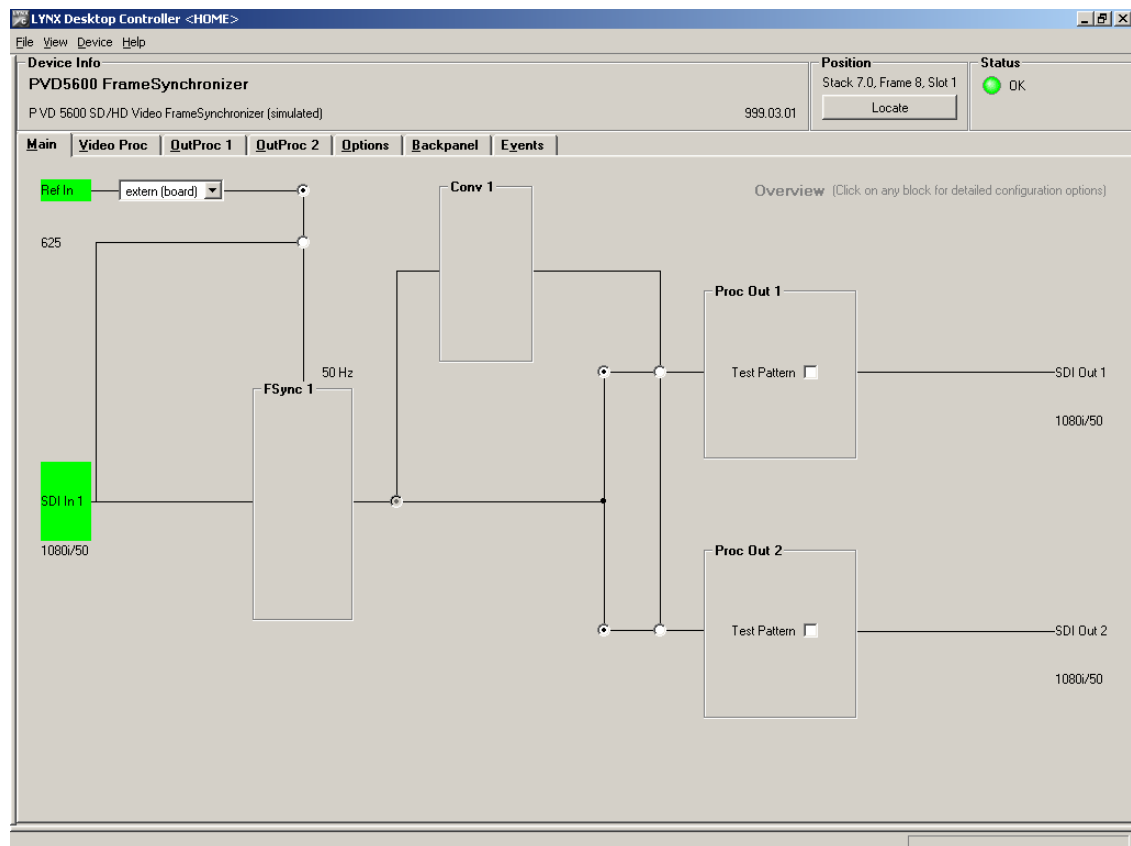
The primary purpose of this screen is to show the overall signal flow through the module and allow easy navigation to other areas. Input standards and formats are auto detected and displayed in the GUI. Parameters will be annunciated in different colors to show status (green = good, red = problem, yellow = caution etc).

REF in Select

There is a select list next to the **REF in** connection. This selects if external reference is to be used from the common rack reference input or the board connection plate reference input.
With the selection above the FSYNC box the reference for the frame synchronizer can also be derived from the digital input. This is useful for applications, where the P VD 5600 is used as a video delay line.

Signal Routing

In the center of the screen there is an area where the internal signal routing can be changed. This area is fundamental to the modules basic function. Here the internal video signal can be routed through (or bypassing) the up/down/cross conversion option. Selecting a cross point via the radio button closes the connection (operation is self explanatory)

Test Patterns

In each of the two output channels it's possible to switch the test pattern on from the main tab if required. (Also selectable from the individual **Proc Out** GUI screen)

Video Proc Tab

This tab will bring up the configuration screen for the conversion option (if fitted), this screen can also be accessed by clicking on the "*Conv1*" box in the flow diagram on the main GUI screen.

> **Note.** *If the conversion option have not been installed then the selection in the Video Converter box will be grayed out.*
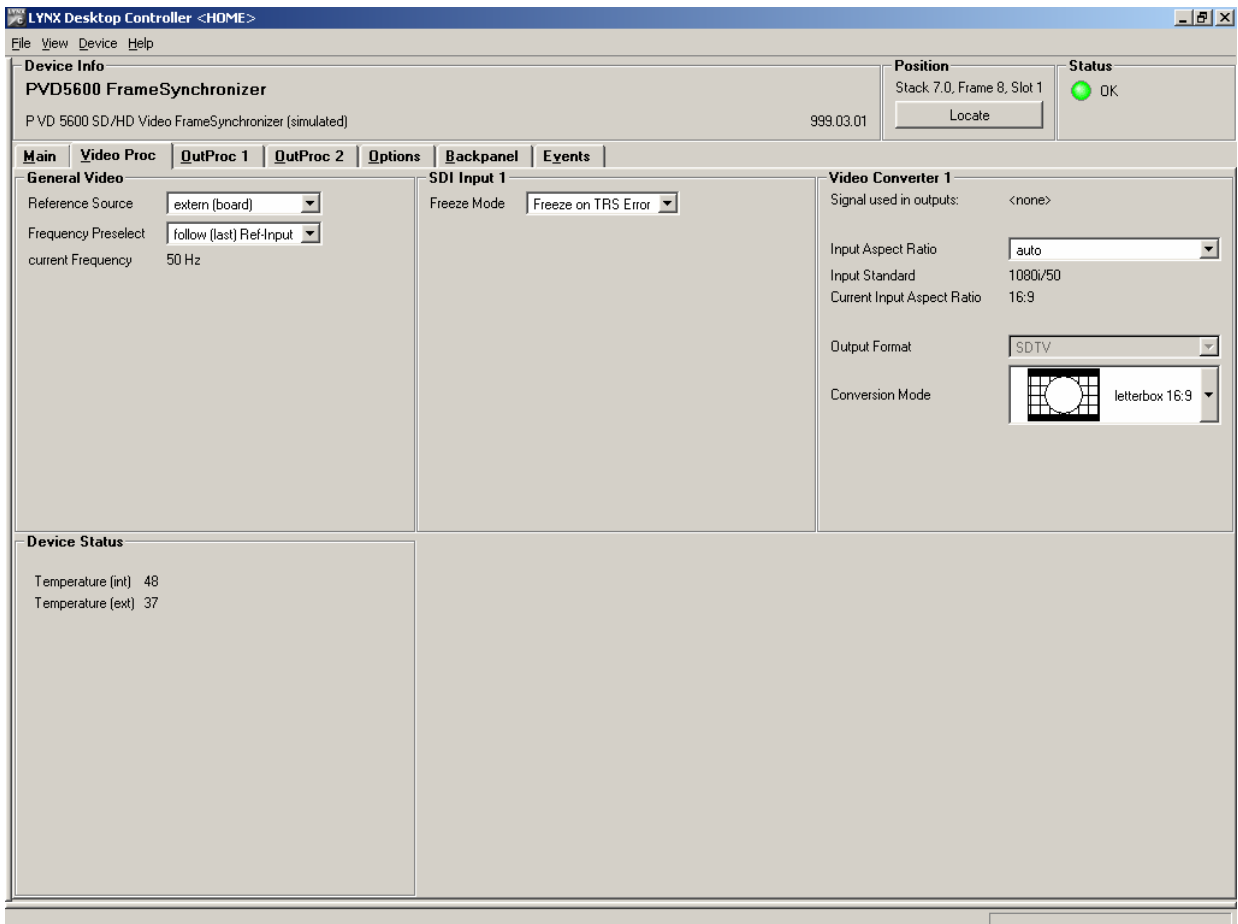
General Video Settings

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

External Reference Source

It is possible to take the external reference signal from two sources. Either from the common rack reference (*an external reference connection to the rack frame which is fed to all cards installed in the rack*) or via the BNC connection provided on the module rear connection panel. Selections provided are:

- External (board) = Via module rear connection panel
- Internal (rack) = Common rack reference

Frequency Pre-select

This is where the Frame synchronizer output frequency (or frame rate) is selected. This can be jammed into a format which will never change (regardless of the connected reference or the connected input video source). If a signal with an incompatible frame rate is connected then a rudimentary standards conversion will take place to maintain a constant output frame rate. This conversion process drops and repeats fields/frames and **should not** be considered broadcast quality.

> **Note.** *For systems without the up/down/cross conversion option fitted then this conversion will only take place between compatible video formats.*

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:

- 50Hz
- 59.94Hz
- 60Hz
- Follow (last) reference (default)

> **Note.** *The synchronizer is supplied from the factory with the last stored reference as 50Hz. With no reference connected its 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)

Device Status

This area is used to show the detected internal and external temperature of the Module. If the internal temperature exceeds 80ºC then the module will log a "over temperature" event in the control system error log.

SDI Input

The next section on the GUI is sectioned SDI 1. This is where the reaction of each channel is defined in case of excessive video errors. The output can be configured to "freeze" or pass the input signal transparently when errors are encountered. If configured to pass the video transparently then all video errors and disturbances are passed 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 Signal" and is a sequence of digital values embedded in the SDI data stream. 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

Video Converter

This section will only be active if the Up/Down/Cross conversion option is purchased. Options are installed via a license strings (purchased separately) these are entered into the module to activate the options. Option licenses are managed / entered using the **Options Tab** in the GUI.

> **Note.** *Currently the option only supports down conversion, the up / cross conversion functionality will be added at a later date (at no additional charge)*

Down Converter Mode (optional)

The down converter provides three modes which can be selected using the drop down selections provided:

- Letterbox 16:9
- Center cut 4:3
- Stretch to Fill

SDTV Aspect Ratio Converter Mode

The Aspect Ratio converter provides three modes for 16:9 to 4.3 conversion and three modes for 4.3 to 16:9 conversion, which can be selected using the drop down selections provided:

16:9 to 4:3 conversion

- Letterbox
- Center cut
- Stretch to Fill (vertical)

4:3 to 16:9 conversion

- Pillar Box
- Center cut
- Stretch to Fill (horizontal)

The "Input format" and the "signal used for the outputs" indicate which input format is routed to the specific conversion channel, and also indicates which of the two outputs the converter output is routed to. (These will change if the internal signal routing is changed).

Output Proc Tabs

There are two "Out Proc" tabs provided, one for each of the two outputs provided. This is where the individual video processing functions are set for each channel. The two "Out Proc" tabs have identical adjustments.
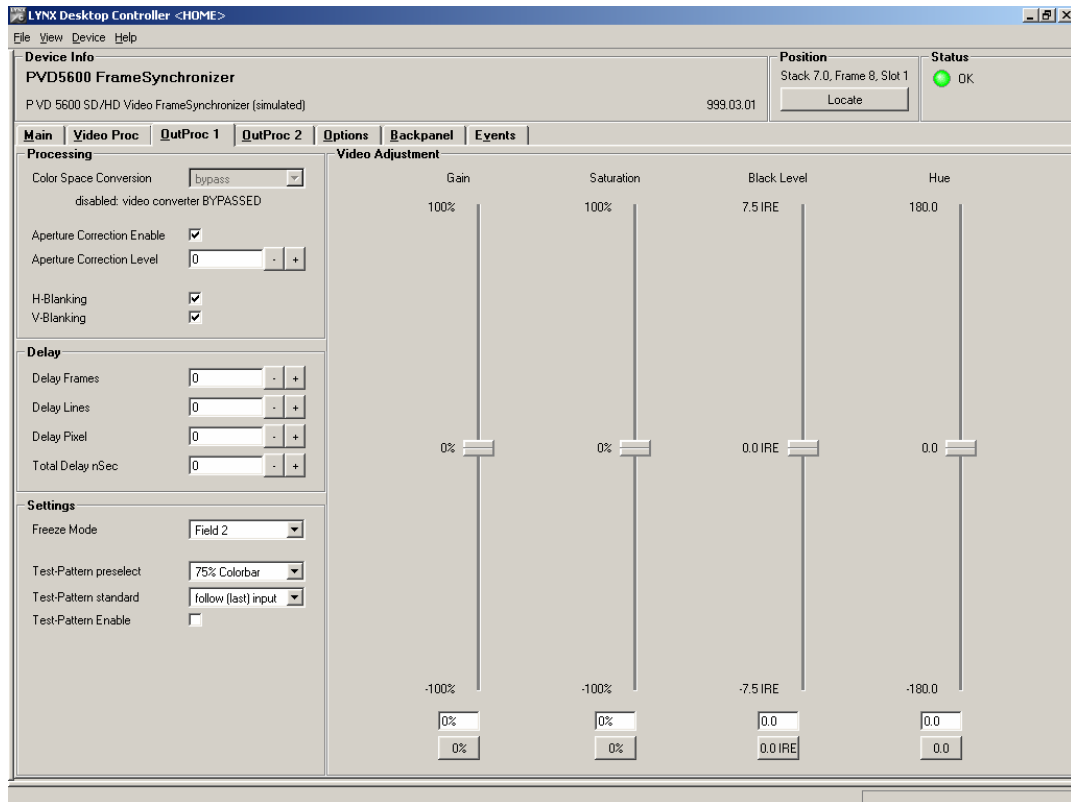
Color Space Conversion

Note. This is only active when the conversion option(s) are installed
This is where the color space conversion functionality is configured. This is used to ensure correct color reproduction on the outputs. HD color space is wider than SDTV color space so there is the possibility of some illegal colors being reproduced if the color space is not converted. Possible selections are:

- Convert *(convert the video signal)*
- Bypass *(perform no conversion)*
- Luma in Bypass (*only convert Chroma portion of signal*)

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 and an adjustment range

The numerical adjustment range provided is + 80 to -30, and is changed by clicking on the "+" or "-" Buttons.

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

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).

Video Delay Adjustment

Each video output can be delayed relative to the reference sync up to a maximum of 5 frames. This is usually used for downstream system timing applications. The delay is adjustable in the following increments:

- Frames
- Lines
- Pixels
- Time (ns)

Depending on preferences you can use one or all of the adjustments provided to set the total video delay.

> **Note.** *The adjustable delay applied is __in addition__ to the fixed one frame processing delay of the module.*

Settings

This area is where the freeze function is defined and also the action (and settings) of the integrated test pattern generator. (Each channel has its own independent test pattern generator)

Freeze Mode

When the synchronizer encounters excessive TRS errors it can be set to freeze or pass the video transparently (selected on the Video Proc tab). 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
- Display (pre-selected) Test Pattern
- Black

> **Note.** *If the pre-selected test pattern is selected this will be used in the respective channel video format and **NOT** influenced by the "Test Pattern Standard" selection mentioned below.*

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 will be used if the freeze mode is set to "test pattern" and will also 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 a stand alone test generator using this selection 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)
- SDTV
- 720P
- 1080i

Note. Signal Frame rate (or frequency) is set on the **Video Proc** Tab (this is the pre selected frequency)

Test Pattern Enable

This checkbox simply switches on the pre-selected test Pattern. (The same can be done using the Test Pattern checkbox on the **Main** Tab)

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, Pedestal (Black level) and Hue.

Default (null) settings are 0% (this is the default). Sliders can be quickly returned to the factory null (or transparent) settings using the buttons provided at the bottom of each slider.

Options Tab

One tab on the GUI is reserved for "Options" This is where the option license codes are entered to unlock the embedded firmware options. Currently there is one option available which is the DOWN conversion option.

It's possible to install a conversion option into the PVD 5600. This option must be purchased and installed separately.
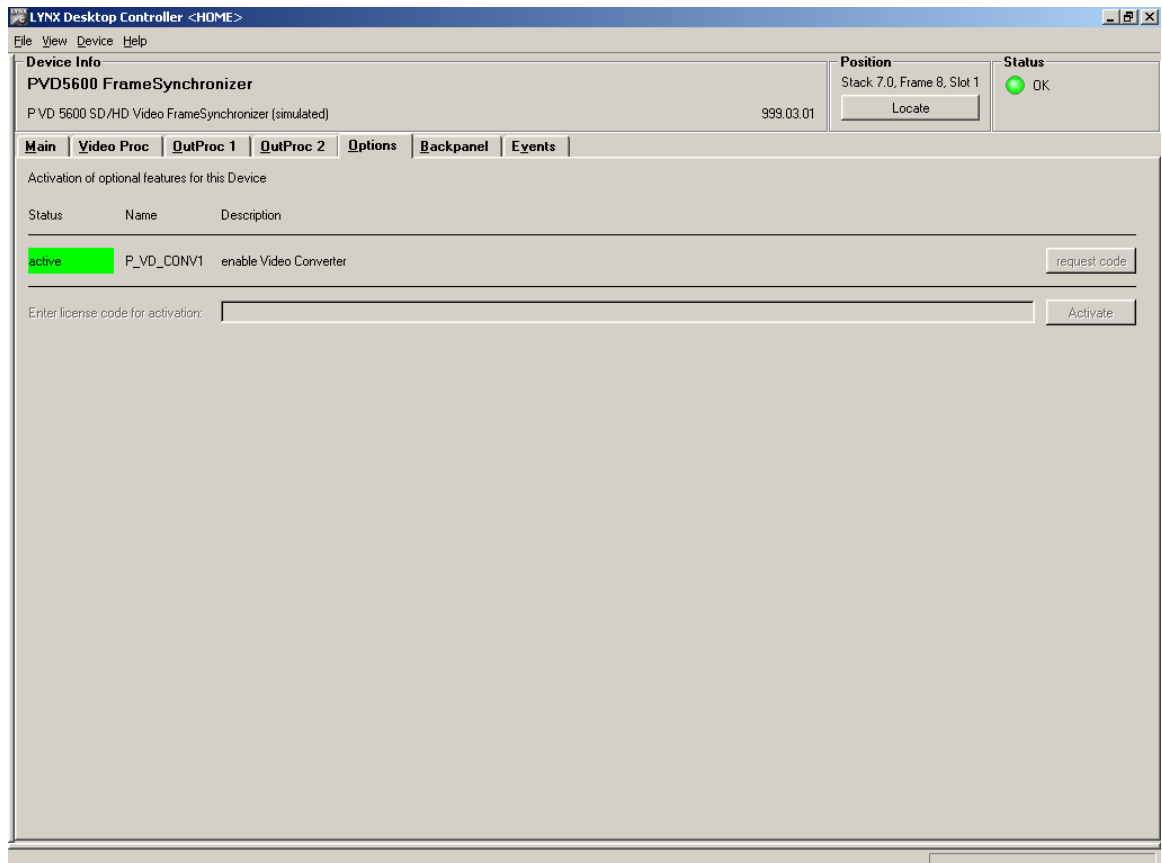
If the module was purchased with options pre-installed then you will see the option status as green (Active).

If you would like to purchase this option after delivery, then you will need to purchase the license codes from LYNX Technik.

Click the "request code" button next to the channel you wish to activate. A number will be displayed, Please forward this number with your purchase order to your authorized LYNX dealer or representative. When you receive the license string simply type it (or paste it using the windows clipboard) into the area provided and press "activate". Activation is confirmed when the option status turns green.

Events Tab

The Events Tab is where the module alarming and error notifications are configured for the module.
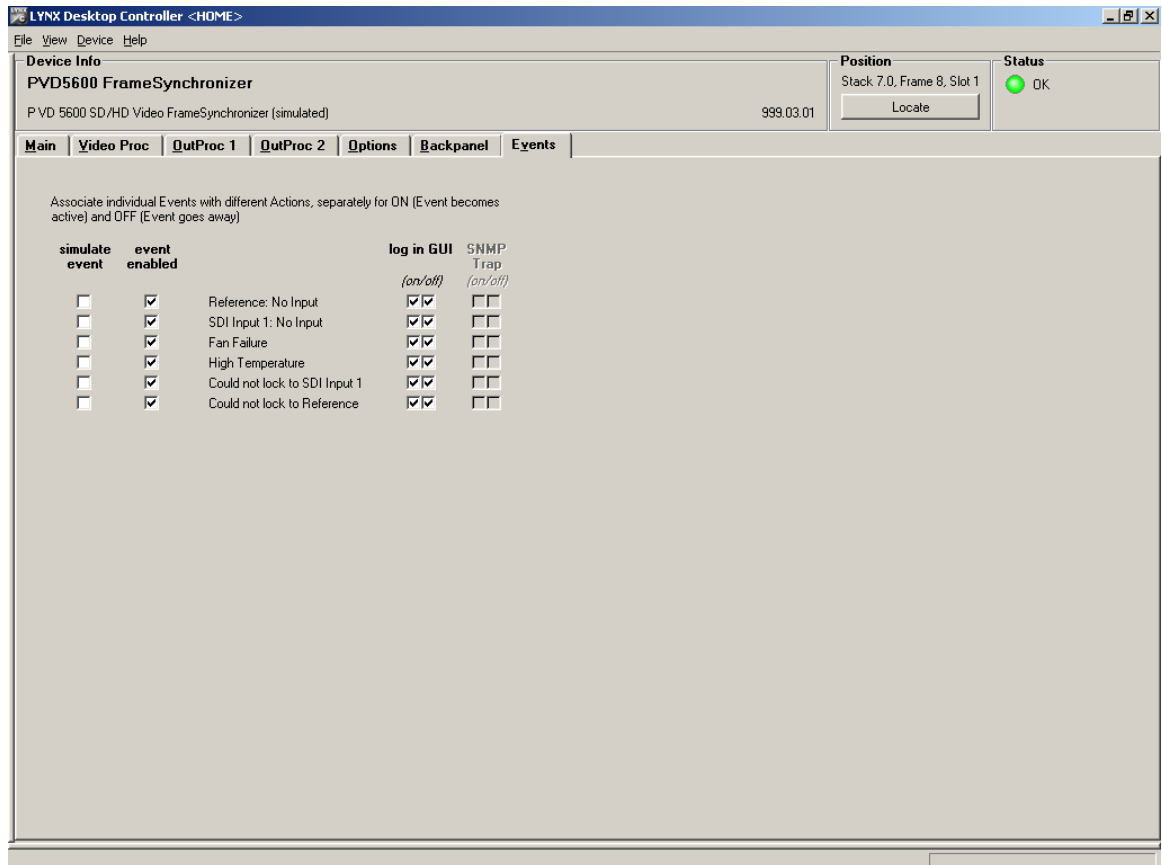
The GUI has an integrated error log, which is a simple text log file stored in the controller PC. This will record an event and timestamp it. The log can be seen at the bottom of the GUI screen and can be scrolled through using the scrolling bar.

Log in GUI Function

Events are selectable, you can chose 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 a 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.

Alarm Activation

By default all alarm conditions are activated (checked), by de-selecting a specific alarm condition I this column you are telling the module to ignore this condition completely. It will not color the alarm LED, log and event in the GUI or send a SNMP trap. This is useful if for example you never have anything connected to AES input 2 and want the card to ignore this input condition completely you would simply de-select "AES Input 2 No Input" and it will be ignored.

SNMP Support

If the system is using a RCT 5030 Master Controller and the SNMP option is installed then the "SNMP Trap" columns become available.

Here you can configure what events you would like to transmit a "SNMP trap" for over the network. (This has no impact or influence over the internally error log maintained by the LYNX control system)

(Internal LYNX error logging and external SNMP traps can be configured independently).

> **Note.** *The simulated event is part of the GUI simulator and allows us to force a particular error condition for testing and demonstration purposes.*

Specifications

Video Input	
Signal Type	Serial digital video SMPTE 292M, 344M, 259M-C
Input standards	HDTV 1080i 59.94Hz / 60Hz / 50Hz / 720P 59.94Hz / 60Hz / 50Hz SDTV 525 59.94Hz / 625 50Hz. (Field upgradeable for additional format support in future)
Connector	BNC
Impedance	75 Ohm
Cable Equalization	Up to 250m Belden 8281 (270MHz) Up to 140m Belden 1694A (1.485GHz)
Return Loss	> 15 dB (270MHz) > 10dB (1.485GHz)
Reference Input	
Signal Type	Analog Bi-level / Tri-level (auto detect) cross lock compatible
No of inputs	1 x External or internal rack reference (selectable) (PVD 5610 DW provides a loop out of reference)
Connection	BNC
Impedance	75 Ohm
Video Outputs	
Signal Type	Serial digital video SMPTE 292M, 344M, 259M-C
Output standards	1080i 59.94Hz / 60Hz / 50Hz 720P 59.94Hz / 60Hz / 50Hz 525 59.94Hz / 625 50Hz.
No. Of outputs	2 separate outputs with 2 x SDI out of each output (4 total) (mapped to any internal signal channel)
Connector	BNC
Impedance	75 Ohms
Jitter	< 0.2 ui (270MHz) < 0.25 ui (1.485GHz)
Return Loss	> 15 dB (1.5GHz)
Video Processing	
Delay adjustment range	Up to 5 frames of programmable delay in pixel / line / frame increments. Independent for the 2 outputs
Minimum delay	1 Frame (including up/down/cross conversion options)
Video adjustments	Gain / Saturation / Hue / Black Level
Aperture correction	Horizontal only, adjustable for each output channel (3)
Color space conversion	601 > 709 or 709 > 601 or transparent (selectable) **Note.** Requires conversion option(s)
Operating Modes	
Frame Sync	Basic SD / HD Multi-rate Frame Synchronizer
Down / ARC conversion + frame sync	Requires Firmware option for Down Conversion
Control	
Local Controls	Local alphanumeric display with integrated menu system 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 mandated for this module
External GPI	Single GPI input on BNC connector. (Function configurable)
Electrical Specifications	
Operating Voltage	12 VDC
Power Consumption	10 W
Safety	IEC 60950/ EN 60950/ VDE 0805

Mechanical	
Size	283mm x 78mm
Weight	CardModule 120g, connector plate 50g
Rack space	Requires 2 slots in rack frame (max 5 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.