TABLE OF CONTENTS

Figures

Tables

REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary version	May 06
0.2	Updated features and specs, miscellaneous editorial changes	Aug 07
1.0	First Release – added user LUT uploading, and features of firmware 1.1	Nov 07
1.1	Update specifications	Feb 08
1.1.1	Fixed typos in section 6.2.1 and removed references to bypass relay	Nov 08
1.2	Updated block diagram	Mar 09

1. OVERVIEW

The Evertz 7732DVP-HD Dual Link Video Processor module is a multi-purpose module designed to convert between 4:2:2 and 4:4:4 HDTV video signals in a wide variety of applications. The model 7732DVP-HD can be operated in a dual link to single link mode for emerging 4:4:4 high definition applications, or a 4:2:2 to 4:4:4 mode to convert traditional high definition content to 4:4:4.

The 7732DVP-HD occupies one card slot in the 3 RU frame, which will hold up to 15 modules or the 1RU frame, which will hold up to three modules.

Features:

- Automatically senses between 1080i/60, 1080i/50, 1080p/24sF, 720p/60, 720p/50 video formats and the 1/1.001 divisor versions where applicable
- Auto-detect video format from SMPTE 352M Payload ID or manual select
- Support for SMPTE 428-9 2048 x 1080 Digital Cinema Mastering Format
- 4:4:4 Dual Link HDSDI to 4:2:2 HDSDI converter
- 4:2:2 HDSDI to 4:4:4 Dual Link HDSDI converter
- 4:4:4 Dual Link HDSDI to 4:4:4 HDSDI with LUTs
- Two serial digital 1.5 Gb/s HD inputs per SMPTE 292M
- Three serial digital 1.5 Gb/s HD outputs per SMPTE 292M
- Retimed 4:4:4 dual link outputs
- Programmable LUTs for 4:4:4 and 4:2:2 HDSDI to accommodate different colourimetry between monitoring devices
- Factory LUTs handle logarithmic ‘filmstream’ inputs from VIPER and ARRI D20 cameras
- Store/recall user presets of common configurations – up to 10 presets
- 6 GPI control inputs to select operating modes or load user presets.
- 2 GP0 status outputs indicate operating modes – programmable functions
- Card edge menu using OSD on 4:2:2 output to configure the operating modes
- Card Edge LEDs for signal presence, module status
- VistaLINK® - enabled offering remote monitoring, control and configuration capabilities via SNMP. VistaLINK® is available when modules are used with the 3RU 7700FR-C frame and a 7700FC VistaLINK® Frame Controller module in slot 1 of the frame using the model 9000NCP Network Control Panel or Evertz VistaLINK® PRO or other third party SNMP manager software.

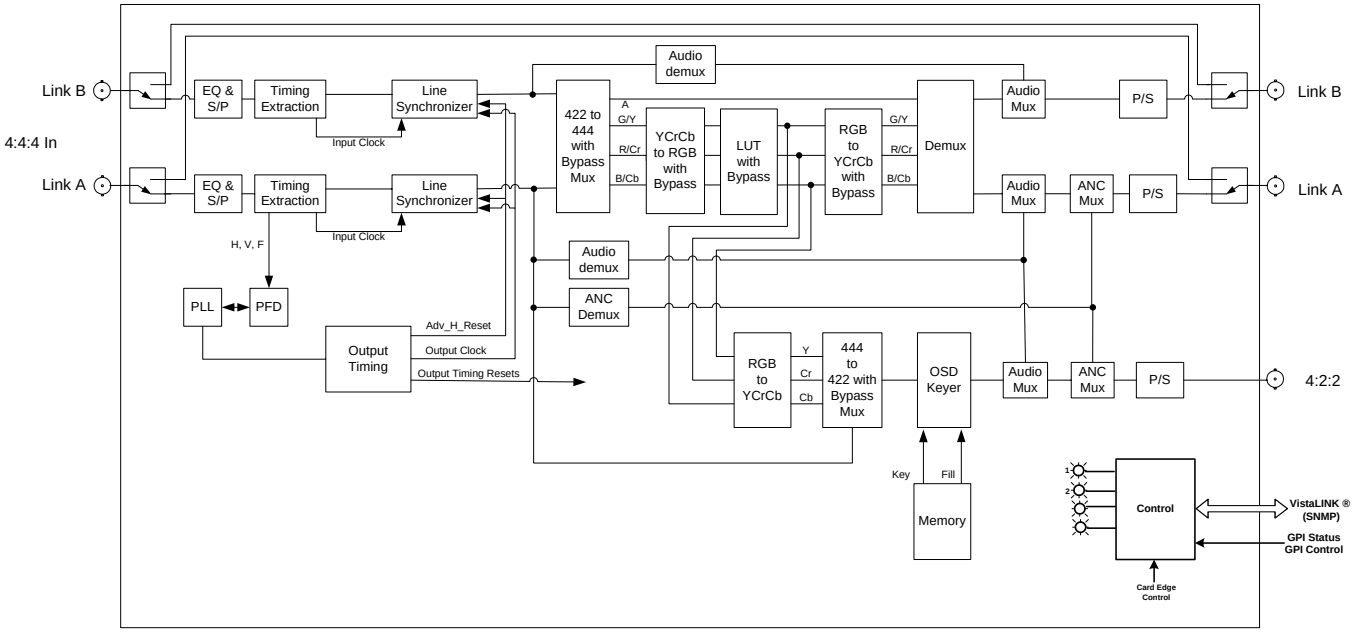


Figure 1-1: 7732DVP-HD Block Diagram

2. INSTALLATION

The 7732DVP-HD comes with a companion rear plate that occupies one slot in the frame. For information on inserting the module into the frame see section 3 of the 7700FR chapter.

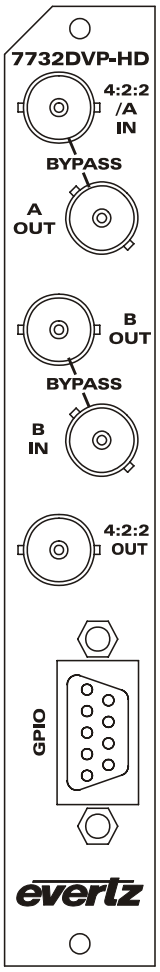


Figure 2-1: 7732DVP-HD Rear IO Module

2.1. HDSDI VIDEO INPUTS AND OUTPUTS

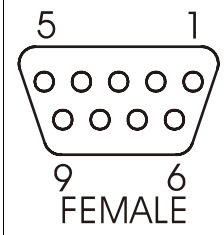
4:2:2/A IN, B IN: When operating the 7732DVP-HD in the 4:4:4 to 4:2:2 mode, these two BNC connectors are for connecting dual link 10-bit serial digital video input signals, compatible with the SMPTE 372M standard. When operating the 7732DVP-HD in the 4:2:2 to 4:4:4 mode connect the 4:2:2 input video compatible with the SMPTE 292M standard to the **4:2:2/A IN** BNC.

4:2:2/A OUT, B OUT: When operating the 7732DVP-HD in the 4:4:4 to 4:2:2 mode, these two BNC connectors provide a reclocked and retimed output from the **4:2:2/A IN** and **B IN** input video. When operating the 7732DVP-HD in the 4:2:2 to 4:4:4 mode, the dual link Video output will be available on these two output BNCs.

4:2:2 OUT: When operating the 7732DVP-HD in the 4:4:4 to 4:2:2 mode, this BNC contains a down sampled 4:2:2 copy of the dual link input video. When operating the 7732DVP-HD in the 4:2:2 to 4:4:4 mode, this BNC contains a reclocked copy of the **4:2:2/A IN** input video.

2.2. GENERAL PURPOSE INPUTS & OUTPUTS

Table 2-1 shows the pinout of the 9 pin Female D GPI connector. The 9 pin D connector has six general purpose inputs and two general purpose outputs.



Pin #	Name	Description
1	GPI6	General Purpose Input 6
2	GPI2	General Purpose Input 2
3	GND	Signal Ground
4	GPI1	General Purpose Input 1
5	GPO2	General Purpose Output 2
6	GPI3	General Purpose Input 3
7	GPI4	General Purpose Input 4
8	GPI5	General Purpose Input 5
9	GPO1	General Purpose Output 1
Shell	GND	Frame Ground

Table 2-1: GPIO Connector Pinout

The GPI inputs are active low. This means that if you leave an input floating (not connected) then it will not be activated. Lowering the GPI input to a voltage below 0.8 volts will activate the input. The user can activate GPIs simply by connecting the GPI input pins to Ground using a button, switch, relay or an open collector transistor. The inputs are internally pulled up to either +5 or +12 volts DC set by jumper J16. The *GPI* menu items on the *UTILITY* menu are used to configure the operation of the GPI inputs. (See section 6.4.3) Figure 2-2 shows the circuit for the General Purpose inputs.

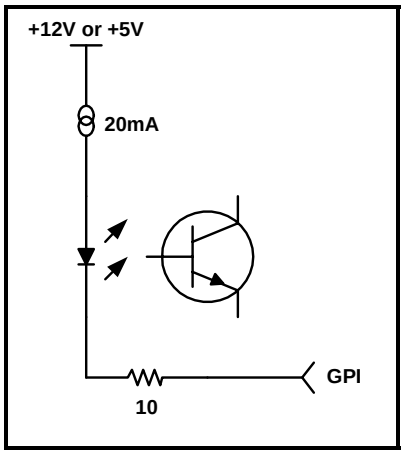


Figure 2-2: Typical GPI Input Circuitry

The GPO outputs are active low. The outputs are internally pulled up to +3.3 volts DC by a 10K resistor. The *GPO* menu items on the *UTILITY* menu are used to configure the operation of the GPO Outputs. (See section 6.4.4)

3. SPECIFICATIONS

3.1. SERIAL VIDEO INPUT

Standard: SMPTE 372M (dual Link 1.5 Gb/s) or SMPTE 292M (1.5 Gb/s) – auto-detects standard using SMPTE 352M Payload ID
SMPTE 274M, SMPTE 296M – 1080i/60, 1080i/50, 1080p/24sF, 720p/60, and 720p/50 and the 1/1.001 divisor versions where applicable
SMPTE 428-9 – 2048 x 1080p/24sF
Number of Inputs: 1 dual link or 1 single link
Connector: BNC per IEC 61169-8 Annex A
Input Equalization: Automatic to 65m @ 1.5Gb/s with Belden 1694 or equivalent cable.
Return Loss: >-15 dB up to 1.5GHz

3.2. SERIAL VIDEO OUTPUTS

Standard: Same as input
Number of Outputs: 2 dual link outputs, 1 single link output
Connector: BNC per IEC 61169-8 Annex A
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 200ps nominal
Overshoot: <10% of amplitude
Return Loss: > -10 dB at 1.5 Gb/s (4:4:4 outputs)
> -6 dB at 1.5 Gb/s (4:2:2 output)
Jitter: < 0.2UI
Payload ID: SMPTE 352M

3.3. GPIO CONTROL PORT

Number of Inputs: 6 Programmable functions
Number of Outputs: 2 Programmable functions
Type: Opto-isolated, active low with internal pull-ups to +5 or +12V (jumper settable)
Connector: 9 pin female D
Signal Level: Closure to ground

3.4. LOOK UP TABLES

Type: 10 bit 1-D LUT
Number: 5 factory programmed
5 User loadable
User Upload: RS232, 57600 baud using card edge connector

3.5. INPUT TO OUTPUT PROCESSING DELAY (HD INPUT VIDEO)

Video Delay: 2 lines.

3.6. ELECTRICAL

Voltage: +12VDC
Power: 10 Watts.
EMI/RFI: Complies with FCC regulations for class A devices.
Complies with EU EMC directive.

3.7. PHYSICAL

Number of slots: 1

4. STATUS INDICATORS

The 7732DVP-HD has 10 LED Status indicators on the main circuit board front card edge to show operational status of the card at a glance. Figure 8-1 shows the location of the LEDs and card edge controls.

Two large LEDs on the front of the board indicate the general health of the module:

LOCAL FAULT: This Red LED indicates poor module health and will be On during the absence of a valid input signal or if a local input power fault exists (i.e.: a blown fuse). The LOCAL FAULT indication can also be reported to the frame through the FRAME STATUS jumper.

MODULE OK: This Green LED indicates good module health. It will be On when a valid input signal is present, and board power is good.

There are two small LEDs on the top side of the board (beside the DIP switch) that indicate that the 7732DVP-HD video inputs are present. The input signal must match the video standard setting for these LEDs to be on.

LINKA/4:2:2 PRESENT: This Green LED will be On when there is a valid signal present on module 4:2:2/Link A input.

LINK B PRESENT: This Green LED will be On when there is a valid signal present on module Link B input.

There are two small LEDs on the bottom side of the board.

LINKA/4:2:2 LOCKED: This Green LED will be On when the HDSDI input circuitry has locked to a valid signal present on module 4:2:2/Link A input.

LINK B LOCKED: This Green LED will be On when the HDSDI input circuitry has locked to a valid signal present on module Link B input.

4.1. AUDIO STATUS LEDs

Four LEDs located on the lower edge of the module (near the card extractor) indicate which audio groups are present in the input video. Audio group LED 1 is located closest to the center of the module.

Audio LED	Colour	Audio Group Status
1	Off	Neither group 1 nor group 2 present on input 1 video.
	Flashing	Only group 1 or group 2 present on input 1 video.
	Green	Both group 1 and group 2 present on input 1 video.
2	Off	Neither group 3 nor group 4 present on input 1 video.
	Flashing	Only group 3 or group 4 present on input 1 video.
	Green	Both group 3 and group 4 present on input 1 video.
3	Off	Neither group 1 nor group 2 present on input 2 video.
	Flashing	Only group 1 or group 2 present on input 2 video.
	Green	Both group 1 and group 2 present on input 2 video.
4	Off	Neither group 3 nor group 4 present on input 2 video.
	Flashing	Only group 3 or group 4 present on input 2 video.
	Green	Both group 3 and group 4 present on input 2 video.

Table 4-1: Audio Group Status LEDs

5. CARD EDGE CONTROLS

The 7732DVP-HD is equipped with an 8 position DIP switch, toggle switch, and a push button to allow the user to select various functions. The DIP switch provides basic configuration functions that will normally be set only once, such as VistaLINK® remote control selection. All other card functions are available through a menu system controlled by the toggle switch and push button and displayed on the On Screen character display (OSD). (See section 6)

DIP switch 1 is located at the top of the DIP switch (farthest from to the card ejector). Table 5-1 gives an overview of the DIP switch functions. Section 5.1 gives a detailed description of each of the DIP switch functions.

There are two types of DIP switches. For slide switches the On (closed) position is farthest from the front edge of the printed circuit board. For 'piano key' switches the On (closed) position is down or closest to the printed circuit board.

DIP Switch	Function
1	Reserved – set to Off
2	
3	
4	
5	
6	
7	
8	VistaLINK® or Local control Selection (future)

Table 5-1: DIP Switch Functions

5.1. SELECTING WHETHER THE MODULE WILL BE CONTROLLED FROM THE LOCAL CONTROLS OR THROUGH THE VistaLINK® INTERFACE

The 7732DVP-HD can be controlled using the menu system or remotely via SNMP using VistaLINK® PRO. See sections 10.2 and 10.3 for a full description of the parameters that can be monitored or controlled using VistaLINK®. VistaLINK® control is only available when the card is installed in the 3RU 7700FR-C frame and a 7700FC VistaLINK® Frame Controller card is installed in slot 1 of the frame.

DIP switch 8 is used to enable or disable VistaLINK® control.

DIP 8	CONTROL MODE
Off	Local control mode. The module will be controlled using the menu system
On	VistaLINK® control mode. The module will be controlled remotely through SNMP or using the menu system

Table 5-2: VistaLINK® Mode Switch Settings

6. CARD EDGE MENUS

A toggle switch and pushbutton allow card edge navigation for a set of on-screen menus used to configure the card. To enter the on-screen menu system, press the pushbutton. This will bring you to the main Setup menu where you can use the toggle switch to move up and down the list of available sub menus. An arrow (➔) moves up and down the left hand side of the menu items to indicate which item you are currently choosing. Once the arrow is on the desired item, press the pushbutton to select the next menu level.

On all menus, there are two extra selectable items: *Back* and *Exit*. Selecting *Back* will take you to the previous menu (the one that was used to get into the current menu) while *Exit* will return the display to its normal operating mode. On the main menu, BACK and EXIT will both take you to the normal operating mode.

Once in a sub menu, there may be another menu layer, or there may be a list of parameters to adjust. If there is another set of menu choices, use the toggle switch to select the desired menu item and press the pushbutton.

To adjust any parameter, use the toggle switch to move up or down to the desired parameter and press the pushbutton. The arrow will move to the right hand side of the line (➔) indicating that you can now adjust the parameter. Using the toggle switch, adjust the parameter to its desired value. If the parameter is a numerical value, the number will increase if you lift the toggle switch and decrease if you push down on the toggle switch.

When you have stopped at the desired value, depress the pushbutton. This will update the parameter to the selected value and move the arrow back to the left side of the parameter list (➔). Continue selecting and adjusting other parameters or use the BACK or EXIT commands.

6.1. TOP LEVEL MENU STRUCTURE

The OSD menu is arranged in a layered structure that groups similar configuration items together. The following section gives a brief description of the first level of menus that appear when you enter the OSD screens. Selecting one of these items will take you to the next menu level. Sections 6.2 to 6.4 provide detailed descriptions of each of the sub menus. The tables in sections 6.2 to 6.4 are arranged in an indented structure to indicate the path taken to reach the control. Menu items or parameters that are underlined indicate the factory default values.

VIDEO	Configures Video setup items
LOOK UP TABLES	Configures the Look Up table to be applied to the output video
UTILITY	Configures miscellaneous setup items

6.2. CONFIGURING THE VIDEO CONTROLS

The *VIDEO* menus are used to configure parameters associated with the video input and output functions and the Source ID decoders. The chart below shows the items available in the *VIDEO* menu. Sections 6.2.1 to 6.4.8 give detailed information about each of the menu items.

Input Type	Selects whether the input is single link or dual link
Video standard	Selects the input video standard
Colour Space	Selects the colour space of the dual link 4:4:4 video
Loss of Video	Selects the action to take when the input video is missing

6.2.1. Selects Whether The Input Is Single Link To Dual Link

VIDEO
- *Input Type*
  - *Auto*
  - *Single Link*
  - *Dual Link*

This control is used to select whether the 7732DVP-HD has a 4:4:4 Dual link video input or a 4:2:2 single link input.

When set to *Auto,* and there is a SMPTE 352M Payload ID present on the input signal, it will be used to determine whether the input type will be single link or dual link. If there is no payload ID, the module will convert single link to dual link when there is only an input on the 4:2:2/A input. The module will convert dual link to single link when there is a valid dual link input on both Link A and Link B inputs.

When set to *Single Link,* the module will convert single link to dual link. 4:2:2 out is a copy of 4:2:2/A in.

When set to *Dual Link,* the module will convert dual link to single link. Link A and Link B outputs are copies of Link A and Link B inputs with LUT applied.

6.2.2. Setting the Video Standard

- *VIDEO*
  - *Video standard*
    - *Auto*
    - *1080i/60*
    - *1080i/59.94*
    - *1080i/50*
    - *1080p/24sF*
    - *1080p/23.98sF*
    - *1080p/30*
    - *1080p/29.97*
    - *1080p/25*
    - *1080p/24*
    - *1080p/23.98*
    - *720p/60*
    - *720p/59.94*
    - *720p/50*
    - *2048x1080p/24sF*

This control is used to set the video standard for the card. If set to *Auto* mode, the card will adjust operation as needed for the incoming standard.

6.2.3. Selects the Colour Space of the 4:4:4 Dual Link Video

- *VIDEO*
  - *Colour Space*
    - *Auto*
    - *YCbCr*
    - *RGB*
    - *FSRGB*

When the *Input Type* menu item is set to *Dual Link* this control should be set to the colour space of the input 4:4:4 video.

When set to *Auto* and there is a valid SMPTE 352M Payload ID on the incoming video, the colour space will be automatically detected as *YCbCr* or RGB. There is currently no Payload ID for FSRGB, therefore this mode must be selected manually.

Select *YCbCr* when the incoming video is in the 10 bit 4:4:4 YCbCr format. In the *YCbCr* mode, the RGB to YCbCr colour transformation for the 4:2:2 output will be disabled.

Select *RGB* when the incoming video is in the 10 bit 4:4:4 RGB format compliant with SMPTE 274M or SMPTE 296M. The RGB video has the three components scaled such that the extreme values are code words 040_h (64) and $3AC_h$ (940) in a 10-bit representation. In the *RGB* mode, the RGB to YCbCr colour transformation for the 4:2:2 output will be enabled.

Select *FSRGB* when the incoming video is in the extended range 10 bit 4:4:4 FSRGB format. The FSRGB video has its three components scaled such that the extreme values are code words 04_h (4) and $3FB_h$ (1019) in a 10-bit representation. In the *FSRGB* mode, the FSRGB to YCbCr colour transformation for the 4:2:2 MON output will be enabled, and the YCrCb 4:2:2 output video components will be scaled such that the extreme values are code words 040_h (64) and $3AC_h$ (940) in a 10-bit representation.

When the *Input Type* menu item is set to *Single Link* this control determines the colour space of the output 4:4:4 video.

Do not use *Auto* in single link mode, as there is no way to detect the desired colour space of the output 4:4:4 video. You must manually select the desired output colour space.

Select *YCbCr* when the dual link output video should be in the 10 bit 4:4:4 YCbCr format. In the *YCbCr* mode, the YCbCr to RGB colour transformation for the 4:2:2 input will be disabled.

Select *RGB* when the dual link output video should be in the 10 bit 4:4:4 RGB format compliant with SMPTE 274M or SMPTE 296M. The 4:4:4 RGB output video will have its the three components scaled such that the extreme values are code words 040_h (64) and $3AC_h$ (940) in a 10-bit representation. In the *RGB* mode, the YCbCr to RGB colour transformation for the 4:2:2 input will be enabled.

Select *FSRGB* when the dual link output video should be in the extended range 10 bit 4:4:4 FSRGB format. The 4:4:4 FSRGB output video will have its three components scaled such that the extreme values are code words 04_h (4) and $3FB_h$ (1019) in a 10-bit representation. In the *FSRGB* mode, the YCbCr to RGB colour transformation for the 4:2:2 input will be enabled.

6.2.4. Selects the Action to Take when Input Video Is Missing

VIDEO	
Loss of video	This control is used to determine what action to take when the video input is missing. The user can either have the output video go to black or blue or pass whatever data is at the input.
Blue	
Black	
Pass	

6.3. CONFIGURING THE LOOK UP TABLES

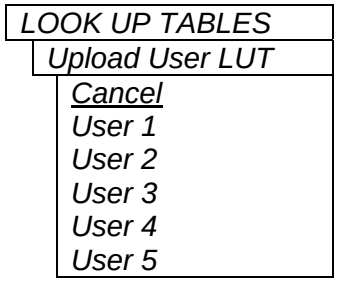
The *LOOK UP TABLES* menus are used to configure the look up table that will be applied to the output video. It is also used to load user look up tables to the 7732DVP-HD memory. The chart below shows the items available in the *LOOK UP TABLES* menu. Sections 6.2.1 to 6.3.2 give detailed information about each of the menu items.

Active Lookup	Selects the active look up table
Upload User LUT	Initiates an upload to one of the User Look up Table memories

6.3.1. Controlling whether the Look Up Table is Loaded

LOOK UP TABLES	
Active Lookup	This control is used to select the currently active look up table from one of the factory LUTs or one of the five user lookup table memories.
1:1	The *1:1* LUT effectively turns off the look up table function
Kill R	The *Kill R* LUT removes all the Red
Kill G	The *Kill G* Look Up table which removes all the Green
Kill B	The *Kill B* Look Up table which removes all the Blue
FilmStream	The *Filmstream* LUT restores a Filmsteam encoded video to a linear space
User 1	Loads the *User 1* LUT
User 2	Loads the *User 2* LUT
User 3	Loads the *User 3* LUT
User 4	Loads the *User 4* LUT
User 5	Loads the *User 5* LUT

6.3.2. Uploading User Lookup Tables



This control is used to initiate an upload to one of the user look up table memories. (This feature not implemented at time of writing.)

Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto header J24 near the card ejector. Connect the 9 pin D connector to a PC running HyperTerminal or some other terminal software.

After selecting the *Upload User LUT* menu, you must select the user look up table memory you want to upload to and press the pushbutton before the upload can take place. After pressing the pushbutton use the terminal software to send the LUT as a text file to the 7732DVP-HD. See section 9 for more information about Look up table files.

You can abort the upload operation by pressing the pushbutton when *Cancel* is displayed.

The Upload baud rate for the 7732DVP-HD modules is 115,200 baud, no parity 1 stop bit.

6.4. UTILITIES

The *UTILITY* menus are used to list the module firmware version, upgrade the firmware, and manage the user presets. The chart below shows the items available in the *UTILITY* menu. Sections 6.4.1 to 6.4.8 give detailed information about each of the parameters.

Recall Preset	Allows user to recall configurations from a user preset.
Store Preset	Allows user to store the current configuration of the card to a user preset.
GPI 1	Allows user to select the function of GPI input 1.
GPI 2	Allows user to select the function of GPI input 2.
GPI 3	Allows user to select the function of GPI input 3.
GPI 4	Allows user to select the function of GPI input 4.
GPI 5	Allows user to select the function of GPI input 5.
GPI 6	Allows user to select the function of GPI input 6.
GPO 1	Allows user to select the function of GPO Output 1.
GPO 2	Allows user to select the function of GPO Output 2.
Status Window	Allows user to turn the Status window OSD on and off.
Upgrade	Used to upgrade the firmware in the module.
Factory Reset	Perform a reset of the module to factory defaults.
About…	Shows the firmware version of the module.

6.4.1. Recalling Card Configurations from the User Presets

UTILITY
  Recall preset
  Cancel
  Preset 1
  Preset 2
  …
  Preset 10
	This control is used to restore the current card configuration from one of the saved user presets.
	
	After selecting the recall preset operation, you must select the preset number you want to recall and press the pushbutton before the recall will take place. You can abort the operation by pressing the pushbutton when *Cancel* is displayed.

6.4.2. Storing Card Configurations to the User Presets

UTILITY *Store preset* *Cancel* *Preset 1* *Preset 2* *…* *Preset 10*	This control is used to store the current card configuration into one of the saved user presets. After selecting the store preset operation, you must select the preset number you want to use to save the card configuration and press the pushbutton before the store will take place. You can abort the operation by pressing the pushbutton when *Cancel* is displayed.

6.4.3. Selecting the function of the GPI inputs

There are six menu items that are used to program the functions of the GPI inputs. For the sake of simplicity only the menu item for GPI1 will be described in the manual.

UTILITY *GPI 1*	This control is used to select the function of GPI input 1.
Off	Turns off the GPI.
Preset 1	Recalls Preset 1
Preset 2	Recalls Preset 2
…	…
Preset 10	Recalls Preset 10
1:1 LUT	Loads the *1:1* Look Up Table
Kill R LUT	Loads the *Kill R* Look Up Table
Kill G LUT	Loads the *Kill G* Look Up Table
Kill B LUT	Loads the *Kill B* Look Up Table
FilmStream LUT	Loads the *Filmstream* Look Up Table
User 1 LUT	Loads the *User 1* Look Up Table
User 2 LUT	Loads the *User 2* Look Up Table
User 3 LUT	Loads the *User 3* Look Up Table
User 4 LUT	Loads the *User 4* Look Up Table
User 5 LUT	Loads the *User 5* Look Up Table
6 Hz Input	Used the GPI input a s a 6 Hz input for 3:2 pulldown control (future)
OSD Disable	Disables the On Screen Display on the 4:2:2 Out
Status Enable	Turns the Status Window On or Off

6.4.4. Selecting the function of the GPO Outputs

There are two menu items that are used to program the functions of the GPO outputs. For the sake of simplicity only the menu item for GPO1 will be described in the manual.

UTILITY *GPO 1* *4:2:2 Input Tally* *4:4:4 Input Tally*	This control is used to select the function of GPO output 1. Tally outputs are Active low. Low when 4:2:2 video present and *Input Type menu* set to *Single Link* Low when 4:4:4 video present and *Input Type menu* set to *Dual Link*

6.4.5. Enabling the Status Window

UTILITY
Status Window
Off
On
GPI

This control is used to turn the status window on or off. The Status window shows the card status at a glance and is visible on the **4:2:2 OUT** video output.

When set to *On* the status window will always be On.
When set to *GPI* the status window can be controlled by one of the GPIs. See section 6.4.3 for information about programming the GPI functions.

The Status window will show the following items on the 4:2:2 Out when it is enabled.

Item	Value	Example
Input Type:	{input type detected | selected}	4:4:4
Link A:	present | missing	present
Link B:	present | missing	present
Video Standard:	{video standard detected | selected}	Auto: 1080p/23.98sF
Colour Space:	YCrCb | RGB | XYZ & GAMMA DETECT	RGB - Gamma out of range
2:3 Pulldown:	not applicable | active | disabled	active
Pulldown Reference:	not applicable | RP188 | 6 Hz | Auto	Auto: RP188
Active Lookup Table:	[List of LUTs}	User 1
GPI 1:	[List of functions} : active | inactive	Load Preset 1 : Inactive
GPI 2:	[List of functions} : active | inactive	Load Preset 2 : Inactive
GPI 3:	[List of functions} : active | inactive	Load Preset 3 : Inactive
GPI 4:	[List of functions} : active | inactive	Load Preset 4 : Inactive
GPI 5:	[List of functions} : active | inactive	Load Preset 5 : Inactive
GPI 6:	[List of functions} : active | inactive	6 Hz : active
GPI 7:	[List of functions} : active | inactive	Load Preset 7 : Inactive
GPI 8:	[List of functions} : active | inactive	Load Preset 7 : Inactive
Control Mode:	Local | Local & VistaLINK	Local Control

Table 6-1: Status Display

6.4.6. Initiating a Software Upgrade

UTILITY
- *Upgrade*
  - *Cancel*
  - *Yes*

This control is used to initiate an upgrade of the module software.

In addition to the software upgrade support detailed in the *Upgrading Firmware* chapter in the front of the binder, you can initiate an upgrade with this control. This will allow you to upgrade the software without unplugging the card and changing the upgrade jumper.

After selecting the upgrade operation, you must change the command to *Yes* and press the pushbutton before the upgrade can take place. Follow the remainder of the instructions in the *Upgrading Firmware* chapter. You can abort the operation by pressing the pushbutton when *Cancel* is displayed.

After the upgrade has finished, the unit will automatically restart and run in normal operating mode.

The Upgrade baud rate for the 7732DVP-HD modules is 115,200 baud.

6.4.7. Restoring the Module to its Factory Default Configuration

UTILITY
- *Factory Reset*
  - *Cancel*
  - *Yes*

This menu item is used to restore all controls back to their factory defaults.

After selecting the reset operation, you must change the command to *Yes* and press the pushbutton before the command takes place. After the command, all parameters will be set to their factory default. You can abort the operation by pressing the pushbutton when *Cancel* is displayed.

6.4.8. Accessing Information About this Module and its Firmware

UTILITY
- *About…*

This control lists the particulars about this module and the firmware residing within it. It gives quick access to information about revisions that can be used to determine when upgrades are required.

7. MENU QUICK REFERENCE

VIDEO
- Input Type
- Video standard
- Colour Space
- Loss of video

LOOK UP TABLES
- Active Lookup
- Upload User LUT

UTILITY
- Recall Preset
- Store Preset
- GPI 1
- GPI 2
- GPI 3
- GPI 4
- GPI 5
- GPI 6
- GPO 1
- GPO 2
- Status Window
- Upgrade
- Factory Reset
- About…

8. LOCATION OF LEDS AND JUMPERS

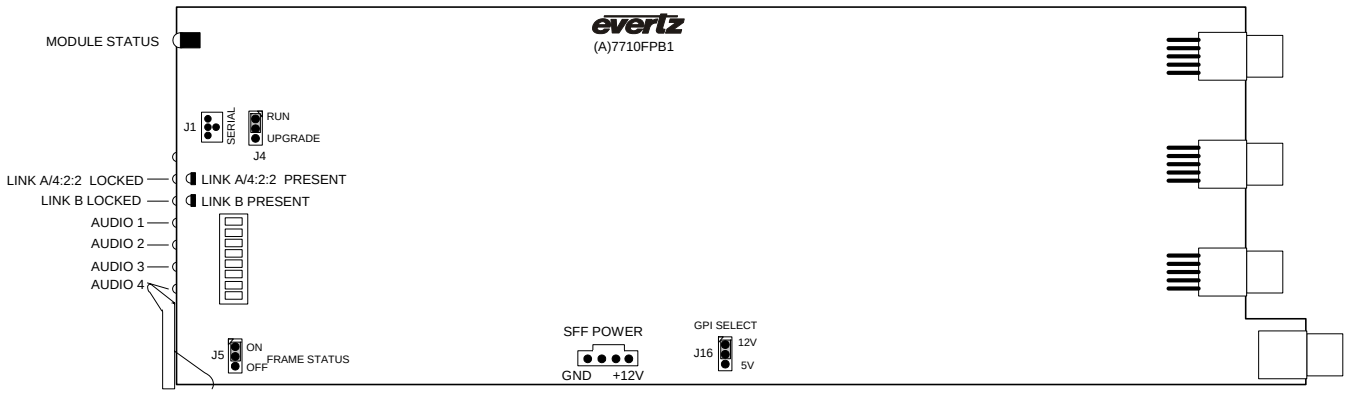


Figure 8-1: LED and Jumper Locations

8.1. SELECTING WHETHER LOCAL FAULTS WILL BE MONITORED BY THE GLOBAL FRAME STATUS

The FRAME STATUS jumper J5, located at the front of the module determines whether local faults (as shown by the Local Fault indicator) will be connected to the 7700FR frame's global status bus.

FRAME STATUS: To monitor faults on this module with the frame status indicators (on the power supply's FRAME STATUS LED's and on the Frame's Fault Tally output) install this jumper in the On position.

When this jumper is installed in the Off position local faults on this module will not be monitored.

8.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

UPGRADE: The UPGRADE jumper J4 located at the front edge of the module, near the serial port header, is used when firmware upgrades are being done to the module. For normal operation it should be installed in the *RUN* position. See the *Upgrading Firmware* section in the front of the binder for more information.

To upgrade the firmware in the module pull it out of the frame. Move Jumper J4 into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto header J24 near the card ejector. Re-install the module into the frame. Run the upgrade as described in the *Upgrading Firmware* section in the front of the binder. Once the upgrade is completed, remove the module from the frame, move J4 into the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.

Note that the baud rate for firmware upgrades is 115200 baud.

8.3. CONTROLLING GPI PULL-UP VOLTAGE

Jumper J16, located at the rear of the module controls whether the GPI inputs and outputs are pulled up to 5 volts or 12 volts.

GPI SELECT: To pull the GPI inputs and outputs up to 5 volts install this jumper in the position closest to the edge of the module.

To pull the GPI inputs and outputs up to 12 volts install this jumper in the position closest to the centre of the module.

9. LOOK-UP TABLE SPECIFICATION

The 7732DVP-HD can apply 1D Look Up Tables (LUTs) to the 4:4:4 video with the resulting video output on the Link A and Link B outputs. Each LUT consists of 3 sets of 1024 mapped values, one set for each colour component – red, green and blue. There is one mapped value for each of the possible 1024 input values for the respective colour component. There are several built in LUTs and 5 locations to store user specified LUTs. The user LUTs are uploaded to the 7732DVP-HD using the serial port. The active LUT is selected using the *Active LUT* OSD Menu item. See section 6.3.2. To turn off the look up table function, select the 1 to 1 LUT.

Look Up Table (LUT) files can be handled in a variety of formats. Basically they are a list of values for each primary component of video in - Red, Green and Blue. The list of values is parsed into a 3 x 1024 two dimensional array of values. The first dimension specifies the colour set (Red, Green or Blue) and the second dimension contains the mapped values for the LUT. You do not need to specify the format - the parser has some simple rules, which allow it to handle all of the following forms.

9.1. FILE CONTENTS

The simplest form of the LUT file has no name, index size or colour indicator. It is just a list of 3072 values (3 X 1024), one per line, and it is assumed that the file will be in red, green, blue order. Such as the following:

```
64        // assumed to be red[0]
64
64
```

Files may also contain a LUT name, colour indicators, mapped values, index values or comments to increase the user readability, or to allow the use of partial LUT tables when only a few values need to be changed.

9.1.1. Special Character Handling

The forward-slash, (/), the comma (,) and the exclamation mark, (!) are all turned into spaces when the line of text from the LUT file is being processed, except when specifying the name. These special characters are useful as separators when the LUT file is processed by other software, but they are treated as white space characters in the LUT file.

The pound sign (#) is treated as a special character to indicate that a Keyword will follow. Valid keyword specifiers are the letters L, N, R, G and B, and the keywords LUT_NAME, NAME, RED, GREEN, and BLUE. The keywords are not case specific and white space between the pound sign and the keyword specifier is ignored.

9.1.2. LUT Name

There are several ways to specify a name for the look up table. The first line in a LUT file may contain an optional LUT name. The name indicator consists of the pound sign (#) followed by either of the letters N or L followed by an optional equals sign (=). An alternate format for the name indicator is the pound sign (#) followed by either of the words NAME or LUT_NAME (not case specific) followed by an optional equals sign (=). The first non-space character will be treated as the start of the LUT name. The LUT name may contain up to 15 printable ASCII characters except quote (“), colon (:), semicolon (;) or vertical bar (|) and is not case specific. Spaces are not allowed in a LUT name. Comments should not be placed on a line specifying the LUT name as they may be treated as part of the name. For example, valid LUT name specifiers could look like this:

```
# name=This is the LUT
# lut_name=This is the LUT
# N=This is the LUT
# L=This is the LUT
```

9.1.3. Index Size

The index size is always assumed to be 1024, which indicates that each component has 1024 possible values (ie. it is a 10 bit number). If a single value of >= 1024 is found anywhere in a file, it will be treated as a reset of all colour indexes to [0,0]. If the index size is included, then the next line must either have a colour indicator, or the 1st value must be in a form, which has an index value. Usually the index size will immediately follow the LUT name if it is present. For example, the first few lines of a LUT file could look like this:

```
1024
# red
64    ; the value for red, index 0
64   // the value for red, index 1
```

Do NOT use values of 1024 or greater, anywhere else in the LUT file.

9.1.4. Colour Indicator

The colour indicator consists of the pound sign (#) followed by the letter R, G, or B. Everything following that on the line is ignored, so you can spell out the colour name or only use the first letter. Case is not significant. The colour indicator resets the index in the table to element 0 for the specified colour. Subsequent values will be entered into the table beginning at this new index location. Following are examples of colour indicators:

```
#RED      // Only the 1st Letter of the word is significant.  Leading/trailing white space optional
# green   // Only the 1st Letter of the word is significant.
//# b      // short for blue  Only the 1st Letter of the word is significant.
```

9.1.5. Mapped Values

Mapped values are the desired output value for an implied input value (the index value). They can be expressed in decimal (NNNN - the usual method), hex (0xNNN or 0XNNN), or octal (0NNNN). They can be formatted in numerous fashions as follows.

9.1.5.1. Terse Form

Terse format has no comments, or additional information. Values may be expressed with either no commas, leading commas, or trailing commas and optional leading or trailing whitespace.

In the following example, if the following three Mapped values are the 1st three values in the file, then they indicate that the values of 0, 1 and 2 in the red component will all be mapped to 64 (legal black).

```
64,
64
,64
```

9.1.5.2. Terse Plus Comments Form

Additional information may be added to a mapped value in the form of comments. Fully transparent comments can start with either a colon, semi-colon, or vertical bar. Anything after these characters will be ignored. Any non-numeric text (other than '0x') also indicates a start of a comment.

```
64,   ; this is an entirely invisible comment
64    : this too is a comment
,64   | 2 - and another form of comment. Notice that the '2' is COMPLETELY ‘hidden’ by the use
of the vertical bar
64    // this line has a comment which starts at the word 'this'
64     // 4 - DO NOT USE slashes or commas or exclamation marks, if the comment starts with a
NUMBER!
```

9.1.5.3. Set Index Value form

The Set Index Value form fully describes each value, with an indicator for set number (ie component color), Index number (ie the video input value), and mapped Value (the desired output value). This form is very uncommon, but can be useful. Commas may be optionally used to separate the 3 values on a line. Set numbers are 0-Red, 1-Green, 2-Blue. Some examples are:

```
0 0 64      // Map an input value of 0 in the red channel, to an output value of 64 in the red
channel
0,1,64     //   similar. N.B. You may NOT skip a value between the commas!
0, 2, 64   //
```

9.1.5.4. Value Set Index form

The Value Set Index form also fully describes each value, with the value given before the index. It is distinguished from the Set Index Value form by having either a left-bracket, '[', or a pound sign, '#' on the line. The following are examples:

```
64, //[0,0]  remember the slashes turn into spaces, so the comment actually begins at the word
'remember'
64  //#0 1  this maps the input value of 1, in the red (0) channel to an output value of 64
```

9.1.5.5. Set Index Header Form

The Set Index Header form lists the Index header on a separate line without a value. This will ensure that the mapped values are properly aligned and also allows the sending of partial sets of mapped values. For example,

```
//[1 100]  starts the green channel at index 100, which is the 101st value in the channel.
64    ;  this is the value for green[100]
# 2 500    starts the blue channel at index 500
480   ;  this is the value for blue[500]
```

9.1.5.6. Value Index Form

In the Value Index form, the value is listed with the index. You must NOT use a left-bracket, or a pound-sign. The Colour Indicator may be sent before the values, or if complete sets are provided then the colour order R, G, B is assumed. For example,

```
64   // 0    ;the value for index 0
64      1    ;the value for index 1
64,   ! 2    ;the value for index 2
```

9.1.6. End of File

The LUT file must be terminated with the EOF character (ASCII 0x1A) or 2 or more empty lines (consisting of only carriage return or line feeds)

10. VISTALINK® REMOTE MONITORING/CONTROL

10.1. What is VistaLINK®?

VistaLINK® is Evertz's remote monitoring and configuration platform which operates over an Ethernet network using Simple Network Management Protocol (SNMP). SNMP is a standard computer network protocol that enables different devices sharing the same network to communicate with each other. VistaLINK® provides centralized alarm management, which monitors, reports, and logs all incoming alarm events and dispatches alerts to all the VLPro Clients connected to the server. Card configuration through VistaLINK® PRO can be performed on an individual or multi-card basis using simple copy and paste routines, which reduces the time to configure each module separately. Finally, VistaLINK® enables the user to configure devices in the network from a central station and receive feedback that the configuration has been carried out.

There are 3 components of SNMP:

1. An SNMP manager, also known as a Network Management System (NMS), is a computer running special software that communicates with the devices in the network. Evertz VistaLINK® Pro Manager graphical user interface (GUI), third party or custom manager software may be used to monitor and control Evertz VistaLINK® enabled products.

2. Managed devices (such as 7732DVP-HD), each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz VistaLINK® enabled 7700 series modules reside in the 3RU 7700FR-C MultiFrame and communicate with the manager via the 7700FC VistaLINK® frame controller module, which serves as the Agent.

3. A virtual database, known as the Management Information Base (MIB), lists all the variables being monitored and which both the Manager and Agent understand. Please contact Evertz for further information about obtaining a copy of the MIB for interfacing to a third party Manager/NMS.

For more information on connecting and configuring the VistaLINK® network, see the 7700FC Frame Controller chapter.

10.2. VistaLINK® MONITORED PARAMETERS

The following parameters can be remotely monitored through the VistaLINK® interface.

Parameter	Description
Link A Presence	Indicates presence of video on Link A input
Link B Presence	Indicates presence of video on Link B input
Video Input Type	Indicates dual link or single link input video type
Video Standard	Indicates video standard
Colour Space	Indicates RGB, RGB Full Scale or YCbCr colour space of video input
GPI 1 State	Indicates if GPI 1 is active (low) or inactive (high)
GPI 2 State	Indicates if GPI 2 is active (low) or inactive (high)
GPI 3 State	Indicates if GPI 3 is active (low) or inactive (high)
GPI 4 State	Indicates if GPI 4 is active (low) or inactive (high)
GPI 5 State	Indicates if GPI 5 is active (low) or inactive (high)
GPI 6 State	Indicates if GPI 6 is active (low) or inactive (high)
GPO 1 State	Indicates if GPO 1 is active (low) or inactive (high)
GPO 2 State	Indicates if GPO 2 is active (low) or inactive (high)
Remote Control Enable	Indicates if card is enabled for VistaLINK® control
Card Type	Indicates the card type (e.g. 7732DVP-HD)

Table 10-1: VistaLINK® Monitored Parameters

10.3. VistaLINK® CONTROLLED PARAMETERS

The following parameters can be remotely controlled through the VistaLINK® interface.

Parameter	Description
Video Input Type	Selects dual link or single link input video type (auto or manual select)
Video Standard Select	Selects video standard (auto or manual standard)
Colour Space Select	Selects RGB, RGB Full Scale or YCbCr colour space of video input
Loss Of Video Mode Select	Selects Loss of Video Mode
Active LUT Select	Selects active Look Up Table
GPI 1 Function	Selects GPI 1 function
GPI 2 Function	Selects GPI 2 function
GPI 3 Function	Selects GPI 3 function
GPI 4 Function	Selects GPI 4 function
GPI 5 Function	Selects GPI 5 function
GPI 6 Function	Selects GPI 6 function
GPO 1 Function	Selects GPO 1 function
GPO 2 Function	Selects GPO 2 function
Recall Preset	Selects preset to recall
Store Preset	Selects Preset to store
Status Window Enable	Turns on Status Window

Table 10-2: VistaLINK® Controlled Parameters

10.4. VistaLINK® TRAPS

The following faults are signalled through the VistaLINK® interface.

Trap	Description
Module Not OK	Triggers when Module Fault LED is On
Video Input Link A Missing	Triggers when Link A video is missing
Video Input Link B Missing	Triggers when Link B video is missing
Unknown Video Standard	Triggers when Input video standard is unknown

Table 10-3: VistaLINK® Traps

10.5. VistaLINK® GUI SCREENS

The following screen shots show the VistaLINK® GUI screens.

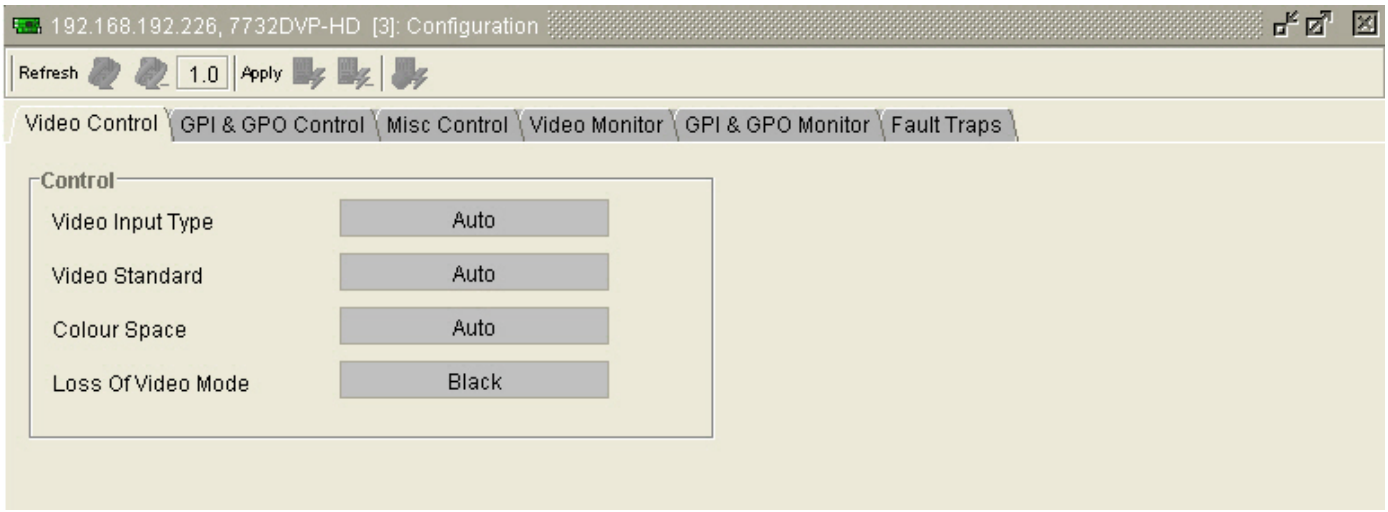


Figure 10-1: Video Control Window

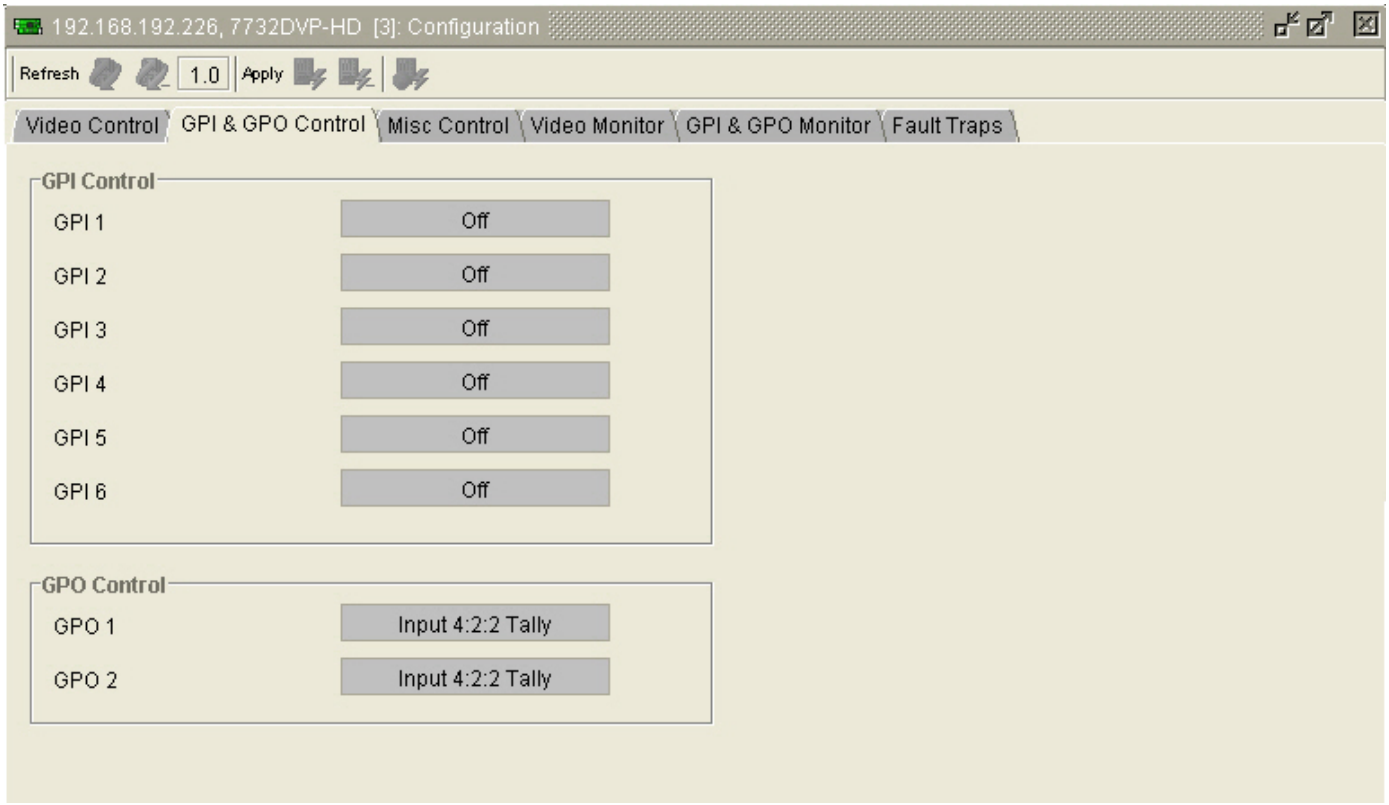


Figure 10-2: GPI & GPO Control Window

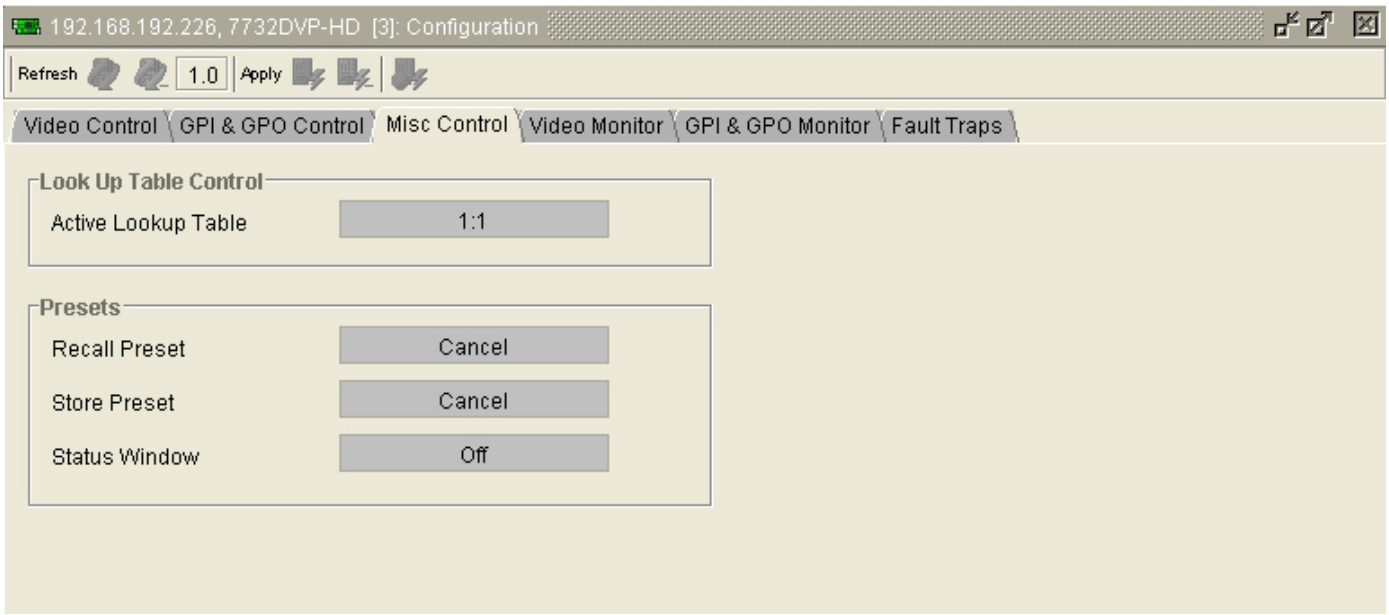


Figure 10-3: Misc. Control Window

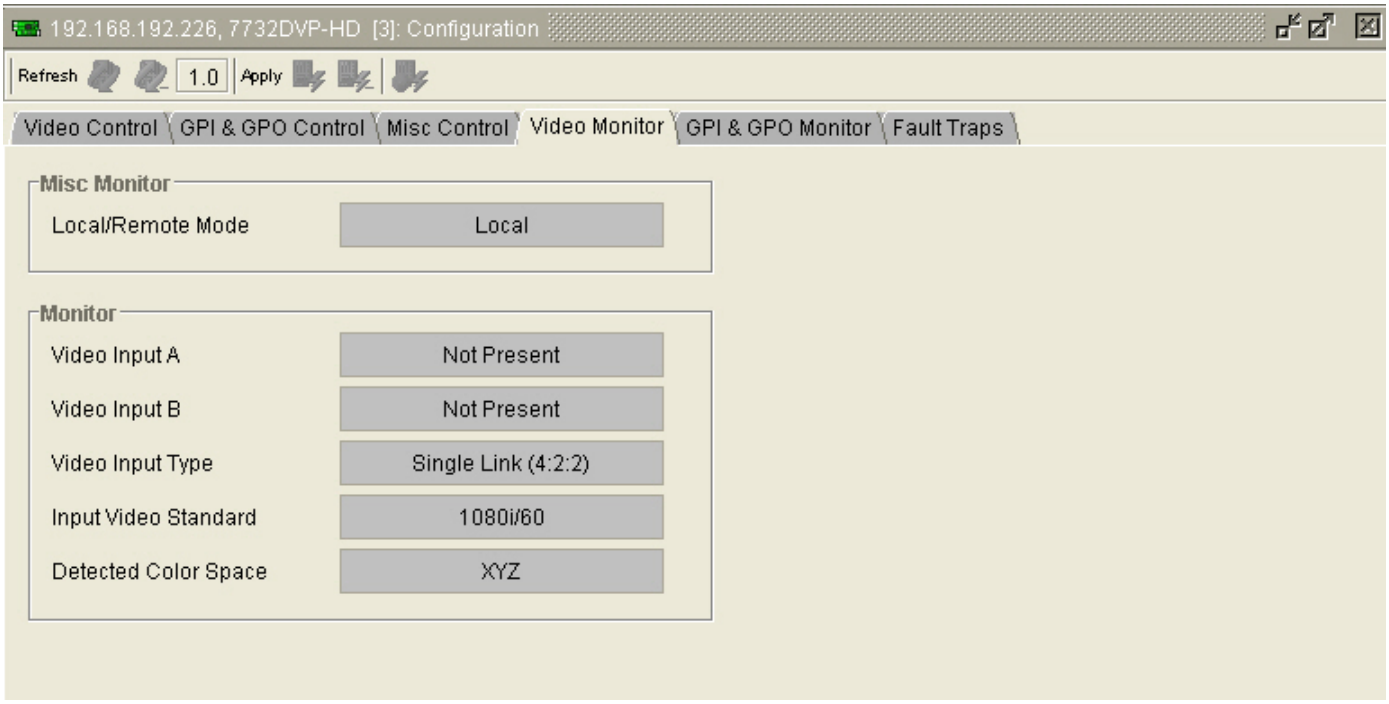


Figure 10-4: Video Monitor Window

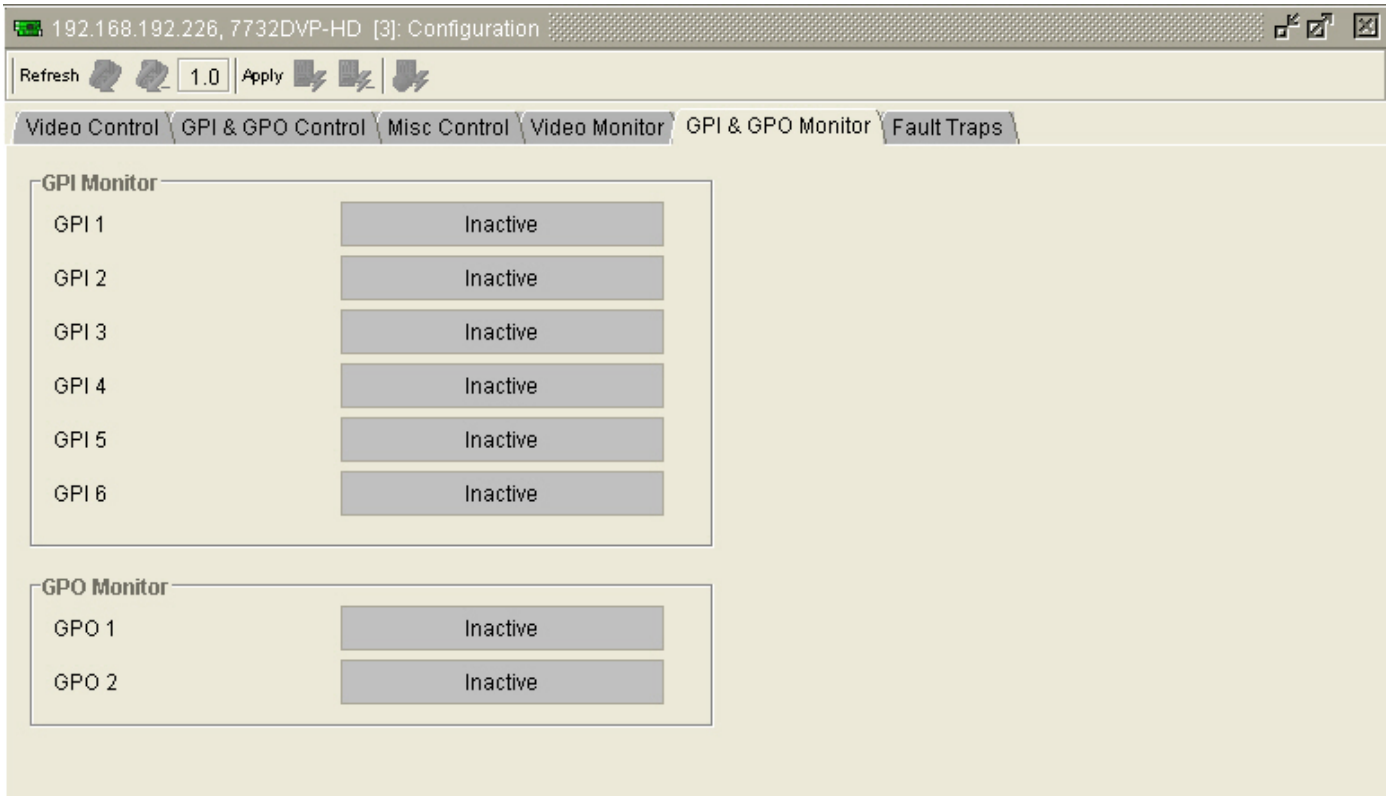


Figure 10-5: GPI & GPO Monitor Window

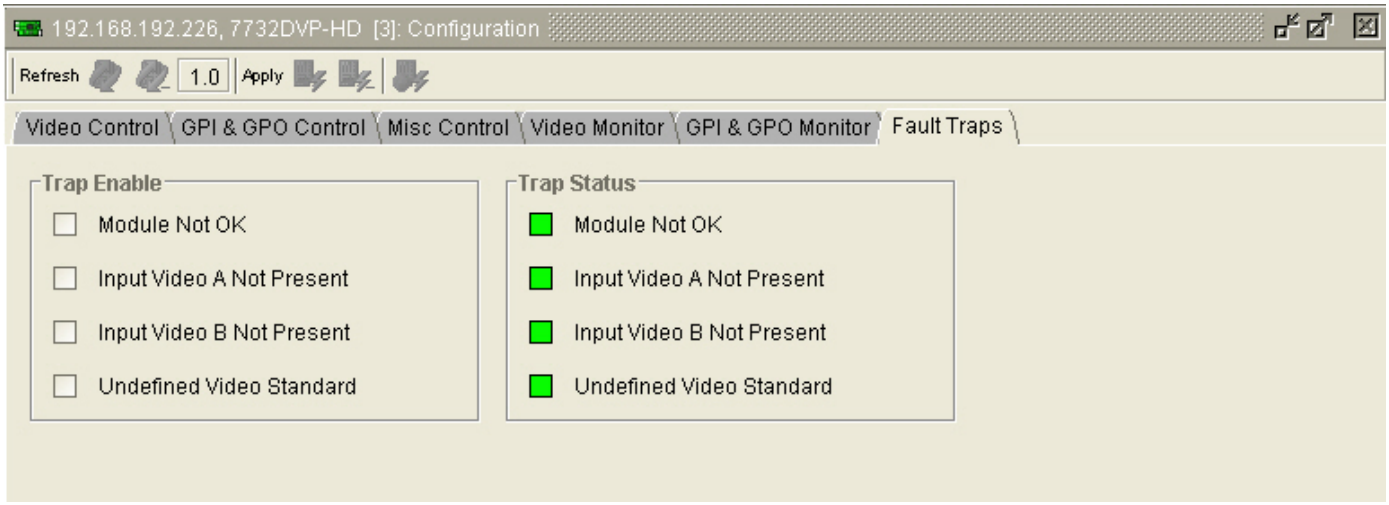


Figure 10-6: Fault Traps Window