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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	Preliminary Version	Jun 2004
1.1	First Release	Nov 2004
1.2	Manual Corrections	Feb 2005
1.3	Added VID option to menu section	Mar 2005
1.4	Changes to RS232 and RS422 Configurations	Apr 2005
1.5	Added +G option feature to the manual	Jan 2006
1.6	General format cleanup	May 2009
1.7	Updated information in section 6.5	May 2010
2.0	Added +VANC and +SCTE104 functionality and expanded VLPro section Firmware version 4.4 build 674; VLPro Product Version 84	Sept 2010
2.1	Add expanded +SCTE104 functionality Firmware version 4.9 build 7; VLPro Product Version 112	Oct 2011
2.2	Updated “SCTE104 Dynamic Mode GPO Triggering” table	Dec 2012

1. OVERVIEW

The 7721DD4-HD Quad Serial data de-embedder extracts 4 x RS-232 or RS422 serial data streams and GPI contact closure information from a 270 Mb/s SD-SDI or 1.5Gb/s HD-SDI video signal. A data error detection and correction scheme is also applied to maintain data integrity on the output of the data de-embedder. At the embedded packet layer, data packets resemble and have the same group DIDs as embedded audio packets. The data is un-packetized and extracted from the AES sub-frame according to SMPTE 337M.

Adding the +GPI option to the decoder (model 7721DD4-HD+GPI) allows the user to decode remote control contact closure information from VITC (SD) or RP188 ATC (HD) user bits **instead of** decoding the GPI information from the AES embedded data stream. This feature allows the user to use remote control user bit patterns to control the six GPO relay outputs. At the encoder end the 7721DE4-HD+GPI GPI Encoder module encodes the remote control user bits in VITC or RP188 ATC.

The +SCTE104 option on the encoder allows the user to insert SCTE104 messages into the VANC. Each of the six GPI's is tied to a custom SCTE104 message, and when the GPI is activated (user selectable HIGH or LOW) a SCTE104 message is inserted.

The +VANC option on the encoder allows the user to insert serial data into a customer VANC packet **instead of** encoding it into the AES embedded data stream.

The 7721DD4-HD series modules occupy one card slots in the 3RU frame (7700FR-C), which will hold up to 15 modules or one slot in the 1RU frame (7701FR), which will hold up to three modules. The 7721DE4-HD series modules may also be used in a standalone unit (S7701FR).

Features:

- Automatic detection of SD-SDI or HD-SDI video input
- 4 x RS232/422 serial outputs with selectable baud rate
- Parity selection: none, even or odd
- Support serial output with BREAK character according to SMPTE 207M
- Packetize data into sub-frame AES format according to SMPTE 337M
- Share the same group DIDs as for embedded audio, selectable from group 1 to 4
- Group selection for extracting data from one of four Audio Groups
- Redundant data transmission to allow data error detection and correction
- Automatically remove the existing embedded packets when the conflict of group DID occurs
- Six GPI outputs to embed simple control information into the video input.
- Card edge LEDs indicate video signal and data presence, cable equalization and module fault

Additional Features with +GPI option installed

- Decodes GPO relay contact closure information from VITC or ATC user bits (instead of decoding the GPI information from AES data)

Additional Features with +SCTE104 option installed

- Allows the six GPO's to activate on static or variable SCTE104 messages

Additional Features with +VANC option installed

- Decodes serial data in a user selectable VANC packet, as transmitted from a 7721DE4-HD+VANC.

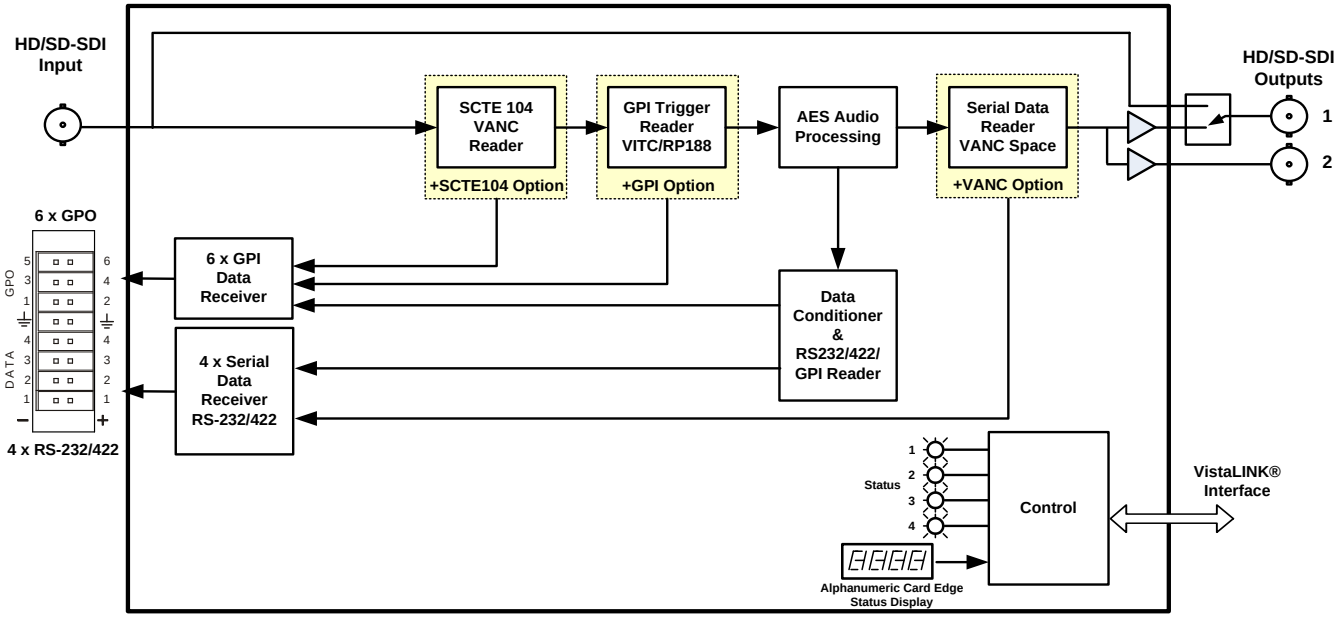

Figure 1-1: 7721DD4-HD Block Diagram

2. INSTALLATION

The 7721DD4-HD module comes with a companion rear plate that has 3 BNCs and a 16 pin Strip Terminal Connector. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR chapter.

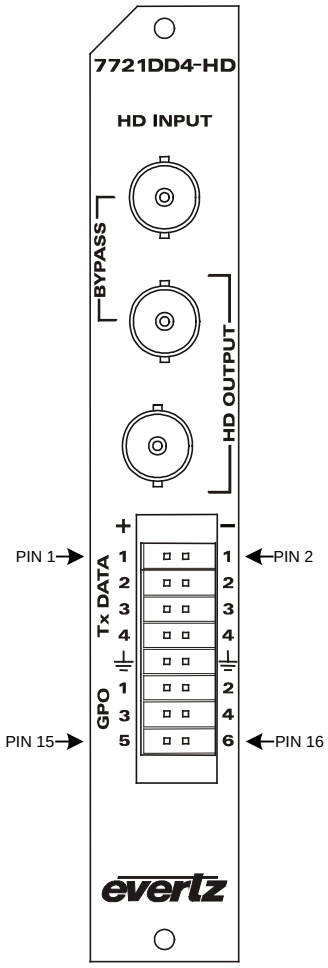

Figure 2-1: 7721DD4-HD Rear Panel

2.1. VIDEO INPUTS AND OUTPUTS

HD INPUT: Input BNC connector for 10-bit serial digital video signals compatible with the SMPTE 259M-C or SMPTE 292M standards. The Input video contains the video with the data from the RS-232/422 and GPI ports from the 7721DE4-HD, embedded in accordance with the SMPTE 337M.

When the +GPI option is installed, the input will also have ATC (HD) or VITC (SD) timecode with GPI information encoded into the user bits.

HD OUTPUT: There are two BNC connectors with reclocked serial component video outputs, compatible with the SMPTE 259M-C and SMPTE 292M standard. The top output is protected by a bypass relay, which will activate in the event of power loss to the module. The remaining output is not bypass protected.

2.2. TERMINAL STRIP OUTPUTS

The 7721DD4-HD modules have a 16 pin terminal block containing 4 serial data port outputs and six GPI outputs. The output cables can be secured into the removable portion of the terminal strips using a small screwdriver. The removable part of the terminal strip is then inserted into the rear panel.

Table 2-1 shows the pin out of the Terminal Block labeled **TX DATA.** Note the location of pins shown in Figure 2-1.

Pin Number	Rear Panel Reference	RS422 OUT	Description	RS232 OUT	Description
1	TX Data **+** 1	DATA 1 OUT 422	Transmit Data +		
2	TX Data **-** 1	DATA 1 OUT 422	Transmit Data -	DATA 1 OUT 232	TXD for UART 1
3	TX Data **+** 2	DATA 2 OUT 422	Transmit Data +		
4	TX Data **-** 2	DATA 2 OUT 422	Transmit Data -	DATA 2 OUT 232	TXD for UART 2
5	TX Data **+** 3	DATA 3 OUT 422	Transmit Data +		
6	TX Data **-** 3	DATA 3 OUT 422	Transmit Data -	DATA 3 OUT 232	TXD for UART 3
7	TX Data **+** 4	DATA 4 OUT 422	Transmit Data +		
8	TX Data **-** 4	DATA 4 OUT 422	Transmit Data -	DATA 4 OUT 232	TXD for UART 4
9	⏚	Digital Ground			
10	⏚	Digital Ground			
11	GPO1	General Purpose Output 1			
12	GPO 2	General Purpose Output 2			
13	GPO 3	General Purpose Output 3			
14	GPO 4	General Purpose Output 4			
15	GPO 5	General Purpose Output 5			
16	GPO 6	General Purpose Output 6			

Table 2-1: TX DATA Terminal Block Output

The RS232 or RS422 Outputs are located on pins 1 through 8. Common digital grounds are shared for all the Data Inputs, located at Pins 9 and 10.

2.2.1. RS232 Data Ports

To output RS232 data from the 7721DD4-HD module, first set the J33 jumper to RS232 mode. See Section 6.3. Connect the RS232 RX Pins on the receiving device to the pins marked TX DATA - # on the terminal strip. See Table 2-1 for details. Connect the ground signal from your RS232 device to one of the terminal strip GROUND pins, PIN 9 or 10. Configure the Port settings via the card edge menu. See Section 5.3.

2.2.2. RS422 Data Ports

To output RS422 data from the 7721DD4-HD module,, first set the J33 jumper to RS422 mode. See Section 6.3. Connect the RS422 RX+/- Pins on the receiving device to the pins marked TX DATA +/- # on the terminal strip. See Table 2-1 for details. Connect the ground signal from your RS422 device to one of the GROUND pins, PIN 9 or 10. Configure the Port settings via the card edge menu. See Section 5.3.

2.2.3. General Purpose Outputs

Pins 11-16 are for six GPO normally open relay contacts with a pullup to either +5 or +12 volts nominal. See section for information on changing the pullup voltage. When the GPIs on the Embedder side are closed to ground, the GPOs on the 7721DD4-HD will go to ground.

On the standard version the GPOs are activated when the corresponding GPI inputs on the 7721DE4-HD Data Embedder are activated. GPI information is contained in the embedded data stream in one or more audio groups.

When the +GPI option is fitted the GPI information from the 7721DE4-HD is encoded in VITC (for SD inputs) or RP188 ATC (for HD inputs) user bits instead of encoding the GPI information into the AES embedded data stream. See section 5.3.

3. SPECIFICATIONS

3.1. SERIAL VIDEO INPUT WITH EMBEDDED DATA

Standard: SMPTE 259M C, SMPTE 292M
Connector: BNC per IEC 61169-8 Annex A
Equalization: Automatic 300m @ 270 Mb/s, 100m @ 1.5Gb/s
with Belden 1694A or equivalent cable
Return Loss: > 15 dB up to 1.5Gb/s

3.2. SERIAL VIDEO OUTPUTS

Number of Outputs: 2 output (bypass relay protected)
Standard: same as input
Connectors: BNC per IEC 61169-8 Annex A
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 600ps nominal SD-SDI, 200ps nominal HD-SDI
Overshoot: <10% of amplitude
Return Loss: > 15 dB up to 1.5Gb/s (Relay Protected)
> 10 dB up to 1.5Gb/s
Wide Band Jitter: < 0.2 UI

3.3. DATA OUTPUT

Standard: 4 x RS-232 or RS-422
Connector: Terminal Block
Baud Rate: 110, 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, or 115200
Format: 8 bits, parity (none, even or odd), 1 or 2 stop bit

3.4. GENERAL PURPOSE OUTPUTS

Number of Outputs: 6
Type: Normally open relay contact
Connector: Terminal Block
Signal Level: Internal pullup to +5/+12VDC nominal, jumper selectable
For other voltages up to 50 VDC remove jumper
Max Current: 2 A

3.5. TIME CODE (+GPI OPTION ONLY)

3.5.1. Ancillary Time Code Reader (ATC) - HD Video Standards Only

Standard: SMPTE RP188
Reader Line: Autodetect

3.5.2. Vertical Interval Time Code Reader (VITC) - SD Video Standards Only

Standard: SMPTE 12M, SMPTE 266M D-VITC
Line Range:
525i/59.94: 10 to 21
625i/50: 6 to 22
Reader Line: Autodetect or user selectable

3.6. EMBEDDING DELAY

3.6.1. Video I/O Delay

The video I/O delay is approximately one line.

3.6.2. Data De-Embedding Delay – Serial Ports

Average latency 1200µs +/- 20% (All Baud rates)

3.6.3. Delay For Data De-Embedding – GPO Outputs

Average latency 20µs +/- 10%

3.6.4. Delay For Time Code Embedding - GPO Outputs (+GPI Option Only)

Decoding latency 1 frame

3.7. ELECTRICAL

Voltage: + 12VDC
Power: 12 Watts
EMI/RFI: Complies with FCC Part 15, class A and EU EMC directive

3.8. PHYSICAL

350FR: 1
7700FR-C: 1
7800FR: 1

Stand Alone Enclosure:
Dimensions: 14” L x 4.5” W x 1.9” H
(355 mm L x 114 mm W x 48 mm H)
Weight: approx. 1.5 lbs. (0.7 Kg)

4. STATUS INDICATORS

The location of the status LEDs is shown in Figure 6-1.

4.1. MODULE STATUS LEDS

MODULE OK: This Green LED will be On when the module is operating properly.

LOCAL FAULT: This Red LED makes it easy to identify one module in a frame that is missing an essential input or has another fault.

The LED will blink on and off if the microprocessor is not running.

The LED will be on solid when input video is missing, or audio is missing from both AES inputs or there is a fault in the module power supply.

SIGNAL PRESENT: This Green LED will be On when there is a valid video signal present at the module input.

AUDIO: This Green LED will be On when there is embedded audio/data present.

4.2. AUDIO/DATA GROUP STATUS LEDS

Four LEDs located on the lower end of the module (opposite the Card Edge Display) indicate the status of the audio/data groups. Group LED 1 is located closest to the center of the module.

Data LED	Color	Group Status
1	Off	There is no group 1 data on the video input.
	On/Pulse	Group 1 data is being encoded/decoded.
2	Off	There is no group 2 data on the video input.
	On/Pulse	Group 2 data is being encoded/decoded.
3	Off	There is no group 3 data on the video input.
	On/Pulse	Group 3 data is being encoded/decoded.
4	Off	There is no group 4 data on the video input.
	On/Pulse	Group 4 data is being encoded/decoded.

Table 4-1: Data Status LEDs

5. CARD EDGE MENU SYSTEM

5.1. NAVIGATING THE MENU SYSTEM

You can use the toggle switch to move up and down the list of available parameters to adjust. To adjust any parameter, use the toggle switch to move up or down to the desired parameter and press the pushbutton. Using the toggle switch, adjust the parameter to its desired value. If the parameter is a numerical value, the number will increase if you push up on the toggle switch and decrease if you push down on the toggle switch. If the parameter contains a list of choices, you can cycle through the list by pressing the toggle switch in either direction. The parameter values are changed as you cycle through the list.

When you have stopped at the desired value, depress the pushbutton. This will return to the parameter select menu item you setting (the display shows the parameter name you were setting). To change another parameter, use the toggle switch to select other parameters. If neither the toggle switch nor pushbutton is operated for several seconds the card edge control will exit the menu system and return to an idle state.

On all menus, there is an extra selectable item: *BACK*. Selecting *BACK* will take you to the previous menu (the one that was used to get into the current menu). On the main menu, *BACK* will both take the user to the normal operating mode (indicated by the moving line on the card edge display).

Not all functionality is accessible through the card edge controls. See VistaLINK Section 7 for the full list of controls available through SNMP.

5.2. TOP LEVEL MENU STRUCTURE

Table 5-1 gives a brief description of the top level of the menu tree that appears when you enter the card edge menu system. Selecting one of these items will take you down into the next menu level to set the value of that parameter. Details for each of the menu items are described in sections 5.3 to 5.7.

DLAY	Displays the delay between incoming GPIs (+GPI option)
VRLN	Sets the range of VITC lines to read (+GPI option)
VID	Sets the input video standard
DEMB	Enables or disables the data de-embedders
HANC	Allows the user to Clean or Pass upstream HANC data
PRT1	Allows the user to configure/monitor the settings for Port 1
PRT2	Allows the user to configure/monitor the settings for Port 2
PRT3	Allows the user to configure/monitor the settings for Port 3
PRT4	Allows the user to configure/monitor the settings for Port 4

Table 5-1: Top End Menu Structure

5.3. GPI USER BIT REMOTE CONTROL OPTION (+GPI OPTION)

When the +GPI option is fitted, the 7721DD4-HD+GPI ATC GPI Decoder module decodes GPI information from time code user bits and outputs them on six relay contact outputs. The companion 7721DE4-HD+GPI allows the user to encode remote control contact closure information as special remote control user bit patterns in VITC (for SD inputs) or RP188 ATC (for HD inputs) instead of encoding the GPI information into the AES embedded data stream.

The User bit remote control system works on one of two modes. In immediate mode, the GPI1 to GPI6 inputs of the 7721DE4-HD+GPI encoder are used to set special codes in the time code user bits as long as the GPI is closed to ground. When the 7721DD4-HD+GPI decodes these special user bit codes it closes the corresponding GPO output. In deferred GPI mode the GPI input to the encoder card occurs a fixed number of frames (user programmable on the encoder using the *DLAY* menu item) before the user actually wants the GPO Output to occur at the decoder. When the GPI input occurs at the encoder, a special code is sent in the user bits indicating the amount of delay and which GPI should activate. When the decoder receives this code, instead of outputting the GPO immediately, it will start a countdown timer and output the GPO at the delayed time. In addition, the encoder will output a second user bit code at the delayed time. The decoder will receive this code at the same time as its countdown reaches zero and output a GPO based on one or the other or both of these codes. This redundancy provides protection for lost contact closure data due to breakups in the video path between the encoder and decoder.

When the 7721DD4-HD+GPI is operated with high definition video, its ATC GPI decoder is compatible with the 7721DE4-HD+GPI (in immediate or deferred mode) as well as the HD9010TM. When the 7721DD4-HD+GPI is operated with standard definition video, its VITC GPI decoder is compatible with the 7721DE4-HD+GPI (in immediate or deferred mode) as well as the 8010TM. Standard definition VITC encoded GPIS may also be decoded by the 7721GPI-D SDI decoder, in immediate mode only.

The parallel port pin designations for the various encoders are shown in Table 5-2 below. Table 5-2 also shows the corresponding output pins of the various decoders and the user bits that control them.

GPI	HD9010TM PIN (IN)	7721DE4-HD+GPI PIN (IN)	7721DD4-HD+GPI PIN (OUT)	7721GPI-D PIN (OUT)	User Bit Data byte 1
1	1	11	11	4	81
2	8	12	12	8	82
3	4	13	13	3	84
4	9	14	14	1	88
5	5	15	15	13	90
6	2	16	16	14**	A0

Table 5-2: **GPI I/O Mapping (+GPI Option Installed)**

The menu items described in sections 5.3.1 to 5.3.2 are used to configure the GPI functions of the De-embedder when the +GPI option is fitted. These menu items are not available in the standard version.

5.3.1. Monitoring the GPI Delay

DLAY
"0010", etc.

The *DLAY* menu is used to display the delay (in frames) between GPIs that are received over VITC or ATC. This delay value is set by the upstream 7721DE4-HD.

An updated value is displayed once a GPI is received over VITC or ATC. Until that point, the last valid delay value is displayed.

The 7721DD4-HD only monitors this parameter.

5.3.2. Setting the VITC Reader Lines

The *VRLN* menu sets the range of VITC lines to look for incoming VITC with GPI information encoded in the user bits for standard definition video formats. The chart below shows the items available in the *VRLN* menu. Sections 5.3.2.1 to 5.3.2.2 give detailed information about each of the menu items.

STRT	Sets the beginning of the VITC reader range.
END	Sets the end of the VITC reader range.

5.3.2.1. Setting the Start Line of the VITC Reader Range

VRLN
STRT
0010 to 0032 (525) *006 to 0032 (625)*

This parameter allows the user to set first line to look for VITC on the incoming video.

For 525i/59.94 video the range is line 10 to line 32 and the default value is line 10.

For 625i/50 video the range is line 6 to line 32 and the default value is line 6.

5.3.2.2. Setting the End of the VITC range

VRLN
END
0010 to 0032 (525) *006 to 0032 (625)*

This parameter allows the user to set last line to look for VITC on the incoming video.

For 525i/59.94 video the range is line 10 to line 32 and the default value is line 20.

For 625i/50 video the range is line 6 to line 32 and the default value is line 21.

The 7721DD4-HD+GPI will NOT allow the user to selects values where the START line is greater than the END line. If the user selects a START line greater than the END line, the module will automatically move the END line to another valid value.

5.4. SETTING THE INPUT VIDEO STANDARD

VID	Sets the input video standard.
AUTO	Auto detect
3I60	1035i/60
3I59	1035i/59.94
1P30	1080p/30
1P29	1080p/29.97
1P25	1080p/25
1P24	1080p/24
1P23	1080p/24
7P60	1080p/23.98
7P59	720p/60
1I60	720p/59.94
1I59	1080i/60 (1080p/30sF)
1I50	1080i/59.94(1080p/29.97sF)
1S24	1080i/50(1080p/25sF)
1S23	1080p/24sF
5I59	1080p/23.98sF
6I50	525i/59.94 Note some firmware versions may show *NTSC* 625i/50 Note some firmware versions may show *PALB*

5.5. ENABLING THE DATA DE-EMBEDDER

DEMB
TRUE
FALS

The *DEMB* function allows the user to enable or disable the de-embedding of the data.

Setting the *DEMB* to *TRUE* will enable the de-embedding of data from the audio group.

Setting the *DEMB* to *FALS* will disable the de-embedding of data.

5.6. SETTING THE HANDLING OF HANC DATA

HANC
PASS
CLN

The *HANC* menu allows the user to pass or remove HANC audio data from the incoming Video feed. The RS232/422 data sent from the 7721DE4-HD is preserved, but all audio in the HANC can be removed.

Selecting *PASS* will pass all upstream audio in the HANC.

Select *CLN* to clean all upstream audio.

5.7. CONFIGURING/MONITORING TRANSMIT PORTS

The *PRT1*, *PRT2*, *PRT3*, and *PRT4* menus allow the user to configure and monitor some of the transmit port settings. The user will be allowed to configure which audio group and channel to de-embed for each port. However, the user will only be allowed to monitor the transmit settings of the port. The setting of the port will occur on the upstream 7721DE4-HD. Sections 5.7.1 to 5.7.8 will describe the various configuration and monitored parameters of the transmit ports.

BAUD	Monitors the Baud rate of the port.
STOP	Monitors the Port Stop bits.
PRTY	Monitors the parity setting of the Port
DATA	Monitors the data length of the Port
LOOP	Displays the Loopback status of the UART for the Port
UART	Displays the status of the UART for the Port
GRP	Sets the audio group to de-embed to the Port
CHNL	Sets the audio channel to de-embed to the Port

Table 5-3: Port Menu Structure

The parameters are the same for all four ports. For simplicity sake, only the parameters for *PRT1* will be described.

The following Transmit Port setting can ONLY be MONITORED by the 7721DD4-HD. The port settings are received from the 7721DE4-HD. The settings CANNOT be adjusted by the 7721DD4-HD.

5.7.1. Displaying the Baud Rate of the Transmit Port 1

PRT1
BAUD
110
300
600
1200
2400
4800
9600
14400
19200
38400
57600
115200

The Baud setting allows the user to monitor the baud rate of the data sent from the Data Embedder unit. The baud rate can be adjusted only from the Transmit side (7721DE4-HD).

If no data is present on the port that is being monitored, the 7721DD4-HD will display the settings of the last Baud Rate and other Port Settings received from the 7721DE4-HD.

5.7.2. Displaying the Stop Bits of the Transmit Port 1

PRT1
STOP
1
2

Allows the user to monitor the number of stop bits.

5.7.3. Displaying the Parity Setting of the Transmit Port 1

PRT1
PRTY
None
Even
Odd

Allows the user to monitor the parity of the port.

5.7.4. Displaying the Data Length of the Transmit Port 1

- *PRT1*
  - *DATA*
    - *5*
    - *6*
    - *7*
    - *8*
    - *None*

Allows the user to monitor the data length of the packets being sent.

5.7.5. Displaying the Loopback Status of the UART for the Transmit Port 1

- *PRT1*
  - *LOOP*
    - *On*
    - *Off*

This displays the Loopback status of the UART for Port 1.

When *On* is displayed, the loopback function of the UART for the transmit port is enabled.

When *Off* is displayed, the loopback function is disabled.

5.7.6. Displaying the Status of the UART for the Transmit Port 1

- *PRT1*
  - *UART*
    - *On*
    - *Off*

This displays the status of the UART for Port 1.

When *On* is displayed, the transmit port is enabled and ready to transmit data.

When *Off* is displayed, the transmit port is disabled.

5.7.7. Setting the Audio Group to De-embed for Port 1

- *PRT1*
  - *GRP*
    - *GRP1*
    - *GRP2*
    - *GRP3*
    - *GRP4*

This parameter allows the user to select which audio group to de-embed for Port 1 data.

Note: The user CANNOT set same Audio Group and Channel to more than ONE transmit port.

5.7.8. Setting the Audio Channel to De-embed for Port 1

- *PRT1*
  - *CHNL*
    - *CH 1*
    - *CH 2*
    - *CH 3*
    - *CH 4*

This parameter allows the user to select which audio channel to de-embed for Port 1 data.

Note: The user CANNOT set same Audio Group and Channel to more than ONE transmit port.

6. JUMPERS AND USER ADJUSTMENTS

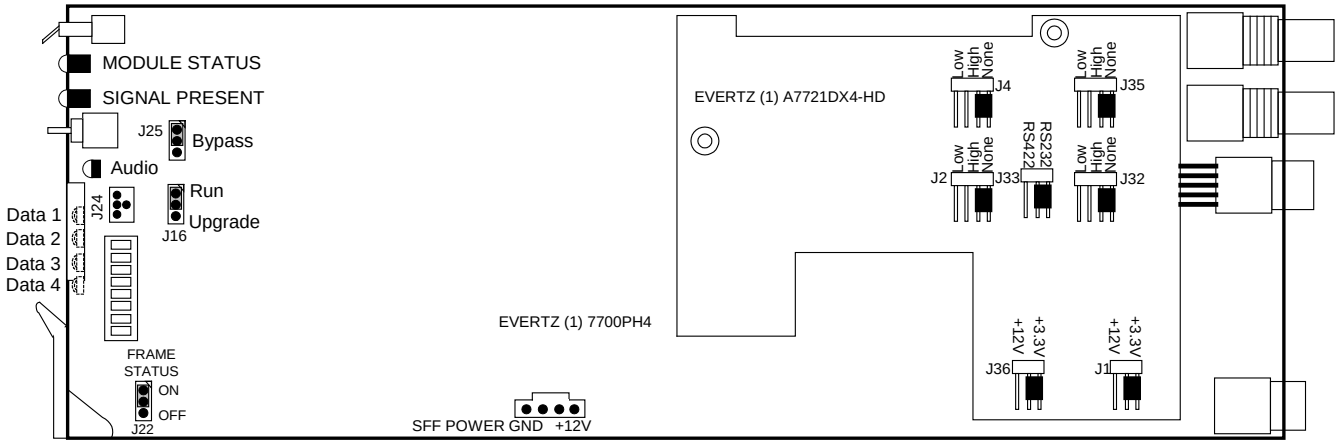

Figure 6-1: Location of Jumpers (Rev 1 Submodule)

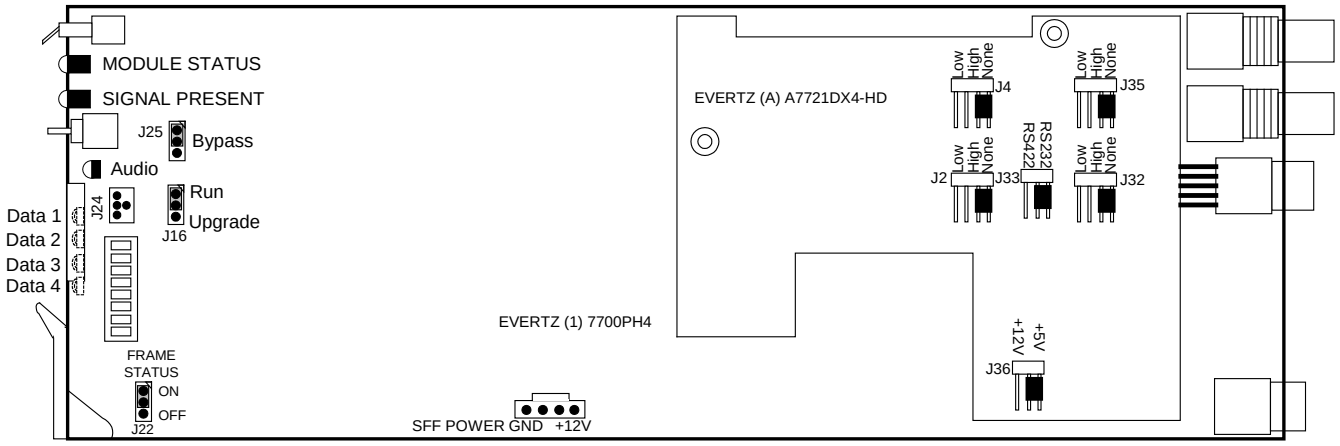

Figure 6-2: Location of Jumpers (Rev A Submodule)

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

FRAME STATUS: The FRAME STATUS jumper 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.

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

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

6.2. SETTING THE BYPASS RELAY JUMPER

BYPASS: The BYPASS jumper J25 controls the Bypass relay functionality.

Set the jumper to the top 2 pins to allow the Bypass relay to only activate when the card looses power. The relay will allow video to pass through the card when it is powered up.

Set the jumper to the bottom 2 pins to activate Bypass relay all the time. The video will not pass through the card. The non-bypassed video output will not have video available.

6.3. SELECTING THE DATA COMMUNICATIONS STANDARD (RS-232 OR RS-422)

232/422: The 232/422 jumper J33 selects whether the serial ports will be configured for RS232 data or RS422 data. See section 2.2 for information on connecting the serial ports and section 5.7 for the menu settings to configure the ports.

Set the jumper to the 2 pins on the left to configure the serial ports for RS422 voltage levels.

Set the Jumper on the 2 pins on the right to configure the serial ports for RS232 voltage levels.

6.3.1. Configuring RS422 Device Communication between a Controller and Tributary

SMPTE Standard 207M defines the electrical and mechanical characteristics of the device interface used in transferring data and control signals between production and post-production equipment. Each interface system consists of a single bus-controller and one or more tributaries. The bus-controller controls the communication flow to all tributaries connected to it, while a tributary transmits data to an operational device.

Two 7721DE4-HD/7721DD4-HD pairs can be configured to interface between a bus controller and a tributary if configured as follows:

Controller DB9 PIN #	7721DE4-HD Connections
8 (Tx -)	Rx -
3 (Tx+)	Rx +

⇒

7721DD4-HD Connections	Tributary DB9 PIN #
Tx -	8 (Rx -)
Tx +	3 (Rx+)

	7721DD4-HD Connections
2 (Rx -)	Tx -
7 (Rx+)	Tx +

⇐

7721DE4-HD Connections	
Rx -	2 (Tx -)
Rx +	7 (Tx+)

Figure 6-3: SMPTE 207M RS422 Controller/Tributary Wiring

6.4. SETTING THE GPO OUTPUT PULLUP VOLTAGE

On Rev 1 of the A7721Dx4-HD submodule, jumpers J36 and J1 are used to select the GPO output pullup voltage as either +12V or +3.3V nominal. To use the GPO's without any pullup voltage you can remove the jumper. Jumper J36 sets the pullup voltage for GPO 1 to 4 and J1 sets the pullup voltage for GPO 5 and 6. (See Figure 6-1)

On Rev A of the A7721Dx4-HD submodule, jumper J36 is used to select the GPO output pullup voltage for all six GPOs as either +12V or +5V nominal. To use the GPO's without any pullup voltage you can remove the jumper. Note that the circuit board silkscreen on Rev A boards may incorrectly show 3.3 volts but it is actually +5 volts as shown in Figure 6-2.

6.5. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

UPGRADE: The UPGRADE jumper J16 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 this manual binder for more information.

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

7. VistaLINK® REMOTE MONITORING/CONTROL

7.1. 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 the frame synchronizers), 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, 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.

7.2. Misc Control Tab

This tab will allow the user to set miscellaneous parameters for controlling the module.

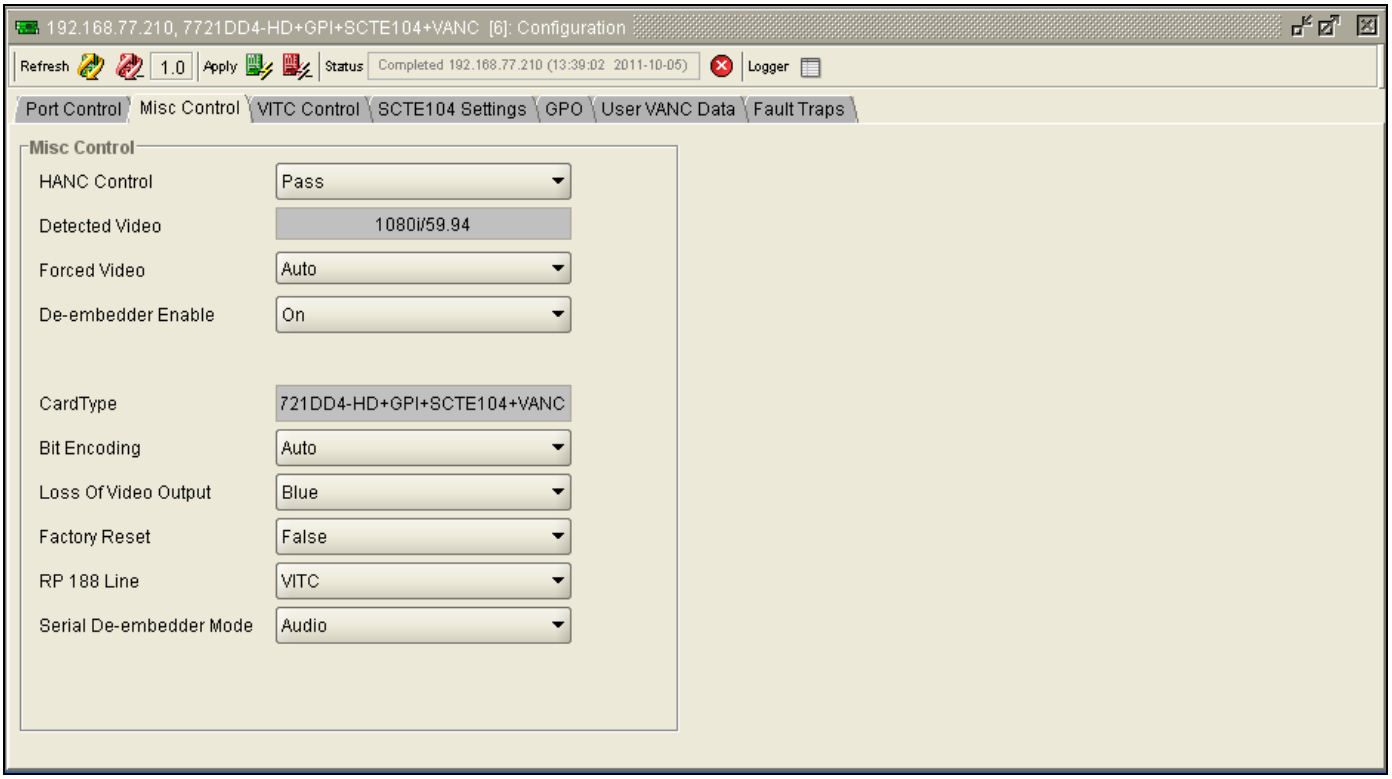

Figure 7-1: VistaLINK® 7721DD4-HD Misc Control View

7.2.1. HANC Control

Misc Control
HANC Control
Pass
Clean

The *HANC Control* menu allows the user to pass or remove HANC audio data from the incoming video feed.

Selecting *Pass* will pass all upstream audio in the HANC.

Select *Clean* to remove all upstream audio.

7.2.2. Detected Video Standard

Misc Control
Detected Video Standard
Video Standard

Displays the currently detected video standard or *Video Unknown* if no video is detected.

7.2.3. Forced Video

- *Misc Control*
  - *Forced Video*
    - *Auto detect*
    - *1035i/60*
    - *1035i/59.94*
    - *1080p/30*
    - *1080p/29.97*
    - *1080p/25*
    - *1080p/24*
    - *1080p/23.98*
    - *720p/60*
    - *720p/59.94*
    - *1080i/60 (1080p/30sF)*
    - *1080i/59.94 (1080p/29.97sF)*
    - *1080i/50 (1080p/25sF)*
    - *1080p/24sF*
    - *1080p/23.98sF*
    - *525i/59.94*
    - *625i/50*

Sets the input video standard.

7.2.4. De-embedder Enable

- *Misc Control*
  - *Embedder Enable*
    - *On*
    - *Off*

The *De-embedder Enable* function allows the user to enable or disable the de-embedding of audio.

Setting the *De-embedder Enable* to *On* will enable the de-embedding of audio, and allow serial data and GPI information to be decoded.

Setting the *De-embedder Enable* to *Off* will disable the de-embedding of audio.

7.2.5. GPO Duration (+GPI Option Only)

- *Misc Control*
  - *GPO Duration*
    - *0 – 30 frames*

This parameter selects the hold time on the GPO for received triggers. Each trigger received will be held for the selected number of frames. If set to 0, then GPO output will be disabled.

7.2.6. CardType

- *Misc Control*
  - *Card Type*
    - *7721DD4-HD+…*

Displays the full module name, including installed options.

7.2.7. Bits Encoding

Misc Control *Bits Encoding* *Auto* *Encoding 20 bits* *Encoding 24 bits* *Encoding 16 bits*	This parameter sets the resolution of audio bit encoding.

7.2.8. Factory Reset

Misc Control *Factory Reset* *False* *True*	This parameter will perform a factory reset, when *True* is selected and applied, all parameters will be restored to a preset default.

7.2.9. RP 188 Line (HD Formats Only)

Misc Control *RP 188 Line* *VITC* *LTC*	This parameter sets which RP188 time code will be used for GPO detection.

7.2.10. Serial De-embedder Mode (+VANC Only)

Misc Control *Serial De-embedder Mode* *Audio* *VANC*	This parameter sets where GPO's and serial data will be de-embedded from.

7.3. Port Control

The *Port Control* tab allows the user to configure the serial data which will be de-embedded from audio.

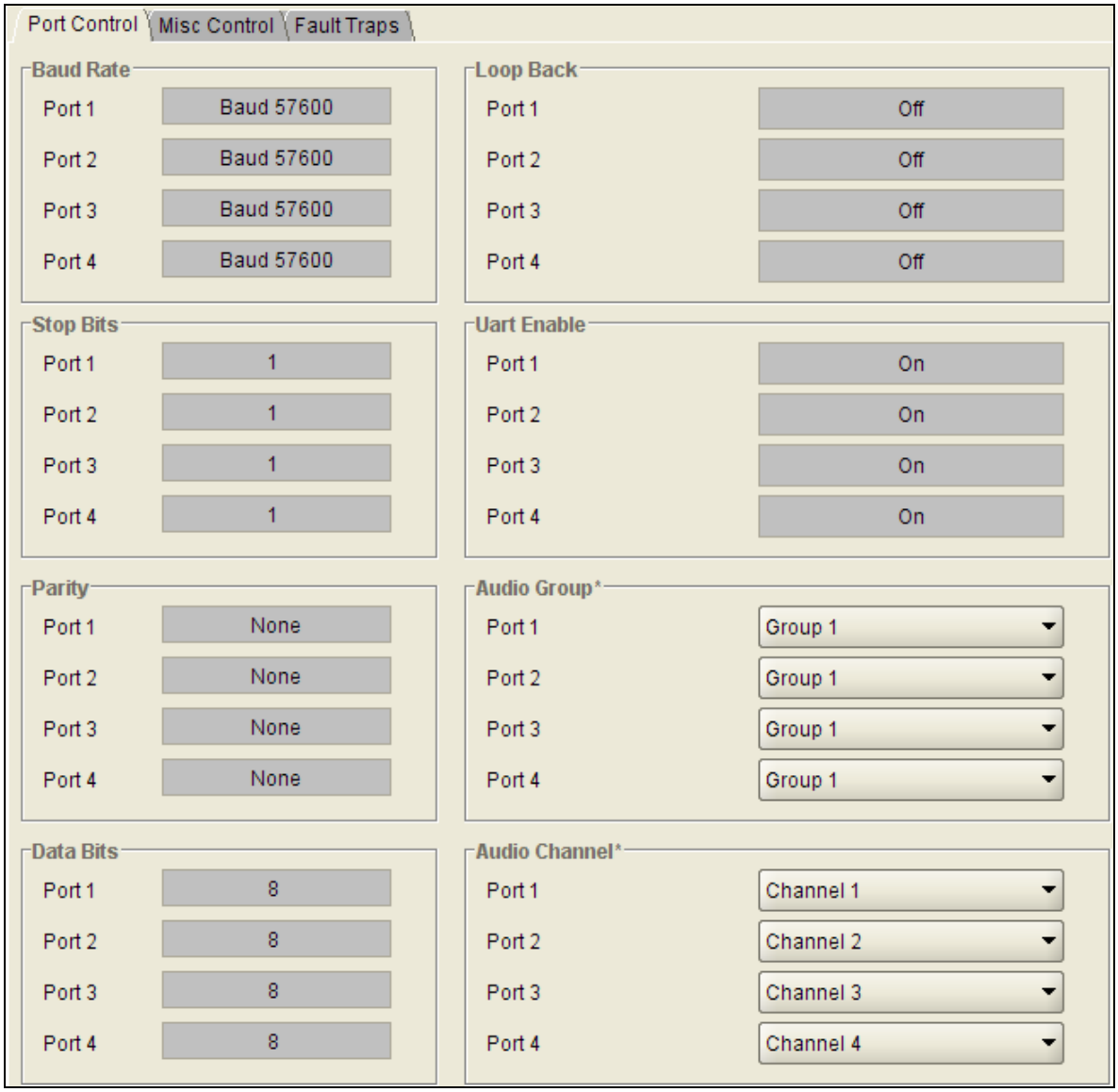

Figure 7-2: VistaLINK® 7721DD4-HD Port Control View

7.3.1. Baud Rate

- *Port Control*
  - *Baud Rate*
    - *Port 1 – 4*
      - *110*
      - *300*
      - *600*
      - *1200*
      - *2400*
      - *4800*
      - *9600*
      - *14400*
      - *19200*
      - *38400*
      - *57600*
      - *115200*

The Baud display will show the baud rate of the data sent from the 7721DE4-HD to the 7721DD4-HD for the specified port.

7.3.2. Stop Bits

- *Port Control*
  - *Stop Bits*
    - *Port 1 – 4*
      - *1*
      - *2*

The Stop Bits display will show the stop bits of the data sent from the 7721DE4-HD to the 7721DD4-HD for the specified port.

7.3.3. Parity

- *Port Control*
  - *Parity*
    - *Port 1 – 4*
      - *None*
      - *Even*
      - *Odd*

The Parity display will show the Parity of the data sent from the 7721DE4-HD to the 7721DD4-HD for the specified port.

7.3.4. Data Bits

- *Port Control*
  - *Data Bits*
    - *Port 1 – 4*
      - *5*
      - *6*
      - *7*
      - *8*

The Data Bits display will show the Data Bits of the data sent from the 7721DE4-HD to the 7721DD4-HD for the specified port.

7.3.5. Loop Back

- *Port Control*
  - *Loop Back*
    - *Port 1 – 4*
      - *On*
      - *Off*

The Loop Back display will show the Loop Back setting of the data sent from the 7721DE4-HD to the 7721DD4-HD for the specified port.

7.3.6. Uart Enable

- *Port Control*
  - *Uart Enable*
    - *Port 1 – 4*
      - *On*
      - *Off*

The Uart Enable display will show the Uart Enable setting of the data sent from the 7721DE4-HD to the 7721DD4-HD for the specified port.

7.3.7. Audio Group

- *Port Control*
  - *Audio Group*
    - *Port 1 – 4*
      - *Group 1 (default Port 1)*
      - *Group 2 (default Port 2)*
      - *Group 3 (default Port 3)*
      - *Group 4 (default Port 4)*

This parameter allows the user to select which audio group the selected port data will be de-embedded from. This setting works in conjunction with the *Audio Channel* setting in Section 7.3.8 to select which specific channel the data goes into.

Note: The user CANNOT set the same Audio Group and Channel to more than ONE transmit port.

7.3.8. Audio Channel

- *Port Control*
  - *Audio Channel*
    - *Port 1 – 4*
      - *Channel 1 (default Port 1)*
      - *Channel 2 (default Port 2)*
      - *Channel 3 (default Port 3)*
      - *Channel 4 (default Port 4)*

This parameter allows the user to select which audio channel within the group set by the *GRP* menu item the Port 1 data will be de-embedded from.

Note: The user CANNOT set the same Audio Group and Channel to more than ONE transmit port.

The Audio Group and Audio Channel settings need to align with the settings on the 7721DE4-HD.

7.4. VITC Control (+GPI Option Only)

The *VITC Control* tab allows the user to define the handling of timecode.

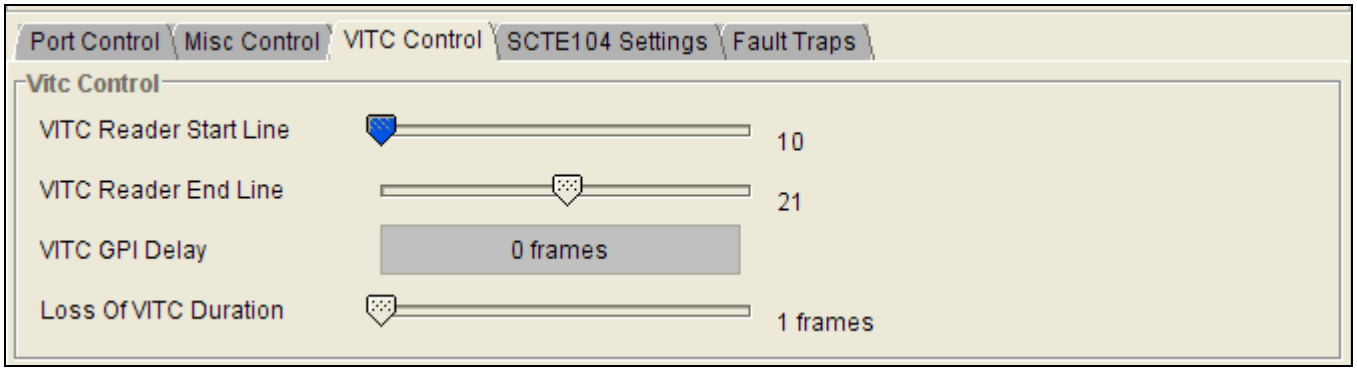

Figure 7-3: VistaLINK® 7721DD4-HD+GPI VITC Control View

7.4.1. VITC Reader Start Line (SD Formats Only)

VITC Control
VITC Control
VITC Reader Start Line
10 - 32 (525)
6 - 32 (625)

This parameter allows the user to set the first line to look for VITC on the incoming video.

For 525i/59.94 video, the range is line 10 to line 32 and the default value is line 10.

For 625i/50 video the range is line 6 to line 32 and the default value is line 6.

7.4.2. VITC Reader End Line (SD Formats Only)

VITC Control
VITC Control
VITC Reader End Line
10 - 32 (525)
6 - 32 (625)

This parameter allows the user to set the last line to look for VITC on the incoming video.

For 525i/59.94 video, the range is line 10 to line 32 and the default value is line 20.

For 625i/50 video, the range is line 6 to line 32 and the default value is line 21.

The 7721DD4-HD+GPI will NOT allow the user to select values where the START line is greater than the END line. If the user selects a START line greater than the END line, the module will automatically move the END line to another valid value.

7.4.3. VITC GPI Delay (SD Formats Only)

VITC Control
VITC Control
VITC GPI Delay
0 - 1023

The *DLAY* menu is used to configure the display (in frames) the delay between GPIs that are transmitted over VITC. The range of the parameter is 0 to 1023 frames.

7.4.4. Loss of VITC Duration

VITC Control
VITC Control
Loss of VITC Duration
1 - 60

This parameter determines the number of frames for VITC to not be present before a Loss of VITC alarm condition is raised.

7.5. User VANC Data (+VANC Option Only)

The *User VANC Data* tab allows the user to configure the VANC packets which will de-encapsulate serial data. Note that this tab will only be present in modules with the +VANC option installed.

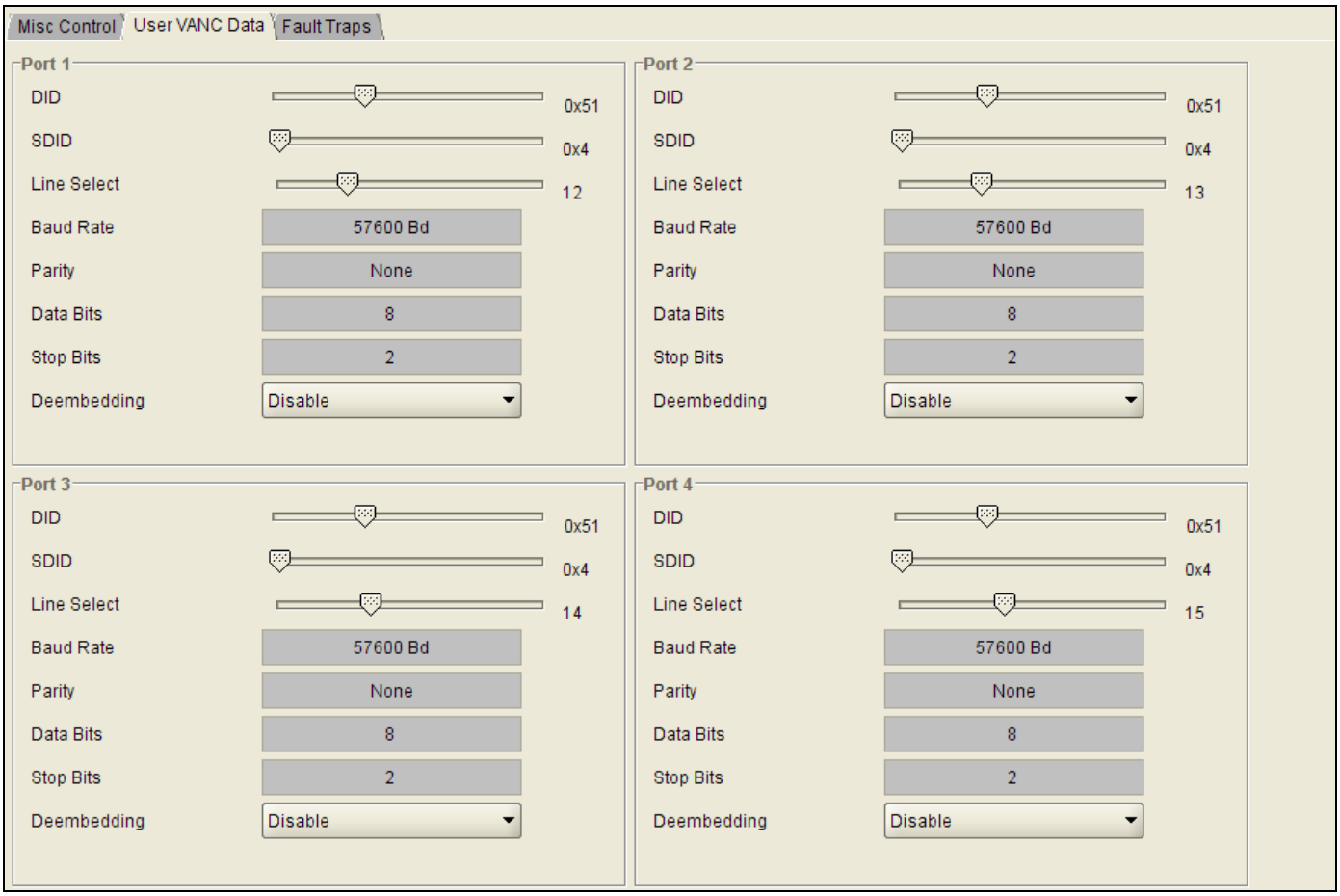

Figure 7-4: VistaLINK® 7721DD4-HD+VANC User VANC Data View

7.5.1. DID

User VANC Data
Port 1 - 4
DID
0x00 – 0xFF

This parameter selects the DID value for the VANC packet which will encapsulate the data.

7.5.2. SDID

User VANC Data
Port 1 - 4
DID
0x00 – 0xFF

This parameter selects the SDID value for the VANC packet which will encapsulate the data.

7.5.3. Line Select

User VANC Data
Port 1 – 4
Line Select
6 – 29

This parameter selects the embed line for the VANC packet which will encapsulate the data.

The DID, SDID and Line Select parameters must match the corresponding 7721DE4-HD+VANC.

7.5.4. Baud Rate

User VANC Data
Port 1 - 4
Baud Rate
2400
4800
9600
14400
19200
38400
57600
115200

The Baud Rate setting allows the user to set the baud rate of the data sent from the 7721DE4-HD to the 7721DD4-HD.

7.5.5. Parity

User VANC Data
Port 1 - 4
Baud Rate
None
Even
Odd

This parameter sets the parity of the port.

7.5.6. Stop Bits

- *User VANC Data*
  - *Port 1 - 4*
    - *Stop Bits*
      - *1*
      - *2*

This parameter sets the number of stop bits.

7.5.7. Data Bits

- *User VANC Data*
  - *Port 1 - 4*
    - *Data Bits*
      - *5*
      - *6*
      - *7*
      - *8*

This parameter sets the data length of the packets being sent.

7.5.8. Deembedding

- *User VANC Data*
  - *Port 1 - 4*
    - *Deembedding*
      - *Enable*
      - *Disable*

This parameter sets whether or not data is de-embedded from the incoming VANC packets.

7.6. SCTE 104 Settings (+SCTE104 Option Only)

The *SCTE104 Settings* tab configures the SCTE104 reader on the module. A specified GPO(s) can be tied to the SCTE104 reader, triggering the GPO(s) whenever a SCTE104 packet is detected.

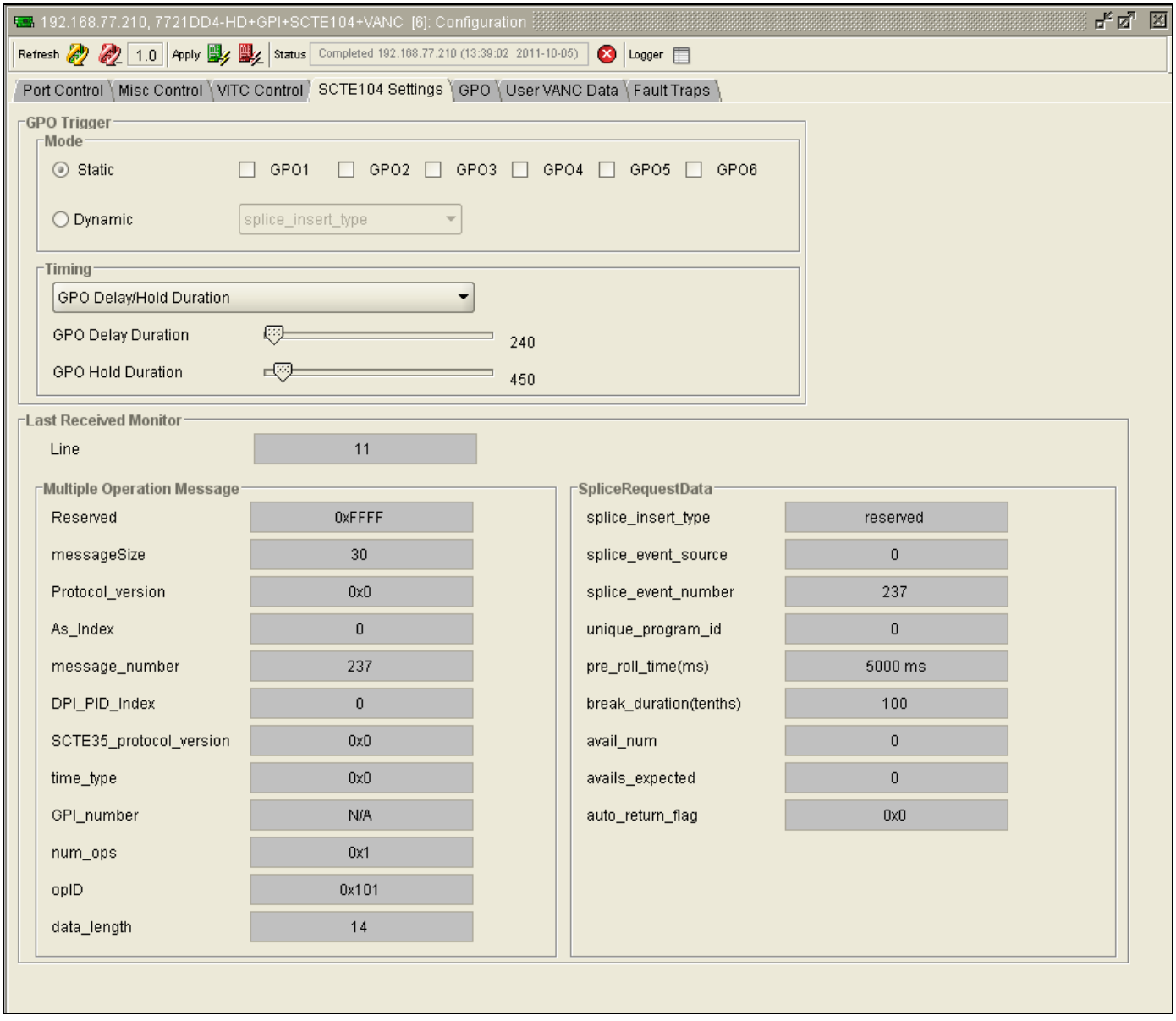

Figure 7-5: VistaLINK® 7721DD4-HD+SCTE104 Configuration View

7.6.1. GPO Trigger Mode

SCTE 104 Settings
GPO Trigger
Mode
Static
Dynamic

This parameter sets the mode of operation for the SCTE 104 reader.

When in Static mode, any incoming SCTE 104 message will trigger the selected GPO's. The GPO must be checked off to be activated by a SCTE 104 message.

When in Dynamic mode, the GPO triggered will depend on the value of the selected SCTE 104 parameter. The GPO fired per selected parameter is shown in Table 7-1.

Dynamic Mode	GPO 1	GPO 2	GPO 3	GPO 4	GPO 5	GPO 6
AS_index	1	2	3	4	5	6
DPI_PID_Index	1	2	3	4	5	6
unique_program_Id	1	2	3	4	5	6
avail_num	1	2	3	4	5	6
avail_expected	1	2	3	4	5	6
time_type	If the detected *time_type* is 0x03 (gpi) then the detected *GPI_number* will determine the corresponding GPO that is triggered.					
splice_insert_type	Reserved	Start Normal	Start Immediate	End Normal	End Immediate	Cancel

Table 7-1: SCTE104 Dynamic Mode GPO Triggering

7.6.2. GPO Trigger Timing

SCTE 104 Settings
GPO Trigger
Timing
GPO Delay/Hold Duration
Splice Request: pre_roll_time/break_duration

This parameter sets the source of the Hold and Delay times on an activated GPO.

Setting it to *GPO Delay/Hold Duration* will use the static settings for each on the card (see next two sections).

Setting it to *pre_roll_time/break_duration* will use the parsed pre_roll_time (Delay time) and break_duration fields (Hold time) from the SCTE-104 message.

7.6.3. GPO Delay Duration

SCTE 104 Settings
GPO Trigger Timing
GPO Delay Duration
Immediate - 5400

The GPO Delay Duration parameter specified how many frames of video to wait before the GPO is activated, after a SCTE 104 message arrives. This setting is activated when *GPO Delay/Hold Duration* is active.

7.6.4. GPO Hold Duration

SCTE 104 Settings
GPO Trigger Timing
GPO Hold Duration
1 - 5400

The GPO Hold Duration parameter specified how many frames of video to hold the GPO when it is activated, after a SCTE 104 message arrives. This setting is activated when *GPO Delay/Hold Duration* is active.

7.6.5. Last Received Monitor

These fields will display the parsed information from the last received SCTE 104 message.

7.7. Fault Traps

The *Fault Traps* tab contains the state of all the alarms on the module. Note that some traps may not be available or visible depending on the installed options and current operating video standard.

Some traps may change state quicker than Auto Refresh can detect, such as a quick GPI. For accurate monitoring, look for the actual trap being sent from the module.

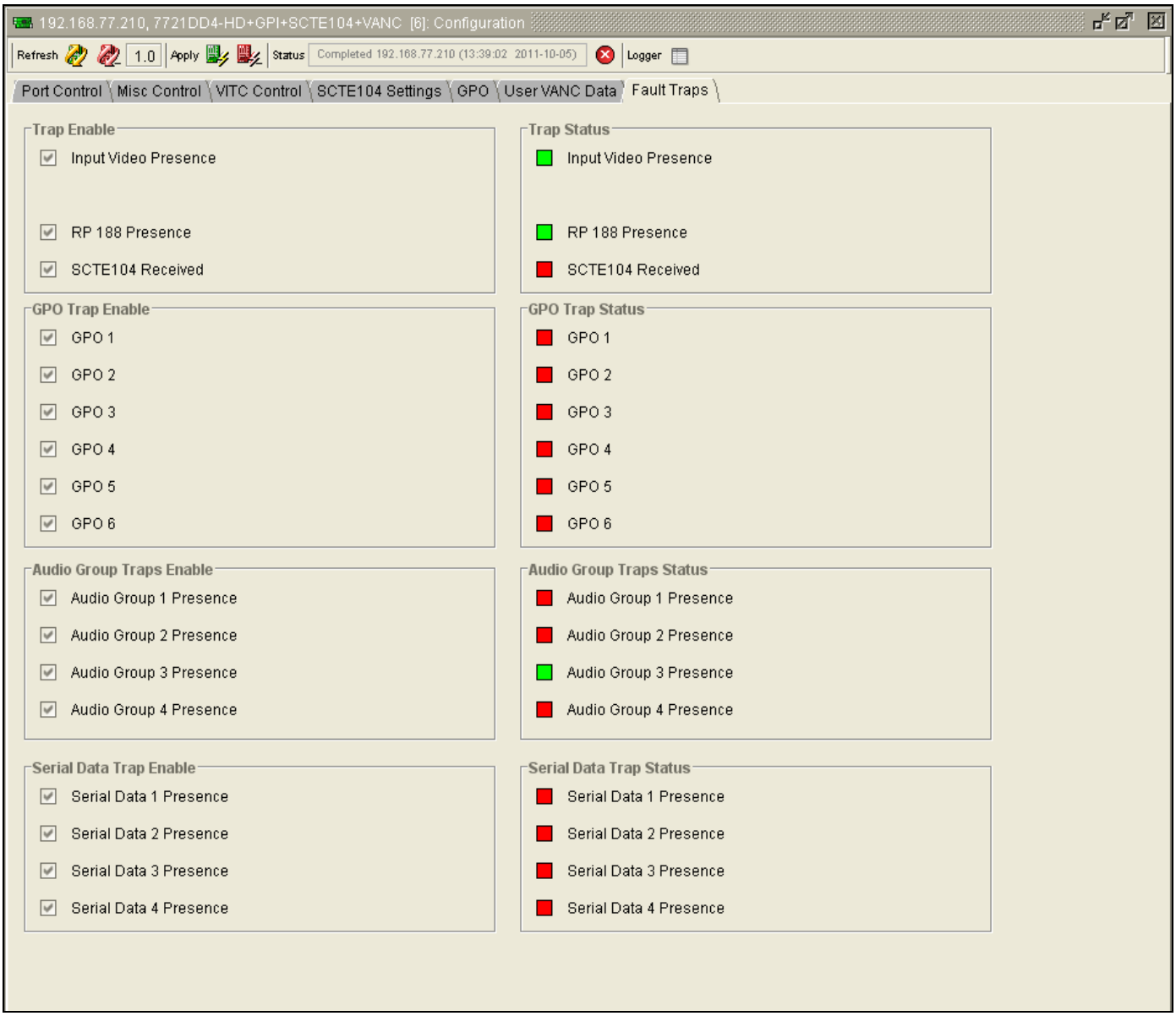

Figure 7-6: VistaLINK® 7721DD4-HD Fault Trap View

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