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REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary version	Jun 06
0.2	Added 7700RD2X2-HD Support	Jul 06

1. OVERVIEW

The 7700R2X2 series modules are bypass routers for 1.5 Gb/s HDTV or standard definition 270 Mb/s serial digital video signals. There are three distinct models in the series, offering a cost-effective solution for your specific requirements. These are the 7700R2X2-HD, the 7700RD2X2-HD and the 7700R2X2-HES. The differences between these three models are described below. The 7700R2X2 series modules accept all the popular international SMPTE 292M video formats, as well as 525 and 625 line SMPTE 259M-C video formats.

These 7700 series modules provide three re-clocked primary outputs, and one re-clocked backup output. The program output is bypass relay protected and provides protection on the program path. If the module is removed from the enclosure or power to the module is lost, the program path is maintained. On both the 7700R2X2-HD and the 7700R2X2-HES, PGM OUT 3 may be used as a Genlock input. The 7700RD2X2-HD comes equipped with a dedicated Genlock Input BNC.

The 7700R2X2-HES has all the features of the 7700R2X2-HD but also incorporates Evertz proprietary SoftSwitch™ technology, for clean video and "popless" embedded audio switching. Line synchronizers on the video inputs can accommodate differences in timing of up to +/- ½ line on the video inputs. The 7700RD2X2-HD provides two monitoring downconverted outputs.

The two inputs are monitored at all times for a variety of error conditions and status including:

- Loss of input video or prescence of invalid video
- Status of embedded audio
- Status of router selection state and cross-point configuration

Status is provided using a number of methods:

- Card edge 4-character alphanumeric display
- Card edge LED status for router state, signal presence, etc.
- Tally output on GPI's for router state
- SNMP reporting and monitoring via VistaLINK® PRO or any SNMP compliant manager

Output selection and control of the selector cross-point can be achieved a number of methods:

- Contact closures (GPI control)
- Card edge control
- Via network control panels (9000NCP, 9000NCP2)
- VistaLINK® control

VistaLINK® provides a software GUI interface for control and monitoring of the device. VistaLINK® can be used to manually control the switch or be configured to trigger a change based on specific errors and thresholds. VistaLINK® enables remote monitoring, control and configuration capabilities via Simple Network Management Protocol (SNMP). This offers the flexibility to manage operations including signal monitoring and module configuration from SNMP enabled control systems (Manager or NMS) locally or remotely.

An advanced thumbnail monitoring and status option will be available in future software releases for the 7700R2X2 series. This option allows for thumbnail viewing of the inputs remotely. Thumbnails are streamed over TCP/IP and viewed with the VistaLINK® suite of software. This option also provides advanced monitoring for several video and audio error conditions. Provisions for durations and thresholds are provided for all the monitored parameters.

The 7700R2X2-HD and 7700R2X2-HES occupy one card slot and can be housed in the 3RU 7700FR frame, which will hold up to 15 single-slot modules, or one slot within the 1RU frame, which will hold up to

three modules. The 7700RD2X2-HD modules occupy two slots within the 3RU 7700FR frame and similiarily one slot within the 1RU frame.

Features:

- Support for serial digital 1.5 Gb/s HD input signals per SMPTE 292M (see Table 3-1)
- Support for serial 270 Mb/s SD input signals per SMPTE 259M-C (525i/59.94 or 625i/50)
- Auto sensing of HD and SD input formats
- Generation of three re-clocked program outputs and one preview output ((HD if HD inputs are applied, SD if SD inputs are applied)
- Bypass relay protection on program output
- Controllable switch point when a Genlock reference is provided
- GPI control inputs
- GPO status outputs for reporting selector cross-point status
- Card edge menu control for configuration of operating modes
- Card edge LEDs for reporting signal presence, router state, module status
- VistaLINK® capable for offering remote monitoring, control, and configuration via SNMP
  Note: 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.

Additional features on 7700RD2X2-HD model only:

- Program and preview monitoring SDI outputs (downconverted from HD if HD input applied, reclocked SD if SD input applied)
- Support for 16:9 letterbox, 4:3 center crop, and 4:3 anamorphic squeeze aspect ratio conversions
- HD to SD colour space conversion (ITU rec. 709 to ITU rec. 601)

Additional features on 7700R2X2-HES model only:

- Full support for 8 channels of embedded audio
- Integrated SoftSwitch™ technology for clean video and "popless" embedded audio switching Dolby-E compliant

From this point forward, the 7700R2X2-HD, the 7700RD2X2-HD, and the 7700R2X2-HES modules will be referred to as the "7700R2X2 Series", unless the feature in question is applicable only to one of the modules, in which case the specific model number will be referenced.

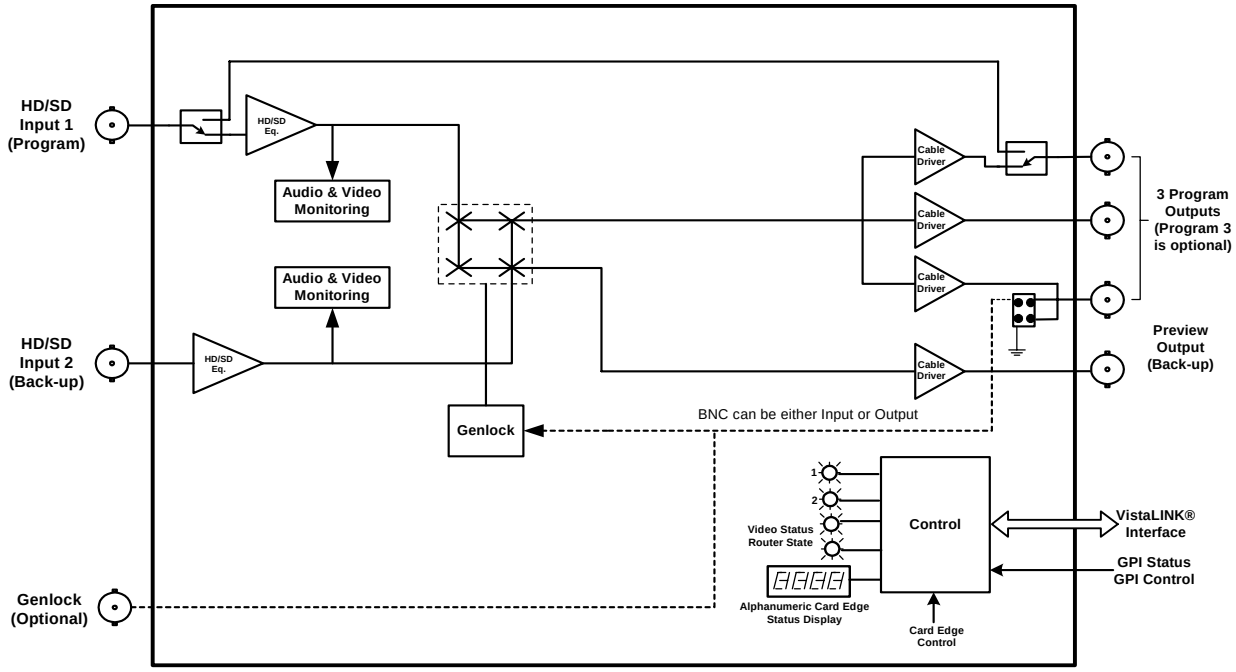

Figure 1-1: 7700R2X2-HD Block Diagram

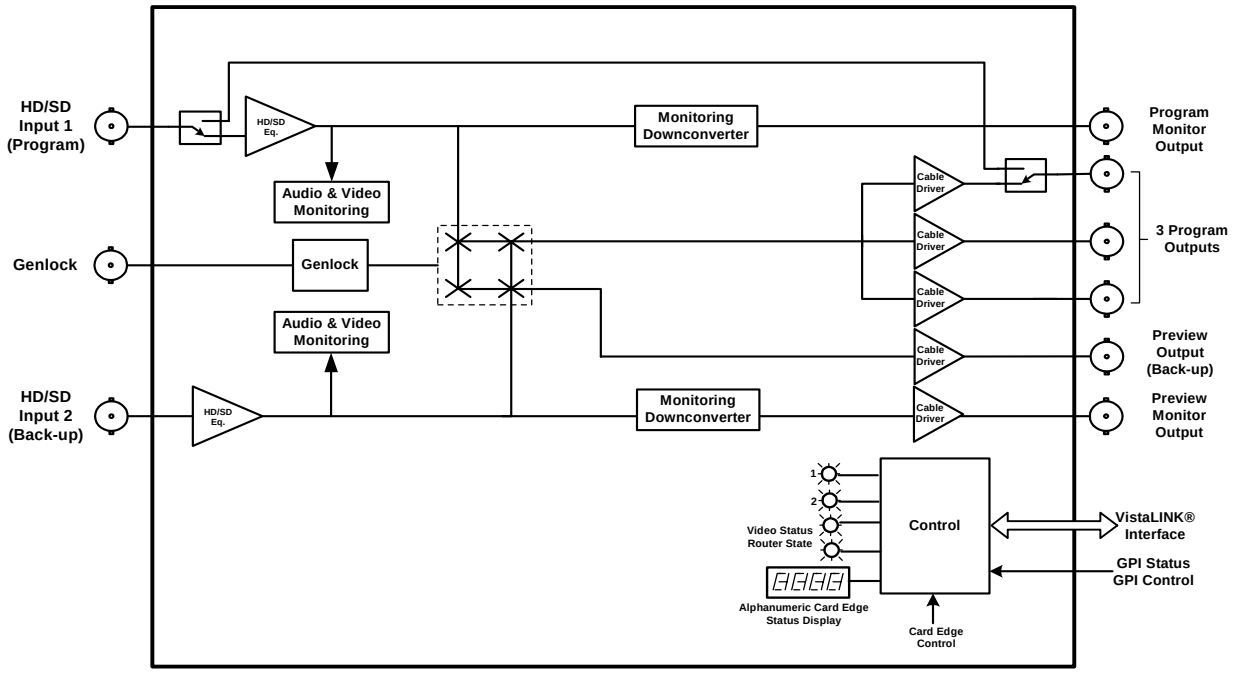

Figure 1-2: 7700RD2X2-HD Block Diagram

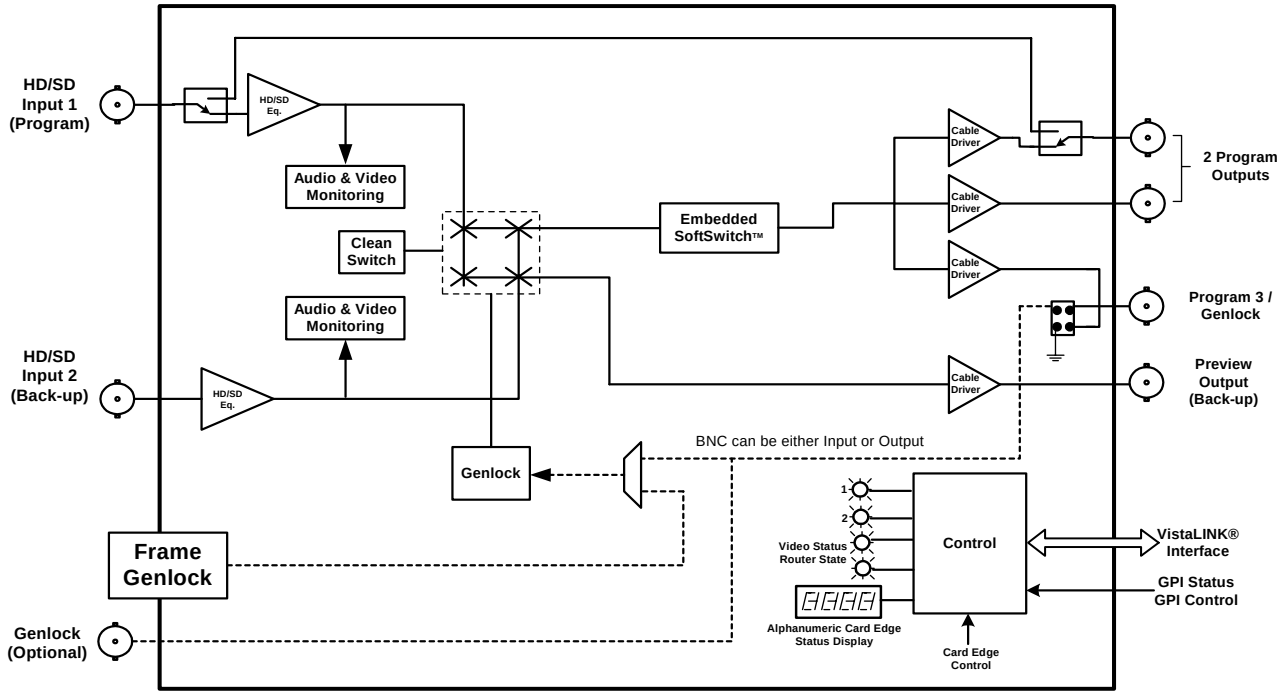

Figure 1-3: 7700R2X2-HES Block Diagram

2. INSTALLATION

The 7700R2X2 Series comes with a companion rear plate that occupies one slot in the frame. For information on inserting the module into the frame see the 7700FR chapter section 3.

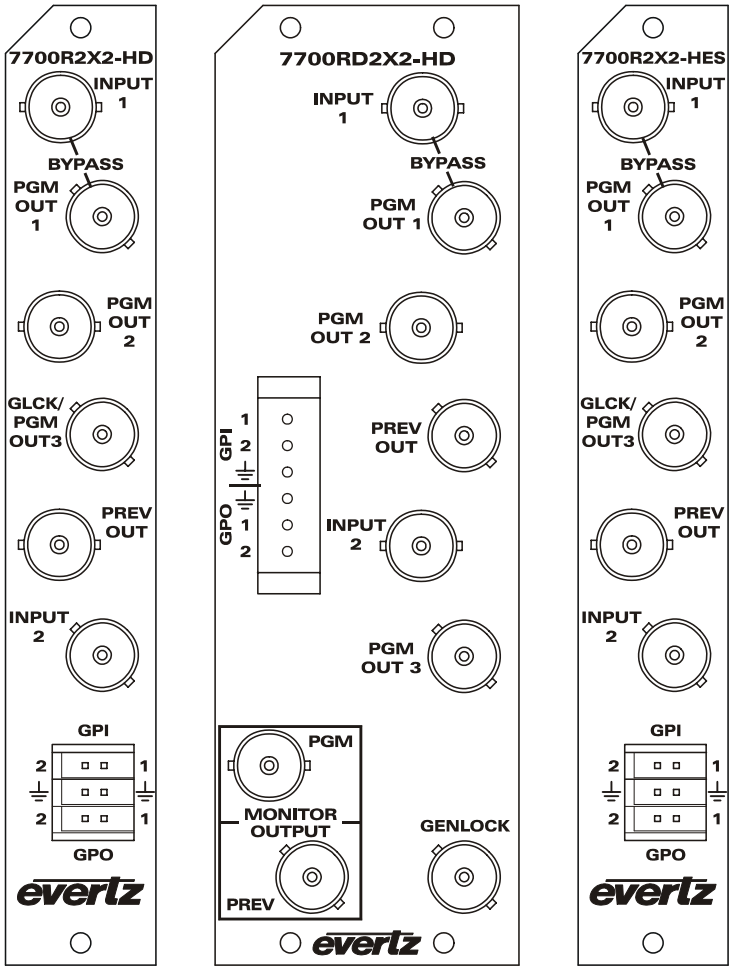

Figure 2-1: 7700R2X2-HD Series Rear IO Modules

2.1. VIDEO CONNECTIONS

INPUTS 1 & 2 Input BNC connectors for serial digital signals compatible with the SMPTE 292M or SMPTE 259M-C standards. The INPUT 1 connector is the *Program* input and the INPUT 2 connector is for the *Backup* or *Preview* input.

PGM OUT 1 to 3 These three BNC connectors are used as the program video bus output. The output video standard is the same as the input video standard.. The PGM OUT1 output is protected by a bypass relay, which will activate in the event that power to the module is lost or the module is removed. PGM OUT2 and PGM OUT3 are identical to PGM OUT1 except that these outputs are not bypass relay protected. The 7700R2X2-HD and the 7700R2X2-HES PGM OUT3 can also be selected as a Genlock input (please refer to section 2.2).

PREV OUT This BNC connector is used as the preview video bus output and is always the same standard as the video input.

MONITOR OUTPUT These two BNC connectors provide a monitor grade downconverted SDI video output, from the PGM and PREV outputs respectively. When the PGM and PREV outputs are SD, the downconverters are bypassed and these BNC connectors become an additional output for each signal. The monitor outputs have 2 groups of embedded audio transferred from the respective inputs.

2.2. GENLOCK REFERENCE

GENLOCK The Genlock signal may be NTSC or PAL colour black or tri-level sync. The reference input type is auto-detected. Jumper J17 on the 7700R2X2 Series selects whether the selected reference input is terminated to 75 ohms (default) or to high impedance (please refer to Figure 7-1 and Figure 7-2). The Genlock reference may also be supplied to the 7700R2X2-HES card through the Frame Genlock if the 7700FR-G frame is being utilized.

2.3. GENERAL PURPOSE INPUTS & OUTPUTS

The 6-pin terminal strip has two general purpose inputs and two general purpose outputs. The GPI inputs are active low with internal pull-ups. If an input is left floating (not connected) it will not be activated. Lowering the GPI input to a voltage below 0.8 volts will activate the input. GPIs can be activated by simply 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 (please refer to Figure 7-1 and Figure 7-2). The GPO outputs are open collector. Care must be taken to limit the load to 0.5 W so there is no effect on the power supply of the module.

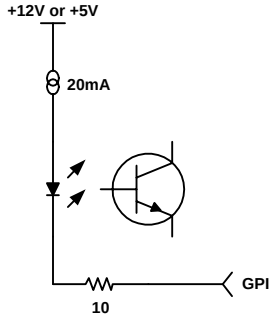

Figure 2-2: Typical GPI Circuitry

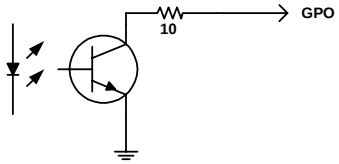

Figure 2-3: Typical GPO Circuitry

The GPIOs can be setup to control and monitor the switching behaviour of the 7700R2X2 Series. GPIO 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 and secured using the hold down screws.

GPI 1 & 2 When the module is set to manual switch mode the GPI's control the routing of the module. For example if GPI 1 is pulled low momentarily, Input 1 will be routed to PGM OUT 1-3 & Input 2 will be routed to PREV OUT. If GPI 2 is pulled low momentarily, Input 1 will be routed to PREV OUT & Input 2 will be routed to PGM OUT 1-3

GPO 1 & 2 The GPO's indicate whether the primary or secondary input has been selected as the primary output. When GPO 1 is high, then the primary input (Input 1) has been selected, and if GPO 2 is high, then the secondary input (Input 2) has been selected.

When SMOD is set to AUS, the user can use the GPIs to force a switch to desired inputs. If user selects GPI 1, then INPUT 1 will be sent to PGM OUT 1 to 3 and INPUT 2 to PREV OUT, regardless of the signal quality. The same applies for GPI 2, where INPUT 2 would be sent to PGM OUT 1 to 3 and INPUT 1 to PREV OUT.

If the GPIs are BOTH HI or BOTH LOW, the autoswitch functionality is retained.

3. SPECIFICATIONS

3.1. SERIAL DIGITAL VIDEO INPUTS

Standard: 270 Mb/s SMPTE 259M - auto-detects standard
1.485 Gb/sec SMPTE 292M – auto-detects standard
SMPTE 125M, SMPTE 274M, SMPTE 296M,– see Table 3-1 for a list of supported video standards
Note: the 7700RD2X2-HD does not support 1080p/30 or 1080p/24sF

Common Name	Pixels / Active Lines	Frame Rate	Progressive /Interlace	SMPTE Standard
480i/59.94	720x480	59.94	I	125M
576i/50	720x576	50	I	125M
1080i/59.94	1920 x 1080	29.97 (30/1.001)	I	274M
1080i/50	1920 x 1080	25	I	274M
1080p/30	1920 x 1080	30	P	274M
1080p/29.97	1920 x 1080	29.97 (30/1.001)	P	274M
1080p/24sF	1920 x 1080	24	P (sF)	274M
1080p/23.98sF	1920 x 1080	23.98 (24/1.001)	P (sF)	274M
720p/59.94	1280 x 720	59.94 (60/1.001)	P	296M
720p/50	1280 x 720	50	P	296M

Table 3-1: Video Input Formats

Connector: 2 BNC per IEC 60169-8 Amendment 2.
Input Equalization: Automatic to 100m @ 1.5Gb/s with Belden 1694 or equivalent cable.
Return Loss: >20 dB up to 270 MHz
>12 dB up to 1.5GHz

3.2. RE-CLOCKED SERIAL DIGITAL VIDEO ROUTER OUTPUTS

Standard: Same as input
Number of Outputs: 3 Program outputs re-clocked, (1 output is bypass relay protected)
1 preview output
Connector: BNC per IEC 60169-8 Amendment 2
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 200ps nominal for HD
900ps nominal for SD
Overshoot: <10% of amplitude
Return Loss: >20 dB up to 270 MHz
> 15 dB at 1.5 Gb/s
Jitter: < 0.16UI (HD) or < 0.10UI (SD)

3.3. DOWNCONVERTED SERIAL VIDEO OUTPUTS (MODEL 7700RD2X2-HD ONLY)

Standard: SMPTE 259M-C (270 Mb/s)
Number of Outputs: 1 Program, 1 preview
Connector: BNC per IEC 60169-8 Amendment 2.
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 750ps nominal
Overshoot: <10% of amplitude
Return Loss: > 15 dB at 270 Mb/s
Jitter: < 0.2 UI

3.4. GENLOCK INPUT

Type: NTSC or PAL Colour Black 1 V p-p
HD Tri-level Sync
Connector: BNC per IEC 60169-8 Amendment 2
or Frame Genlock (available with 7700R2x2-HES only)
Termination: High impedance or internal 75 ohm termination (jumper selectable)

3.5. GENERAL PURPOSE INPUTS AND OUTPUTS

Number of Inputs: 2
Number of Outputs: 2
Type: Opto-isolated, active low with internal pull-ups to +5 or +12V (jumper settable)
Connector: 6 pin removable terminal block
Signal Level: closure to ground

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

Downconverter Video Delay: Approximately 1 to 2 frames depending on input video format, processing mode.

3.7. ELECTRICAL

Voltage: +12VDC
Power: 9 W (7700R2X2-HD)
14 W (7700RD2X2-HD)
11 W (7700R2X2-HES)
EMI/RFI: Complies with FCC regulations for class A devices.
Complies with EU EMC directive.

3.8. PHYSICAL

7700 frame mounting:
Number of slots: 1 (7700R2X2-HD and 7700R2X2-HES)
2 (7700RD2X2-HD)

7701 frame mounting:
Number of slots: 1

4. STATUS INDICATORS

The 7700R2X2 Series has 11 LED status indicators on the main circuit-board front card edge to show the operational status of the card at a glance. Figure 7-1 and Figure 7-2 show 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 on both inputs, and the board power is good.

Five small LEDs near the upper edge of the board indicate the status of the 7700R2X2 Series.

VIDEO 1 PRESENT: This green LED will be ON when there is a valid signal present on module Input 1.

VIDEO 2 PRESENT: This green LED will be ON when there is a valid signal present on module Input 2.

INPUT 1 PGM: This green LED will be ON when user selects Input 1 as PGM output.

INPUT 2 PGM: This green LED will be ON when user selects Input 2 as PGM output.

GENLOCK PRESENT: This green LED will be ON when Genlock Input is present.

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 or 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 or 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 or 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 or 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 7700R2X2 Series is equipped with an 8-position DIP switch, a toggle switch, a push button, and a 4-character dot-matrix display 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, and control/monitor mode selection. All other card functions are available through a menu system controlled by the toggle switch and push button, and displayed on the 4-character dot-matrix display (see Section 6.2).

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. Sections 5.1 to 5.2 provide a detailed description of each of the DIP switch function.

There are two types of DIP switches possible. 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	VistaLINK® or Local control Selection
2	Reserved – set to Off
3	
4	
5	
6	
7	
8	Control or Monitoring Mode Selection

Table 5-1: DIP Switch Functions

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

The 7700R2X2 Series can be controlled using the card edge DIP switches and menu system or remotely via SNMP using VistaLINK® PRO. See Section 8 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 1 is used to enable or disable VistaLINK® control.

DIP 1	CONTROL MODE
Off	Local control mode - the module will be controlled using the DIP switches and menu system.
On	VistaLINK® control mode - the module will be controlled remotely through SNMP.

Table 5-2: VistaLINK® Mode Switch Settings

5.2. ENABLING CARD EDGE CONTROL

DIP switch 8 is used to control whether the card will be controlled using the menu items described elsewhere in Section 6.2, or whether it is in monitor mode.

DIP 8	FUNCTION	DESCRIPTION
Off	Control Mode	Card edge display is used for module setup using the menu system
On	Monitor Mode	Card edge display is used for router status. Pushbutton controls the switch in Manual mode

Table 5-3: Control Mode Switch Setting

6. CARD EDGE MENUS

6.1. NAVIGATING THE CARD EDGE MENU SYSTEM

Status monitoring and control over the card's parameters is provided via the 4-digit alphanumeric display located on the card edge. DIP switch 8 is used to select whether you are displaying status from the card (monitoring mode) or setting control parameters for the card (control mode). When you are in control mode, the toggle switch and pushbutton are used to navigate through a menu system to set various parameters for the module. In Status mode, the menu system only provides the card's status. To enter

the 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. When you have chosen the desired sub menu, press the pushbutton to select the next menu level.

In the sub menu there will be a list of 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 lift 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.

When you have reached the desired value, press the pushbutton. This will update the parameter to the selected value and return to the sub menu. To change another parameter, press the pushbutton to enter the main menu system again and continue selecting and adjusting other parameters.

Each of the menu items is described in the following sections, with an explanation of what each choice accomplishes.

Throughout the descriptions of the menu items, the default values are underlined.

6.2. CARD EDGE DISPLAY – MONITOR MODE

When the module is in monitoring mode (DIP switch 8 is ON), the card edge display will show which input has been routed to the PGM outputs. Selecting one of these items will take you down into the next menu level.

SW1	Input 1 is routed to the PGM outputs, Input 2 is routed to PREV output
SW2	Input 2 is routed to the PGM outputs, Input 1 is routed to PREV output

6.3. CARD EDGE DISPLAY – CONTROL MODE

The following is a brief description of the top level of the menu tree that appears when you enter the card edge setup menu. (DIP switch 8 is OFF). Selecting one of these items will take you down into the next menu level. The details of the each of the displays are described in the sections 6.3.1 to 6.3.24.

BACK	Returns the display back to monitoring mode
V1AS	Auto switch condition controls for input 1
V2AS	Auto switch condition controls for input 2
V1FD	Fault condition control definitions for input 1
V2FD	Fault condition control definitions for input 2
ASP1	Selects the aspect ratio for monitor output 1
PCL1	Selects the panel colours for monitor output 1
ASP2	Selects the aspect ratio for monitor output 2
PCL2	Selects the panel colours for monitor output 1
OMOD	Selects video routing to the monitoring outputs
GSRC	Selects the genlock source
SWCT	Selects the control system use to configure the module
SMOD	Selects the type of switch mode
SLIN	Selects the switch line
V1D1	Selects the first audio de-mux group for input 1
V1D2	Selects the second audio de-mux group for input 1
V2D1	Selects the first audio de-mux group for input 2
V2D2	Selects the second audio de-mux group for input 2
V1M1	Selects audio embedder 1 group select for input 1
V1M2	Selects audio embedder 2 group select for input 1
V2M1	Selects audio embedder 1 group select for input 2
V2M1	Selects audio embedder 2 group select for input 2
PCTL	Control Vertical and Horizontal Phase Offsets
ESS	Control embedded audio SoftSwitch™ functionality for input 1
DISP	Sets the orientation of the display
VER	Display the firmware version number

6.3.1. Auto Switch Condition Controls for Inputs 1 and 2

The 7700R2X2 has two fault conditions (one for each input) that can be configured to warn the user of numerous conditions. The V1AS and V2AS menu items re used to configure when fault 1 or fault 2 is triggered, and how the fault should be presented. For audio loss, audio over, audio silence, audio phase reversal, and audio mono, fault triggers become active if the fault condition is active for the programmed fault duration. The fault trigger will deactivate within one second (user configurable, by default) once the fault condition is inactive. These two sub-menus also control the router's auto-switch when the module is in auto-switch mode (SMOD). The controls for V1AS and V2AS operate in the same way. This manual only includes a detailed description of if the menu items for V1AS.

6.3.1.1. Setting the Duration of the Fault Condition

V1AS
FDUR
Until reset *1 to 254 frames* *30 frames*

This control sets how long the fault condition will be held. The fault display will be displayed as long as the fault condition is active and the *Fault mode* is set to *Enable*. The fault condition can either be held until the user resets the condition (by utilizing a programmed GPI, the Clear faults & peaks menu option or by pressing the toggle switch when not in a menu) or until a programmable timer expires.

6.3.1.2. Determining Logic Operation to Generate the Fault Condition

V1AS
FLOG
Or *And*

This control is determines whether one item or more than one item will generate a fault. The user will set this parameter to a logical OR or AND.

The table below shows the possible error (fault) conditions to produce a fault. These are in the same sub-menu under V1AS or V2AS. Each possible fault condition my be enabled or disabled by selecting YES or NO in the menu system.

The default value is NO for all items except VLOS (Video loss condition). The difference between VLOS and VINV (Video invalid) is that VINV is controlled by a duration setting while VLOS is an instant condition without duration control.

VLOS	Video loss condition
VFRE	Video freeze condition
VBLK	Video black condition
AG1L	Audio group 1 loss condition
AG2L	Audio group 2 loss condition
AG3L	Audio group 3 loss condition
AG4L	Audio group 4 loss condition
P1OV	Audio pair 1 over condition
P2OV	Audio pair 2 over condition
P3OV	Audio pair 3 over condition
P4OV	Audio pair 4 over condition
P1SL	Audio pair 1 silence condition
P2SL	Audio pair 2 silence condition
P3SL	Audio pair 3 silence condition
P4SL	Audio pair 4 silence condition
P1PH	Audio pair 1 phase reversal condition
P2PH	Audio pair 2 phase reversal condition
P3PH	Audio pair 3 phase reversal condition
P4PH	Audio pair 4 phase reversal condition
P1MO	Audio pair 1 mono condition
P2MO	Audio pair 2 mono condition
P3MO	Audio pair 3 mono condition
P4MO	Audio pair 4 mono condition
VINV	Video invalid condition

Table 6-1: Error Conditions that can be set to Produce a Fault Alarm

Since the menu items for all of the fault conditions are very similar, this manual only details the menu for VLOS.

V1AS *VLOS* *YES* *NO*	This control determines whether a fault will be generated upon loss of video.

6.3.2. Fault condition control definitions for input 1 and 2

This sub-menu defines fault condition controls. The menus for fault condition control definitions for inputs 1 and 2 (V1FD and V2FD) are indentical. This manual only details only the V1FD.

BACK	Returns the display back to upper level
NLVL	Video noise level control
FDUR	Video freeze duration control
BDUR	Video black duration control
OLVL	Audio over level control
ODUR	Audio over duration control
SLVL	Audio silence level control
SDUR	Audio silence duration control
PLVL	Audio phase reversal level control
PDUR	Audio phase reversal duration control
MLVL	Audio mono level control
MDUR	Audio mono duration control
VDUR	Video invalid duration control

6.3.3. Detecting Picture Freeze

The *Picture noise level* and *Picture freeze duration* controls are used to detect when a video picture is considered frozen. The *Picture noise level* control sets the threshold that decides whether activity in the picture is considered to be noise. The picture activity must be greater than this amount for the duration set by the *Picture freeze duration* control before the fault condition exists.

6.3.3.1. Setting the Picture Noise Level

V1FD (or V2FD)
- *NLVL*
  - *9*
  - *1 to 10*

This control sets the approximate level of noise expected in the video signal feed, it is used by the freeze detect feature to distinguish motion from background noise on top of a video feed.

As a guide, here are some signal to noise ratio comparisons:
1 = digital freeze (no noise on top of frozen picture)
10 = 40 dB SNR

6.3.3.2. Setting the Picture Freeze Duration

V1FD (or V2FD)
- *FDUR*
  - *302 frames*
  - *6 to 902 frames*

This control sets the duration, in number of frames, of video activity under the picture noise level that is considered a fault.

This parameter is adjusted in four-frame increments.

When increasing *Picture noise level*, it is recommended that you increase *Picture freeze duration* as well. This is because the higher the Picture noise level, the lower is equipment's motion sensitivity, thus long periods without significant on-screen movement are more likely to trigger a "false" freeze alarm.

6.3.3.3. Optimizing the Picture Noise Level and Picture Freeze Duration Parameters

Setting up the optimum *Picture noise level* and *Picture freeze duration* parameters will depend on the amount of noise in the video path from the first equipment with freeze-frame capability to the monitoring point. The system designer should determine the maximum amount of time permissible between the moment of freeze and the alarm.

Setting this time as high as tolerable has two benefits:

- It lowers the frequency of “false” freeze alarms generated when a perfectly valid content contains long motionless periods
- It allows raising the *Picture noise level* parameter, without increasing frequency of “false” freeze alarms.

It is suggested that *Picture noise level* should be set after setting the *Picture freeze duration*.

If the video path is fully digital, then set the *Picture noise level* depending on bit-error rate of the link as follows:

- For bit-error rates less than 1 in 10^{E-12}, set value in the range of 1 to 5
- For bit-error rates greater than 1 in 10^{E-12}, set value in the range of 6 to 10

Failing to accomplish optimal adjustment of the *Picture noise level* will result in either:

- A large number of false alarms, or
- Lack of alarm condition when the video is frozen.

The *Picture noise level* and *Picture freeze duration* controls have been designed to be able to detect short-term "digital" freezes such as MPEG or motion JPEG server artifacts. When these devices have a significant problems with the content that they are de-compressing, they will typically start to produce a "blocky" effect. If the problem is severe enough, they will freeze a frame of video and play it out for a number of frames. With the *Picture noise level* set to 1 (i.e. only detect exact, or nearly exact pictures) and the *Picture freeze duration* set to *minimum*, the unit can detect these quick "digital freezes". You can't however detect both this type of freeze and a freeze from a link that has added noise to the picture.

6.3.4. Detecting Picture Black Duration

V1FD (or V2FD) *BDUR* *88 frames* *4 to 900 frames*	This control sets duration, in frames, of active picture content below 7 IRE that is considered a fault. A Fault is generated when the video level within the active picture area falls below the preset black level (7 IRE) and remains for the specified duration.

6.3.5. Detecting Audio Over Level Faults

The Over level and Over duration controls are used to detect when an audio amplitude is close to a dangerous level (i.e. clipping a downstream device, or saturating the digital word length). The Over level control sets the audio level over which there is considered to be a fault. The audio must be over this level for the duration set by the Over duration control before the fault condition exists. A fault will be generated when any channel has generated an over condition.

6.3.5.1. Setting the Audio Over Level

V1FD (or V2FD)
OLVL
-6dB FS -30dB to 0dB FS

This control sets the audio level over which there is considered to be over level. This value is expressed in dB full scale (FS) and can even be used to detect digital clipping. If set to 0 dB FS, then if 3 or more consecutive samples (set with the duration control) are at digital saturation (max or min), then the digital word length has been exceeded.

This parameter is adjusted in 0.25 dB increments.

6.3.5.2. Setting the Audio Over Duration

V1FD (or V2FD)
ODUR
*3 3 to 255 samples

This control sets the duration, in number of consecutive samples that are at or above the *Over level* before a fault condition exists.

Note that as longer durations are configured, you are eliminating the detection of higher frequency content over the set *Over level*.

The parameter is adjusted in one-sample increments

6.3.6. Detecting Audio Silence Faults

The *Silence level* and *Silence duration* controls are used to detect when the audio is considered to be silent. The *Silence level* control sets the audio level under which the audio is considered to be silent. The audio must be under the *Silence level* for the duration set by the *Silence duration* control before the fault condition exists. When the fault condition exists, the audio must be over the *Silence level* for 1 sec. before the fault condition will be removed. A fault will be generated when both channels in a pair (1 and 2 or 3 and 4) have satisfied a silence condition.

6.3.6.1. Setting the Audio Silence Level

V1FD (or V2FD)
SLVL
-60dB FS -96dB to -20dB FS

This control sets the audio level under which it is considered to be silent. This value is expressed in dB full scale (FS).

This parameter is adjusted in 0.25 dB increments.

6.3.6.2. Setting the Audio Silence Duration

V1FD (or V2FD)
SDUR
10 sec 0.5 to 127 sec

This control sets the length of audio silence, in seconds, before a fault occurs.

This parameter is adjusted in 0.5 second increments.

6.3.7. Detecting Audio Phase Reversal Faults

All stereo audio material has a varying amount of phase difference between the two channels. If there is significant phase reversal for a period of time, then this is a sign that the audio signals may be out of phase.

The *Phase reversal level* and *Phase reversal duration* controls are used to detect when the left and right audio channels are considered to be out of phase. The *Phase reversal level* control sets the amount of phase difference that is considered to be out of phase. The audio must be out of phase by more than the *Phase reversal level* amount for the duration set by the *Phase reversal duration* control before the fault

condition exists. When the fault condition is active, the audio must be out of phase by less than the *Phase reversal level* amount for 1 sec. before the fault condition will be removed.

6.3.7.1. Setting the Audio Phase Reversal Level

V1FD (or V2FD)
PLVL
0.9
0.5 to 1

This control sets the amount of phase difference before the audio is considered to be out of phase. This phase reversal is calculated by comparing the difference of the two channels to the average of the two. If a signal is always out of phase, then the difference between the two will be high compared to the average of the two. This corresponds to 1 in this control.

If there is only content on one of the channels (i.e. left only or right only), then the difference is equivalent to the average of the two channels. This corresponds to 0.5 in this control.

6.3.7.2. Setting the Audio Phase Reversal Duration

V1FD (or V2FD)
PDUR
10 sec
0.5 to 127 sec

This control sets the period over which to analyze the audio content for phase reversal.

Note that conditions of silence are not included in this value. This means that if the audio is 50% quiet then it will take twice the period set with this control to detect a phase reversal condition.

This parameter is adjusted in 0.5 second increments

6.3.8. Detecting Audio Mono Faults

Mono audio material can take two forms: one channel with information and the other quiet or both channels with the same information. The AVM cards will detect both types of mono material.

If there is only a small amount of phase difference between the two channels (perhaps caused by the noise present on the audio) then the content may be mono. If there is no significant difference for a period of time, then this is a sign that the audio signals are mono.

Mono is detected by comparing the difference of the two channels to the average of the two. If a signal always has no out of phase information (or just a small amount) for a period of time, then the signal may be mono.

The *Mono threshold level* and *Mono duration* controls are used to detect when two audio channels are considered to be mono. The *Mono threshold level* control sets the threshold that decides whether the signals are the same. The audio difference must be less than the *Mono threshold level* amount for the duration set by the *Mono duration* control before the fault condition exists. When the fault condition exists, the audio difference must be more than the *Mono threshold level* amount for 1 sec. before the fault condition will be removed.

Material that is both mono and out of phase will be detected as being out of phase and not mono. Once the phase polarity is fixed, then the card will detect mono material.

6.3.8.1. Setting the Audio Mono Level

V1FD (or V2FD) *MLVL* *0.2* *0.2 to 0.5*	This control sets the level of L/R audio difference under which is considered mono. 0 corresponds to both channels being identical while 1 corresponds to both channels being exactly out of phase. This parameter is adjusted in 0.01 increments.

6.3.8.2. Setting the Audio Mono Duration

V1FD (or V2FD) *MDUR* *10 sec* *0.5 to 127 sec*	This control sets the duration of mono audio, in seconds, that is considered a fault. This parameter is adjusted in 0.5 second increments

6.3.9. Setting the Video Invalid Duration

V1FD (or V2FD) *VDUR* *0* *0 to 900 Frames*	This control sets the duration for which the board ignores glitches on the video signal, thereby not displaying fault alert messages. This parameter is adjusted in one-frame increments

6.3.10. Configuring the PGM Monitoring Output Aspect Ratio (model 7700RD2X2-HD only)

ASP1 *16:9* *4:3Q* *4:3S*	This control selects the aspect ratio for the PGM monitoring output 16:9 letterbox 4:3 anamorphic squeeze 4:3 centre cut

6.3.11. Configuring the PGM Monitoring Output Panel Colours (model 7700RD2X2-HD only)

PCL1 *BLUE* *WHIT* *GREN* *RED* *BLCK*	This control selects the panel colours for the PGM monitoring output Blue White Green Red Black

6.3.12. Configuring the PREV Monitoring Output Aspect Ratio (model 7700RD2X2-HD only)

ASP2 *16:9* *4:3Q* *4:3S*	This control selects the aspect ratio for the PREV monitoring output 16:9 letterbox 4:3 anamorphic squeeze 4:3 centre cut

6.3.13. Configuring the PREV Monitoring Output Panel Colours (model 7700RD2X2-HD only)

PCL2
BLUE
WHIT
GREN
RED
BLCK

This control selects the panel colours for the PREV monitoring output
- Blue
- White
- Green
- Red
- Black

6.3.14. Configuring the Inputs for the Downconverted Monitoring Outputs (model 7700RD2X2-HD only)

OMOD
FOLI
FOLO

This control selects the video input for the downconverted monitoring outputs.

When FOLI is selected, video INPUT 1 will be routed to monitoring output PGM, and INPUT 2 will be routed to monitoring output PREV

When FOLO is selected, the monitoring output PGM will follow PGM OUT 1, and monitoring output PREV will follow PREV OUT

6.3.15. Selecting the Genlock Source (models 7700R2X2-HD and 7700R2X2-HES only)

GSRC
RFIN
FRF 1
FRF2

This control selects the Genlock source being used.
- Select BNC reference input from the rear plate
- Select BNC reference input 1 from the 7700FR-G frame
- Select BNC reference input 2 from the 7700FR-G frame

Note: applies only to the 7700R2X2-HD and 7700R2X2-HES modules that have REV A or newer circuit boards.

6.3.16. Configuring the Method of Control

SWCT
L & R
REM
LOC

This control selects the control system source for the module
- Both local and remote control
- Remote mode only (VistaLINK®)
- Local mode only (card edge)

6.3.17. Configuring the Switch Mode

SMOD
AUSB
MAN
AUS

This control selects the switching mode for the module
- Auto switches back to primary input when video applied to Input 1
- Switches are controlled by the GPI's
- Auto switches to input that has video when another input is removed

When in SMOD is set to AUSB, the user can use the GPIs to force a switch to desired inputs. If user selects GPI 1, then INPUT 1 will be sent to PGM OUT 1 to 3 and INPUT 2 to PREV OUT, regardless of the signal quality. The same applies for GPI 2, where INPUT 2 would be sent to PGM OUT 1 to 3 and INPUT 1 to PREV OUT.

If the GPIs are BOTH HI or BOTH LOW, the autoswitch functionality is retained.

6.3.18. Configuring the Switch Line

SLIN
10
1-64

This control selects the switch line based on the reference input.

6.3.19. Configuring the Audio De-Embedder Groups

V1D1
GRP1
GRP2
GRP3
GRP4

This control selects the source audio group for de-embedder 1 on Input 1.

V1D2
GRP1
GRP2
GRP3
GRP4

This control selects the source audio group for de-embedder 2 on Input 1.

V2D1
GRP1
GRP2
GRP3
GRP4

This control selects the source audio group for de-embedder 1 on Input 2.

V2D2
GRP1
GRP2
GRP3
GRP4

This control selects the source audio group for de-embedder 2 on Input 2.

6.3.20. Configuring the Audio Embedder Groups (model 7700RD2X2-HD only)

There are four controls that select the destination audio group for each embedder on each input of the 7700RD2X2-HD.

V1M1
GRP1
GRP2
GRP3
GRP4
OFF

This control selects the destination audio group for embedder 1 on Input 1

V1M2
GRP1
GRP2
GRP3
GRP4
OFF

This control selects the destination audio group for embedder 2 on Input 1

V2M1
GRP1
GRP2
GRP3
GRP4
OFF

This control selects the destination audio group for embedder 1 on Input 2

V2M2
GRP1
GRP2
GRP3
GRP4
OFF

This control selects the destination audio group for embedder 2 on Input 2

6.3.21. Control V & H Phase Offsets (models 7700R2X2-HD and 7700R2X2-HES only)

PCTL
VPHA
0
0 to max lines

This control sets the vertcal phase offset of both the PGM and PREV outputs.

This parameter is adjusted in 1 line increments.

PCTL
HPHA
0
0 to max samples

This control sets the horizontal phase offset of both the PGM and PREV outputs.

This parameter is adjusted in 1 sample increments.

6.3.22. Control embedded audio softswitch functionality (model 7700R2X2-HES only)

ESS
ON
OFF

This control switches the audio embedded softswitch function on or off. The audio softswitch is applied to the PGM outputs only.

6.3.23. Configuring the Orientation of the Text On the Display

DISP
VERT
HORZ

This control allows the user to select a horizontal or vertical orientation for the displays to accommodate mounting the module in the 3RU or 1RU frames.

6.3.24. Viewing the Firmware Version

VER
x.xx BUILD xxxx

This control shows the firmware version and build number of the firmware. The message will scroll across the display.

For example: **VER 1.0 BLD 067**

7. LOCATION OF LEDS AND JUMPERS

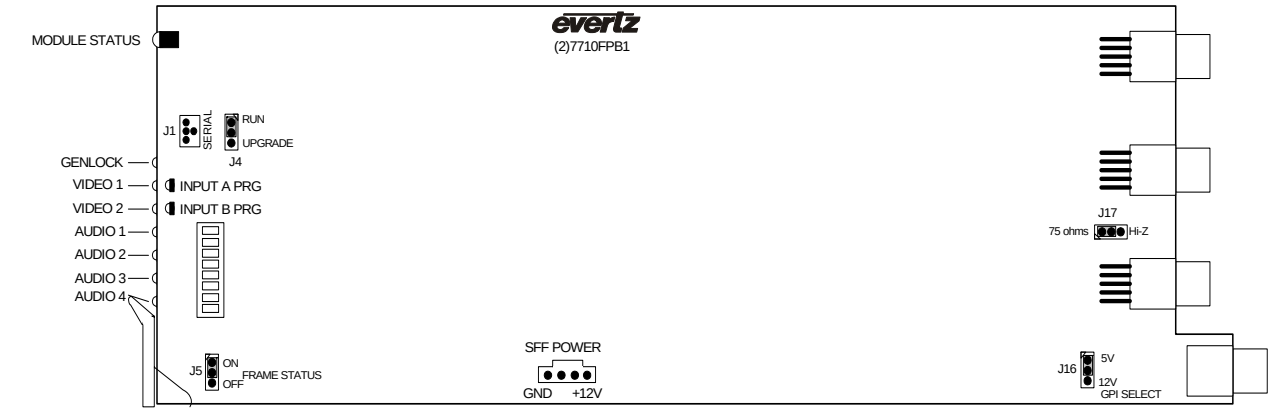

Figure 7-1: LED and Jumper Locations on REV 2 Boards

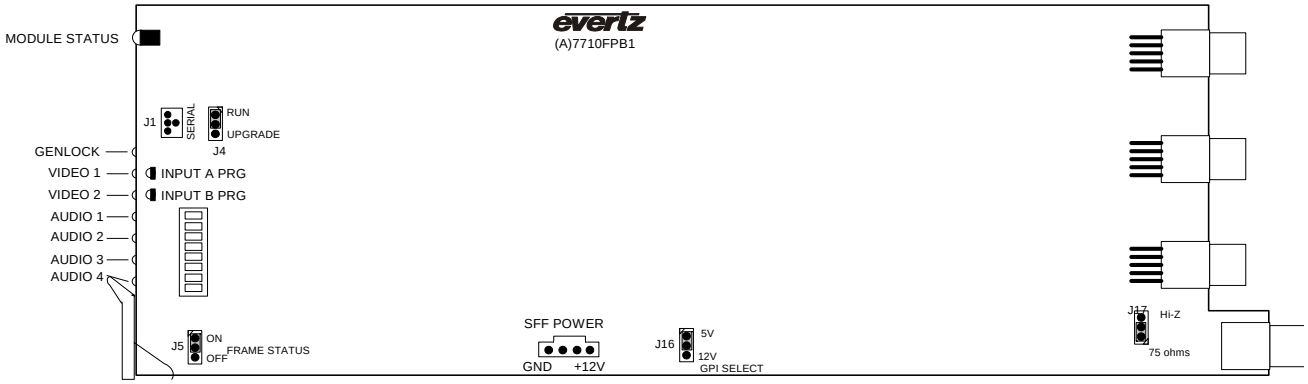

Figure 7-2: LED and Jumper Locations on REV A Boards

7.1. 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 LEDs 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.

7.2. 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.

Alternatively, the 7700R2X2 series modules can be upgrade via *Vista*LINK™. Please refer to your *Vista*LINK™ user manual for more details.

7.3. SELECTING WHETHER THE GENLOCK REFERENCE INPUT IS TERMINATED

TERM

The TERM jumper J17 located at the rear of the module is used to terminate the genlock loop input. Then it is in the 75R position a 75 ohm terminating resistor will connect the input to ground. When it is in the HI-Z position the genlock input will be high impedance.

7.4. CONTROLLING GPI PULLUP 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 12 volts install this jumper in the position closest to edge of the module.

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

7.5. SELECTING THE GENLOCK INPUT SOURCE vs. The PGM OUTPUT 3

7.5.1. Genlock Input Mode of Operation

The 7700R2X2 (excluding the 7700RD2X2-HD) can optionally be configured to accept a Genlock input from the PGM Output 3 BNC. To enable this mode, remove the rear plate from the 7700FR frame. Locate jumper J1 on the PCB, apply a jump across the “GL” pin with the “BNC” pin, and a jump across the “TERM” pin with the “PGM” pin (please refer to Figure 7-3). This will map the BNC to the Genlock input circuitry and terminate the PGM output path.

The 7700R2X2-HES can also use the 7700FR-G frame Genlock (Rev A cards or newer). To enable this mode, access the menu system and locate the GSRC (Genlock Source), and select which of the the two frame Genlock signals will be used. Please refer to section 6.3.15

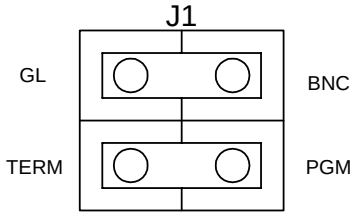

Figure 7-3: Genlock Source Jumper Configuration

7.5.2. PGM Output 3 Mode of Operation

The 7700R2X2 (excluding the 7700RD2X2-HD) can optionally be configured to output a third PGM signal from the PGM Output 3 BNC. To enable this mode, locate jumper J1 on the rear plate. Apply a jump across the “PGM” pin with the “BNC” pin, and a jump across the “TERM” pin with the “GL” pin (please refer to Figure 7-4). This will map the BNC to the PGM output circuitry and terminate the Genlock BNC input path.

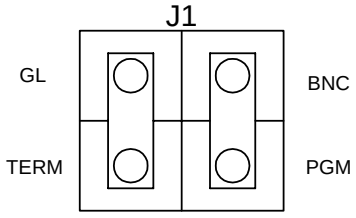

Figure 7-4: PGM Output 3 Jumper Configuration

8. VISTALINK® REMOTE MONITORING/CONTROL

8.1. What is VistaLINK®?

VistaLINK® is Evertz's remote monitoring and control capability 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. For monitoring, there needs to be a detecting device that automatically reports all errors to a central alarm and error logging station. We also need to be able to interrogate individual detector devices from the central station to determine the status of individual channels. Finally, we need to be able to configure devices in the network from the 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 7700R2X2-HD and 7700R2X2-HES), 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.

8.2. VistaLINK® MONITORED PARAMETERS

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

Parameter	Description
Video Standard Input1	Indicates video standard of input 1 signal
Video Standard Input2	Indicates video standard of input 2 signal
Card Type	Indicates the card type (e.g. 7700R2X2-HD, 7700R2X2-HES)
Genlock Standard	Indicated the detected Genlock standard

Table 8-1: VistaLINK® Monitored Parameters

8.3. VistaLINK® CONTROLLED PARAMETERS

Parameter	Description
Downconverter 1 Aspect Ratio	Sets the aspect ratio of the Monitoring PGM Output (applies only to the 7700RD2X2-HD module)
Downconverter 1 Panel Colour	Sets the panel colour of the Monitoring PGM Output (applies only to the 7700RD2X2-HD module)
Downconverter 1 Aspect Ratio	Sets the aspect ratio of the Monitoring PREV Output (applies only to the 7700RD2X2-HD module)
Downconverter 1 Panel Colour	Sets the panel colour of the Monitoring PGM Output (applies only to the 7700RD2X2-HD module)
Downconverter Output Mode	Sets the output mode of the Monitoring Output (applies only to the 7700RD2X2-HD module)
Switch Line	Sets the switch line number
Switch Control	Sets the router to local and/or remote switching
Switch Mode	Sets the router switching mode to either manual or automatic
PGM Output Select	Selects which input is routed to the PGM outputs
Vertical Phase Control	Sets the vertical phase of both the PGM and PREV outputs (applies only to the 7700R2X2-HD and 7700R2X2-HES modules)
Horzontal Phase Control	Sets the vertical phase of both the PGM and PREV outputs (applies only to the 7700R2X2-HD and 7700R2X2-HES modules)
Audio SoftSwitch™ Control	Sets the audio softswitch to enable or disable (applies only to the 7700R2X2-HES module)
Video 1 Audio de-embedder 1 Grp	Sets source group for Video input 1 de-embedder 1
Video 1 Audio de-embedder 2 Grp	Sets source group for Video input 1 de-embedder 2
Video 2 Audio de-embedder 1 Grp	Sets source group for Video input 2 de-embedder 1
Video 2 Audio de-embedder 2 Grp	Sets source group for Video input 2 de-embedder 2
Video 1 Audio embedder 1 Grp	Sets destination group for Video input 1 embedder 1
Video 1 Audio embedder 2 Grp	Sets destination group for Video input 1 embedder 2
Video 2 Audio embedder 1 Grp	Sets destination group for Video input 2 embedder 1
Video 2 Audio embedder 2 Grp	Sets destination group for Video input 2 embedder 2
Video Black Duration	Sets the duration in frames for which video is considered to be black
Video Picture Noise Level	Sets the picture noise threshold, used by the black and freeze detectors
Video Freeze Duration	Sets the duration in frames for which video is considered to be frozen
Video Error Duration	Sets the duration in frames for which video is considered to be invalid
Audio Over Level	Sets the audio over threshold in dBFS
Audio Over Duration	Sets the duration in samples for which audio is considered to be over
Audio Silence Level	Sets the audio silence threshold in dbFS
Audio Silence Duration	Sets the duration in seconds for which audio is considered to be silent
Audio Phase Reversal Level	Sets the phase reversal threshold
Audio Phase Reversal Duration	Sets the duration in seconds for which audio is considered to be phase rev'd
Audio Mono Level	Sets the mono threshold
Audio Mono Duration	Sets the duration in seconds for which audio is considered to be mono
Fault Hold Duration	Sets the duration is frames to hold a fault once cleared
Fault Logic	Sets the fault logic operator to either OR or AND

Table 8-2: VistaLINK® Controlled Parameters

8.4. VistaLINK® TRAPS

Trap	Description
Genlock Missing	Triggers when genlock is missing
Primary Output Switch	Triggers when output switch changes
GPI 1	Triggers when GPI 1 is activated
GPI 2	Triggers when GPI 2 is activated
Input 1 to PGM Output	Triggers when Input 1 is switched to PGM Output
Input 2 to PGM Output	Triggers when Input 2 is switched to PGM Output
Input 1 Video Invalid	Triggers when Input 1 video is missing or invalid
Input 1 Audio Group 1 Missing	Triggers when Input 1 Audio group 1 is missing
Input 1 Audio Group 2 Missing	Triggers when Input 1 audio group 2 is missing
Input 1 Audio Group 3 Missing	Triggers when Input 1 audio group 3 is missing
Input 1 Audio Group 4 Missing	Triggers when Input 1 audio group 4 is missing
Input 1 Video Frozen	Triggers when Input 1 video is frozen
Input 1 Video Black	Triggers when Input 1 video is black
Input 2 Video Invalid	Triggers when Input 2 video is missing or invalid
Input 2 Audio Group 1 Missing	Triggers when Input 2 audio group 1 is missing
Input 2 Audio Group 2 Missing	Triggers when Input 2 audio group 2 is missing
Input 2 Audio Group 3 Missing	Triggers when Input 2 audio group 3 is missing
Input 2 Audio Group 4 Missing	Triggers when Input 2 audio group 4 is missing
Input 2 Video Frozen	Triggers when Input 2 video is frozen
Input 2 Video Black	Triggers when Input 2 video is black
Input 1 Audio Pair 1 Over Condition	Triggers when Input 1 audio pair 1 reaches an over condition
Input 1 Audio Pair 2 Over Condition	Triggers when Input 1 audio pair 2 reaches an over condition
Input 1 Audio Pair 3 Over Condition	Triggers when Input 1 audio pair 3 reaches an over condition
Input 1 Audio Pair 4 Over Condition	Triggers when Input 1 audio pair 4 reaches an over condition
Input 1 Audio Pair 1 Silence	Triggers when Input 1 audio pair 1 is silent
Input 1 Audio Pair 2 Silence	Triggers when Input 1 audio pair 2 is silent
Input 1 Audio Pair 3 Silence	Triggers when Input 1 audio pair 3 is silent
Input 1 Audio Pair 4 Silence	Triggers when Input 1 audio pair 4 is silent
Input 1 Audio Pair 1 Reversal	Triggers when Input 1 audio pair 1 is phase reversed
Input 1 Audio Pair 2 Reversal	Triggers when Input 1 audio pair 2 is phase reversed
Input 1 Audio Pair 3 Reversal	Triggers when Input 1 audio pair 3 is phase reversed
Input 1 Audio Pair 4 Reversal	Triggers when Input 1 audio pair 4 is phase reversed
Input 1 Audio Pair 1 Mono	Triggers when Input 1 audio Pair 1 is mono
Input 1 Audio Pair 2 Mono	Triggers when Input 1 audio Pair 2 is mono
Input 1 Audio Pair 3 Mono	Triggers when Input 1 audio Pair 3 is mono
Input 1 Audio Pair 4 Mono	Triggers when Input 1 audio Pair 4 is mono
Input 2 Audio Pair 1 Over Condition	Triggers when Input 2 audio pair 1 reaches an over condition
Input 2 Audio Pair 2 Over Condition	Triggers when Input 2 audio pair 2 reaches an over condition
Input 2 Audio Pair 3 Over Condition	Triggers when Input 2 audio pair 3 reaches an over condition
Input 2 Audio Pair 4 Over Condition	Triggers when Input 2 audio pair 4 reaches an over condition
Input 2 Audio Pair 1 Silence	Triggers when Input 2 audio pair 1 is silent
Input 2 Audio Pair 2 Silence	Triggers when Input 2 audio pair 2 is silent
Input 2 Audio Pair 3 Silence	Triggers when Input 2 audio pair 3 is silent
Input 2 Audio Pair 4 Silence	Triggers when Input 2 audio pair 4 is silent
Input 2 Audio Pair 1 Reversal	Triggers when Input 2 audio pair 1 is phase reversed
Input 2 Audio Pair 2 Reversal	Triggers when Input 2 audio pair 2 is phase reversed
Input 2 Audio Pair 3 Reversal	Triggers when Input 2 audio pair 3 is phase reversed
Input 2 Audio Pair 4 Reversal	Triggers when Input 2 audio pair 4 is phase reversed
Input 2 Audio Pair 1 Mono	Triggers when Input 2 audio Pair 1 is mono
Input 2 Audio Pair 2 Mono	Triggers when Input 2 audio Pair 2 is mono
Input 2 Audio Pair 3 Mono	Triggers when Input 2 audio Pair 3 is mono
Input 2 Audio Pair 4 Mono	Triggers when Input 2 audio Pair 4 is mono

Table 8-3: VistaLINK® Traps