

HDSD9545DLY-PRO
Profanity Bypass Delay System
Instruction Manual

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	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “Dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (Servicing) instructions in the literature accompanying the product.

- Read this information
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades with one wider than other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
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- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

WARNING

TO REDUCE THE RISK OF FIRE OR ELECTRIC – SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.

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WARNING

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INFORMATION TO USERS IN EUROPE

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This equipment with the CE marking complies with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European standards:

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- EN55103-1 Electromagnetic Interference Class A (Emission)
- EN55103-2 Electromagnetic Susceptibility (Immunity)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the European Union EMC directive. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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Use of unshielded plugs or cables may cause radiation interference. Properly shielded interface cables with the shield connected to the chassis ground of the device must be used

REVISION HISTORY

<u>REVISION</u>	<u>DESCRIPTION</u>	<u>DATE</u>
0.1	Quick Reference Guide	Aug 2004
0.2	Preliminary Manual	Oct 2004
0.3	Updated Transition Menu item, remove Remote Panel section	Nov 2004
0.4	Updated Front & Rear panel drawings, and sections relating to Video out D & E	Nov 2004
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1.3.3	Added React. Time BYP menu item	Jun 2007
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1.3.5	Updated electrical specifications	Apr 2010
1.3.6	Updated information in Saving the Configuration to a User Preset section	Sept 2010
1.3.7	Added note regarding on-air path to overview section	Feb 2011

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CHAPTER 1: OVERVIEW

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1. OVERVIEW

In live shows there is always the risk that certain actions, on the part of an artist or an intruder, might be offensive to certain viewers. The Evertz HDS9545DLY-PRO Profanity Protection device is designed to give an operator complete control over the program content being broadcast to air.

The HDS9545DLY-PRO enables the operator to insert the desired time delay, via a front panel control and a display panel. There are two program paths that are HD and SD compatible. The main program feed will usually be focused on the main detailed action. The secondary back-up path will generally offer a wide angle shot, or some suitable alternative picture to the main content. Both channels are delayed by the same amount of time. If an unscheduled, offensive event occurs, the operator has only to hit one remote button to cause the program video and audio output to be clean switched to the alternative back-up channel. When the offensive material is no longer present, the output can be returned to the main detailed image, without the audience noticing that an edit has occurred.

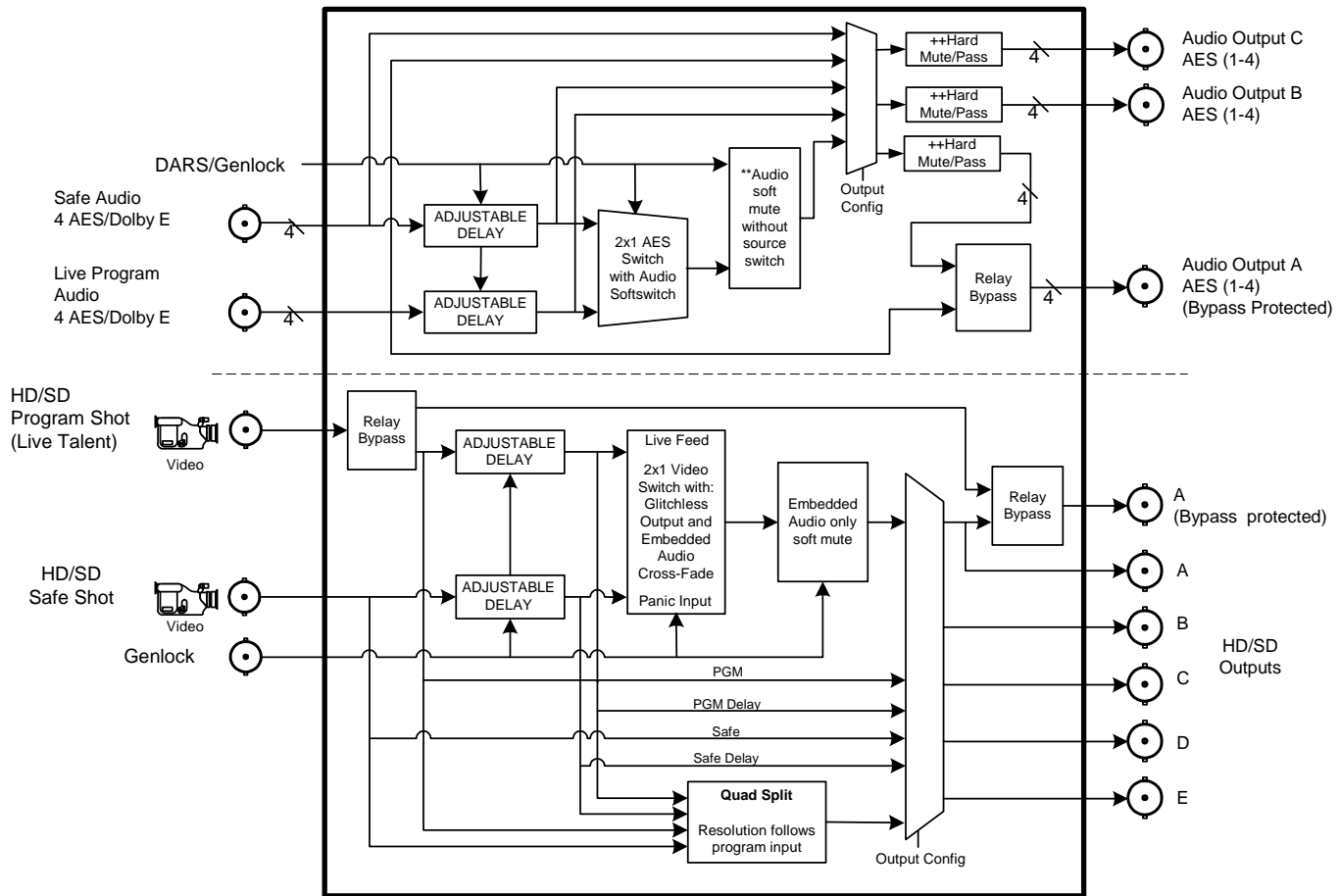
On the standard unit the delay can be adjusted up to a maximum of 24 seconds for HDTV or SDTV. The user can allocate this maximum delay to primary and secondary paths. Typically it is set for max 12 seconds primary and max 12 seconds secondary. When the -HD40 option is added, the delay can be adjusted up to a maximum of 40 seconds for HDTV or 240 seconds for SDTV.

The HDS9545DLY-PRO includes a built-in HD/SD quad split output that shows all four pictures on one monitor. The four pictures are as follows:

- Program
- Delayed Program
- Safe
- Delayed Safe

Features:

- HD or SD SDI compatible – SMPTE 292M (1.5 Gb/s) and SMPTE 259M (270Mb/s) video signals
- Embedded Audio and Discrete (4ch AES) Audio Support
- Monitoring outputs of delayed program and delayed backup can be provided
- Selectable quad split monitoring outputs
- Clean transition between program and backup feed
- SoftSwitch™ audio
- Clean switch video
- Video and audio input relay bypass for power failure bypass protection
- Delay memory is solid state (no moving parts) - no hard drive to fail or maintain
- GPI control inputs for bypass triggering
- Programmable pre-trigger reaction time
- Optional dual power supplies



** Soft mutes only function when embedded audio softswitch is enabled
 ++ Hard mutes only function when delayed sources are selected

Figure 1-1: Standard Delay Unit Block Diagram

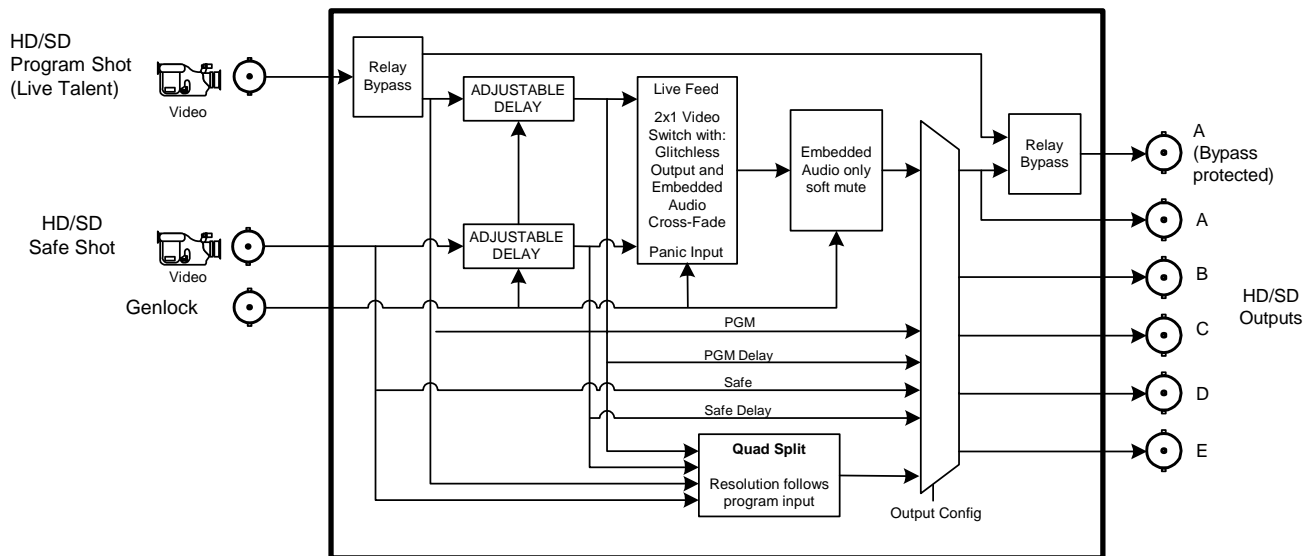


Figure 1-2: Delay Unit with HD40 option (Embedded Audio Mode) Block Diagram



The on-air path routes through a 2x1 video switch that allows you to select between the program chain Input A 'live' video (and audio) and the Input B 'safe' video/audio source in the event that objectionable content is seen or heard. Therefore, the 'on air' output provides the switched output between delayed program and delayed safe video so that alternate video (and audio) can be switched to air after you have seen or heard the objectionable content but before your viewers have.

Program and safe outputs are duplicates of the program and safe inputs, and delayed program/delayed safe are delayed outputs of the respective inputs. A delay program output will always be the same signal as the program input, but delayed by the amount dialled in.

1.1. HOW TO USE THIS MANUAL

This manual is organised into 4 chapters: Overview, Installation, Operation, and Technical Description. This chapter contains a quick summary of the features and a glossary to define concepts and terms used throughout the remainder of the manual.

Chapter 2 provides a detailed description of the rear panel connectors, and how the unit should be connected into your system.

Chapter 3 provides a detailed description of the operation of the front panel controls, starting with an overview of the pushbuttons and front panel indicators.

Chapter 4 provides the specifications, instructions on how to update the firmware in the unit and other technical issues.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important safety related operating and maintenance (Servicing) instructions in the literature accompanying the product.



This symbol is intended to alert the user to important operating instructions.

1.2. GLOSSARY

CCIR-601 (This document now known as ITU-R601). An international standard for component digital television from which was derived SMPTE 125M and EBU 3246-E standards. CCIR-601 defines the sampling systems, matrix values and filter characteristics for Y, B-Y, R-Y and RGB component digital television signals.

SERIAL DIGITAL Digital information that is transmitted in serial form. Often used informally to refer to serial digital television signals.

4Fsc: Four times sub-carrier sampling rate uses in composite digital systems. In NTSC this is 14.3 MHz. In PAL this is 17.7 MHz.

- 4:2:2** A commonly used term for a component digital video format. The details of the format are specified in the CCIR-601 standard. The numerals 4:2:2 denote the ratio of the sampling frequencies of the luminance channel to the two colour difference channels. For every four luminance samples, there are two samples of each colour difference channel.
- SDI** An abbreviation for *serial digital interface*, this acronym is most commonly used to refer to Standard definition serial digital television video signals up to 540 Mb/s.
- HDTV** An abbreviation for *high definition television*, this acronym is most commonly used to refer to High definition serial digital television video signals at 1.485 Gb/s.
- AES:** (Audio Engineering Society): A professional organization that recommends standards for the audio industries.
- AES/EBU:** Informal name for a digital audio standard established jointly by the Audio Engineering Society and the European Broadcasting Union organizations.
- ANALOG:** An adjective describing any signal that varies continuously as opposed to a digital signal that contains discrete levels representing digits 0 and 1.
- A-TO-D CONVERTER (ANALOG-TO-DIGITAL):** A circuit that uses digital sampling to convert an analog signal into a digital representation of that signal.
- BIT:** A binary representation of 0 or 1. One of the quantized levels of a pixel.
- BIT PARALLEL:** Byte-wise transmission of digital video down a multi-conductor cable where each pair of wires carries a single bit. This standard is covered under SMPTE 125M, EBU 3267-E and CCIR 656.
- BIT SERIAL:** Bit-wise transmission of digital video down a single conductor such as coaxial cable. May also be sent through fibre optics. This standard is covered under SMPTE 259M and CCIR 656.
- BIT STREAM:** A continuous series of bits transmitted on a line.
- BYTE:** A complete set of quantized levels containing all the bits. Bytes consisting of 8 to 10 bits per sample are typical in digital video systems.
- CABLE EQUALIZATION:** The process of altering the frequency response of a video amplifier to compensate for high frequency losses in coaxial cable.
- CCIR (International Radio Consultative Committee):** An international standards committee. (This organization is now known as the ITU.)
- CCIR-601:** (This document now known as ITU-R601). An international standard for component digital television from which was derived SMPTE 125M and EBU 3246-E standards. CCIR-601 defines the sampling systems, matrix values and filter characteristics for Y, B-Y, R-Y and RGB component digital television signals.
- CCIR-656:** (This document now known as ITU-R656). The physical parallel and serial interconnect scheme for CCIR-601. CCIR-656 defines the parallel connector pinouts as well as the blanking, sync and multiplexing schemes used in both parallel and serial interfaces. It reflects definitions found in EBU Tech 3267 (for 625 line systems) and SMPTE 125M (parallel 525 line systems) and SMPTE 259M (serial 525 line systems).

CLIFF EFFECT: (also referred to as the 'digital cliff') This is a phenomenon found in digital video systems that describes the sudden deterioration of picture quality due to excessive bit errors, often caused by excessive cable lengths. The digital signal will be perfect even though one of its signal parameters is approaching or passing the specified limits. At a given moment, however, the parameter will reach a point where the data can no longer be interpreted correctly and the picture will become totally unrecognisable.

COMPONENT ANALOG: The non-encoded output of a camera, video tape recorder, etc., consisting of the three primary colour signals: red, green, and blue (RGB) that together convey all necessary picture information. In some component video formats these three components have been translated into a luminance signal and two colour difference signals. For example: Y, B-Y, R-Y.

COMPONENT DIGITAL: A digital representation of a component analog signal set. This is most often Y, B-Y, R-Y. The encoding parameters are specified by CCIR-601. CCIR-656 and SMPTE 125M specify the parallel interface.

COMPOSITE ANALOG: An encoded video signal such as NTSC or PAL video that includes horizontal and vertical synchronizing information.

COMPOSITE DIGITAL: A digitally encoded video signal, such as NTSC or PAL video that includes horizontal and vertical synchronizing information.

D1: A component digital video recording format that uses data which conforms to the CCIR-601 standard. Records on 19 mm magnetic tape (often used incorrectly to refer to component digital video).

D2: A composite digital video recording format that uses data which conforms to SMPTE 244M. Records on 19 mm magnetic tape (often used incorrectly to refer to composite digital video).

D3: A composite digital video recording format that uses data which conforms to SMPTE 244M. Records on 1/2" magnetic tape.

EBU (European Broadcasting Union): An organization of European broadcasters that, among other activities, provides technical recommendations for the 625/50 line television systems.

EBU TECH 3267-E: The EBU recommendation for the parallel interface of 625 line digital video signal. This is a revision of the earlier EBU Tech 3246-E standard that was in turn derived from CCIR-601.

EDH: Error Detection and Handling (EDH) is defined in SMPTE RP-165 as a method of determining when bit errors have occurred along the digital video path. According to RP-165, two error detection checkwords are used, one for active picture samples, and the other on a full field of samples. Three sets of flags are used to convey information regarding detected errors to facilitate identification of faulty equipment or cabling. One set of flags is associated with each checkword, and the third is used to evaluate ancillary data integrity. The checkwords and flags are combined into a special error detection data packet that is included as ancillary data in the serial digital signal.

EMBEDDED AUDIO: Digital audio is multiplexed onto a serial digital video data stream.

ITU: The United Nations regulatory body governing all forms of communications. ITU-R (previously CCIR) regulates the radio frequency spectrum, while ITU-T (previously CCITT) deals with the telecommunications standards.

ITU-R601: See CCIR601

PIXEL: The smallest distinguishable and resolvable area in a video image. A single point on the screen. In digital video, a single sample of the picture. Derived from the words *picture element*.

RESOLUTION: The number of bits (four, eight, ten, etc.) determines the resolution of the signal. Eight bits is the minimum resolution for broadcast television signals.

4 bits = a resolution of 1 in 16.

8 bits = a resolution of 1 in 256.

10 bits = a resolution of 1 in 1024.

SERIAL DIGITAL: Digital information that is transmitted in serial form. Often used informally to refer to serial digital television signals.

SMPTE (Society of Motion Picture and Television Engineers): A professional organization that recommends standards for the film and television industries.

SMPTE 125M: The SMPTE standard for bit parallel digital interface for component video signals. SMPTE 125M defines the parameters required to generate and distribute component video signals on a parallel interface.

SMPTE 244M: The SMPTE standard for bit parallel digital interface for composite video signals. SMPTE 244M defines the parameters required to generate and distribute composite video signals on a parallel interface.

SMPTE 259M: The SMPTE standard for 525 line serial digital component and composite interfaces.

SMPTE 292M: The SMPTE standard for HDTV 1.5 Gb/s serial digital high definition video interfaces.

SMPTE 299M: The SMPTE standard for embedding AES audio into SMPTE 292M serial digital high definition video.

SMPTE 292M: The SMPTE standard for HDTV 1.5 Gb/s serial digital high definition video interfaces.

TRS-ID: Abbreviation for "Timing Reference Signal Identification". A reference signal used to maintain timing in composite digital systems (it is four words long).

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2. INSTALLATION

2.1. REAR PANEL OVERVIEW

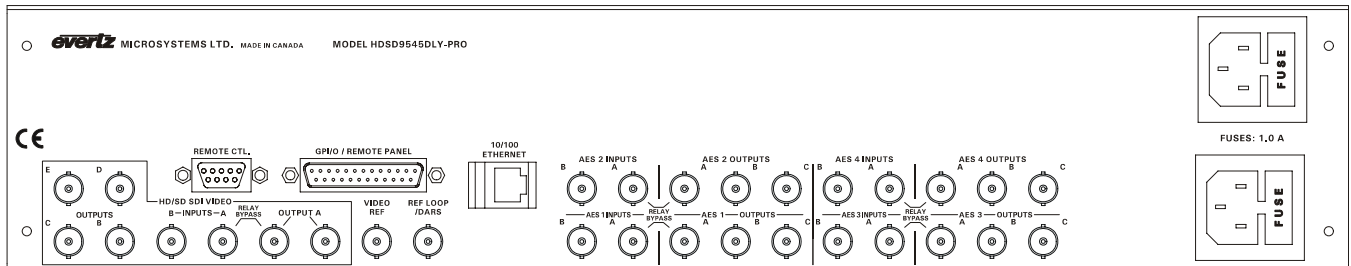


Figure 2-1: Rear Panel Layout

Figure 2-1 shows the rear panel of the HSD9545DLY-PRO unit. Sections 2.1.1 to 2.1.6 describe the specific video, audio, and control signals that should be connected to the HSD9545DLY-PRO unit. Sections 2.2 to 2.7 describe how to connect them into your system.

2.1.1. Digital Video Connections

INPUT A This BNC connector is for connecting the live program signal. The input can accommodate HD or SD serial digital component video signal compatible with the SMPTE 259M-C and SMPTE 292M standards. The *Video Standard* menu item in the *VIDEO CONFIG* menu is used to select the input video standard. This input is protected by a bypass relay to the adjacent **OUTPUT A** BNC. The bypass relay will activate in the event of power loss to the unit and can also be activated from the front panel or a GPI. When the bypass relay is activated, **OUTPUT A** output will be a direct relay connection to the **INPUT A** BNC.

INPUT B This BNC connector is for connecting the safe program signal. The input can accommodate HD or SD serial digital component video signal compatible with the SMPTE 259M-C and SMPTE 292M standards. The *Video Standard* menu item in the *VIDEO CONFIG* menu is used to select the input video standard.

OUTPUT A These output BNC connectors are normally used for the ‘on-air’ program video output and are normally connected to the main broadcast chain of your plant. This output may be configured using the *Video Output A* menu item in the *OUTPUT CONFIG* menu. The output on the left is protected by a bypass relay to the adjacent **INPUT A** BNC. When the bypass relay is activated on power loss the output will be a direct relay connection to the **INPUT A** BNC and the right output will not have any signal present.

OUTPUT B, C, D, E These output BNC connectors are used for other serial digital component video outputs and are configured using the *Video Out B*, *Video Out C*, *Video Out D* and *Video Out E* menu items on the *OUTPUT CONFIG* menu. When the bypass relay is activated on power loss these outputs will normally not have any signal present.

2.1.2. Reference Video Connections

VIDEO REF This BNC input is used for connecting an analog Genlock reference. The genlock signal may be tri-level sync, NTSC, and is selected by using the *Video Reference* menu item in the *VIDEO CONFIG* menu. Jumper J20 inside the unit selects whether the reference input is terminated to 75 ohms (default) or high impedance. (See section 4.2.2.1)

REF LOOP/DARS The reference BNCs are shipped as separate 75 ohm terminated inputs for a Video Reference and Digital Audio Reference Signal. The input BNCs can also be configured as a high impedance loop for a video reference by removing the top cover of the unit and changing three jumpers. At the time of writing, use of the DARS reference input is not implemented.

2.1.3. AES AUDIO Connections

There are four identical sets of AES inputs and outputs for the 4 pairs of AES audio associated with the video connected to the **INPUT A** and **INPUT B** BNCs.

AES 1, AES 2, AES 3, AES 4 INPUT A These 4 input BNC connectors typically provide inputs for the 4 AES pairs of program audio associated with the video connected to the **INPUT A** video input. These inputs are protected by bypass relays to the **AES OUTPUT A** BNCs. The bypass relays will activate in the event of power loss to the unit and can also be activated from the front panel or a GPI.

AES 1, AES 2, AES 3, AES 4 INPUT B These 4 input BNC connectors typically provide inputs for the 4 AES pairs of safe audio associated with the video connected to the **INPUT B** video input.

AES 1, AES 2, AES 3, AES 4 OUTPUT A These 4 BNC connectors provide outputs for the 4 AES pairs of 'on-air' program audio and are normally connected to the main broadcast chain of your plant. They may also be configured using the *AES Out A* menu item on the *OUTPUT CONFIG* menu. These outputs are protected by bypass relays to the four **AES INPUT A** input BNCs. When the bypass relay is activated on power loss, from the front panel, or from a GPI, the four **AES OUTPUT A** outputs will be a direct relay connection to the four **AES INPUT A** inputs.

AES 1, AES 2, AES 3, AES 4 OUTPUT B, C These two groups of 4 BNC connectors provide alternate outputs for 4 AES pairs of audio and are configured using the *AES Out B* and *AES Out C* menu items on the *OUTPUT CONFIG* menu. When the bypass relay is activated on power loss the **AES OUTPUT B** and **C** BNCs will not normally have any signal present.

2.1.4. Ethernet Network Connections

ETHERNET This RJ-45 connector is an Ethernet port used for high speed FTP firmware upgrades. See section 2.6 for information on connecting to an Ethernet network. See section 4.3.1 for information on upgrading firmware using FTP.

2.1.5. Serial I/O and GPI/O Connections

REMOTE CTL This 9 pin female D connector provides an RS-232 serial interface used for updating the firmware. This port is wired at the factory as an RS232 DCE port as shown in Table 2-1.

	Pin #	Name	Description
	1	GND	Chassis ground
	2	TxD	RS-232 Transmit Output
	3	RxD	RS-232 Receive Input
	4		
	5	Sig Gnd	RS-232 Signal Ground
	6		
	7	RTS	RS-232 RTS Input
	8	CTS	RS-232 CTS Output
	9		

Table 2-1: Remote CTL Port Pin Definitions

GPI/O This female DB-25 pin connector provides 8 General Purpose Opto-isolated inputs (GPIs) and 4 General Purpose isolated relay outputs (GPOs). **Vint** provides +5Volts from the unit and **Vext** is used to provide external power to the opto-isolators. Typically **Vint** and **Vext** are connected together so that the isolators may be powered from the unit. Table 2-2 shows the pin definitions of the GPIO connector. Figure 2-2 shows a schematic of the GPIO circuitry. See section 2.7 for more information on connecting the General Purpose inputs and outputs. The GPIs are used as additional triggers to initiate a transition such as a video and/or audio switch. The GPOs are used to trigger external devices and a transition tally capability. The GPI and GPO functions can be programmed using the *TRANSITION* menu. See section 3.8.

Pin #	Name	Description
1	GPI 01	General Purpose Input 01
2	GPI 02	General Purpose Input 02
3	GPI 03	General Purpose Input 03
4	GPI 04	General Purpose Input 04
5	GPI 05	General Purpose Input 05
6	GPI 06	General Purpose Input 06
7	Tx+	RS-422 Tx+(b) Output
8	Tx-	RS-422 Tx-(a) Output
9	GND	Serial I/O Ground
10	Rx+	RS-422 Rx+(b) Input
11	Rx-	RS-422 Rx-(a) Input
12	SELECT	RS-422/232 Select (Gnd for RS232)
13	GPI 07	General Purpose Input 07
14	GPI 08	General Purpose Input 08
15	Vext	External voltage input to power opto isolators
16	Vint	Protected +5 volts output from unit
17	GPO 01 NC	General Purpose Output 01 Normally closed contact
18	GPO 01 C	General Purpose Output 01 Common contact
19	GPO 02 NC	General Purpose Output 02 Normally closed contact
20	GPO 02 C	General Purpose Output 02 Common contact
21	GPO 03 NC	General Purpose Output 03 Normally closed contact
22	GPO 03 C	General Purpose Output 03 Common contact
23	GPO 04 NC	General Purpose Output 04 Normally closed contact
24	GPO 04 C	General Purpose Output 04 Common contact
25	GND	Unit Chassis ground

Table 2-2: GPI/O Port Pin Definitions

2.1.6. Power Connections

The main unit has one or two universal voltage power supplies that operate on 100 to 240 Volts 50/60 Hz AC.

2.2. MOUNTING

The HDSD9545DLY-PRO is equipped with rack mounting angles and fits into a standard 19 inches by 3.5 inches (483 mm x 89 mm) rack space. The mounting angles may be removed if rack mounting is not desired.

2.3. POWER REQUIREMENTS

Power requirements are 100 to 240 volts AC at 50 or 60 Hz. The HDSD9545DLY-PRO has universal power supplies that automatically sense the input voltage. Power should be applied by connecting a 3-wire grounding type power supply cord to the power entry module on the rear panel. The power cord should be minimum 18 AWG wire size; type SVT marked VW-1, maximum 2.5 m in length. If the units are fitted with the redundant power supply there will be an additional IEC-320 connector on the rear panel. The power entry module combines a standard power inlet connector, two 5 x 20 mm fuse holders and an EMI line filter.



CAUTION - To reduce the risk of electric shock, grounding of the center pin of the mains plug must be maintained

2.4. CONNECTING THE VIDEO

2.4.1. Video Inputs

The program video source should be connected to the **INPUT A** BNC. The HDSD9545DLY-PRO supports standard definition and high definition digital video in the formats shown in Table 2-3. The video standard must be set manually to match the incoming video type using the *Video Standard* menu item in the *VIDEO* menu (see section 3.10.1).

Common Name	Pixels / Active Lines	Frame Rate	Progressive /Interlace	SMPTE Standard	Valid Genlock Types
525i/59.94	720 x 486	29.97 (30/1.001)	I	SMPTE 125M	NTSC
625i/50	720 x 576	25	I	EBU TECH 3267-E	PAL
1080i/59.94	1920 x 1080	29.97 (30/1.001)	I	274M	1080i/59.94 NTSC
1080i/50	1920 x 1080	25	I	274M	1080i/50 PAL
720p/59.94	1280 x 720	59.94 (60/1.001)	P	296M	1080i/59.94 720p/59.94

Table 2-3: Video Input Formats

2.4.2. Video Outputs

The video output from the five serial digital video outputs is configured at the factory to meet the most common use of the HDSD9545DLY-PRO, however these outputs can be configured using the *OUTPUT CONFIG* MENU items. In addition to the default signals provided at the outputs, both the delayed and non-delayed inputs to the HDSD9545DLY-PRO are also available.

The **OUTPUT A** BNCs normally contain the ‘on-air’ program video output and are normally connected to the main broadcast chain of your plant. The leftmost **OUTPUT A** BNC output is protected by a bypass relay that is activated on power loss, from the front panel or from a GPI. When the relay is active, the left **OUTPUT A** BNC is directly connected to the **INPUT A** BNC.

The default signal for **OUTPUT B** is the Delayed Program video. The default signal for **OUTPUT C** is the Delayed Safe video. The default signal for **OUTPUT D** and **OUTPUT E** is the quad split output showing the two video inputs and their delayed feeds.

2.4.3. Video Timing Reference

For proper timing of the video and audio signals an analog video genlock reference must be supplied. Connect a composite analog NTSC colour black video signal to the **VIDEO REF** connector. Make sure that the signal type is correct for the video standard in use. (See Table 2-3) The Video reference type is set using the *Video Reference* menu item on the *VIDEO* menu. (See section 3.10.2)

2.5. CONNECTING THE AUDIO

The HDSD9545DLY-PRO is capable of working with either embedded or discrete AES audio. The *AUDIO* menu is used to configure various items related to the audio.

2.5.1. Connecting Program ('Live') Audio

If you are using discrete AES program audio, connect up to 4 pairs of AES audio that is associated with the program video input (connected to the **INPUT A BNC**) to the **AES 1 A**, **AES 2 A**, **AES 3 A** and **AES 4 A** audio inputs. If you are using embedded program audio then you do not need to connect any program audio to the AES inputs.

2.5.2. Connecting Backup ('Safe') Audio

If you are using discrete AES program audio, connect up to 4 pairs of AES audio that is associated with the program video input (connected to the **INPUT B BNC**) to the **AES 1 B**, **AES 2 B**, **AES 3 B** and **AES 4 B** audio inputs. If you are using embedded backup audio then you do not need to connect any program audio to the AES inputs.

2.5.3. Connecting the Audio Outputs

The four **AES A OUTPUT** connectors normally contain the audio outputs from the program audio (live audio) buss and should be connected to the main broadcast chain of your plant. These outputs are protected by bypass relays that are activated on power loss or from the front panel. When the relays are active, the **AES A** outputs are directly connected to the four **AES A** inputs.

The four **AES B OUTPUT** connectors normally contain the live (undelayed) program audio. The four **AES C OUTPUT** connectors normally contain the live (undelayed) safe audio. These outputs each provide alternate outputs for 4 AES pairs of audio and are configured using the *AES Out B* and *AES Out C* menu items on the *OUTPUT CONFIG* menu. When the bypass relays are active, **AES B** and **AES C** outputs will not have any audio on them.

2.6. CONNECTING TO AN ETHERNET NETWORK

The HDSD9545DLY-PRO is designed to be used with either 10Base-T (10 Mbps) or 100Base-TX (100 Mbps), also known as *Fast Ethernet*, twisted pair Ethernet cabling systems. When connecting for 10Base-T systems, category 3, 4, or 5 UTP cable as well as EIA/TIA – 568 100Ω STP cable may be used. When connecting for 100Base-TX systems, category 5 UTP cable is required. The cable must be “straight through” with a RJ-45 connector at each end. Make the network connection by plugging one end of the cable into the RJ-45 receptacle of the HDSD9545DLY-PRO and the other end into a port of the supporting hub.

The straight-through RJ-45 cable can be purchased or can be constructed using the pin out information in Table 2-4. A colour code wiring table is provided in Table 2-4 for the current RJ 45 standards (AT&T 258A or EIA/TIA 258B colour coding shown). Also refer to the notes following the table for additional wiring guide information.

Pin #	Signal	EIA/TIA 568A	AT&T 258A or EIA/TIA 568B	10BaseT or 100BaseT
1	Transmit +	White/Green	White/Orange	X
2	Transmit –	Green/White or White	Orange/White or Orange	X
3	Receive +	White/Orange	White/Green	X
4	N/A	Blue/White or Blue	Blue/White or Blue	Not used (required)
5	N/A	White/Blue	White/Blue	Not used (required)
6	Receive –	Orange/White or Orange	Green/White or Green	X
7	N/A	White/Brown	White/Brown	Not used (required)
8	N/A	Brown/White or Brown	Brown/White or Brown	Not used (required)

Table 2-4. Standard RJ45 Wiring Color Codes

Note the following cabling information for this wiring guide:

- Only two pairs of wires are used in the 8-pin RJ 45 connector to carry Ethernet signals.
- Even though pins 4, 5, 7 and 8 are not used, it is mandatory that they be present in the cable.
- 10BaseT and 100BaseT use the same pins, a crossover cable made for one will also work with the other.
- Pairs may be solid colours and not have a stripe.
- Category 5 cable must use Category 5 rated connectors.

The maximum cable run between the HDSD9545DLY-PRO and the supporting hub is 300 ft (90 m). The maximum combined cable run between any two end points (i.e. HDSD9545DLY-PRO and PC/laptop via network hub) is 675 feet (205 m).

Devices on the Ethernet network continually monitor the receive data path for activity as a means of checking that the link is working correctly. When the network is idle, the devices also send a link test signal to one another to verify link integrity. The rear panel is fitted with two LEDs to monitor the Ethernet connection.

10/100

This Amber LED is ON when a 100Base-TX link is last detected. The LED is OFF when a 10Base-T link is last detected (the LINK LED is ON). Upon power-up the LED is OFF as the last detected rate is not known and therefore defaults to the 10Base-T state until rate detection is completed.

LN/ACT

This dual purpose Green LED indicates that the HDSD9545DLY-PRO has established a valid linkage to its hub, and whether the HDSD9545DLY-PRO is sending or receiving data. This LED will be ON when the HDSD9545DLY-PRO has established a good link to its supporting hub. This gives you a good indication that the segment is wired correctly. The LED will BLINK when the HDSD9545DLY-PRO is sending or receiving data. The LED will be OFF if there is no valid connection.

2.7. CONNECTING THE GENERAL PURPOSE INPUTS AND OUTPUTS

The 25 pin GPI/O connector has 8 programmable general purpose inputs (GPI) and 4 programmable general purpose outputs (GPO) as shown in Table 2-2. The schematic representation is in Figure 2-2. The GPIs are opto-isolated inputs that can be powered from an external source or from the frame. The GPOs are relay contacts that are normally closed when the power to the HDSD9545DLY-PRO is off.

2.7.1. Connecting the General Purpose Inputs

The GPI's are used as additional triggers to initiate a transition, such as a video and/or audio switch. They can be programmed using the *TRANSITION* menu.

The GPI inputs are active low, which means a ground level on the input will trigger the GPI function when the Opto isolator is normally powered. See Figure 2-2 and Figure 2-3

The user can connect GP+5V supplied from the frame (Vint pin) into the Vext pin to provide power to the GPIO opto-isolator circuitry. In this configuration the user can activate GPIs simply by connecting the GPI input pins to Ground (see Figure 2-3). This can be done with a button, switch, relay or an open collector transistor.



Warning: Do not connect GP+5V from one unit to another unit's GP+5V.

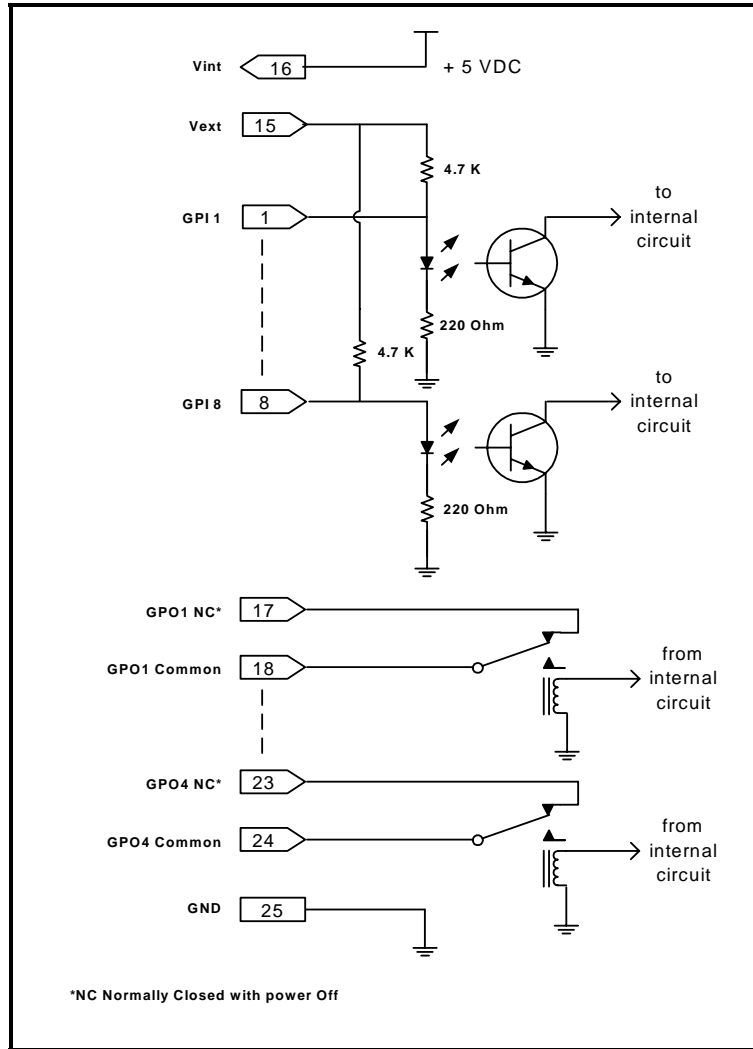


Figure 2-2: General Purpose I/O Schematic

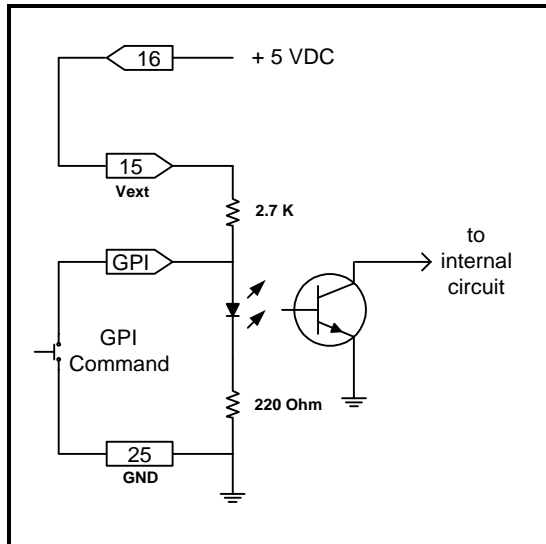


Figure 2-3: Powering the General Purpose Input Opto-Isolators from the HDSD9545DLY-PRO

Alternately, an external voltage source may be applied as shown in Figure 2-4. The Vext voltage must be greater than the voltage supplied to the GPI by at least 5v.

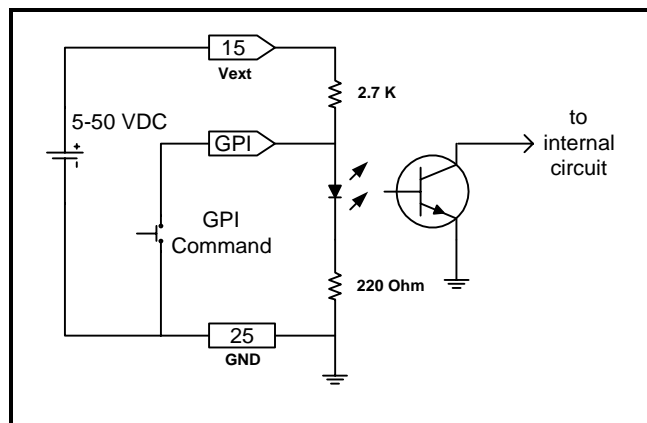


Figure 2-4: Powering the General Purpose Input Opto-Isolators from an External Power Supply

2.7.2. Connecting the General Purpose Outputs

The Programmable GPOs are used to trigger external devices and a transition tally capability. The GPOs will be in the de-energized state when the power is off so all contacts will be closed. When the unit is powered up the GPO Relay contacts will open. A transition tally will cause a contact closure. The 4 contact sets are assigned to particular transition tallies using the *TRANSITION* menus. (See section 3.8)

CHAPTER 3: OPERATION

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3. OPERATION

The Evertz HDSD9545DLY-PRO Profanity Protection device is designed to give an operator complete control over live program content being broadcast to air eliminating the risk that certain actions, on the part of an artist or an intruder, might be offensive to certain viewers.

There are two program paths that are HD and SD compatible. The main program feed will usually be focused on the main detailed live action. The secondary back-up path will generally offer a wide angle shot, or some suitable alternative picture to the main content. Both channels are delayed by a set amount of time. If an unscheduled, offensive event occurs, the operator has only to hit one button to cause the program video and audio output to be clean switched to the alternative back-up channel. When the offensive material is no longer present, the output can be returned to the main detailed image, without the audience noticing that an edit has occurred.

The HDSD9545DLY-PRO electronics is housed in a 2RU rack mount frame and is controlled from the built-in front panel controls. All units can also be controlled by contact closures on the GPI/O control port.

3.1. OVERVIEW OF THE FRONT PANEL DISPLAY AND CONTROLS

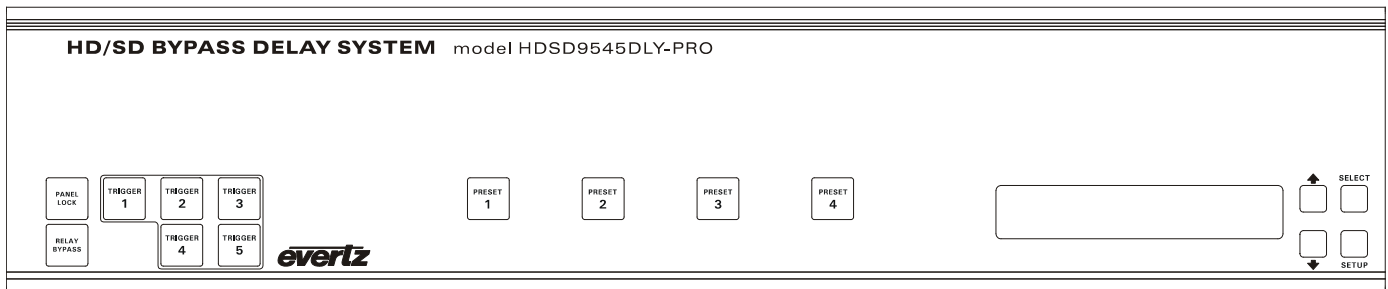


Figure 3-1: Front Panel Layout

3.1.1. Trigger Key Group

Trigger 1 to 5 These five buttons allow the user to perform a pre-selected process (e.g. switch the video and audio to the 'safe' feed, switch the video only to the 'safe' feed, mute the audio, etc.) The button caps can be removed to allow the user to provide his own legends for the buttons. The functions of the buttons can be programmed using the *TRANSITION* menu items. By default, trigger button 1 causes a timed video and AES audio switch from Program to Safe. The other trigger buttons do not have a default setting.

PANEL LOCK This button locks out the use of the control panel.



The HDSD9545DLY-PRO may still be controlled from the GPI inputs when the front panel is Locked.

RELAY BYPASS This button activates the audio bypass relays and the video bypass mode specified in the *VIDEO* menu.

3.1.2. Preset Key Group

Preset 1 to 4 These four buttons allow the user to quickly change the configuration of the HDSD9545DLY-PRO. There are 10 user presets that can be stored in the non-volatile memory. Pressing button 1 to 4 will recall user presets 1 to 4. The remaining presets can only be recalled using the *Recall Preset* menu. The button caps can be removed to allow the user to provide his own legends for the buttons.

3.1.3. Setup Key Group

SETUP This button is used to enter the *Setup* menu that is used to control various setup options to configure the operating modes of the HDSD9545DLY-PRO. (See sections 3.3 to 3.13 for a complete description of the *Setup* menu.) When you are in the *Setup* menu, this button is also used to back out of menu selections to the next higher menu level or to exit the *Setup* menu completely.

SELECT This button is used to choose a sub-menu and navigate to the next level down in the menu structure. It is also used to make a menu choice.

↑ & ↓ The arrow keys are used to navigate through various menu choices at a menu level in the *Setup* menu.

3.1.4. Front Panel Display Messages

In addition to the normal operating mode displays that show the names of the inputs that have been selected, the HDSD9545DLY-PRO shows some diagnostic messages to help the user diagnose possible system problems.

The front panel will automatically display the following messages describing the following video and audio settings:

V: XXXX A: XXXX Displays the current video and audio source on the on-air path (either Pgm or Safe)

INPUT-A FAULT Indicates that video input A does not have a proper signal.

GENLOCK FAULT Indicates that a *Video Reference* signal specified in the *VIDEO CONFIG* menu is not present at the Video Ref input BNC.

3.2. OVERVIEW OF OPERATION

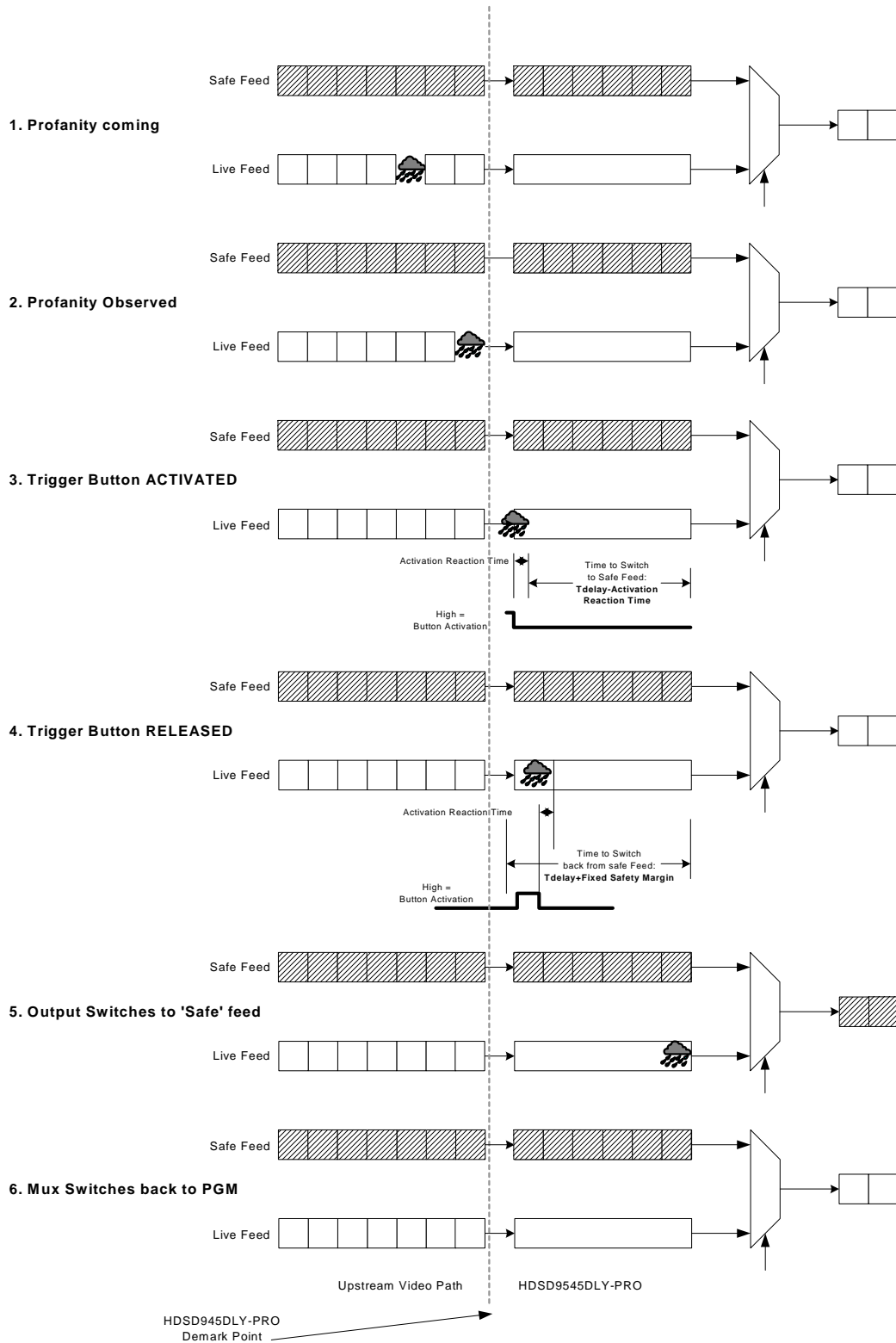


Figure 3-2: Operational Overview

Figure 3-2 summarizes the basic operation of the HDSD9545DLY-PRO. The device is configured with active ‘live’ feed as the main input and an alternate ‘safe’ wide angle camera as the backup input. Both video feeds and their associated audio is delayed by a predetermined amount of time to allow for operator observation and reaction to any undesirable profane material.

During one of the acts, the operator observes profane material on the live video feed. The operator determined that the profanity occurred only in the picture contend and that the program audio should be preserved. The operator activates a Trigger Button that has been configured to initiate the Transition that will switch the video to the alternate feed while maintaining the audio. As long as the button is pressed the Transition will be active. After the pre-determined delay, the unit will switch the video to the alternate ‘safe’ feed while maintaining the main program audio. The reaction time of the operator is subtracted from the program delay time, so that the switch occurs at the end of the delay.

When the operator observes that the profane material has passed, he will release the Trigger A button, causing the video output to switch back to the ‘live’ feed again after the program delay time.

Each of the five Trigger buttons and 8 GPIs can be configured to perform different processes, allowing for a tremendous flexibility in responding to varying types of profanity.

3.3. FRONT PANEL SETUP MENU

The *Setup* menu system uses the 16 digit alphanumeric display and provides a quick, intuitive method of configuring the unit. The *Setup* Menu contains items that pertain to the overall operation of the HDSD9545DLY-PRO and normally only require setting up at installation time.

OUTPUT — Video Output A — Video Output B — Video Output C — Video Output D — Video Output E — AES Output A — AES Output B — AES Output C	OSD — Enable/Disable	TRANSITION — GPI Config — GPI 1 — ... — GPI 8 — GPO 1 — ... — GPO 4 — Trigger Button 1 — ... — Trigger Button 5	TIMING — Reaction Time — React. Time BYP — Merge Time — Pgm Delay — Safe Delay — Pgm AES Offset — Safe AES Offset
VIDEO — Video Standard — Video Reference — Output H Phase — Output V Phase — Bypass Mode — Safe Mode — Pgm Blur Factor — Safe Blur Factor	AUDIO — AES 1 SS — AES 2 SS — AES 3 SS — AES 4 SS — Embed Audio SS	PRESET — Recall Preset — Store Preset	FIRMWARE — Firmware Version — Maximum Delay — Reboot Now

Figure 3-3: Overview of the Setup Menu

3.4. NAVIGATING THE SETUP MENU

To enter the on-screen menu system, press the **SETUP** key. This will bring you to the main *Setup* menu where you can use the **↑ & ↓** keys to move up and down the list of available sub-menus. Top level menu items are displayed on the front panel in UPPERCASE (and are shown in this manual in *UPPERCASE ITALICS*.) Once you have chosen the desired sub-menu, press the **SELECT** key to select the next menu level.

Once in a sub-menu, there may be another menu layer that will be displayed in Title Case (and shown in this manual as *Title Case Italics*). If there is another set of menu choices, (indicated by the -> symbol) use the **↑ & ↓** keys to select the desired menu item and press the **SELECT** key. Continue this process until you get to the bottom of the menu tree where the list of parameters to be adjusted is displayed in lower case (and shown in this manual as *lower case italics*).

To adjust any parameter, use the **↑ & ↓** keys to move up or down to the desired parameter. To view the possible values for that item, press the **SELECT** key. The current value for that parameter will be shown with an asterisk (*) on the left. Pressing the **↑ & ↓** keys enables the user to show the possible values for the selected menu item. The various menu values that are not currently selected will NOT display the asterisk. When you have stopped at the desired value, press the **SELECT** key to save your selection. The asterisk will be shown to the left of the parameter value indicating that it is the current value. To move up one level in the menu press the **SETUP** key.

You can select other parameters from that sub-menu by using the **↑ & ↓** keys, followed by the **SELECT** key. Alternatively, you can move up one menu item by pressing the **SETUP** key.

When you have made all the desired changes, press the **SETUP** key one or more times until you exit the *Setup* menu.

Each of the menu items, with function explanations, are described in the following sections.

3.5. SETUP MENU – TOP LEVEL MENU

The *Setup* menu is arranged in a layered structure that groups similar configuration items together. The following section provides a brief description of the first level of menus that appear when you enter the menu. Selecting one of these items will take you to the next menu level. Sections 3.6 to 3.13 provide detailed descriptions of each of the sub-menus. The tables in sections 3.6 to 3.13 are arranged in an indented structure to indicate the path taken to reach the control. Menu items or parameters that are underlined indicate the factory default values.

<i>OUTPUT</i>	This menu is used to configure the video and audio outputs.
<i>OSD</i>	This menu is used to configure the on screen displays.
<i>TRANSITION</i>	This menu is used to configure the transitions that are initiated by the Trigger buttons and GPI inputs.
<i>TIMING</i>	This menu is used to configure the delays for the program feeds, and to set the reaction time for the operator.
<i>VIDEO</i>	This menu is used to configure the video standard, reference type and output timing.
<i>AUDIO</i>	This menu is used to configure the audio reference type and the audio SoftSwitch™ functions.
<i>PRESET</i>	This menu is used to save and recall user presets, and to restore the unit to its factory default condition.
<i>FIRMWARE</i>	This menu is used to view the current firmware version and to upload new firmware into the unit.

3.6. CONFIGURING THE VIDEO AND AUDIO OUTPUTS

The *OUTPUT* menu items are used to configure the video and audio outputs. The chart below shows the items available in the *OUTPUT* menu. Sections 3.6.1 to 3.6.2 provide detailed information about each of the sub-menus.

<i>Video Output A</i>	Configures what video will be present on the Video A output.
<i>Video Output B</i>	Configures what video will be present on the Video B output.
<i>Video Output C</i>	Configures what video will be present on the Video C output.
<i>Video Output D</i>	Configures what video will be present on the Video D output.
<i>Video Output E</i>	Configures what video will be present on the Video E output.
<i>AES Output A</i>	Configures what audio will be present on the AES A outputs.
<i>AES Output B</i>	Configures what audio will be present on the AES B outputs.
<i>AES Output C</i>	Configures what audio will be present on the AES C outputs.

3.6.1. Configuring the Video Outputs

There are three identical menu items used to select the function of the Video A, Video B, Video C, Video D and Video E outputs. Configuring the outputs for each of the buses is done in the same manner, but for simplicity, only the *Video A* menu will be shown in the manual.

OUTPUT
<i>Video A</i>
<i>Vid A:pgm</i>
<i>Vid A:safe</i>
<i>Vid A:dly pgm</i>
<i>Vid A:dly safe</i>
<i>Vid A:on air</i>
<i>Vid A:quad split</i>

This menu item configures the Video Outputs.

- The program input (A) video is being output on the VID A output
- The safe input (B) video is being output on the VID A output
- The delayed program input (A) video is being output on the VID A output
- The delayed safe input (B) video is being output on the VID A output
- The on air program video is being output on the VID A output
- The quad split is being output on the VID A output

The default signal for **OUTPUT A** is the On air (on air) video. The default signal for **OUTPUT B** is the Delayed Program (*dly pgm*) video. The default signal for **OUTPUT C** is the Delayed Safe (*dly pgm*) video. The default signal for **OUTPUT D** and **OUTPUT E** is the quad split (*quad split*) output showing the two video inputs and their delayed feeds.

3.6.2. Configuring the Audio Outputs

There are three identical menu items used to select the function of the AES A, AES B and AES C outputs. Configuring the outputs for each of the buses is done in the same manner, but for simplicity only the *AES A* menu will be shown in the manual.

OUTPUT
<i>AES A</i>
<i>AES A:pgm</i>
<i>AES A:safe</i>
<i>AES A:dly pgm</i>
<i>AES A:dly safe</i>
<i>AES A: on air</i>

This menu item configures the Audio Outputs.

- The program input (A) AES audio is being output on the AES A output
- The safe input (B) AES audio is being output on the AES A output
- The delayed pgm input (A) AES audio is being output on the AES A output
- The delayed safe input (B) AES audio is being output on the AES A output
- The on air input AES audio is being output on the AES A output

The default signal for **AES A** is the On air (on air) AES. The default signal for **AES B** is the Delayed Program (*dly pgm*) AES. The default signal for **AES C** is the Delayed Safe (*dly pgm*) AES.

3.7. CONFIGURING THE ON SCREEN DISPLAY

The *OSD* menu items are used to configure the on screen displays. The chart below shows the items available in the *OSD* menu. Section 3.10.1 provides detailed information about the sub-menu.

<i>Enable/Dis.</i>

Enables or disables the on screen displays

3.7.1. Enabling the On Screen Displays

OSD
OSD Enable/Dis.
OSD:Enable
OSD:Disable

This menu item determines whether the On Screen status displays will be on or off.

3.8. CONFIGURING THE TRANSITION ACTIONS

The *TRANSITION* menu items are used to configure how the video and audio will transition in the event of identified profanity. The five **TRIGGER** buttons and the eight general purpose inputs can each be used to trigger one or more video or audio transitions. In addition, the four general purpose outputs can be configured to activate on any combination of transitions and, as such will act as tallies to other equipment. The chart below shows the different kinds of triggers/tallies available.

Gpi Config
Gpi #
Gpo #
Trigger Button #

Configures whether the GPIs will be active high or active low.

Gpi's 1-8 can be used to trigger transitions.

Gpo's 1-4 act as tallies that will be activated when a transition occurs.

Trigger Buttons 1-5 can be used to trigger transitions.

3.8.1. Setting the Active State of the GPI Inputs

TRANSITION
Gpi Config
Gpi: active low
Gpi: active high

This control selects whether the GPI inputs will be active high or active low. The functions of the GPI inputs are set using the *Gpi #* menu items on the *TRANSITION* menu.

3.8.2. Setting the Functions of the GPI Input, GPO Outputs and Trigger Buttons

In order to configure a GPI, GPO or Trigger Button, use the \uparrow & \downarrow keys to move up and down the list of available triggers/tallies and press the **SELECT** key to configure a specific one.

You are now presented with a list of the possible transitions to associate with a trigger/tally. Use the \uparrow & \downarrow keys to move up and down the list of available transitions. Press the **SELECT** key to select a transition for the trigger/tally. An asterisk (*) will appear to the left of the transition name when it is active for this trigger/tally. You can select as many transitions for each trigger/tally as you wish. When you are finished selecting transitions to be assigned to the trigger/tally, press the **SETUP** key. You will return to the list of triggers/tallies where you can repeat the process to configure other ones. Figure 3-4 shows an example of one transition being activated by the **TRIGGER 1** button, and another transition being activated by GPI 1.

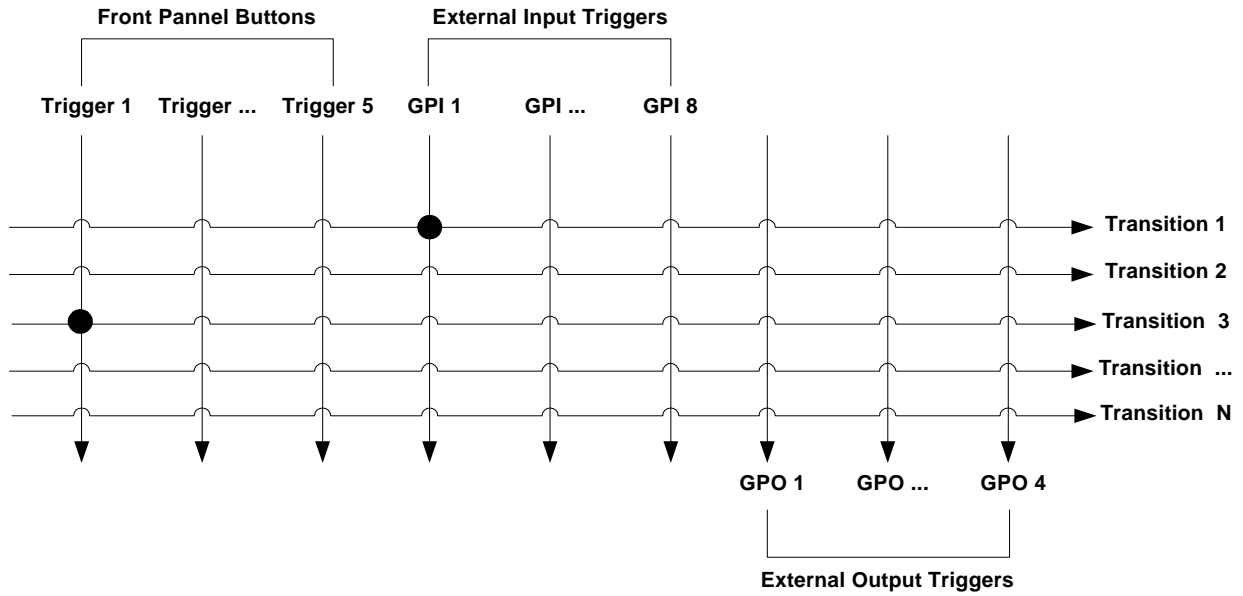


Figure 3-4: Transition Activation Example



**Soft mutes only function when embedded audio SoftSwitch™ is enabled.
Hard mutes only function when the delayed sources are selected.**

TRANSITION
Gpi 1
Clear All
tot video switch
act video switch
blank vid sw
hblank vid sw
pgm blur
safe blur
aes-# switch
emb smute g##
aes-# smute
aes-a# hmute
aes-b# hmute
aes-c# hmute
t tot video sw
t act video sw
t blank vid sw
t hblank vid sw
t pgm blur
t safe blur
t aes-# switch
t e smute g##
t aes-# smute
t aes-a# hmute
t aes-b# hmute
t aes-c# hmute
video bypass
audio bypass
safe capture

A list of the possible transitions is shown below.

Clear all transitions for this trigger or tally

Immediately switches the 'on air' video (including embedded audio and ancillary data) from the Program to the Safe video.

Immediately switches the 'on air' active video (excluding embedded audio and ancillary data) from the Program to the Safe video.

Transitions both the h blanking and v blanking between the program feed and safe feed.

Transitions only the h blanking (embedded audio) between the program feed and safe feed.

Immediately blurs the program delayed video by the amount set by the *Pgm Blur Factor* menu item.

Immediately blurs the safe delayed video by the amount set by the *Safe Blur Factor* menu item.

Immediately switches the 'on air' audio from the Program AES to the Safe AES audio.

Immediately fades the embedded audio to silence. Select the group and channel to be muted.

Immediately fades the 'on air' AES audio to silence. Select the pair to be muted.

Immediately mutes the audio on the AES A outputs. Select the pair to be muted.

Immediately mutes the audio on the AES B outputs. Select the pair to be muted.

Immediately mutes the audio on the AES C outputs. Select the pair to be muted.

The Timed Transitions perform the same functions as the Immediate Transitions above but are delayed by the amount of the *Program Delay* minus the *Reaction Time*.

Immediately activates the video bypass mode selected by the *Bypass mode* menu item.

Immediately activates the audio bypass relays.

Captures video to be used by the Safe Input when the Frame, or Loop mode is enabled. The length of the capture buffer is equal to the length set for the safe delay.

Operation:

Safe Mode = Repeat Frame: When active, causes live safe video to be routed directly to the safe delayed input. When inactive, the safe delayed input freezes on the last frame.

Safe Mode = Cont. Loop: A momentary activation causes the buffer to begin recording until it is full.

Safe Mode = Loop on Switch: (Same as Cont. Loop)

3.9. CONFIGURING THE TRANSITION TIMING

<i>Reaction Time</i>	Sets the operator reaction time.
<i>React. Time BYP</i>	Sets whether or not reaction time will be bypassed.
<i>Merge Time</i>	Sets the merge time.
<i>Pgm Delay</i>	Sets the amount of delay for the Program video.
<i>Safe Delay</i>	Sets the amount of delay for the Safe video.
<i>Pgm AES Offset</i>	Sets the difference in delay between the program video and the discrete program audio.
<i>Safe AES Offset</i>	Sets the difference in delay between the safe video and the discrete safe audio.

3.9.1. Setting the Operator Reaction Time

TIMING	This control sets the time that it takes an operator to see or hear the profanity and activate the appropriate trigger button or GPI. The delay is shown in video frames and seconds.
<i>Reaction Time</i>	
<i>Rt= xxf:y.yys</i> <i>0 to prg dly-1frame</i> <u><i>1sec</i></u>	

3.9.2. Setting the Reaction Time Bypass

TIMING	When React. Time BYP is set to <i>on</i> , reaction time will be bypassed while switching from safe to program (as requested below). When React. Time BYP is set to <i>off</i> , reaction time will be used while switching from safe to program.
<i>React. Time BYP</i>	
<i>ON</i> <u><i>OFF</i></u>	



NOTE: that reaction time will always be used when switching from program to safe.

3.9.3. Setting the Merge Time

TIMING	This control sets the Merge Time. If the operator sees that the profanity is continuing and reactivates the appropriate trigger button or GPI within the time set by this control, the two button events will be merged and the output of the HDSD9545DLY-PRO will not change back to the Program input but remain on the Safe input. The merge time is shown in video frames and seconds.
<i>Merge Time</i>	
<i>Mt= xxf:y.yys</i> <i>0 to prg dly</i> <u><i>1 sec</i></u>	

3.9.4. Setting the Video Delay Time

The total amount of delay memory (24 seconds on standard units, 40 seconds with HD40 option) in HDSD9545DLY-PRO is divided between the *Program Delay* and the *Safe Delay*, so the setting of one delay determines the maximum value of the other. Typically the delay is set so that the program video and safe video are both delayed by 12 seconds maximum.



The *Program Delay* and *Safe Delay* parameters are REAL TIME ADJUSTMENTS and will affect the output video timing immediately. These settings should not be adjusted when the output video is in the broadcast chain.

3.9.4.1. Setting the Program Video Delay Time

TIMING
<i>Program Delay</i>
Pd= xxf:y.yys
<u>4 sec</u>

This menu item sets the amount of delay that is applied to the program video. This time also determines when the timed transitions will occur. The program audio delay is normally equal to the *Program Delay* but can be offset using the *Program Offset* menu item. The delay is shown in video frames and seconds.

3.9.4.2. Setting the Safe Video Delay Time

TIMING
<i>Safe Delay</i>
Sd= xxf:y.yys
<u>4 sec</u>

This menu item sets the amount of delay that is applied to the safe video. The safe audio delay is normally equal to the *Safe Delay* but can be offset using the *Safe Offset* menu item. The delay is shown in video frames and seconds. The total memory in the unit less the amount of memory taken for the *Program Delay* determines the maximum *Safe Delay* value.

3.9.5. Setting the Program Audio Delay Time

TIMING
<i>Program AES Offset</i>
Pofs= (zzzzms)
-2000 to +2000ms
<u>0ms</u>

The program discrete audio delay is normally equal to the *Program Delay*. If it is necessary to retime the audio to achieve lip sync, the program audio delay time can be offset using the *Program Offset* menu item. To set the audio delay less than the video delay, set the Offset to a negative number (shown in milliseconds).

3.9.6. Setting the Safe Audio Delay Time

TIMING
<i>Safe AES Offset</i>
Sofs= (zzzzms)
-2000 to +2000ms
<u>0ms</u>

The safe discrete audio delay is normally equal to the *Safe Delay*. If it is necessary to retime the audio to achieve lip sync, the safe audio delay time can be offset using the *Safe Offset* menu item. To set the audio delay less than the video delay, set the Offset to a negative number (shown in milliseconds).

3.10. CONFIGURING THE VIDEO

The *VIDEO* menus are used to configure the video and reference standard, system phasing, and other general items related to the video. The chart below shows the items available in the *VIDEO* menu. Sections 3.10.1 to 3.10.5 provide detailed information about each of the sub-menus.

<i>Video Standard</i>	Sets the video standard for the system
<i>Video Reference</i>	Selects the reference video standard
<i>Output H Phase</i>	Sets the video output horizontal phase with respect to the reference video
<i>Output V Phase</i>	Sets the video output vertical phase with respect to the reference video
<i>Bypass Mode</i>	Selects the video bypass mode
<i>Safe Mode</i>	Selects the Mode of Operation for the Safe Input
<i>Pgm Blur Factor</i>	Selects the amount of video blur on the program delayed video path
<i>Safe Blur Factor</i>	Selects the amount of video blur on the safe delayed video path

3.10.1. Setting the Video Standard

VIDEO	The <i>Video Standard</i> menu is used to select the type of video being used.
<i>Video Standard</i>	
<i>Std:525i/59.94</i>	
<i>Std:625i/50</i>	
<i>Std:1080i/59.94</i>	
<i>Std:1080i/50</i>	
<i>Std:720p/59.94</i>	

3.10.2. Setting up the Video Reference

VIDEO
<i>Video Reference</i>
<u>ref:ntsc/59.94</u>
<u>ref:625i/50</u>
<u>ref:1080i/59.94</u>
<u>ref:1080i/50</u>
<u>ref:720p/59.94</u>

For proper timing of the video and audio signals an analog video genlock reference must be supplied. The HDSD9545DLY-PRO can accept NTSC (525i/59.94) or Tri-level sync HD video references.

In general, the reference video should be chosen to match the standard of the video program material passing through the unit.

For SD program video, a standard definition reference video signal must be used.

For HD program video, a standard definition reference video signal can be used as long as it is at the same frame rate.

e.g.	HDSDI PGM Video	Analog Genlock Video
	1080i/59.94	525i/59.94
		1080i/59.94
	720p/59.94	525i/59.94
		720p/59.94

3.10.3. Setting Up the Video Output Timing

The output stage of the HDSD9545DLY-PRO contains a frame buffer and a line buffer so that the output video can be timed with respect to the reference video applied to the **VIDEO REF** input BNC.



The *Output V* and *Output H* phase adjustments are REAL TIME ADJUSTMENTS and will affect the output video timing immediately. These settings should not be adjusted when the output video is in the broadcast chain.

3.10.3.1. Setting the Vertical Phase of the Output Video

VIDEO
<i>Output V Phase</i>
<i>V Phase: 0 to Max Lines</i>
<u><i>V Phase: 0</i></u>

This control enables the user to set the vertical timing of the output video with respect to the genlock reference input. There are separate settings of V phase offset for each output video type. Setting this control to 1 keeps the output video in time with the genlock reference.

Increasing the value will delay the output video in one-line increments of the output video standard. In order to advance the vertical timing of the output video with respect to the genlock reference, set the control to the maximum total number of lines of the output video minus the number of lines that you wish to advance the output video. (E.g. for 1080i/59.94 output video the total number of lines is 1125, so to advance the output video 5 lines set the value to 1120.) When if increasing the *Output V Phase* value causes it to go beyond the limit of the frame buffer, the *Output V Phase* will wrap to the beginning of the frame buffer resulting in a change of one frame of throughput delay between the video input and the video output.

3.10.3.2. Setting the Horizontal Phase of the Output Video

VIDEO
Output H Phase
H Phase: 0 to Max samples
H Phase: 0

This control enables the user to set the horizontal timing of the output video with respect to the genlock reference input. There are separate settings of Output H phase for each output video type. Setting this control to 0 keeps the output video in time with the genlock reference.

Increasing the value will delay the output video in one-sample increments. In order to advance the horizontal timing of the output video with respect to the reference video, set the control to the maximum number of samples per line for the output video standard minus the number of samples that you wish to advance the output video. (E.g. for 1080i/59.94 output video the total number of samples per line is 2200, so to advance the output video 5 samples set the value to 2195.) When if increasing the *Output H Phase* value causes it to go beyond the limit of the line buffer, the *Output H Phase* will wrap to the beginning of the line buffer and the *Output V Phase* will change by 1 line.

3.10.4. Setting the Video Bypass Mode

VIDEO
Bypass Mode
Xpoint Bypass
Relay Bypass

This control enables the user to select how the video will be bypassed when a bypass transition is triggered or the “Relay Bypass” button is pressed.

When you select *xpoint* bypass mode, the bypass is done electronically through activating the appropriate cross point in the router block. This allows the delayed video to continue undisturbed.

When you select *relay* bypass mode, the bypass is executed by activating the bypass relay on the program input. This will cut off the video input to the unit and cause the delayed video to stop.

3.10.5. Enabling Safe Capture Mode

VIDEO
Safe Mode
Normal delay
Repeat frame
Cont. Loop
Loop on switch

This control enables the user to select the mode of operation for the Delayed Safe Input.

Normal delay – Delay controlled by the safe delay setting

Repeat frame – Captured frame is continually repeated

Cont. Loop – Captured loop is continually repeated

Loop on switch – Captured loop is repeated while the safe input is selected to be the On-Air source. Play always commences from the first frame at the instant the On-Air source changes.

Note: To capture a frame/loop the Safe Capture Transition is used.

3.10.6. Setting the Amount of Blur on the Program Delayed Video

VIDEO
Pgm Blur Factor
PgmBF:0 to 8
<u>PbmBF:8</u>

This control enables the user to set the amount of blurring that will be applied to the delayed program video when the *pgm blur* or *t pgm blur* transition is selected.

Increasing the value will increase the amount of blurring.

3.10.7. Setting the Amount of Blur on the Safe Delayed Video

VIDEO
Safe Blur Factor
SafBF:0 to 8
<u>SafBF:8</u>

This control enables the user to set the amount of blurring that will be applied to the delayed safe video when the *safe blur* or *t safe blur* transition is selected.

Increasing the value will increase the amount of blurring.

3.11. CONFIGURING THE AUDIO

The *AUDIO* menus are used to configure the audio reference, and SoftSwitch™ settings for each of the audio channel pairs. The chart below shows the items available in the *AUDIO* menu. Sections 3.11.1 to 3.11.2 provide detailed information about each of the sub-menus.

AES 1 SS
AES 2 SS
AES 3 SS
AES 4 SS
Embed Audio SS

Selects whether SoftSwitch™ is enabled for the AES A 1 pair

Selects whether SoftSwitch™ is enabled for the AES A 2 pair

Selects whether SoftSwitch™ is enabled for the AES A 3 pair

Selects whether SoftSwitch™ is enabled for the AES A 4 pair

Selects whether SoftSwitch™ is enabled for the embedder group 1-4 audio

3.11.1. Enabling the AES Audio SoftSwitch™ for Clean Audio Switches

There are four identical menu items that allow the user to enable the Audio SoftSwitch™ on each of the AES A outputs. When SoftSwitch is On, the unit will provide a clean AES switch on the respective AES audio buss. For the sake of simplicity, only the menu item for the AES 1 output will be shown in the manual.

AUDIO
AES 1 SS
AES1 SS:off
AES1 SS:on
AES1 SS:non pcm

This menu allows the user to control SoftSwitch™ on the AES 1 output.

Select *Off* to disable SoftSwitch™. AES audio switches may 'pop'.

Select *On* to enable SoftSwitch™ and perform clean AES audio switches when using linear audio sources

Select *non pcm* to allow the unit to perform clean switches when switching non-pcm audio sources such as Dolby E.

3.11.2. Enabling the Embedded Audio SoftSwitch™ For Clean Audio Switches

AUDIO
Embed Audio SS
Emb Aud SS:off
Emb Aud SS:on

This menu allows the user to control Audio SoftSwitch™ on the Embedded audio (all groups). When SoftSwitch is On, the unit will provide a clean audio switch. When using non-pcm embedded audio such as Dolby E, set the embedded SoftSwitch™ to *Off*.

Select *Off* to disable SoftSwitch™. Embedded audio switches may 'pop'.

Select *On* to enable SoftSwitch™ and perform clean embedded audio switches when using linear audio sources.

3.12. SAVING AND RECALLING CONFIGURATION PRESETS

The *PRESET* menu allows the user to save specific configurations to one of ten non-volatile presets. Using this menu, these presets can be restored, or the user can restore the unit to its factory preset configuration. The chart below shows the items available in the *PRESET* menu. Sections 3.12.1 and 3.13.2 provide detailed information about each of the sub-menus.

Recall Preset
Store Preset

This allows the user to recall the unit's configuration from the factory defaults or one of ten user presets.

This allows the user to save the current unit configuration to one of ten user presets.

3.12.1. Recalling a Preset Configuration



Loading a factory preset or user preset will override all of your current configuration items.

<i>PRESET</i>
<i>Recall Preset</i>
<i>factory defaults</i>
<i>1 to 10</i>

This control is used to recall the values of all the programmable features in the unit saved in one of ten user presets, or to restore the factory default configuration.

Use the ↑ or ↓ keys to select the preset that you want to load. Pressing the **SELECT** key when this preset is shown will prompt you to confirm that you want to load the preset configuration. To proceed, press the **SELECT** key one more time to actually load the preset. The front panel display will briefly show a message indicating that the preset configuration has been loaded.

3.12.2. Saving the Configuration to a User Preset

<i>PRESET</i>
<i>Store Preset</i>
<i>1 to 10</i>

This control is used to save the values of all the programmable features in the unit in one of ten user presets.

Use the ↑ or ↓ keys to select the preset that you want to save. Pressing the **SELECT** key when “Store #x” (where x=preset 1-10) is shown immediately overwrites the values currently saved in the user preset and reverts up one level to “Store Preset”. To proceed, press the **SELECT** key one more time to actually save the preset. It takes approximately 30 seconds to complete copying the preset to non-volatile memory after you save it.

3.13. MANAGING THE FIRMWARE

The *FIRMWARE* menu allows the user to view the Firmware version and to update the firmware to a new version. The chart below shows the items available in the *FIRMWARE* menu. Sections 3.13.1 and 3.13.2 provide detailed information about each of the sub-menus.

<i>Firmware Version</i>
<i>Maximum Delay</i>
<i>Reboot Now</i>

This allows the user to view the current firmware version.

This allows the user to view the maximum delay available in the unit.

This allows the user to reboot the unit after a firmware update.

3.13.1. Viewing the Firmware Version

FIRMWARE
Firmware Version
HDS9545DL Y-PRO Version 1.0 Build 22

This menu item is used to view the firmware version of the unit.

Pressing the **SELECT** key when this menu item is displayed will show the firmware name. Use the ↑ or ↓ keys to view the version and build number.

3.13.2. Viewing the Maximum Delay

FIRMWARE
Maximum Delay
SD Delay = xx sec HD Delay = xx sec

This menu item is used to view the firmware version of the unit.

Pressing the **SELECT** key when this menu item is displayed will show the maximum delay. Use the ↑ or ↓ keys to view the HD and SD maximum delay.

3.13.3. Updating the Firmware Version

FIRMWARE
Reboot Now

After new firmware has been loaded into the unit using an FTP connection the unit will require rebooting. This menu item provides a convenient way of doing this without removing the power. For more information about updating the firmware in the unit see section 4.3.1.

Pressing the **SELECT** key when this menu item is shown will prompt you to reboot the unit. Press the **SELECT** key one more time to reboot the unit.

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CHAPTER 4: TECHNICAL DESCRIPTION

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4. TECHNICAL DESCRIPTION

4.1. SPECIFICATIONS

4.1.1. Serial Digital Video Inputs

Standards:	SMPTE 292M (1.5 Gb/s), SMPTE 259M (270Mb/s) – see Table 2-3
Number of Inputs:	2
Connector:	BNC per IEC 61169-8 Annex A
Equalisation:	
HD Video Stds:	Automatic up to 50m on Input A and 140m on Input B with Belden 1694 or equivalent cable
SD Video Stds:	Automatic up to 250m with Belden 8281 or equivalent cable
Return Loss:	
Input A:	> 15 dB up to 1.0 Gb/s, >10dB at 1.5 Gb/s
Input B:	> 15 dB up to 1.5 Gb/s

4.1.2. Serial Digital Video Outputs

Standard:	Same as Input
Number of Outputs:	5 outputs (2 copies of Output A) Input A bypass protected to output A1.
Connector:	BNC per IEC 61169-8 Annex A
Signal Level:	800mV nominal
DC Offset:	0V \pm 0.5V
Rise and Fall Time:	
HD Video Stds:	200ps nominal
SD Video Stds:	650ps nominal
Overshoot:	<10% of amplitude
Wide Band Jitter:	< 0.2 UI
Output Return Loss:	
A1	> 10 dB up to 1.5 Gb/s
Out A2, B, C, D, E	> 15 dB up to 1.5 Gb/s
Output Phase:	measured with respect to the Genlock reference 0 to a full frame of offset - separate H and V phase adjustments

4.1.3. Video Reference

Type:	Menu selectable - depends on video format (See section Table 2-3) NTSC or PAL Colour Black 1 V p-p Composite Bi-level sync (525i/59.94 or 625i/50) 300 mV HD Tri-level Sync
Connectors:	BNC per IEC 61169-8 Annex A
Termination:	High impedance loop through or High impedance non-looping or 75 ohm non looping (jumper selectable)

4.1.4. DARS Reference (not implemented at the time of writing)

Type: AES Digital Audio Signal with 48KHz sample rate.
Standard: SMPTE 276M-1995 single ended AES
Connectors: BNC per IEC 61169-8 Annex A
Termination: High impedance non-looping or 75 ohm non looping (jumper selectable)

4.1.5. AES Audio Inputs

Standards: SMPTE 276M single ended AES
Number of Inputs: 2 Groups of 4
Connector: BNC per IEC 61169-8 Annex A
Signal Level: 1 V p-p \pm 10%
Return Loss: > 25 dB up to 6 MHz

4.1.6. AES Audio Outputs

Standards: SMPTE 276M single ended AES
Number of Outputs: 3 buses, 4 outputs per bus
Safe AES Inputs bypass protected to AES A outputs when bypass relay option is installed
Connector: BNC per IEC 61169-8 Annex A
Signal Level: 1 v p-p
Return Loss: > 35 dB up to 6 MHz
Reference: From Video Reference.

4.1.7. GPI Control Port

Number of Inputs: 8 opto-isolated, active high or active low, programmable functions
Number of Outputs: 4 sets of relay contacts, normally closed, programmable functions
Relay Max Current: 1 A at 30 V DC

4.1.8. Remote Control Port

Standard: RS 232
Connector: Software upgrade cable female DB-9
Baud Rate: 115200
Format: 8 bits, no parity, and 2 stop bits

4.1.9. Functional

Maximum Total Delay: (configurable between live and safe inputs)

HDSD9545DLY-PRO 24 seconds of HD or SD delay
HDSD9545DLY-PRO-HD40 40 seconds of HD delay or 240 seconds of SD delay

4.1.10. Electrical

Voltage: Auto ranging 100 ↔ 240 Volts AC, 50/60 Hz – dual redundant power supplies
Fuse Rating: 250 V, 1amp time delay
Power: 40 watts
Safety: TÜV Listed, complies with EU safety directives
EMI/RFI: Complies with FCC Part 15 Class A regulations
Complies with EU EMC directive

4.1.11. Physical

Dimensions: 19" W x 3.5" H x 7.75" D.
(483mm W x 89mm H x 196mm D)
Weight: 8 lbs. (3.5Kg)

4.2. SERVICING INSTRUCTIONS



CAUTION – These servicing instructions are for use by qualified service personnel only. To reduce risk of electric shock do not perform any servicing instructions in this section of the manual unless you are qualified to do so.



Make sure that both power cords are disconnected before opening the top cover of the unit.

4.2.1. Changing the Fuses

The fuse holder is located inside the power entry module. To change the fuses, disconnect the line cord from the power entry module and pull out the fuse holder from the power entry module using a small screwdriver. The fuse holder contains two fuses, one for the line and one for the neutral side of the mains connection. Pull out the blown fuse and place a fuse of the correct value in its place. Use time delay 5 x 20 mm fuses rated for 250 Volts with a current rating of 1 amp. Carefully reinsert the fuse holder into the power entry module.



Check that the line fuse is rated for the correct value marked on the rear panel. Never replace with a fuse of greater value.

4.2.2. JUMPERS

4.2.2.1. Configuring the Unit for a DARS Reference (DARS reference not implemented at the time of writing)

The **VID REF/DARS** BNC can be configured as either a high impedance loop through from the **VIDEO REF** BNC or as a 75 ohm terminated DARS reference input (factory default).

To reconfigure this BNC for a reference loop it is necessary to disconnect the power from the unit and remove the top cover. Jumper J19 controls whether the BNC will be a loop through or a DARS reference input. Position jumper J19 in the *Loop* position (pins 2 & 3) for loop through operation. Position jumper J19 in the *Split* position (pins 1 & 2) for DARS operation. In addition you should also set the termination jumpers for the **VIDEO REF** and **VID REF/DARS** input BNCs to the 75 ohm position when J19 is set in the *Split* position. Position jumper J20 in the 75 position to terminate the **VIDEO REF** input BNC. Position jumper J12 in the 75 position to terminate the **VID REF/DARS** input BNC. You should set the termination jumper (J20) for the **VIDEO REF** input BNC to the Hi-Z position when J19 is set in the *Loop* position.

4.2.2.2. Configuring the Module for Firmware Upgrades using the Serial Port Method

The **UPGRADE** jumper J12, located at the front of the main circuit card, is used when firmware upgrades are being done to the unit using the serial port method. For normal operation it should be installed in the *RUN* position. See the section 4.3.2 for more information.

To upgrade the firmware, move Jumper J12 into the *UPGRADE* position. Install the Upgrade cable provided. Run the upgrade as described in section 4.3.2. Once the upgrade is completed, move J12 into the *RUN* position and remove the upgrade cable. The unit is now ready for normal operation.

4.3. UPGRADING FIRMWARE

The HDSD9545DLY-PRO contains firmware that is contained in a FLASH EPROM device. From time to time firmware updates will be provided to add additional features to the unit.

There are two methods of updating the firmware in the HDSD9545DLY-PRO: File Transfer Protocol (FTP) and Serial Upload. Due to the large size of the firmware binary file the FTP method is the preferred method of updating the firmware.

Prior to initiating the upgrade process:

- Confirm the version of code currently installed on the unit by using the Firmware Version menu item on the front panel setup menu. See section 3.13.1.
- Download the new application code from the Evertz FTP site (www.evertz.com). Unzip the file into a temporary working folder on your PC.

4.3.1. Upgrading the Firmware using FTP

You will need the following equipment in order to update the Firmware:

- PC with available communications port and Ethernet network port. The communication speed is 1152600 baud, therefore a 486 PC or better with a 16550 UART based communications port is recommended.
- “Straight-thru” serial extension cable (DB9 female to DB9 male) or (DB25 female to DB9 male).
- Appropriate Ethernet cable as outlined in section 2.6.
- Terminal program such as HyperTerminal.
- New firmware supplied by Evertz.

4.3.1.1. Step 1 – Determine the IP Addresses

Before any FTP (file transfer protocol) upgrades can be initiated, the user must determine the IP address of the HDSD9545DLY-PRO unit. Both the PC/laptop and the unit must be on the same subnet for the FTP upgrade to work properly.

1. Connect a ‘straight through’ serial cable to the REMOTE CTL DB9 connector on the rear panel.
2. Connect the 9 pin female connector on the end of the serial cable to the PCs’ RS-232 communications port.
3. Start the terminal program.
4. Configure the port settings of the terminal program as follows:

Baud	115200
Parity	no
Data bits	8
Stop bits	2
Flow Control	None

5. Once the frame is powered-up, the HyperTerminal connection displays boot-up status information and once completed, ends with the “Status Message” as shown below:

```
Initialization Completed - HDSD9545DLY-PRO Running
```

6. Press the <Enter> key to see the main Menu.

```
Initialization Completed - HDSD9545DLY-PRO Running
-----
|                               |
|           Main Menu           |
| (HDSD9545DLY-PRO v1.00 b310) |
|                               |
|-----|
(1) Network Configuration
(2) Engineering Debug Utility

(X) Exit
```

- Press the number <1> key to enter the Network Configuration menu, which is used to set the IP address properties for the unit.

```

-----
|           Network Configuration           |
| (HSD9545DLY-PRO v1.00 b310)           |
-----
MAC: 00:02:c5:fe:e8:08

ip address:          192.168.8.206
netmask address:    255.255.255.0
gateway:            0.0.0.0
broadcast address: 255.255.255.255
DHCP enabled: False
-----
(1) Set IP Address
(2) Set Netmask
(3) Set Gateway
(4) Set Broadcast Address
(5) Use DHCP

(S) Save and Exit
(X) Exit
    
```

- The Network configuration menu selecting options “1” through “4” allows the user to set the networking parameters of the unit. If this unit is running on a public LAN enabled with DHCP, then option “5” allows the networking system to assign a non-conflicting IP address for this module. After completing the IP configurations, save and exit this menu by selecting “S”. The unit ships with DHCP disabled (or DHCP enabled set to “FALSE”). If you are not sure whether you should use this option, contact your networking/IT administrator.

Once you return to the Main Menu, reboot the unit so that the new settings will take effect. You can do this using the *Reboot Now* menu item on the *FIRMWARE* menu, or you can disconnect the power to the unit and then plug it back in.

4.3.1.2. Step 2 – Establishing a Valid Network Connection

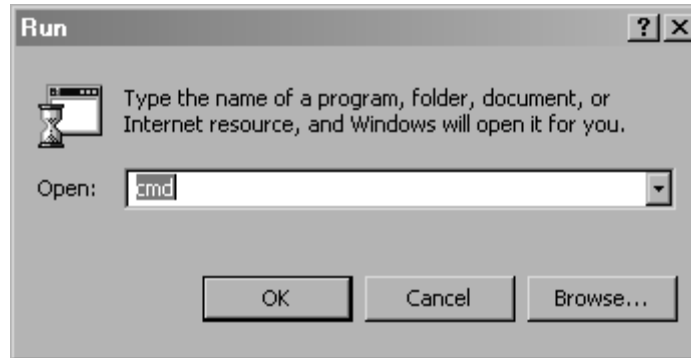
- Connect a crossover network cable from the PC/laptop to the unit.
- Open a Command Prompt window on the PC/laptop and “ping” the IP address of the module being upgraded. For example:

```
C:\ ping 192.168.9.100 <Enter>
```

If a proper network connection has been established, a “reply” is displayed on the DOS window. If there is a faulty network connection, a “Destination Host Unreachable” message is provided. If this occurs, either the IP addresses of the nodes should be verified or the network (Ethernet) cable is faulty. For more information, please see the *INSTALLATION & CONFIGURATION* chapter of this manual.

4.3.1.3. Step 3 – Upgrading the Application Code

11. Obtain the new application code and place it on the local drive of the PC
12. Open a DOS window. This can be accomplished by using the run command under the start button, type “cmd”; see figure below for an example:



13. In the DOS window type: `ftp xxx.xxx.xxx.xxx` (IP address of the module).
14. Press the <Enter> key when prompted for a “Username”.
15. Press the <Enter> key when prompted for a “Password”.
16. At the “FTP>” prompt, type the following: `put "the name of the file.bin"`.
(For example: `put 9000JJ_SW-1-0b310.bin`)
17. If the application file is not local to where you are performing the ftp, then include the path with the name (For example: `put c:\firmware\9000JJ_SW-1-0b310.bin`).
18. A message indicating the successful connection to the module is displayed.
19. File transfer occurs in several seconds and the DOS window displays the “FTP>” prompt again.
20. Type “quit” at the “FTP>” prompt to exit the FTP procedure. At this time, the front panel display will show a “% complete” value indicating that the card is now uploading the new code.



During this time it is mandatory that all power cycles of the unit be avoided. The figure below displays a successful FTP session.

```

Command Prompt
Microsoft Windows [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.

c:\>ftp 192.168.8.206
Connected to 192.168.8.206.
220-Evertz FTP Server.
    Copyright 2001 Evertz Microsystems Ltd. All rights reserved.
220 Type QUOTE HELP for information.
User (192.168.8.206:(none)):
331 User name okay, need password.
Password:
230 User logged in, proceed.
ftp> put c:\9000JJ_sw-1-0-b310-rc.bin
200 PORT command successful.
150 Opening data connection.
226 Transfer complete.
ftp: 5186580 bytes sent in 1.30Seconds 3998.91Kbytes/sec.
ftp> quit
221 Goodbye.

c:\>
    
```

4.3.1.4. Step 4 – Completing the Upgrade

21. Once the % complete display on the front panel indicates that the upgrade has been completed, you will need to reboot the unit so that the new firmware will take effect. You can do this using the *Reboot Now* menu item on the FIRMWARE menu, or you can disconnect the power to the unit and then plug it back in.
22. You can now close the DOS window and disconnect the network cable.

4.3.2. Upgrading the Firmware using RS-232 Serial Cable



This method of upgrading the firmware will take over 15 minutes and is not recommended unless the FTP method fails.

You will need the following equipment in order to update the Firmware:

- PC with available communications port. The communication speed is 115200 baud, therefore a 486 PC or better with a 16550 UART based communications port is recommended.
- “Straight-thru” serial extension cable (DB9 female to DB9 male) or (DB25 female to DB9 male).
- Terminal program that is capable of Xmodem file transfer protocol. (such as HyperTerminal)
- New firmware supplied by Evertz.

4.3.2.1. Step 1 – Setup

1. Connect a ‘straight through’ serial cable to the REMOTE CTL DB9 connector on the rear panel.
2. Connect the 9 pin female connector on the end of the serial update cable to the PCs’ RS-232 communications port.

3. Connect the 9 pin connector on the end of the serial update cable to the PCs' RS-232 communications port.
4. Start the terminal program.
5. Configure the port settings of the terminal program as follows:

Baud	115200
Parity	no
Data bits	8
Stop bits	2
Flow Control	None

4.3.2.2. Step 2 – Invoke Upload Mode from the Terminal Program

6. Power up the HDSD9545DLY-PRO. After the unit powers up, a banner with the boot code version information should appear in the terminal window. The cursor to the right of the word "BOOT>" should be spinning for about 5 seconds then the unit will continue to boot. While the cursor is spinning press Ctrl-X to abort the boot-up process.

For example:

```
PPC BOOT>
```

7. The following is a list of possible reasons for failed communications:
 - Defective Serial Upgrade cable.
 - Wrong communications port selected in the terminal program.
 - Improper port settings in the terminal program. (Refer to step 5 for settings). Note that HyperTerminal will not change port settings while connected. Click on HyperTerminal's "Disconnect" Button then click the "Reconnect" button to activate changes to the port settings.
8. Hit the <ENTER> key on your computer once.
9. Type the word "upload", without quotes, and hit the <ENTER> key once.
10. You should now see a prompt asking you to upload the file.

4.3.2.3. Step 3 – Uploading the New Firmware

11. Upload the "*.bin" file supplied using the X-Modem transfer protocol of your terminal program. If you do not start the upload within 10 minutes the unit's Boot code will time out. You can restart the upgrade process by power cycling the unit.
12. When the transfer is complete (can take up to 15+ minutes) the terminal will return to the PPCBOOT prompt.

For Example:

```
UPLOAD OKAY  
PPC BOOT> |
```

13. The following is a list of possible reasons for a failed upload:

- If you get the message "transfer cancelled by remote" you must restart the terminal program and load the bin file, then remove and install the module again.
- The supplied "*.bin" file is corrupt.
- Wrong file specified to be uploaded.
- Wrong file transfer protocol used – make sure you specify Xmodem, not Xmodem 1K.
- The PCs' RS-232 communications port cannot handle a port speed of 57600.
- Noise induced into the Serial Upgrade cable.

4.3.2.4. Step 4 – Completing the Upgrade

14. Power cycle the unit. It should proceed through a normal boot up sequence.

15. You can now close the terminal program and disconnect the RS-232 serial cable from the PC and the unit.