HD2014, HD2012,
HD2011 Video PassPort™
1RU Multi-Path Video Converter,
Frame Synchronizer and Decoder
User Manual

EVERTZ MICROSYSTEMS LTD.
5288 John Lucas Drive,
Burlington, Ontario, Canada
L7L 5Z9
Phone: +1 905-335-3700
Sales Fax: +1 905-335-3573
Tech Support Phone: +1 905-335-7570
Tech Support Fax: +1 905-335-7571

Internet: Sales: sales@evertz.com
Tech Support: service@evertz.com
Web Page: http://www.evertz.com

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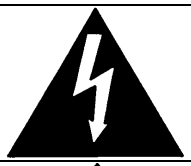
IMPORTANT SAFETY INSTRUCTIONS

	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of un-insulated “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 these instructions
- 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 is 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.
- Only use attachments/accessories specified by the manufacturer
- 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

WARNING
DO NOT EXPOSE THIS EQUIPMENT TO DRIPPING OR SPLASHING AND ENSURE THAT NO OBJECTS FILLED WITH LIQUIDS ARE PLACED ON THE EQUIPMENT

WARNING
TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE

WARNING
THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE

INFORMATION TO USERS IN EUROPE

NOTE

This equipment with the CE marking complies with both the EMC Directive (2004/108/EC) and the Low Voltage Directive (2006/95/EC) issued by the Commission of the European Community.

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

- EN60065 Product Safety
- 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.

CE	EN60065	Safety
	EN55103-1: 1996	Emission
	EN55103-2: 1996	Immunity

	EN504192 2005 Waste electrical products should not be disposed of with household waste. Contact your Local Authority for recycling advice

INFORMATION TO USERS IN THE U.S.A.

NOTE

FCC CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING

Changes or Modifications not expressly approved by Evertz Microsystems Ltd. could void the user's authority to operate the equipment.

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

Evertz Microsystems Ltd FC For Home or Office Use	Tested to comply with FCC Standards	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: This device may cause harmful interference, and This device must accept any interference received, including interference that may cause undesired operation.

REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary	Apr 2010
1.0	First Release	Nov 2010
1.1	Added information on the +FL-ADC-HD option	Jan 2011
1.2	Updated Block Diagrams	Sept 2011

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1. OVERVIEW

The Evertz HD2014, HD2012 and HD2011 are high performance multi-path 1RU video conversion, frame synchronization and decoder platforms. The HD2014 integrates four independent paths of video processing. An internal router up-stream of the conversion engines allows each path to be fed from any of the device inputs. Each processing path includes full frame sync and up/down/cross conversion capabilities in addition to noise reduction and video proc capabilities. Optional MPEG2 and H.264 flex modules allow the HD2014/12/11 series to accept ASI input signals and generate decoded base-band video that can then be sent to conversion engines*. The HD2012 integrates two independent paths of processing. Each path can be fed from different device inputs. The HD2011 has the same capabilities as the HD2012 except that both processing paths must be fed from the same input video signal.

The processing power of the HD2014/12/11 series in combination with their simple to use front panels make them ideal choices for utility conversion and decoding applications within facilities, ENG/DSNG truck or mobile environments. The HD2014/12/11 series can support up to 4x coax HD/SD/ASI serial inputs, 4x fiber optic HD/SD/ASI serial inputs, four composite analog video inputs, 4x or 8x mono analog audio inputs and 8x AES digital audio inputs**. Analog video inputs are processed using 12 bit A/D converters and use 3D video decoding technology. DVI inputs (720p and 1080p) can also be supported. 1080p DVI inputs are automatically interlaced to 1080i.

The HD2014/12/11 series can support up to 4x coax HD/SD serial digital outputs, four fiber optic HD/SD serial digital outputs, four composite analog video outputs, eight or four mono analog audio outputs and eight AES digital audio outputs**. DVI outputs (720p and 1080i) can also be supported. A reference input is available to allow these units to lock to an external reference. SNMP control and monitoring is supported using the 10/100 Ethernet port. An integrated four input multi-image display is available as an ordering option*.

These Evertz converters are packaged in a space saving 1RU form factor and have local front panel control capabilities. Quick access hot keys for each processing channel are available on the front panel to enable easy changes to core processing parameters. Eight (8) front panel “HOT KEY MACROS” can be programmed with user controls to enable multi-parameter sets with a single button push. The HD2014/12/11 series can be ordered with dual AC power supplies. The HD2014 series can also support operation from externally supplied +12V DC power supply (1x AC inlet and 1x DC inlet supported)*.

* Future function. Contact Evertz for pricing and availability information.

** *Fiber SFP modules ordered as separate accessories to enable fiber inputs/outputs*
One FL-xx flex module may be installed at a time
One FR-xx flex module may be installed at a time
1x analog video input and 1x analog video output are standard
Three additional analog inputs available with FL-CD3 option
One additional analog input available with FL-ADC-HD option (if installed, the FL-CD3 option is disabled; the unit cannot run these two options at the same time)
Three additional analog outputs available with FL-CE3 option (each output must be fed 525/625i)
Redundant power supply is an ordering option
The +AA option supports analog audio with 4x in and 8x out
The +AA2 option supports 8x in and 4x out
The +AA2 and the +AA option cannot be installed at the same time

Figure 1-1: HD2014 Video PassPort™ Front Panel

Within the HD2014/12/11 architecture, 16 channels of audio are de-embedded from the input of each conversion path and sent to the internal audio processor. Eight discrete AES audio inputs and four/eight analog audio inputs can also be made available to the audio processor**. Per channel audio delay, stereo to 5.1 up-mixing (+UMX), 5.1 to stereo down-mixing (+DMX), IntelliGain™ audio loudness management (+IG) and audio band equalization (+EQ) can be performed on selected input audio channels.

Following the audio processor, 16 channels of audio may be embedded into each of the outgoing video processors. Each of the four audio embedders can support audio inversion, gain, mono mixing and channel swapping capabilities. Similar per channel audio routing, inversion, gain and mono-mixing capabilities are available for the 8x AES outputs and the 4x or 8x mono analog audio outputs**.

Figure 1-2: HD2014 Video PassPort™ Rear View

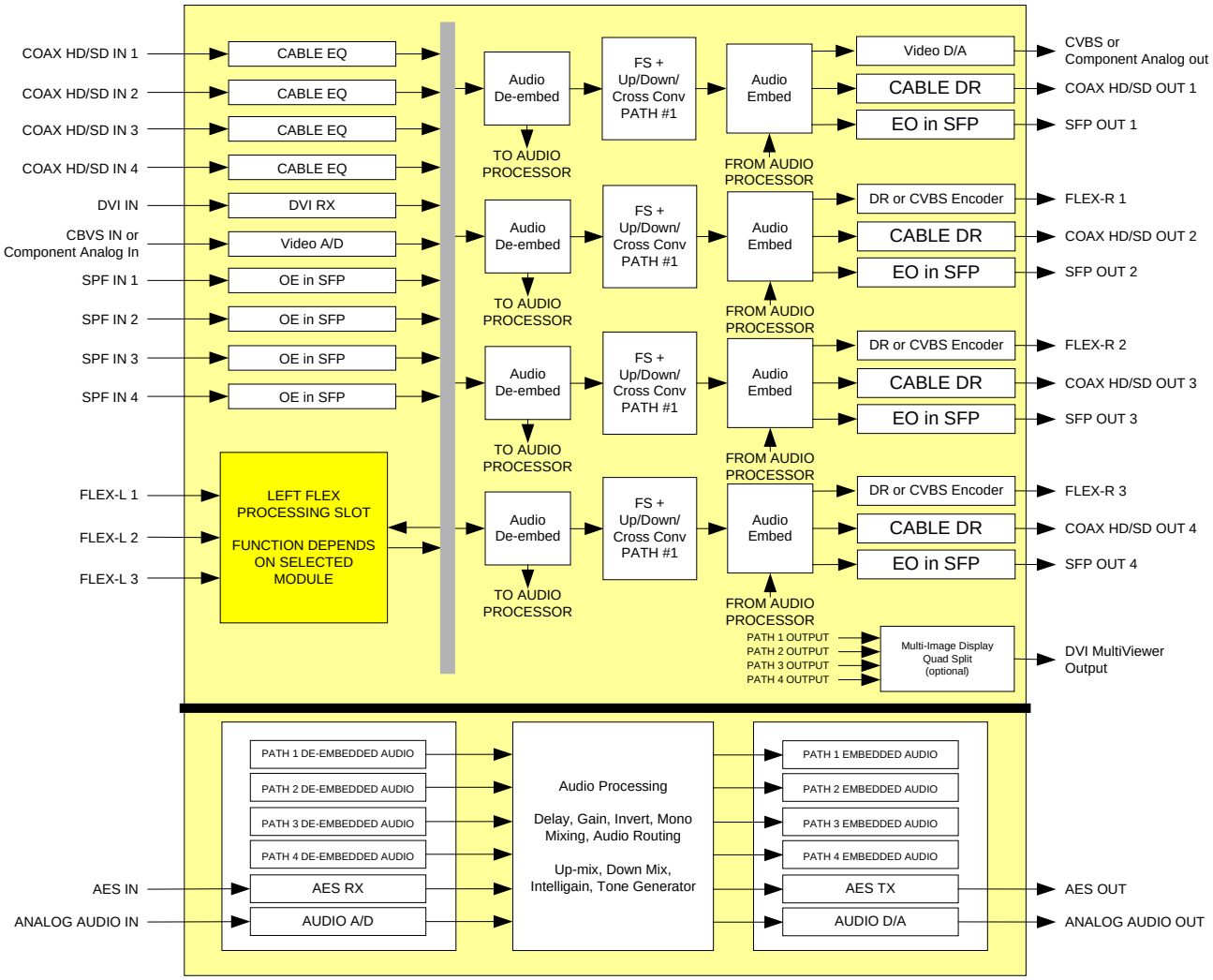

Figure 1-3: HD2014 Block Diagram

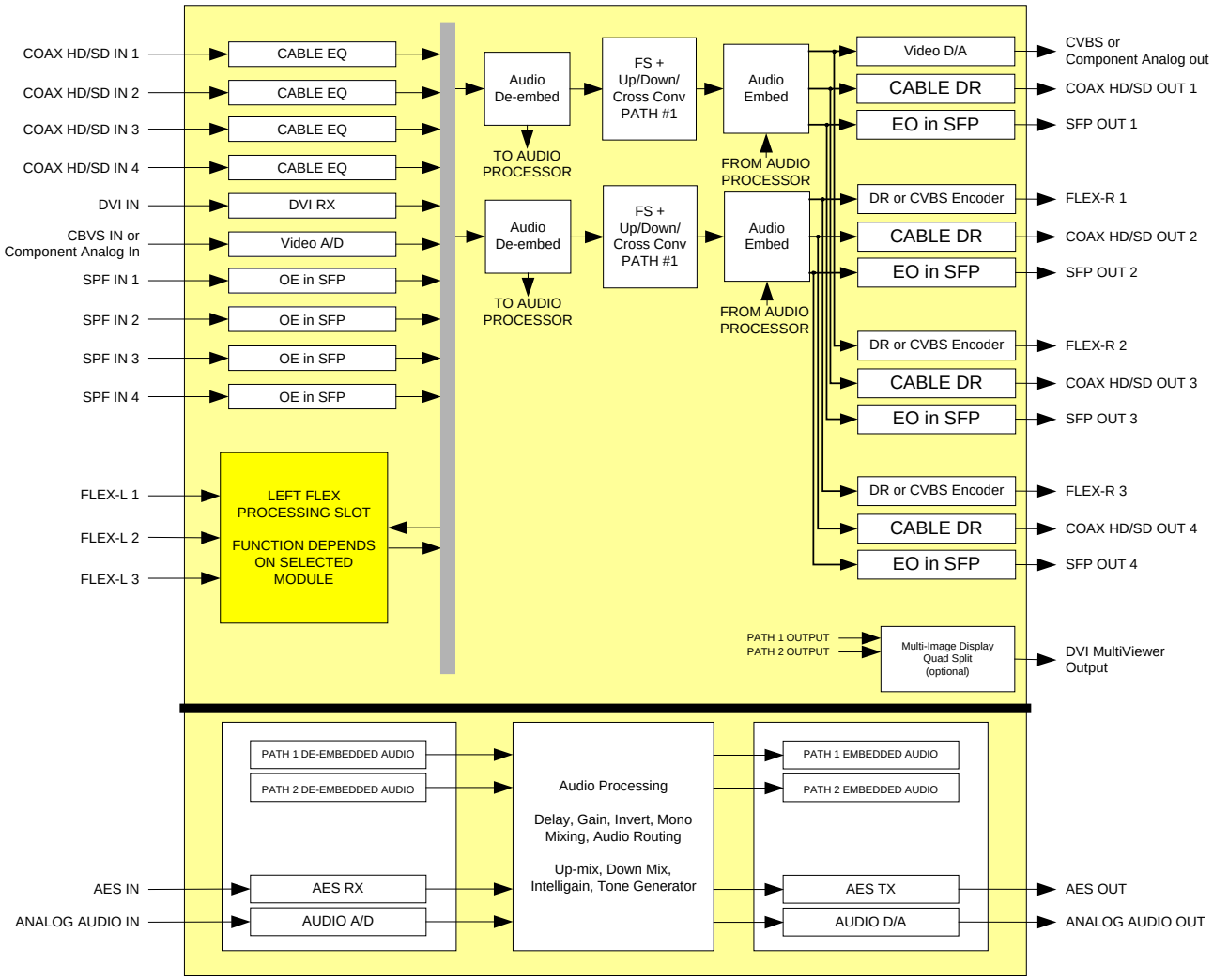

Figure 1-4: HD2012 Block Diagram

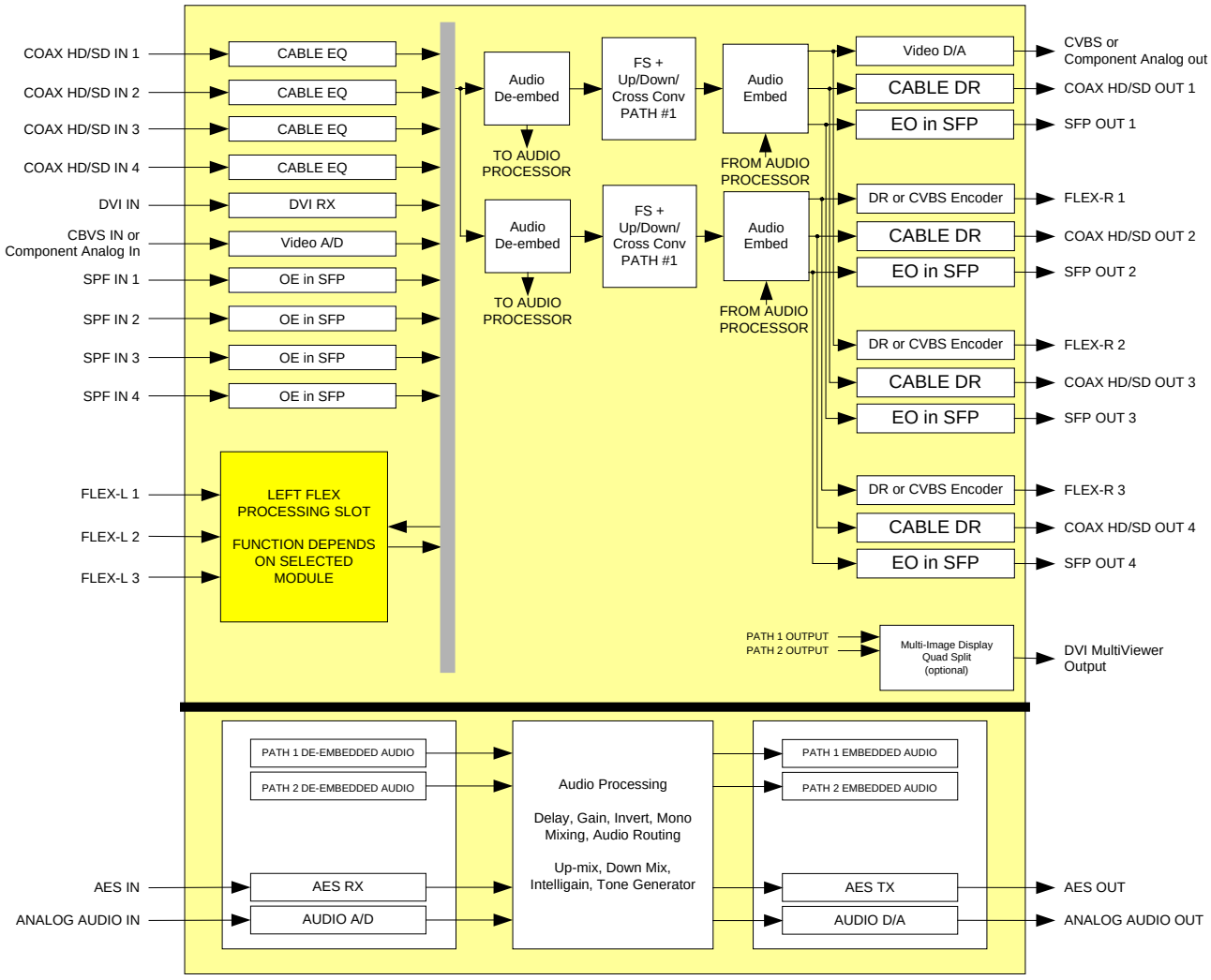

Figure 1-5: HD2011 Block Diagram

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2. INSTALLATION

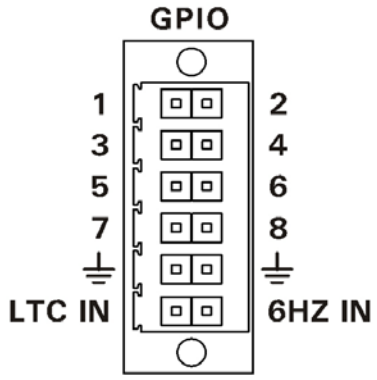
2.1. REAR PANEL OVERVIEW

The rear panel of the HD201x Video PassPort series is shown in Figure 2-1. The following sections will give an overview of each connection and their function including any relevant pin-out information.

Figure 2-1: Rear View of HD2014

2.1.1. GPIO (General Purpose Input/Outputs) Connections

The HD201x series supports eight configurable GPIOs. Table 2-1 describes the pin-out information for the GPIO removable terminal block connector.



PIN #	Name	Description
1	GPIO1	General Purpose Input/Output #1
2	GPIO2	General Purpose Input/Output #2
3	GPIO3	General Purpose Input/Output #3
4	GPIO4	General Purpose Input/Output #4
5	GPIO5	General Purpose Input/Output #5
6	GPIO6	General Purpose Input/Output #6
7	GPIO7	General Purpose Input/Output #7
8	GPIO8	General Purpose Input/Output #8
9	GND	Signal Ground.
10	GND	Signal Ground.
11	LTC IN	LTC IN Input (not used at time of writing)
12	6HZ IN	6HZ In Input (not used at time of writing)

Table 2-1: Pin out for General Purpose Inputs/Outputs

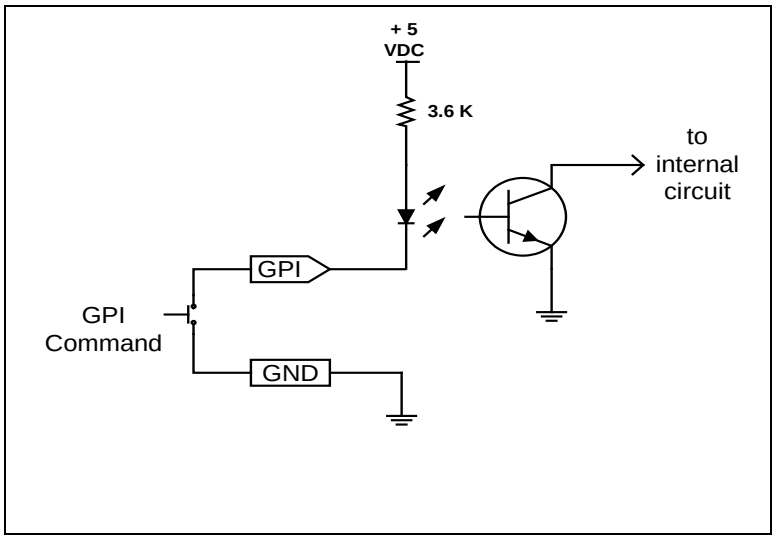


Figure 2-2: GPI Input Circuitry

Figure 2-2 shows the internal circuit when HD201x GPIOs are configured to be General Purpose Inputs (GPIs). GPIs are active low and edge sensitive rather than level sensitive. Figure 2-3 shows the internal circuit when HD201x GPIOs are configured to be General Purpose Outputs (GPOs). The GPO is active low with internal pull up (10k Ohm) resistors to +5V. When the output goes low it is able to sink up to 10mA. When high, the signal will go high (+5V). **Do not draw more than 100µA from the output.**

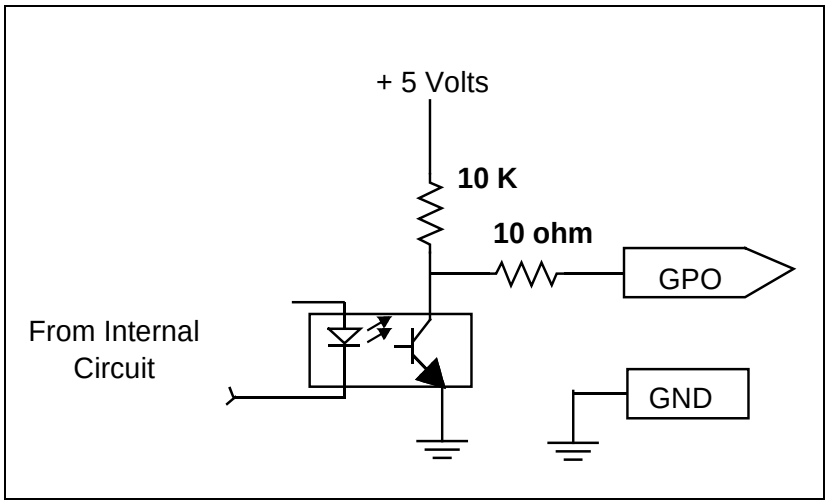


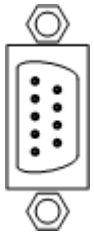
Figure 2-3: GPO Output Circuitry

2.1.2. Reference Video Connections

REF IN: BNC input for supplying external reference with internal 75 ohm termination. The HD201x series supports bi-level sync NTSC or PAL references. NSTC/PAL color black references may also be used.

2.1.3. COM Connections

COM: A standard DB9 connector (female) is used for the HD201x serial port interface. This serial port is used as an engineering debug port. To enable this serial port, you must be running firmware revision *hd2010-100114-1657* or later. To enable this serial port you must simultaneously hold down the front panel **LOCK** and **SEL** buttons during initial system boot-up. If those key are not activated during boot-up, this serial COM port will be inactive. Pin-out for this serial connection as shown below. Pin 1 is the top left pin of the connector as shown below.



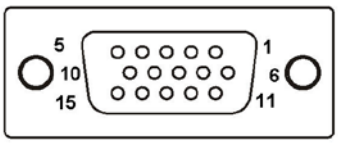
PIN #	Name	Description
1	N/A	Not used
2	TX	Transmit Line
3	RX	Receive Line
4	N/A	Not used
5	GND	Ground
6	N/A	Not used
7	N/A	Not used
8	N/A	Not used
9	N/A	Not used

2.1.4. AES Audio Connections

AES OUT: Eight (8) unbalanced AES outputs are provided on a DB15 connector.
DB15 to BNC breakout cables are available for AES I/O (Evertz part number WPAES8-BNCM-6F).
DB15 connector and breakout cable pin-out information is provided in the tables below.
Breakout cables are ordered as an HD201x accessory.

AES IN: Eight (8) unbalanced AES inputs are supported on a DB15 connector.
DB15 to BNC breakout cables are available for AES I/O (Evertz part number WPAES8-BNCM-6F).
DB15 connector and breakout cable pin-out information is provided in the tables below.
Breakout cables are ordered as HD201x accessory.

AES IN



Female

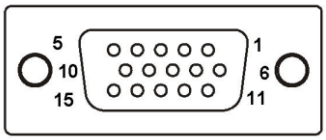
PIN #	Name	Description
1	Not used	Reserved for future use
2	Not used	Reserved for future use
3	Not used	Reserved for future use
4	Not used	Reserved for future use
5	Not used	Reserved for future use
6	Not used	Reserved for future use
7	AES In 2	AES Input 2 – Unbalanced
8	Not used	Reserved for future use
9	AES In 6	AES Input 6 – Unbalanced
10	AES In 5	AES Input 5 – Unbalanced
11	AES In 1	AES Input 1 – Unbalanced
12	AES In 8	AES Input 8 – Unbalanced
13	AES In 7	AES Input 7 – Unbalanced
14	AES In 4	AES Input 4 – Unbalanced
15	AES In 3	AES Input 3 – Unbalanced
Shell	GND	Ground

Table 2-2: AES Input Audio Connector Pinout

High Density DB-15 PIN (male)	Breakout Cable Connector	Ground/ Shield Connection	Labelled Name	HD201x Connector Pin Map
1	Red Wire		W1 RED	Pin 1 – Not used
2	Green Wire		W2 GREEN	Pin 2 – Not used
3	Blue Wire		W3 BLUE	Pin 3 – Not used
4	Not Used		Not used	Pin 4 – Not used
5	Not used		Not used	Pin 5 – Not used
6	White Wire		W4 WHITE	Pin 6 – Not used
7	Coax BNC Male	Soldered to Shell	AES A2	Pin 7 – AES In 2
8	Yellow		W5 YELLOW	Pin 8 – Not used
9	Coax BNC Male	Soldered to Shell	AES B2	Pin 9 – AES In 6
10	Coax BNC Male	Soldered to Shell	AES B1	Pin 10– AES In 5
11	Coax BNC Male	Soldered to Shell	AES A1	Pin 11– AES In 1
12	Coax BNC Male	Soldered to Shell	AES B4	Pin 12– AES In 8
13	Coax BNC Male	Soldered to Shell	AES B3	Pin 13– AES In 7
14	Coax BNC Male	Soldered to Shell	AES A4	Pin 14– AES In 4
15	Coax BNC Male	Soldered to Shell	AES A3	Pin 15– AES In 3
Shell	Black Wire		GND	GND

Table 2-3: AES Audio Input Breakout Cable (Evertz Part # WPAES8-BNCM-6F)

AES OUT



Female

PIN #	Name	Description
1	Not used	Reserved for future use
2	Not used	Reserved for future use
3	Not used	Reserved for future use
4	Not used	Reserved for future use
5	Not used	Reserved for future use
6	Not used	Reserved for future use
7	AES Out 2	AES Output 2 – Unbalanced
8	Not used	Reserved for future use
9	AES Out 6	AES Output 6 – Unbalanced
10	AES Out 5	AES Output 5 – Unbalanced
11	AES Out 1	AES Output 1 – Unbalanced
12	AES Out 8	AES Output 8 – Unbalanced
13	AES Out 7	AES Output 7 – Unbalanced
14	AES Out 4	AES Output 4 – Unbalanced
15	AES Out 3	AES Output 3 – Unbalanced
Shell	GND	Ground

Table 2-4: AES Output Audio Connector Pinout

High Density DB-15 PIN (male)	Breakout Cable Connector	Ground/ Shield Connection	Labelled Name	HD2014 Connector Pin Map
1	Red Wire		W1 RED	Pin 1 – Not used
2	Green Wire		W2 GREEN	Pin 2 – Not used
3	Blue Wire		W3 BLUE	Pin 3 – Not used
4	Not Used		Not used	Pin 4 – Not used
5	Not used		Not used	Pin 5 – Not used
6	White Wire		W4 WHITE	Pin 6 – Not used
7	Coax BNC Male	Soldered to Shell	AES A2	Pin 7 – AES Out 2
8	Yellow		W5 YELLOW	Pin 8 – Not used
9	Coax BNC Male	Soldered to Shell	AES B2	Pin 9 – AES Out 6
10	Coax BNC Male	Soldered to Shell	AES B1	Pin 10– AES Out 5
11	Coax BNC Male	Soldered to Shell	AES A1	Pin 11– AES Out 1
12	Coax BNC Male	Soldered to Shell	AES B4	Pin 12– AES Out 8
13	Coax BNC Male	Soldered to Shell	AES B3	Pin 13– AES Out 7
14	Coax BNC Male	Soldered to Shell	AES A4	Pin 14– AES Out 4
15	Coax BNC Male	Soldered to Shell	AES A3	Pin 15– AES Out 3
Shell	Black Wire		GND	GND

Table 2-5: AES Audio Output Breakout Cable (Evertz Part # WPAES8-BNCM-6F)

2.1.5. Analog Audio Connections

ANALOG AUDIO: Analog audio is interfaced using a 36 pin analog audio terminal block. With the +AA option for the HD201x, there are eight balanced mono analog audio outputs and four balanced mono analog audio inputs on this connector. Relevant pinout information is provided in Table 2-6.

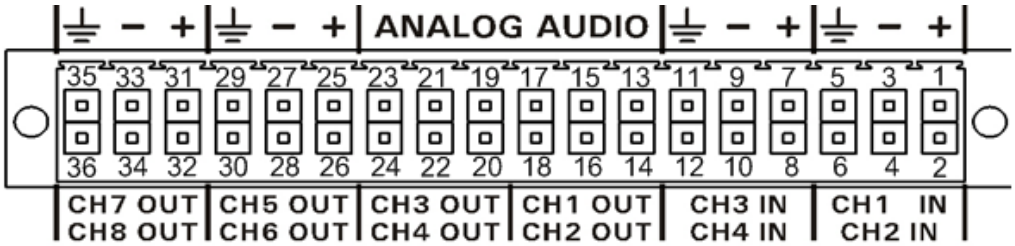


Figure 2-4: Analog Audio Connector

PIN #	PIN OUT	DESCRIPTION
1	CH1 IN +	Channel 1 Analog Audio Input +
2	CH2 IN +	Channel 2 Analog Audio Input +
3	CH1 IN -	Channel 1 Analog Audio Input -
4	CH2 IN -	Channel 2 Analog Audio Input -
5	CH1 IN GND	Channel 1 IN Ground
6	CH2 IN GND	Channel 2 IN Ground
7	CH3 IN +	Channel 3 Analog Audio Input +
8	CH4 IN +	Channel 4 Analog Audio Input +
9	CH3 IN -	Channel 3 Analog Audio Input -
10	CH4 IN -	Channel 4 Analog Audio Input -
11	CH3 IN GND	Channel 3 Ground
12	CH4 IN GND	Channel 4 Ground
13	CH1 OUT +	Channel 1 Analog Audio Output +
14	CH2 OUT +	Channel 2 Analog Audio Output +
15	CH1 OUT -	Channel 1 Analog Audio Output -
16	CH2 OUT -	Channel 2 Analog Audio Output -
17	CH1 OUT GND	Channel 1 OUT Ground
18	CH2 OUT GND	Channel 2 OUT Ground
19	CH3 OUT +	Channel 3 Analog Audio Output +
20	CH4 OUT +	Channel 4 Analog Audio Output +
21	CH3 OUT -	Channel 3 Analog Audio Output -
22	CH4 OUT -	Channel 4 Analog Audio Output -
23	CH3 OUT GND	Channel 3 OUT Ground
24	CH4 OUT GND	Channel 4 OUT Ground
25	CH5 OUT +	Channel 5 Analog Audio Output +
26	CH6 OUT +	Channel 6 Analog Audio Output +
27	CH5 OUT -	Channel 5 Analog Audio Output -
28	CH6 OUT -	Channel 6 Analog Audio Output -
29	CH5 OUT GND	Channel 5 OUT Ground
30	CH6 OUT GND	Channel 6 OUT Ground
31	CH7 OUT +	Channel 7 Analog Audio Output +
32	CH8 OUT +	Channel 8 Analog Audio Output +
33	CH7 OUT -	Channel 7 Analog Audio Output -
34	CH8 OUT –	Channel 8 Analog Audio Output -
35	CH7 OUT GND	Channel 7 OUT Ground
36	CH8 OUT GND	Channel 8 OUT Ground

Table 2-6: Analog Audio Connector Pin Out

2.1.6. HD/SD SDI Input and Outputs

HD/SD SDI OUT 1-4:
There are four BNCs on the rear panel, which support HD/SD serial digital outputs signals.

In the HD2014,
BNC 1 Out is internally connected to the output of PATH1.
BNC 2 Out is internally connected to the output of PATH2.
BNC 3 Out is internally connected to the output of PATH3.
BNC 4 Out is internally connected to the output of PATH4.

In the HD2011 and HD2012
BNC 1 Out is internally connected to the output of PATH1.
BNC 2 Out is internally connected to the output of PATH2.
BNC 3 Out is internally connected to the output of PATH1.
BNC 4 Out is internally connected to the output of PATH2.

HD/SD SDI IN 1-4:
There are four BNCs on the rear panel, which support HD/SDI/ASI serial digital input signals. Processing of ASI input signals requires flex modules for MPEG/H264 video decoding.

2.1.7. DVI Connections

DVI IN /PrPb/RB IN:
The female "DVI IN RB/PrPb IN" connector on the rear of the panel enables the user to connect both DVI and component analog video signals to the HD201x series. Users may directly connect a standard DVI-D cable to this connector to supply the HD201x series with a digital DVI signal. At the time of writing, 1080p59.94/50 Hz and 720p59.94/50 Hz input signal formats are supported in the HD201x series.

NOTE: At the time of this manual's writing, EDID is not currently supported. If a DVI source REQUIRES EDID to operate, external EDID "dongles" like the DVI DETECTIVE from Gefen can be used to ensure proper DVI operation.

To connect component analog video signals to the HD201x series, Evertz breakout cable #WPDVI-DVIBNC5 (optional accessory) is required. Refer to the breakout cable diagram in Figure 2-5.

When the WPDVI-DVIBNC5 breakout cable is connected to the HD201x, DVI-D cables may be connected to the female DVI connector of the break-out cable to supply digital DVI input signals. When interfacing component analog video to the HD201x one must use the dedicated **CBVS IN Y/G IN** CBVS IN Y/G IN BNC on the HD201x rear panel and the Red + Blue wires on the WPDVI-DVIBNC5 break-out cable. The Y/G element of a component analog video signal is connected directly to BNC labelled **CBVS IN Y/G IN** CBVS IN Y/G IN on the rear panel. The Pb/B element of a component analog signal should be connected to the BLUE wire on the break-out cable. The Pr/R element of a component analog signal should be connected to the RED wire on the break-out cable. External H sync (if applicable) should be connected to the GREY channel of the break-out cable. External V sync (if applicable) should be connected to the BLACK channel of the break-out cable. At the time of this manual's writing, component analog video inputs are not supported. Support for this feature will be included in the next firmware release.

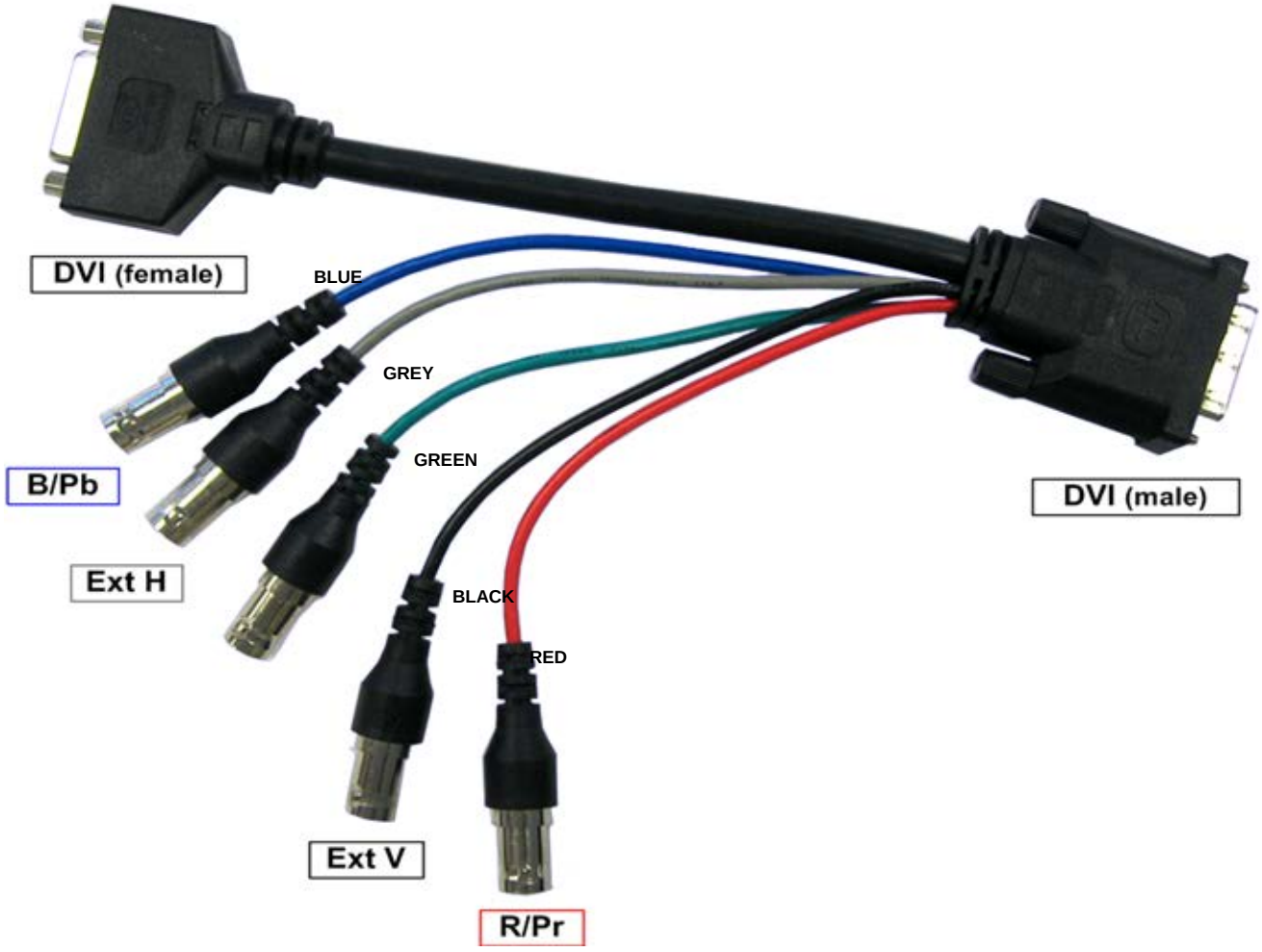


Figure 2-5: Evertz Breakout Cable #WPDVI-DVIBNC5

DVI IN /RB/PrPb OUT:
The female "DVI/PbPr/RB OUT" connector on the rear of the panel enables the user to connect to both DVI and analog video signals generated by the HD201x. When directly connecting a DVI-D cable to this connector, the HD201x's full screen DVI output will be available.

To take advantage of the HD201x's optional multi-viewer output and its component analog video output, two additional break-out cables must be used. The first cable is Evertz breakout cable #WPDVI-DVIBNC5 (optional accessory). The second cable is Evertz breakout cable #WPDVI-DVI2 (optional accessory). Refer to Figure 2-6 for a diagram of these breakout cables. When connecting these cables to the HD201x, first connect cable #WPDVI-DVI-BNC5 to the female DVI connector on the HD2014/12/11 as shown below. After this, connect cable #WPDVI-DVI2 to the female DVI connector on cable #WPDVI-DVI-BNC5 as shown below.

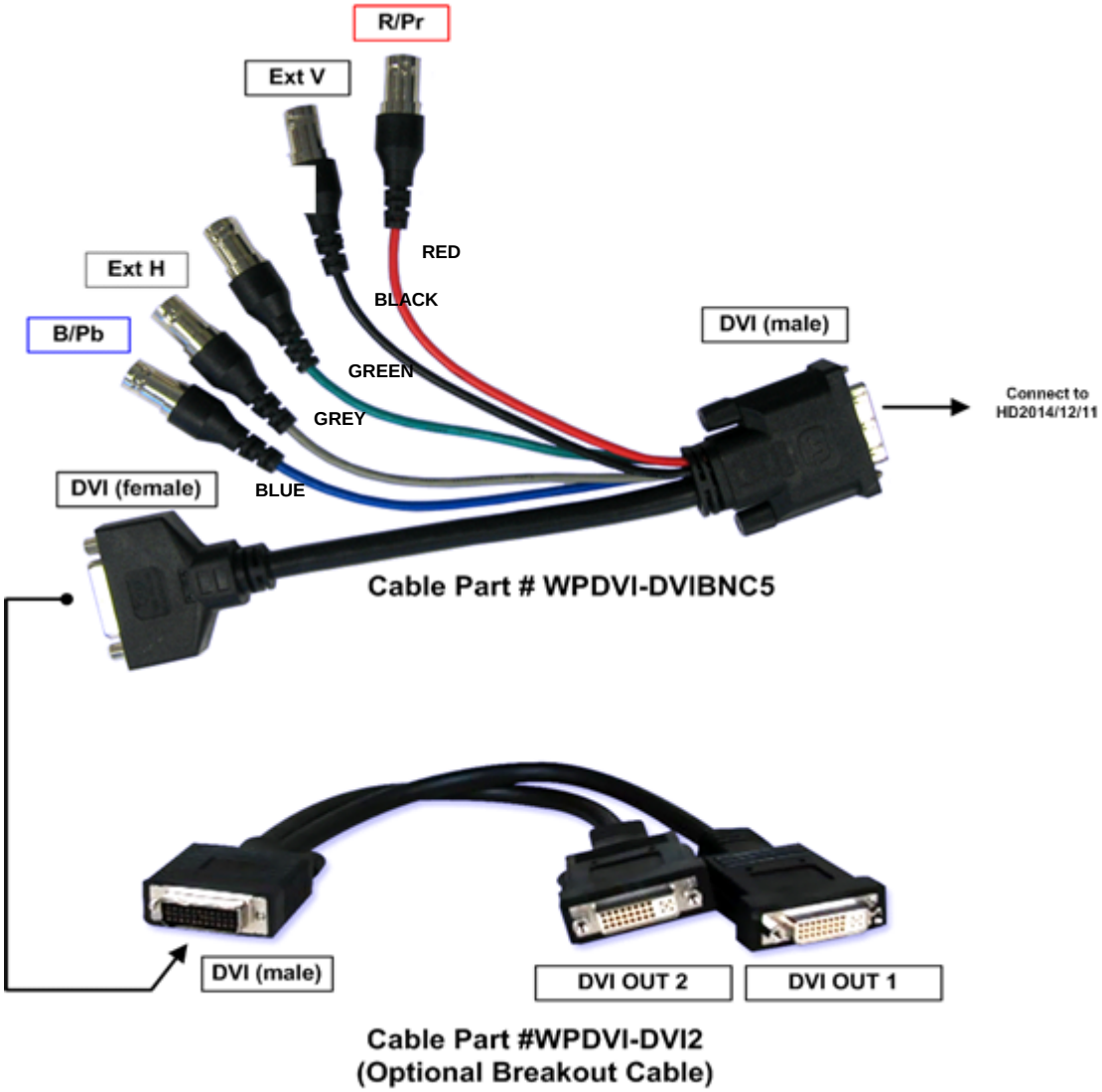


Figure 2-6: Two Connected DVI Cables

DVI OUT 1 will carry the HD201x's DVI program output.
DVI OUT 2 will carry the HD201x's DVI internal multi-viewer output.

The Y/G element of a component analog signal must be connected directly to the BNC labelled **CBVS OUT Y/G OUT** CBVS OUT Y/G OUT on the HD201x rear panel. The Pb/B elements of a component analog signal should be connected to the Blue wire on the break-out cable. The Pr/R element of a component analog signal should be connected to the Red wire on the break-out cable. External H sync (if applicable) should be connected to the GREY channel of the break-out cable. External V sync (if applicable) should be connected to the BLACK channel of the break-out cable. At the time of this manual's writing, component analog video outputs are not supported but will be added in the next firmware release for the HD201x.

2.1.8. Composite Analog Video Connections

CVBS IN Y/G IN: Connection for composite analog video (NSTC/PAL) input signals with 75 ohm termination. When connecting component analog video to the HD201x, connect the Y/G channel of the component signal to this BNC.

CVBS OUT Y/G OUT: Connection for composite analog video (NSTC/PAL) output signals with 75 ohm impedance. The CVBS OUT Y/G BNC is internally connected to the output of PATH 1. When utilizing the component analog output of the HD201x, this BNC will supply the Y/G element of the component analog video signal.

2.1.9. Flex Processing Module Connectors

RIGHT FLEX: The Flex Left slot allows the user to expand the HD201x processing capabilities. Functionality depends on the installed flex module. For example, the FL-HIO enables the use of FLEX LEFT BNC1-3 as three additional and individually configurable HD/SD SDI input/outputs and the FL-CD3 enables the use of FLEX LEFT BNC1-3 as 3x additional composite analog video inputs.

The FL-ADC-HD also enables the use of FLEX LEFT BNC1-3 as:
BNC1 for Y/G(CVBS) input
BNC2 for Pb input
BNC3 for Pr input

LEFT Right: The Flex Right slot allows one to expand the HD2014/12/11 processing capabilities. Functionality depends on the installed flex module. For example, the FR-HIO enables the use of FLEX RIGHT BNC1-3 as three additional and individually configurable HD/SD SDI input/outputs and the FR-CE3 enables the use of FLEX RIGHT BNC1-3 as 3x additional composite analog video outputs.

Flex Right Out 1 is internally connected to the output of PATH2.
Flex Right Out 2 is internally connected to the output of PATH3.
Flex Right Out 3 is internally connected to the output of PATH4.

2.1.10. Optical Connections

SFP IN: SFP fiber input cage accepting 2x Dual SFP fiber RX.
The HD201x supports up to 4 fiber input signals (2x dual RX modules).
Dual SFP receiver modules may be purchased as a HD201x accessory.

SFP OUT: SFP fiber input cage accepting 2x Dual SFP fiber TX.
The HD201x supports up to 4 fiber output signals (2x dual TX modules).
Dual SFP transmit modules may be purchased as a HD201x accessory.

In the HD2014,

SFP 1 Out is internally connected to the output of PATH1.
SFP 2 Out is internally connected to the output of PATH2.
SFP 3 Out is internally connected to the output of PATH3.
SFP 4 Out is internally connected to the output of PATH4.

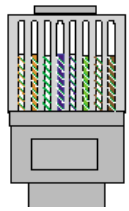
In the HD2011 and HD2012,

SFP 1 Out is internally connected to the output of PATH1.
SFP 2 Out is internally connected to the output of PATH2.
SFP 3 Out is internally connected to the output of PATH1.
SFP 4 Out is internally connected to the output of PATH2.

2.2. CONNECTING TO AN ETHERNET NETWORK

The HD201x is designed for use with 10Base-T (10 Mbps), 100Base-TX (100 Mbps) Ethernet cabling systems. A single 10/100 Ethernet port is available on the HD0201x rear panel "Straight-Through" Ethernet cables may be used when connecting to the HD201x.

Straight-through RJ-45 cable can be purchased or can be constructed using the pinout information in Table 2-7. A colour coded wiring table is provided in Table 2-7 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 2-7: Standard RJ45 Wiring Colour 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.

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.

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 HD201x has established a valid linkage to its hub, and whether the HD2014 is sending or receiving data. This LED will be ON when the HD201x 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 HD201x is sending or receiving data. The LED will be OFF if there is no valid connection.

The HD201x has a specific IP address that may be set through the engineering front panel.

NOTE: Changes to the HD201x's IP address are made via the front panel engineering menu. When using HD201x firmware revision HD2010A-20100212-1051.img or earlier changes done to the units IP address DO NOT become active until the unit is power-cycled. In firmware revisions HD2010A-20100212-1051.img or later, changes to the unit's IP address done via the front panel become active immediately.

2.3. 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.

3. TECHNICAL DESCRIPTION

3.1. SPECIFICATIONS

3.1.1. Coax Inputs

Number of Inputs:	4
Connector:	BNC per IEC 61169-8 Annex A
Input Equalization:	300m @ 270 Mbs with Belden 1694A or equivalent 100m @ 1.5 Gbs with Belden 1694A or equivalent
Return Loss:	> 15 dB to 1.5 GHz
Data Rate:	Auto-sensing SD and HD (270 Mbs & 1.5 Gbs)
Formats:	525i/59.94, 720p/59.94, 1080i/59.94, 625i/50, 720p/50, 1080i/50

3.1.2. CVBS IN, Y/G Inputs

Number of Inputs:	1 (one additional input is available if the +FL-ADC-HD option installed) Supply CVBS when configured to operate with CVBS analog video inputs Supply Y/G when configured to operate with component analog video input
Connector:	BNC per IEC 61169-8 Annex A
Signal Level:	1V nominal
Impedance:	75 ohm
Standard	NSTC/PAL
Freq Lock Range	+/- 50 ppm
Return Loss:	> 35dB to 10 MHz

3.1.3. Coax Outputs

Number of Outputs:	4
Connector:	BNC per IEC 61169-8 Annex A
Signal Level:	800 mV nominal
DC Offset:	0V ± 0.5V
Rise/Fall Time:	270 ps nominal
Overshoot:	< 10% of amplitude
Return Loss:	> 15 dB to 1.5 GHz
Wide Band Jitter:	< 0.20 UI
Format:	525i/59.94, 720p/59.94, 1080i/59.94, 625i/50, 720p/50, 1080i/50

3.1.4. CVBS OUT, Y/G Outputs

Number of Inputs:	1 CVBS supplied when configured for CVBS out Y/G supplied when configured for component out
Connector:	BNC per IEC 61169-8 Annex A
Signal Level:	1V nominal
Impedance:	75 ohm
Standard	NSTC/PAL
DC Offset	0V +/- 50 mV
Return Loss:	> 35dB to 10 MHz
SNR	> 75 dB

3.1.5. Fiber Inputs

Number of Inputs:	4
Connector:	LC/UPC
Form Factor:	Dual Optical SFP Receiver (support for single mode and multi-mode fiber RX)
Wavelength:	1260-1620 nm
Data Rate:	Auto-sensing SD and HD (270 Mbs and 1.5 Gbs)
Formats:	525i/59.94, 720p/59.94, 1080i/59.94, 625i/50, 720p/50, 1080i/50
Receiver Sensitivity	-22 dBm @ 1.485 Gb/s
Max Input Power	-1 dBm

3.1.6. Fiber Outputs

Number of Outputs:	4
Connector:	LC/UPC
Form Factor:	Dual Optical SFP Transmitter (single mode fiber support)
Wavelength:	1310 nm
Data Rate:	SD and HD (270 Mbs and 1.5 Gbs)
Format:	525i/59.94, 720p/59.94, 1080i/59.94, 625i/50, 720p/50, 1080i/50
Optical Power	- 2 dBm nominal

3.1.7. DVI /Analog Video Inputs

Number of Inputs:	1
Connector:	DVI-I (Female)
Breakout Cables:	Supply DVI-D signals directly when interfacing DVI signals only. Use DVI-I → DVI-D and 5x RGBHV BNCs break-out cable when interfacing component analog video signals (optional accessory # WPDVI-DVIBNC5) Pr/R supplied to RED wire Pb/B supplied to BLUE wire Y/G or composite supplied separately to dedicated CBVS IN Y/G IN rear panel BNC
Standards	DVI-D: 1080p/720p @ 59.94 HZ (no HDCP).1080p inputs are interlaced to 1080i. DVI-D: 1080p/720p @ 50 Hz (no HDCP). 1080p inputs are interlaced to 1080i.

3.1.8. DVI /Analog Video Outputs

Number of Outputs: 1
Connector: DVI-I (Female)
Breakout Cables: DVI OUT 1 – Full screen program.
DVI OUT 2 – Optional multi-viewer output.
Use DVI-D "Y Cable" (Part #WPDVI-DVI2 optional accessory) when access to DVI OUT 2 is desired.
Use DVI-I → 2x DVI and 5x RGBHV BNCs (WPDVI-DVIBNC5 optional accessory) when access to component analog video out is desired
Pr/R supplied to RED wire, Pb/B supplied to BLUE wire
Y/G supplied separately to dedicated CBVS OUT / Y/G OUT rear panel BNC
Standards: DVI-D Out 1 (Full screen DVI output): 1080i/720p @ 59.94 Hz (no HDCP)
DVI-D Out 2 (Multi-viewer output)

3.1.9. Analog Audio Inputs

Number of Inputs: 4 (+AA option)
Type: Mono signals, balanced analog audio
Connector: Removable terminal strip
Input Impedance: 10k Ω minimum (differential)
Sampling Freq: 48 KHz
Signal Level: 0 dBFS = 25dBu or 19 dBu (software selectable)
Freq Response: ± 0.5 dB (20 Hz to 20 kHz)
CMRR: > 99 dB @ 1KHz

3.1.10. Analog Audio Outputs

Number of Outputs: 8 (+AA option)
Type: Mono signals, balanced analog audio
Connector: Removable terminal strip
Output Impedance: 60k Ω max
Output Loads: Hi Z
Signal Level Level 0 dBFS = 25 dBu or 19 dBu (software selectable)
Sampling Freq: 48 KHz
Freq Response: +/- 0.1 dB (20 Hz to 20 kHz)

3.1.11. AES Audio Input

Number of Inputs: 8x AES inputs
Standard: SMPTE 276M
Connector: DB15
Input Type: Unbalanced
Impedance: 75 Ω
Sampling Rate: 48 KHz

3.1.12. AES Audio Outputs

Number of Outputs:	8x AES outputs
Standard:	SMPTE 276M
Connector:	DB15
Input Type:	Unbalanced
Impedance:	75 Ω
Sampling Rate:	48 KHz

3.1.13. GPIO Specifications

Number:	8 configurable GPIOs (configurable as input or output)
Type:	Opto-isolated, active low with internal pull-ups to +5V
Connector:	Removable terminal block
Signal Level:	Closure to ground
Function:	Tally of front panel button push (GPO) Virtual front panel button push (GPI)

3.1.14. Reference Input

Type:	NTSC bi-level sync or colour black 1V p-p; PAL bi-level sync or colour black 1 Vp-p
Impedance	75 ohm
Connector:	BNC per IEC 61169-8 Annex A

3.1.15. Electrical

IEC Inlets	Dual IEC inlets Single power supply standard/IEC standard Redundant power supply/IEC optional with +2PS option
IEC Main Inputs	Auto ranging, 100-240 VAC, 50/60 Hz
Max Power Consumption	200 W
Power-Up In Rush Current	max 20A, 8ms duration

3.1.16. Physical

Dimensions	1.75"H x 17.75"D, 19” rack mountable

3.2. ORDERING OPTIONS

+AA	Balanced Analog Audio I/O (4x in and 8x out)
+AA2*	Balanced Analog Audio I/O (8x in and 4x out)
+2PS	Redundant AC Power Supply
+12VPS*	Support for external 12V DC power
+CF2G	Embedded Compact Flash for Test Signal Storage
+MVR	Optional Internal Multi-Viewer (Quad Split)
+UMX	Stereo to 5.1 PCM Surround Sound Up-Mix
+DMX	5.1 PCM Surround Sound Down-Mix
+IG	IntelliGain Audio Loudness Management
+EQ	Programmable Audio Frequency Equalizer
+FL-DECMP2SD-4*	Quad SD MPEG-2 Decoder
+FL-DEC264SD-2*	Dual SD H.264 Decoder
+FL-DECMP2HD-2*	Dual HD/SD MPEG-2 Decoder
+FL-DEC264HD*	HD/SD MPEG-4 Decoder
+FL-HIO	Triple bi-directional HD/SD I/O Flex Module
+FL-CD3	Triple Composite Analog Video Input Flex Module
+FL-ADC-HD	Additional Analog Video Input Flex Module
+FR-HIO	Triple bi-directional HD/SD I/O Flex Module
+FR-CE3	Triple Composite Analog Video Output Flex Module
+2TX	1x Dual SFP Fiber Transmitter (two fiber outputs)
+4TX	2x Dual SFP Fiber Transmitter (four fiber outputs)
+2RX	1x Dual SFP Fiber Receiver (two fiber inputs)
+4RX	2x Dual SFP Fiber Receiver (four fiber inputs)

** Contact Evertz for pricing and release timing*
** Note: +FL-CD3 and +FL-ADC-HD options cannot be added simultaneously (only one option can be selected at a time)*

3.2.1. HD201x Accessories

WPDVI-DVIBNC5	DVI to DVI/RGBHV break out cable
WPDVI-DVI2	DVI "Y' break out cable
WPAES8-BNCM-6F	WPAES8-BNCM-6F cable

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4. FRONT PANEL

The HD201x front panel has been designed to be a simple to use control surface. Quick access control buttons are located on the left hand side of the front panel to enable quick and easy changes to core processing parameters on a per path basis. Eight (8) front panel HOT KEY MACROS are located on the far right hand side of the front panel. HOT KEY MACRO buttons can be programmed to execute multi-parameter sets with a single button push. Control buttons for Analog Audio and AES Audio outputs are located directly to the left of the HOT KEY MARCOs. Status LEDs are visible in the middle of the front panel directly below the front panel display.

Engineering menu navigation buttons are conveniently located directly to the right of the front panel display. A rotary shaft encoder is located to the very right of the front panel. The rotary shaft encoder is used to assist with engineering menu navigation and individual parameter control.

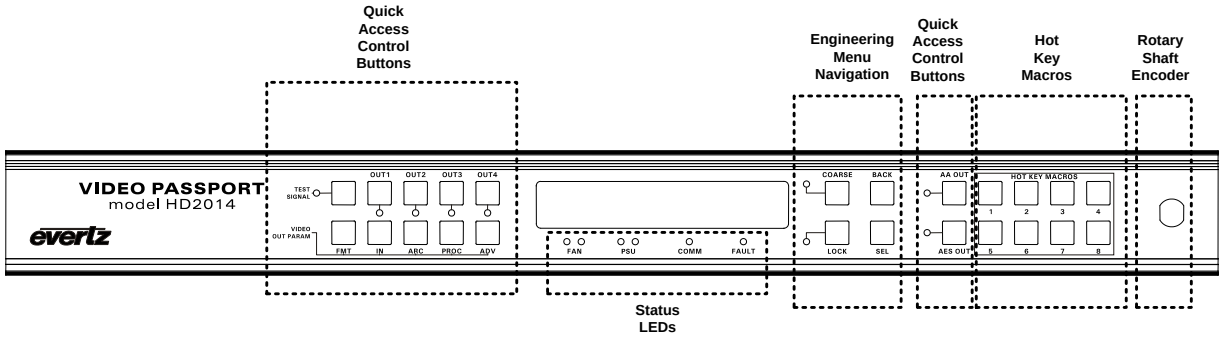


Figure 4-1: HD2014 Front Panel

4.1. UTILIZING THE FRONT PANEL HOT KEYS

The HD201x has four key processing paths. The hot keys located on the left hand side of the front panel are designed to give instant access to key processing parameters on a path by path basis. The HD2012 and HD2011 have front panel controls for only OUT1 and OUT2.

4.1.1. Choosing a Processing Path to Control

To access the processing parameters for PATH 1, press the **OUT1** button. The LED directly below the **OUT1** button will illuminate to indicate that subsequent control selections are for PATH1.

To access the processing parameters for PATH 2, press the **OUT2** button. The LED directly below the OUT2 button will illuminate to indicate that subsequent control selections are for PATH2.

To access the processing parameters for PATH 3, press the **OUT3** button. The LED directly below the **OUT3** button will illuminate to indicate that subsequent control selections are for PATH3.

To access the processing parameters for PATH 4, press the **OUT4** button. The LED directly below the **OUT4** button will illuminate to indicate that subsequent control selections are for PATH4.

4.1.2. Selecting the Processing Path Output Video Format

Once a particular processing path has been selected for control (as per section 4.1.1) push the **FMT** button on the front panel. The currently selected video format will automatically appear once the **FMT** button is pushed. To select a different output video format, use the rotary shaft encoder on the very right hand side of the front panel to select from the available list of output video formats. Once the desired video format is shown, select this video format by pressing the shaft encoder in. The text indicating the video format will momentarily become brighter indicating that the shaft encoder has in fact been depressed and the new video format has been selected. The HD201x currently supports the following output video formats

525i5994: Selects 525i/59.94 as the output video standard.
1080i5994: Selects 1080i/59.94 as the output video standard.
720p5994: Selects 720p/59.94 as the output video standard.
625i/50: Selects 625i/50 as the output video standard.
1080i/50: Selects 1080i/50 as the output video standard.
720p/50: Selects 720p/50 as the output video standard

Note that conversions are possible only between video formats within the same frame rate family.
The HD201x does not have an internal frame rate converter. If an output video format with a frame rate different than the applied video input video format, the processing path will simply output black video.

4.1.3. Selecting the Video Source for the Processing Path

Once a particular processing path has been selected for control (as per section 4.1.1) push the **IN** button on the front panel. The currently selected source of video for the relevant processing path will automatically appear once the **IN** button is pushed. To select a different input video source for the processing path in question, use the rotary shaft encoder on the very right hand side of the front panel to select from the available list of input video sources. Once the desired source of video is shown on the front panel, select this source of video by depressing the shaft encoder. The text indicating the new source of video will momentarily become brighter indicating that the shaft encoder has in fact been depressed and the source of video has been selected. The available source of video depends on the installed options in the device. The following list is representative of a typical list of video sources.

Analog in
bncIn1
bncIn2
bncIn3
bncIn4
dviIn
flexleft1
flexleft2
flexleft3
sfpIn1
sfpIn2
sfpIn3
sfpIn4

4.1.4. Selecting the Aspect Ratio Conversion Mode for the Processing Path

Once a particular processing path has been selected for control (per section 4.1.1) push the **ARC** button on the front panel. The currently selected aspect ratio conversion mode will automatically appear once the **ARC** button is pushed. To select a different aspect ratio conversion, use the shaft encoder on the very right hand side of the front panel to select from the available list of aspect ratio conversion modes. Once the desired aspect ratio conversion mode is shown on the front panel, select the new conversion mode by depressing the shaft encoder. The text indicating the new conversion mode will momentarily become brighter indicating that the shaft encoder has in fact been depressed and the new conversion mode has been selected. The following table provides a list of the available conversions

fullRaster
User
sdPn143toTBCt169 *ltBx139toTBCt169* *ltBx149toTBCt169* *stch139toTBCt169* *stch149toTBCt169* *stch169toTBCt169*
stch139toSdPnl43 *stch149toSdPnl43* *stch169toSdPnl43*
43to43SdPnlon169 *43to139Stchon169* *43to149Stchon169* *43to169Stchon169* *43to139Cropon169* *43to149Cropon169* *43to169Cropon169*
169x169LtBxon43 *169x149LtBxon43* *169x139LtBxon43* *169x43SdCuton43* *169x43Sqzeon43*
169TLBOn43To169 *149TLBOn43TBC169* *149TLBOn43SPn149* *149TLB43To169St1* *169LB43To169* *149LB43ToTBC169m* *149LB43ToSdPn149* *149LB43To169St16* *SP43To43* *SP149To149LtBx43* *SP149To43SdCt43* *SP149To43Sqz43*

4.1.5. Adjusting the Video Proc for the Processing Path

Once a particular processing path has been selected for control (as per section 4.1.1) push the **PROC** button on the front panel. The list of available video proc controls for relevant processing path will then appear. To select a specific video proc control, use the rotary shaft encoder on the very right hand side of the front panel to select from the available list of video proc controls. Once the desired proc control is shown on the front panel, select the proc control by depressing the shaft encoder. The range controls for that proc item will then be presented. Using the front panel shaft encoder, adjust the numerical value to the setting and depress the shaft encoder to select the new value. Note that the proc value will affect the output video in real time. However, to accept the new proc value, the shaft encoder must be depressed. If the front panel **BACK** button is pressed before the shaft encoder is depressed, the new proc value will be discarded and will return to the value previously set before entering range adjustment. The following list is a list of the available proc controls

B Gain
B Gamma
B Offset
Cb Gain
Cb Offset
Cr Gain
Cr Offset
Gamma Adjust
Gamma Level
G Gain
G Gamma
G Offset
Hue
R Gain
R Gamme
RGB Clip
R Offset
Saturation Gain
VideoGain
VidProcRest
Y Gain
Y Offset
Video Gain

4.1.6. Using the ADV Control Button for the Processing Path

The **ADV** control button is currently not enabled and is reserved for future use.

4.1.7. Controlling the Test Signal

Once a particular processing path has been selected for control (as per section 4.1.1) push the **TEST SIGNAL** button to gain control of the internal test signal. Upon pressing the TEST SIGNAL button, the user may choose between the option of ENABLING or DISABLING the test signal generator on the selected processing path output. Note that there is a single test signal generator in the HD201x and this test signal may be routed to one conversion path output at a time. If test signal is active on a particular output path and it is then subsequently enabled on a different path, the test signal will automatically be disabled on the first path and enabled on the second path.

4.1.8. Controlling the Analog Audio Output

The **AA OUT** button on the front panel is designed to give quick and easy access to controls for analog audio output signals. When the **AA OUT** button is pressed on the front panel, the user will immediately be brought to the menu tree for the analog audio outputs. The menu tree presented includes the MIXER, DAC GAIN CONTROL, FORCE SOFT MUTE and OUTPUT SOURCE menus. 5.1.4

4.1.9. Controlling the AES Audio Output

The **AES OUT** button on the front panel is designed to give quick and easy access to controls for AES audio output signals. When the **AES OUT** button is pressed on the front panel, the user will immediately be brought to the menu tree for the AES audio outputs. The menu tree presented includes the MIXER, OUTPUT SOURCE, C BIT and FORCE PRO menus. The menus and their controls are explained in section 5.2 of this manual

4.2. FRONT PANEL LEDS

4.2.1. HD201x Front status LEDs

The HD201x series has several front panel status LEDs. The following sections will provide descriptions for the front panel LEDs.

PSU: The right LED will be green when internal power supplies are present and functioning properly. The left LED will be red when a fault has been detected with the internal power supplies. When ordered with dual redundant power supplies (+2PS option) both supplies must be connected to AC power for the right green LED to be illuminated and the left red LED to turn off.

FAN: The HD201x series has multiple fans providing airflow to cool internal electronics. All fans are located on the right hand side of the HD201x. Airflow through the unit is left to right. The right LED will be green when all fans are operating properly. The left LED will be red when a fault has been detected with any of the HD201x fans.

FAULT: This LED will be red when a serious internal fault has been detected within the HD201x device.

COMMS: This LED will be activated when a HD201x RCP (hardware RCP or software RCP) is controlling the HD201x.

4.3. ENGINEERING MENU SCROLL KNOB

The HD201x has a rotary shaft encoder on the right side of front panel, which is used for navigating the engineering menu. The scroll knob can turn left and right to scroll up and down engineering menus. Push the scroll knob in to select parameters and drill down into sub-menu layer.

4.4. ENGINEERING MENU NAVIGATION BUTTONS

The HD201x has four front panel buttons that are used for navigating the engineering menu and system control.

COARSE: The **COARSE** button is used to increase the rate at which the user may scroll through the device parameters. To activate the coarse functionality, press the **COARSE** button. The front panel display will temporarily display a message indicating "coarse enabled". The LED directly to the left of the **COARSE** button will also illuminate. To disable the coarse functionality, depress the **COARSE** button a second time. The front panel display will temporarily display a message indicating "coarse disabled". The LED directly to the left of the **COARSE** button will also turn off.

BACK: The **BACK** button is used when navigating the engineering front menu system. Pushing this button causes you to move back (up) one level in the engineering menu structure.

LOCK: The **LOCK** button is used to lock the HD201x front panel. Pushing the **LOCK** button will lock the front panel and cause button pushes to be ignored. The LED directly to the left of the front panel will illuminate when the front panel is locked. Pushing any button on the front panel will cause the front panel to display a message indicating that "push LOCK+ADV to Unlk". The **LOCK** + **ADV** button must be held down together to un-lock front panel control.

SEL: This button is used when navigating the engineering front menu system. Press the **SEL** button when you wish to select a parameter or menu item.

4.5. HOT KEY MACROS

The HD201x has eight (8) front panel HOT KEY MACROS. These buttons enable control macros to be executed at the single touch of a button. To program these front panel macro buttons, the HD201x's on-board web server must be used to create a system configuration file. Once this configuration file has been created, it must be saved to the HD201x unit and activated using the front panel menu system. Refer to the HD201x Web Tool Programming Guide for additional information on how to program these control macros.

5. FRONT PANEL ENGINEERING MENU – MAIN MENU

The HD201x front panel engineering menu is arranged in a layered structure that groups logical system controls together. The highest level in the engineering menu is split into ***VIDEO***, ***AUDIO***, ***MISC*** and ***SYSTEM*** categories. Selecting one of these items will take you to the next menu level. Section 5 of this manual provides detailed descriptions of each of the sub-menu. The tables in these sections are arranged in an indented structure to indicate the path taken to reach individual controls. Menu items or parameters that are underlined indicate the factory default values.

VIDEO	This menu enables the user to configure the video parameters.
AUDIO	This menu enables the user to configure the audio parameters.
MISC	This menu enables the user to configure the network settings.
SYSTEM	This menu enables the user to manage the configuration files on the HD201x. In this menu, you are also able to determine the firmware revision installed on the unit as well as all options installed on the unit.

5.1. VIDEO CONFIGURATION ITEMS

Within the ***VIDEO*** control menu the following sub-menus become available to the user**.**

Routing	Defines which sources of video are routed to each FS/conversion path.
Processing	Defines video processing parameters for each FS/conversion path.
Analog In	Configures the analog video input parameters.
Analog Out	Configures the analog video output parameters.
DVI Input	Configures the DVI video input parameters.
DVI Output	Configures the DVI video output parameters.
Octoplus	Configures the internal quad split multi-image display.
Reference	Configures the reference signal.
Test Generator	Configures the internal test signal generator parameters.

Table 5-1: Top Level of the Video Menu

5.1.1. Selecting the Routing Path

The source of video for each processing path may be selected using the **PATH1**, **PATH2**, **PATH3** and **PATH4** controls. In the HD2014, there will be four selections available to the user, one for each of the four processing paths in the unit. In the HD2012, there will be two selections available to the user, one for each of the two processing paths in the unit. In the HD2011, there will be one video source selection. In this case, the selected source of video will be routed to both processing paths in the unit. Depending on the options installed in the unit, different sources of video will be made available. For the sake of brevity, only routing selections for **PATH1** will be shown. Selections for other processing paths are the same for **PATH2**, **PATH3** and **PATH4**.

- *VIDEO*
  - *Routing*
    - *Source*
      - *Path 1*
        - *analogIn*
        - *bncIn1*
        - *bncIn2*
        - *bncIn3*
        - *bncIn4*
        - *dviIn*
        - *FlexLeftBNC1*
        - *FlexLeftBNC2*
        - *FlexLeftBNC3*
        - *sfpIn1*
        - *sfpIn2*
        - *sfpIn3*
        - *sfpIn4*

Selects an input to be the source of video for processing path #1.

Note that selections for FlexLeftBN1, FlexLeftBNC2 and FlexLeftBN3 will only be presented when a Left Flex processing module is installed in the unit.

5.1.2. Configuring the Parameters for the Processing Converter Sub-Menu

To access the core video processing parameters, navigate the engineering menu as follows: **Video > Processing > Converter**. The HD2014 has four internal video processors. The HD2012 and the HD2011 has two internal video processors. For the sake of brevity, only controls for PATH 1 will be shown in the following sections.

5.1.2.1. Monitoring the Audio Delay Status

For each processing path, the audio delay incurred during the conversion process is reported as part of the overall audio monitoring process. Select **AUDIO DELAY STATUS** to determined embedded audio processing delay.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1*
        - *Audio Monitor*
          - *Audio Delay Status*

When selected, the audio delay through the processing path is reported in microseconds (us). Divide the number presented by 1000 to determine the delay in milliseconds (ms).

5.1.2.2. Viewing the Sample Rate Converted Status for the Selected Path

For each processing path, the status of converter's internal sample rate converters is reported as part of the overall audio monitoring process. Select **SRC STATUS** menu selection to determine status of the converters embedded audio sample rates converters.

VIDEO
Processing
Converter
VIDEO
Audio Monitor
Src Status
Enable or Disable

Audio sample rate converter status is reported when this parameter is selected. Sample rates converters are disabled when any non PCM audio data (ie. Dolby E) is present in the embedded audio stream.

5.1.2.3. Setting the CC1 to CC4 Service Controls

Each processing path in the HD201x performs full closed caption processing. When converting from CEA608 to CEA708 captions, specific controls are made available for mapping cc1, cc2, cc3 and cc4 services. For the sake of brevity, only controls for CC1 will be mentioned below. Controls for cc2, cc3 and cc4 are identical. Select **CC1 TO EIA708SERVICE** to control cc1 mapping.

VIDEO
Processing
Converter
Path 1
Caption
cc1ToEIA708Service
Off,
1
to
16

The **CC1 Service Control** will be mapped to the CEA708 Service N, where N is the selected parameter values. When **CC1 Service Control** is set to *off*, the CC1 is not mapped to any EIA708 Caption Service.

5.1.2.4. Setting the T1 to T4 Service Controls

Each processing path performs full closed caption processing. When converting from CEA608 to CEA708 captions, specific controls are made available for mapping T1, T2, T3 and T4 services. For the sake of brevity, only controls for T1 will be mentioned below. Controls for T2, T3 and T4 are identical. Select **T1 TO EIA708SERVICE** to control T1 mapping.

VIDEO
Processing
Converter
Path 1
Caption
t1ToEIA708Service
Off,
1
to
16

The **T1 Service Control** will be mapped to the CEA708 Service N, where N is the selected parameter values. When **T1 Service Control** is set to *off*, the T1 is not mapped to any EIA708 Caption Service.

5.1.2.5. Enabling Closed Captions

The **CC Enable** control allows the user to enable and disable caption insertion on the converter outputs. When the **Captions** control is *enabled*, any closed captioning will be mapped to line 21 if the output video is SD, or to the designated HD write line if the output video is HD. When the **Captions** control is *disabled*, no closed captioning is encoded in the output video generated by the converter.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1*
        - *Caption*
          - *ccEnable*
            - *Enable*
            - *Disable*

The **CC Enable** control allows the user to enable and disable caption insertion on the converter outputs. When the **Captions** control is *enabled*, any closed captioning will be mapped to line 21 if the output video is SD, or to the designated HD write line if the output video is HD. When the **Captions** control is *disabled*, no closed captioning is encoded in the output video generated by the converter. make

5.1.2.6. Setting the HD Write Line

The **HD Write Line** control will set the HD line where the HD VANC captions are inserted on the output HD video as per SMPTE 334M.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1*
        - *Caption*
          - *hdWriteLine*
            - *7 to 24*

To set the **HD Write Line** control, enter a value between 7 and 24 into the *HD write line* field.

5.1.2.7. Setting the CC Timeout

The **CC Timeout** control sets the duration used to determine whether captions are present in the input video signal.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1 to 4*
        - *Caption*
          - *ccTimeout*
            - *0 to 600*

The **CC Timeout** control sets the duration used to determine whether captions are present in the input video signal. Units are frames.

5.1.2.8. Setting the Type of Deinterlacer

The user can adjust basic operating mode for the video de-interlacing used in the video processors with the **De-Interlacer Type** control. Options include Adaptive VT, Field Merge Only, Temporal Only. Optimal performance is obtained when selecting Adaptive VT processing.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1*
        - *Deinterlacer*
          - *Deinterlacer Type*
            - *adaptiveVT*
            - *fieldMergeOnly*
            - *temporalOnly*

When *adaptiveVT* is selected, optimal processing is achieved for all types of video content using an advanced directional filter and fully motion adaptive weighting process.

When *fieldMergeOnly* is selected, field 1 and field 2 are simply meshed together when generating the de-interlaced video.

When *temporalOnly* is selected, a simple and non adaptive temporal filter is used to generate de-interlaced video.

5.1.2.9. Setting the Film Detection Mode for the Deinterlacer

The user can adjust basic operating mode for the film mode processor used in the video de-interlacer with the **Film Detection Mode** control.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1*
        - *Deinterlacer*
          - *filmDetectionMode*
            - *Auto*
            - *detect22Only*
            - *detect32and22*
            - *detect32Only*
            - *videoOnly*

When set to Auto, the film mode detector will automatically search for all embedded film mode sequences in the incoming video and automatically perform “inverse telecine” processing as appropriate to create progressive content. When no film mode sequence is found, video mode processing will be activated to create progressive content.

When set to *detect 32and22*, the film mode detector will automatically search for embedded 3:2 and 2:2 sequences in the incoming video and automatically perform inverse 3:2 and 2:2 processing as appropriate. When no 3:2 or 2:2 film mode sequence is found, video mode processing will be activated.

When set to detect 22Only, the film mode detector will automatically search for embedded 2:2 sequences in the incoming video and automatically perform inverse 2:2 processing as appropriate. When no 2:2 film mode sequences are found, video mode processing will be activated.

When set to detect *32Only,* the film mode detector will automatically search for embedded 3:2 sequences in the incoming video and automatically perform inverse 3:2 processing as appropriate. When no 3:2 film mode sequence is found, video mode processing will be activated.

When set to *video only*, the film mode detector is turned off and video processing only will be used when de-interlacing incoming video.

5.1.2.10. Setting the ifmd Mode

The motion adaptive nature of the internal de-interlacer may be set to Auto, Disable or Noise Adaptive using the **IFMD MODE** control. Optimal processing for normal video content is achieved when set to Auto. In very noisy environments enhanced image quality may be achieved by using the Noise Adaptive setting. When set to Disable, no motion processing will be activated. Reduced vertical resolution may result from using the Disable setting.

VIDEO
Processing
Converter
Path 1
Deinterlacer
ifmdMode
Auto
Disable
noiseadaptive

Optimal processing for normal video content is achieved when set to *Auto*. In very noisy environments enhanced image quality may be achieved by using the Noise Adaptive setting. When set to *Disable*, no motion processing will be activated. Reduced vertical resolution may result from using the *Disable* setting.

5.1.2.11. Viewing the Input Standard

The status of the video standard detected on the input of a converter may be monitored by selecting the **DETECTED INPUT STANDARD** menu item

VIDEO
Processing
Converter
Path 1
IO
detectedInputSta
(input standard)

The converter will report none, 525i5994, 625i50, 1080i5994, 1080i50, 720p5994 or 720p50.

5.1.2.12. Setting the Mode when the Video is Lost

The **Loss of Video Mode** enables the user to set the action the processing path will take when the input video signal is lost.

VIDEO
Processing
Converter
Path 1
IO
lossOfVideoMode
Black
Blue
Freeze

When set to *Black*, the processing path will output black video when the video signal is lost.

When set to *Blue*, the processing path will output blue video when the video signal is lost.

When set to *Freeze*, the processing path will freeze on the last good video frame received.

5.1.2.13. Setting SD Blanking

With the **SD Blanking** control, the user can adjust which standard definition lines will be blanked prior to up-converting the signal. All active video lines up to and including the selected line number will be blanked. Normally line 21 (where closed caption information may be present) is blanked. Captioning will still be processed normally; this control prevents caption waveforms from being processed as video.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1*
        - *IO*
          - *sdBlanking*
            - *19*
            - *20*
            - *21*
            - *22*
            - *23*

To set the SD Blanking control, select a value from the list of supported line numbers.

19	Lines up to and including line 19 will be blanked.
20	Lines up to and including line 20 will be blanked.
21	Lines up to and including line 21 will be blanked.
22	Lines up to and including line 22 will be blanked.
23	Lines up to and including line 23 will be blanked.

5.1.2.14. Setting the Input Video Standard

The **Video Input Standard** control selects the input video standard being used. Interlaced video formats are shown with the number of fields per second. Progressive formats are shown with the number of frames per second. Converters are not capable of temporal processing, so it will not convert between 59.94 and 60 or between 50 and the 60 related frame rates. When the input standard is set to *Auto*, the module will auto-detect the video standard.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1 to 4*
        - *IO*
          - *videoStdInput*
            - *Auto*
            - *525i5994*
            - *1080i5994*
            - *720p5994*
            - *625i50*
            - *1080i50*
            - *720p50*

To select a specific video input standard, select a standard from the drop down list of supported input video formats.

Auto:	Auto-detect input video standard.
525i5994:	Select 525i/59.94 as the input video standard.
1080i5994:	Select 1080i/59.94 as the input video standard.
720p5994:	Select 720p/59.94 as the input video standard.
625i/50:	Select 625i/50 as the input video standard.
1080i50:	Select 1080i/59.94 as the input video standard.
720p50:	Select 720p/59.94 as the input video standard.

5.1.2.15. Setting the Output Video Standard

The **Video Output Standard** control selects the output video standard. Converters are not capable of temporal processing, so it will not convert between 59.94 and 60 or between 50 and the 60 related frame rates.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1 to 4*
        - *IO*
          - *videoStdOutput*
            - *525i5994*
            - *1080i5994*
            - *720p5994*
            - *625i50*
            - *1080i50*
            - *720p50*

The following output standard are available:

525i5994: Select 525i/59.94 as the output video standard.
1080i5994: Select 1080i/59.94 as the output video standard.
720p5994: Select 720p/59.94 as the output video standard.
625i/50: Select 625i/50 as the output video standard.
1080i/50: Select 1080i/50 as the output video standard.
720p/50: Select 720p/50 as the output video standard.

5.1.2.16. Setting the VITC Read Select

The **VITC Read Select** control determines on which line the processing path will search for vertical interval time code.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1 to 4*
        - *IO*
          - *vitcReadSelect*
            - *6 to 21*

The processing path will search for vertical interval time code on the line number selected.

5.1.2.17. Setting the VITC Write Select

The **HD Write Line** control will set the VITC line where the processing path will insert VITC VANC packets.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1 to 4*
        - *IO*
          - *vitcWriteSelect*
            - *6 to 21*

The processing path will place vertical interval time code on the selected line number.

5.1.2.18. Setting the Noise Reduction Level

The **Noise Reduction** control manages the level of noise reduction to apply to the video signal. The selection levels automatically set the motion detection threshold and the aggressiveness of the filters to remove noise.

- *Path 1 to 4*
  - *NoiseReduction*
    - *Level*
      - *gnr*
        - *Off*
        - *Low*
        - *Middle*
        - *High*

Off - When the control is set to *Off*, there is no noise reduction. The input video is left untouched.

Low - When the control is set to *Low*, the noise reducer will have a lower motion detection threshold and a less aggressive filter. This level of noise reduction is used for video that has low random noise, where removal of low-level details is minimized.

Middle - When the control is set to *Middle*, the noise reducer will have an average threshold set for the motion detection threshold and aggressive filters. This level of noise reduction is used for video that has typical amounts of random noise, where the module will remove random noise and affect low-level details, more so than a *Low* setting.

High - When the control is set to *High*, the noise reducer will have a high motion detection threshold and a very aggressive filter. This level of noise reduction is used for video that has a high level of random noise, where the filters will remove the random noise, but will soften the low-level details.

5.1.2.19. Setting the Y, Cr, Cb, R, G, B Gain

The **Y Gain**, **Cr Gain**, **Cb Gain**, **R Gain**, **G Gain**, **B Gain** enable the user to change the gain of the video signal in the Y Cb Cr space or the R G B space. The **Y Gain**, **Cr Gain**, **Cb Gain**, **R Gain**, **G Gain**, **B Gain** controls all operate in the same manner. Gain adjustments in the Y, Cb, Cr domain are made first, followed by gain adjustments in the RGB domain. Illegal values are clipped after gain adjustments. For the sake of simplicity, only the **Y Gain** control will be described in this manual.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1 to 4*
        - *Proc*
          - *Y Gain*
            - *-50 to 100*

With the **Y Gain** control, the user can adjust the gain of the Y channel over a range of +-50/+100% in 0.1% increments. To set the gain value for the Y channel, enter a value between -50% and 100% into the appropriate *Y gain* field. On the HD201x front panel the selected value is show in both % (range -50% to +100%) and a numerical value (-500 to +1000)

5.1.2.20. Setting the Y, Cr and Cb Offset and R, G, B Offset

There are three controls that set the DC Offset of each component in the Y Cb Cr space and the DC offset each component in the R G B space. For the sake of simplicity, only the Y Offset control will be included in this manual.

VIDEO
Processing
Converter
Path 1 to 4
Proc
Y Offset
-200 to 200

The **Y Offset** controls enable the user to adjust the DC offset of the Y channel in +/- 100 quantization levels. To set the offset value for the Y channel, enter a value between -100 and 100 into the appropriate *Y offset* field.

5.1.2.21. Setting the R, G and B Gamma Level

With the **Gamma Level** control, the user can adjust the Gamma correction factor for R, G, and B. For the sake of simplicity, only the R Gamma control will be included in this manual.

VIDEO
Processing
Converter
Path 1 to 4
Proc
rGamma
-128 to 127

The **R Gamma** control enables the user to adjust the gamma level for the R channel. To set the gamma value for the R channel, enter a value between -128 and 127 into the appropriate *R Gamma* field.

5.1.2.22. Setting the Hue

With the HUE control, the user can adjust the HUE of the video signal in the processing path.

VIDEO
Processing
Converter
Path 1
Proc
Hue
-180 to 180 degrees

With the **HUE** control, the user can adjust the Hue or colour of the video with a +/- 180 degrees range in 0.1 degree increments. To set the hue for the converter, enter a value between -180 to 180 degrees into the *Hue* field. On the HD201x On front panel the selected value is show in both degrees (range -180 to 180) and a numerical value (-1800 to +1800)

5.1.2.23. Enabling the RGB Clip

The **RGB Clip** control enables and disables the converter's internal RGB clipper/colour legalizer. When enabled, the module will clip any illegal levels of R, G, and B (individually) to black and white levels. This control is normally set to *Disable* in order to allow for super black or other test patterns to pass through the module.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1 to 4*
        - *Proc*
          - *rgbClip*
            - *Enable*
            - *Disable*

Enable - When enabled, the module will clip any illegal levels of R, G, and B (individually) to black and white levels. If disabled, then the illegal values are passed unmodified.

Disable - This control is normally set to *Disable* in order to allow for super black or other test patterns to pass through the module.

5.1.2.24. Setting the Gamma Adjust

The **Gamma Adjust** control enables and disables the converter's ability to adjust gamma.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1 to 4*
        - *Proc*
          - *gammaAdjust*
            - *Enable*
            - *Disable*

Enable - When enabled, the module will allow the user to adjust the gamma level.

Disable - If disabled, then the gamma level is set to 0.

5.1.2.25. Setting the Gamma Level

With the **Gamma Level** control, the user can adjust the Gamma correction factor.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1 to 4*
        - *Proc*
          - *gammaLevel*
            - *-128 to 127*

To set the gamma level, enter a value between -128 and 127 into the *gamma level* field.

5.1.2.26. Setting the Saturation Gain Level

With the **Saturation Gain** control, the user can adjust the saturation of the video signal passing through the conversion engine with a range of -50% to 100%.

VIDEO
Processing
Converter
Path 1 to 4
Proc
saturationGain
%

With the **SATURATION** control, the user can adjust the saturation of the video with a -50% to 100% range in 0.1 degree increments. To set the saturation, enter a value -50% to 100%. On the HD201x front panel the selected value is shown in both percentage (range -50% to 100%) and a numerical value (-500 to +1000)

5.1.2.27. Setting the Video Gain Level

With the **Video Gain** control, the user can adjust the video gain of the video signal passing through the conversion path.

VIDEO
Processing
Converter
Path 1 to 4
Proc
videoGain
-10% to 10%

With the **VIDEO GAIN** control, the user can adjust the overall gain of the video with a -50% to 100% range in 0.1 degree increments. To set the video gain, enter a value -50% to 100%. On the HD201x front panel the selected value is show in both percentage (range -50% to 100%) and a numerical value (-500 to +1000)

5.1.2.28. Resetting the Video Processing Parameters

The **Video Proc Reset** control allows the user to rest the video proc controls to their nominal settings.

VIDEO
Processing
Converter
Path 1
Proc
videoProcReset
Force

When force is selected, the video proc parameters will be reset to their nominal settings.

5.1.2.29. Setting the Aspect Ratio Converter

The **Aspect Ratio** control sets the aspect ratio control that will be performed during the up/down/cross conversion process. Many of the standard aspect ratio conversions are listed as pre-defined options that may be selected. In addition to this, custom aspect ratio conversions can be defined using the *USER* mode of operation. Once *USER* is selected, **Input H Start**, **Input H Stop**, **Input V Start**, **Input V Stop**, **Output H Start**, **Output H Stop**, **Output V Start**, **Output V Stop** controls are used for this purpose. The active region of the input raster is defined by the **Input H Start**, **Input H Stop**, **Input V Start**, **Input V Stop.** The region defined by those controls is scaled to the output raster as defined by the **Output H Start**, **Output H Stop**, **Output V Start**, **Output V Stop.** Colored image side panels can be utilized to fill regions of the output raster that are outside the region defined by the output image raster controls.

VIDEO
Processing
Converter
Path 1
Scaler
aspectRatioConve
See Table 5-2

Table 5-2 provides the user with a list of Aspect Ratio Conversion menu options.

MENU ITEM	PARAMETER	DESCRIPTION
fullRaster	Full raster	Converts the full input raster to full output raster. If the input and output aspect ratios are not equivalent there will be aspect distortion.
User	*User*	Converts the region of the active input raster as defined by the **Input H Start**, **Input H Stop**, **Input V Start**, **Input V Stop** controls to the output raster as defined by the **Output H Start**, **Output H Stop**, **Output V Start**, **Output V Stop.**
sdPn143toTBCt169 *1tBx139toTBCt169* *1tBx149toTBCt169* *stch139toTBCt169* *stch149toTBCt169* *stch169toTBCt169*	*side Panel 4:3 to TB Cut 16:9* *Letter Box13:9 toTB Cut 16:9* *letterBox14:9 to TB Cut16:9* *Stretch 13:9 to TB Cut16:9* *Stretch 14:9 to TB Cut16:9* *Stretch 16:9 to TB Cut16:9*	These settings convert the input picture to 16:9 top and bottom cuts.
stch139toSdPn143 *stch149toSdPn143* *stch169toSdPn143*	*Stretch13:9 to Side Panel 4:3* *Stretch14:9 to Side Panel 4:3* *Stretch16:9 to Side Panel 4:3*	These settings squeeze common 16:9, 14:9 and 13:9 input aspect ratios to 4:3 side paneled images on a 16:9 aspect raster.

43to43SdPnlon169 *43to139Stchon169* *43to149Stchon169* *43to169Stchon169* *43to139Cropon169* *43to149Cropon169* *43to169Cropon169*	*V4:3 to 4:3 Side Panel on16:9* *V4:3 to 13:9 Stretch on 16:9* *V4:3 to 14:9 Stretch on 16:9* *V4:3 to 16:9 Stretch on 16:9* *V4:3 to 13:9 Crop on 16:9* *V4:3 to 14:9 Crop on 16:9* *V4:3 to 16:9 Crop on 16:9*	These settings are common up-converter settings for converting 4:3 aspect ratio images to common 16:9 formats.
169x169LtBxon43 *169x149LtBxon43* *169x139LtBxon43* *169x43SdCuton43* *169x43Sqzeon43*	*V16:9 to 16:9 Letter Box on 4:3* *V16:9 to 14:9 Letter Box on 4:3* *V16:9 to 13:9 Letter Box on 4:3* *V16:9 to 4:3 Side Cut on 4:3* *V16:9 to 4:3 Squeeze on 4:3*	These settings are common down-converter settings for converting 16:9 aspect ratio images to common 4:3, 16:9, 14:9 and 13:9 formats.
169TLBOn43To169 *149TLBOn43TBC169* *149TLBOn43SPn149* *149TLB43To169St1* *169LB43To169* *149LB43ToTBC169m* *149LB43ToSdPn149* *149LB43To169St16* *SP43To43* *SP149To149LtBx43* *SP149To43SdCt43* *SP149To43Sqz43*		

Table 5-2: Aspect Ratio Conversion Menu Options

5.1.2.30. Setting the Panel Colour

There are three controls used to set the side panel colours called **Red Panel**, **Green Panel**, **Blue Panel**. The control for each colour component works in the same way, so for the sake of brevity, only the menu item for the **Red Panel** control will be discussed in this manual.

VIDEO
Processing
Converter
Path 1
Scaler
Red Panel
0 to 255

The **Red Panel** control defines the red colour component for the desired side panel colour. Set the **Red Panel** control field to the red value required (range *0* to *255*).

Hint: You can use a standard colour picker such as is available in Microsoft Paint to determine the colour values that you wish to use.

5.1.2.31. Setting the Input H Start

The **Input H Start** control defines the starting horizontal portion of the input image that will be processed to the output. **Input H Start** does not have any effect when the pre-defined aspect ratios are used.

VIDEO
Processing
Converter
Path 1
Scaler
Input H Start
0 to 1919

To set the **Input H Start** control, enter a value between 0 and 1919 into the *Input H Start* field. The default value is 0.

5.1.2.32. Setting the Input H Stop

The **Input H Stop** control defines the ending horizontal portion of the input image that will be processed to the output. **Input H Stop** does not have any effect when the pre-defined aspect ratios are used.

VIDEO
Processing
Converter
Path 1
Scaler
Input H Stop
0 to 1919

To set the **Input H Stop** control, enter a value between 0 and 1919 into the *Input H Stop* field. The default value is 0.

5.1.2.33. Setting the Input V Start

The **Input V Start** control defines the starting vertical portion of the input image that will be processed to the output. **Input V Start** does not have any effect when the pre-defined aspect ratios are used.

VIDEO
Processing
Converter
Path 1
Scaler
Input V Start
0 to 1079

To set the **Input V Start** control, enter a value between 0 and 1079 into the *Input V Start* field. The default value is 0.

5.1.2.34. Setting the Input V Stop

The **Input V Stop** control defines the ending vertical portion of the input image that will be processed to the output. **Input V Stop** does not have any effect when the pre-defined aspect ratios are used.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1 to 4*
        - *Scaler*
          - *Input V Stop*
            - *0 to 1079*

To set the **Input V Stop** control, enter a value between 0 and 1079 into the *Input V Stop* field. The default value is 0.

5.1.2.35. Setting the Output H Start

The **Output H Start** control determines where to place the selected portion of the input image onto the output video raster. The **Output H Start** control defines the starting horizontal position for the video content on the output image raster. The input image will be stretched to fill the width defined by **Output H Start** and **Output H Stop**. Areas of the output image raster not filled with video content will be filled with the pre-defined panel colours.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1*
        - *Scaler*
          - *Output H Start*
            - *0 to 1919*

To set the **Output H Start** control, enter a value between 0 and 1919 into the *Output H Start* field.

5.1.2.36. Setting the Output H Stop

The **Output H Stop** control determines where to place the selected portion of the input image onto the output video raster. The **Output H Stop** control defines the ending horizontal position for video content on the output image raster. The input image will be stretched to fill the width defined by **Output H Start** and **Output H Stop**. Areas of the output image raster that are not filled with video content will be filled with the pre-defined panel colours.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1*
        - *Scaler*
          - *Output H Stop*
            - *0 to 1919*

To set the **Output H Stop** control, enter a value between 0 and 1919 into the *Output H Stop* field.

5.1.2.37. Setting the Output V Start

The **Output V Start** control determines where to place the selected portion of the input image onto the output video raster. The **Output V Start** control defines the starting vertical position for video content on the output image raster. The input image will be stretched to fill the width defined by **Output V Start** and **Output V Stop**. Areas of the output image raster that are not filled with video content will be filled with the pre-defined panel colours.

VIDEO
Processing
Converter
Path 1
Scaler
Output V Start
0 to 1079

To set the **Output V Start** control, enter a value between 0 and 1079 into the *Output H Start* field.

5.1.2.38. Setting the Output V Stop

The **Output V Stop** control determines where to place the selected portion of the input image onto the output video raster. The **Output V Stop** control defines the ending vertical position for video content on the output image raster. The input image will be stretched to fill the width defined by **Output V Start** and **Output V Stop**. Areas of the output image raster that are not filled with video content will be filled with the pre-defined panel colours.

VIDEO
Processing
Converter
Path 1 to 4
Scaler
Output V Stop
0 to 1079

To set the **Output V Stop** control, enter a value between 0 and 1079 into the *Output H Stop* field.

5.1.2.39. Setting the H Slew Rate Limit

The **H Slew Rate Limit** control enables and disables the Horizontal Slew Rate Limit for the Scaler. Enabling the **H Slew Rate Limit** control causes the internal video processing to adapt for sharp horizontal transitions in the video content and minimize edge ringing that may occur due to such transitions. Disabling the **H Slew Rate Limit** control bypasses the edge processing in the scaler.

VIDEO
Processing
Converter
Path 1
Scaler
hSlewLimit
Enable
Disable

To set the **H Slew Rate Limit** control, select either *enable* or *disable*.

Enable - Enables the H Slew Rate Limit. The internal video processing will adapt its filtering for sharp horizontal transitions in the video content and will minimize edge ringing that may occur due to such transitions.

Disable - Disables the H Slew Rate Limit.

5.1.2.40. Setting the V Slew Rate Limit

The **V Slew Rate Limit** control enables and disables the Vertical Slew Rate Limit for the Scaler. Enabling the **V Slew Rate Limit** control causes the internal video processing to adapt for sharp vertical transitions in the video content and minimize edge ringing that may occur due to such transitions. Disabling the **V Slew Rate Limit** control bypasses the edge processing in the scaler.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1*
        - *Scaler*
          - *vSlewLimit*
            - *Enable*
            - *Disable*

To set the **V Slew Rate Limit** control, select either *enable* or *disable*.

Enable - Enables the V Slew Rate Limit. The internal video processing will adapt its filtering for sharp vertical transitions in the video content and will minimize edge ringing that may occur due to such transitions.

Disable - Disables the V Slew Rate Limit.

5.1.2.41. Setting the V Filter Cutoff

The **V Filter Cutoff** sets the vertical cutoff for the Scaler. This control manages the amount of aliasing that the vertical scaler allows to pass from its input to output when performing scaling and aspect ratio conversion.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1*
        - *Scaler*
          - *vFilterCutoff*
            - *Auto, 0 to 64*

This range for this control is 1 to 64. Level 1 performs the most band limiting and results in a soft image. Level 64 performs the least band limiting and results in a sharper image. The Auto setting automatically selects the optimal filter based on input and output video formats.

5.1.2.42. Setting the H Filter Cutoff

The **H Filter Cutoff** sets the horizontal cutoff for the scaler. This control manages the amount of aliasing that the horizontal scaler allows to pass from its input to output when performing scaling and aspect ratio conversion.

- *VIDEO*
  - *Processing*
    - *Converter*
      - *Path 1*
        - *Scaler*
          - *hFilterCutoff*
            - *Auto, 0 to 64*

The range for this control is 1 to 64. Level 1 performs the most band limiting and results in a soft image. Level 64 performs the least band limiting and results in a sharper image. The Auto setting automatically selects the optimal filter based on input and output video formats.

5.1.2.43. Setting the Timing for the H Phase Offset

With the **H Phase Offset** control, the user can set the horizontal timing of the output video with respect to the reference input. Setting this control to *0* keeps the output video line aligned with the reference. For normal operation, the **H Phase** control for each converter should be set to *0*. Increasing this 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, 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.

VIDEO
Processing
Converter
Path 1
Timing
hPhaseOffset
0 to 1920

To set the **H Phase Offset**, enter a value between 0 and 1920 into the *H Phase* field.

5.1.2.44. Setting the V Phase

With the **V Phase Offset** control, you can set the vertical timing of the output video with respect to the reference. Setting this control to *0* keeps the output video frame aligned with the converter's reference input or with the incoming video if reference is missing. For normal operation, the **V Phase Offset** control for each converter should be set to *0*. 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 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 increasing the **V Phase Offset** causes it to go beyond the limit of the frame buffer, the *V Phase Offset* 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.

VIDEO
Processing
Converter
Path 1
Timing
hPhaseOffset
0 to 1124

To set the **V Phase Offset**, enter a value between *0* and *1124* into the *V Phase* field.

5.1.2.45. Setting the Timing Reference

Each individual converter is fed a copy of the reference that is supplied to the HD201x REF IN BNC. To allow each converter to lock to this reference, the **REFERENCE SELECT** control should be set to *frame*. To have the converters lock to the incoming video, select *video*.

VIDEO
Processing
Converter
Path 1
Timing
referenceSelect
Video
Frame

Video - Select *Video* to lock the output video to the input video. When there is no input video, the output video will free run.

Frame - Select *frame*, to the lock to the reference applied to the HD201x REF IN BNC.

5.1.2.46. Viewing the CDP 708 Demux

Each conversion path in the HD201x monitors that status of 708 captions on incoming video. This control reports the status of the 708 packet demux process.

VIDEO
Processing
Converter
Path 1 to 4
Video Monitor
Cdp708Demux

This control displays information of the CDP 708 Demux

5.1.2.47. Viewing the CDP Parser

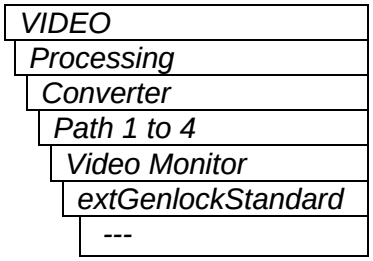
Each conversion path in the HD201x monitors that status of cdp captions parser on incoming video. This controls reports the status of the cdp parser.

VIDEO
Processing
Converter
Path 1
Video Monitor
CdpParser

This control displays information on the CDP Parser.

5.1.2.48. Viewing the External Genlock Standard

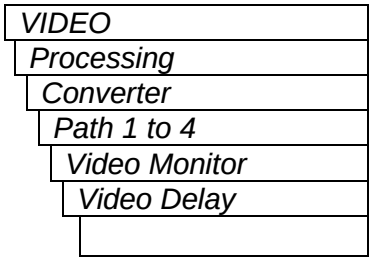
Each conversion path in the HD201x monitors that status of selected reference. The **EXT GENLOCK STANDARD** control reports the status of the applied reference.



This control displays video delay information.

5.1.2.49. Viewing the Video Delay

Each conversion path in the HD201x monitors the video processing delay. The **VIDEO DELAY** control reports the status of the processing path video delay.



This control displays video delay information.

5.1.3. Configuring the Analog In Controls

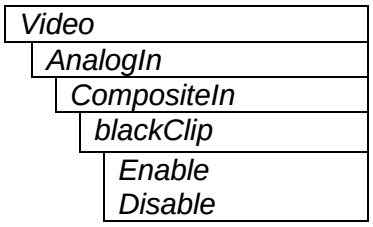
The controls under the *Analog In* menu allow the user to set parameters for the composite analog input for the HD201x.

5.1.3.1. Configuring the Analog Video Source Select

Under the *Source Select* control, the user will be able to select whether the source of analog video is composite analog video or component analog video. At the time of writing only composite analog video is supported in the HD201x series.

5.1.3.2. Setting the Black Clip Control

The ***Black Clip*** control is used to set whether the black clip will be enabled or not. Enabling the ***Black Clip*** control forces the HD201x to clip all values below the level defined by the ***Black Clip Level*** control.



Enable – Enables the Black Clip control.

Disable – Disabling the ***Black Clip*** control bypasses the clipping function.

5.1.3.3. Setting the Black Clip Level

The **Black Clip Level** control enables the user to set the level of the black clip for the analog video input of the HD201x.

- *Video*
  - *AnalogIn*
    - *CompositeIn*
      - *blackClipLevel*
        - *-10 to10*

To set the black clip level, enter a value between -10 and 10 into the ***BLACK CLIP LEVEL*** field. The units are IRE.

5.1.3.4. Setting the Black Level Control

The **Black Level** control sets the black level of the analog video input video.

- *Video*
  - *AnalogIn*
    - *CompositeIn*
      - *blackLevel*
        - *-128 to 128*

To set the *black level*, enter a value between -128 and 128 into the *black level* field.

5.1.3.5. Setting the Chroma Kill

The **Chroma Kill** control can be used to turn *on* and *off* the composite decoder's chroma kill circuitry.

- *Video*
  - *AnalogIn*
    - *ChromaKill*
      - *Enable*
      - *Disable*

When *enabled*, the output of the composite decoder will be black and white.

When *disabled*, the output of the composite decoder will be coloured.

5.1.3.6. Setting the Chroma Level Control

This control sets the overall chroma level gain.

- *Video*
  - *AnalogIn*
    - *CompositeIn*
      - *ChromaLevel*
        - *-100 to 100*

To set the **Chroma Level** control, enter a value between -100 to 100 into the *chroma level* field.

5.1.3.7. Displaying the Detected Standard

The *Composite In* **Detected Standard** reports the standard that the composite video decoder has detected.

- *Video*
  - *AnalogIn*
    - *CompositeIn*
      - *detectedStandard*
        - *525i5994, 625i50, unknown*

Values will be 525i5994 or 625i50 or unknown.

5.1.3.8. Setting the Frame TBC

The composite video decoder has an internal time base corrector that can be enabled or disabled. The time base corrector should be enabled when dealing with poor quality analog video sources.

To set the Frame TBC, enter either *enable* or *disable*.

- *Video*
  - *AnalogIn*
    - *CompositeIn*
      - *frameTBC*
        - *Enable*
        - *Disable*

When set to *Enable* the Frame TBC control will be enabled.

When set to *Disable* the Frame TBC control will be disabled.

5.1.3.9. Setting the Hue Control

The hue of the decoded signal can be adjusted with the **HUE** control.

- *Video*
  - *AnalogIn*
    - *CompositeIn*
      - *Hue*
        - *-180 to 180*

To adjust the hue, enter a value between -180 to 180 into the *hue* field. The units for this control are degrees.

5.1.3.10. Setting the Line 21 Setup

The **Line 21 Setup** control is used to set whether or not setup is removed from Line 21 of the incoming composite video signal.

- *Video*
  - *AnalogIn*
    - *CompositeIn*
      - *Line21Pedestal*
        - *Remove*
        - *Don't Remove*
        - *Blank*

Select *Remove* to remove setup from line 21 of the incoming video signal.

Select *dontRemove* to bypass the removal of line 21 setup.

5.1.3.11. Setting the NTSC Setup Pedestal

The **NTSC Setup Pedestal** control is used to select whether or not pedestal is removed from the composite video inputs.

- *Video*
  - *AnalogIn*
    - *CompositeIn*
      - *ntsc21Pedestal*
        - *Remove*
        - *Don't Remove*

Select *Remove* to remove the NTSC pedestal from the input.

Select *dontRemove* to pass the input through this processing block and to not remove NTSC Setup Pedestal.

5.1.3.12. Setting the Video Standard

The **Standard** control enables the user to select the analog video standard.

- *Video*
  - *AnalogIn*
    - *CompositeIn*
      - *standard*
        - *Auto*
        - *NTSC*
        - *PAL*

NTSC – Sets the video standard to NTSC.

PAL – Sets the video standard to PAL.

Auto – In Auto mode, the Genlock reference video standard is used to determine what standard to use.

5.1.3.13. Setting the Video Level Control

The **Video Level** control sets the overall video level/gain for the analog video input.

- *Video*
  - *AnalogIn*
    - *CompositeIn*
      - *videoLevel*
        - *-100 to 100*

To set the **Video Level** control, enter a value between -100 to 100 into the *video level* field.

5.1.3.14. Setting the White Clip Control

Enabling the ***White Clip*** control forces the analog video decoder to clip all values above the level defined by the ***White Clip Level*** control. Disabling the ***White Clip*** control bypasses the clipping function.

- *Video*
  - *AnalogIn*
    - *CompositeIn*
      - *whiteClip*
        - *Enable*
        - *Disable*

Enable – Enables the white Clip control.

Disable – Disabling the white Clip control bypasses the clipping function and allows all values to pass.

5.1.3.15. Setting the White Clip Level

The ***White Clip Level*** control enables the user to set the level of the white clip for analog video inputs.

Video
AnalogIn
CompositeIn
whiteClipLevel
Enable
Disable

To set the white clip level, enter a value between 90 and 110 into the ***WHITE CLIP*** *level* field. The units are IRE.

5.1.3.16. Setting the Blanking Controls – Field 1

The *Blanking Controls for Field 1* enables the user to set what type of video processing will be applied to lines 10 through 23 of the incoming video signal. Each line may be comb filtered, notch filtered, blanked or bypassed directly to the Y channel output. For the sake of brevity only the control for line 10 is shown in this manual. Field 1, line 10 processing is determined using the **VBI FLD 1 LINE 10** control. At the time of writing, this feature is not implemented.

Video
AnalogIn
CompositeIn
vbiProcessing
FLD1
Line 10 to 23
Comb
Bypass-to-Y
Blank

Select one of the following options:

Comb – Comb filter content on line *n*

Bypass-to-Y – Bypass content on line x to Y Channel output.

Blank – Blank content on line *n*.

5.1.3.17. Setting the Blanking Controls – Field 2

The *Blanking Controls for Field 2* enable the user to set what type of video processing will be applied to lines 10 through 23 of the incoming video signal. Each line may be comb filtered, notch filtered, blanked or bypassed directly to the Y channel output. For the sake of brevity, only the control for line 10 is shown in this manual. Field 2, line 10 processing is determined using the **VBI FLD 2 LINE 10** control. At the time of writing, this feature is not implemented.

Video
AnalogIn
CompositeIn
vbiProcessing
FLD2
Line 10 to 23
Comb
Bypass-to-Y
Blank

Select one of the following options:

Comb – Comb filter content on line *n*.

Bypass-to-Y – Bypass content on line x to Y Channel output.

Blank – Blank content on line *n*.

5.1.4. Configuring the Analog Out Controls

5.1.4.1. Select the Output Format

The ***Output Format*** control enables the user to select the analog video output format. This control will allow the user to configure the on-board video D/A converter to operate in either composite mode or component mode. At the time of writing, the HD201x only supports composite analog video D/A.

Video
AnalogOut
outputSelect

Currently only *composite* format is available.

5.1.4.2. Output Force Black

The ***Output Force Black*** control allows the user to control whether the analog video output (whether composite or component) is forced to black.

Video
AnalogOut
forceBlack
On
Off

When *On* is selected the analog video outputs are forced to be black.

When *Off* is selected the analog video output will contain the active video as generated by the HD201x and supplied to its video D to A converter.

5.1.4.3. Setting the Brightness

The **Brightness** control allows the user to adjust the brightness of the analog video output.

Video
AnalogOut
CompositeOut
Brightness
-32 to 32

To set the brightness, enter a value between -32 and 32 in the *brightness* field. Level -32 corresponds to -15.9 IRE and level 32 corresponds to +15.9 IRE.

5.1.4.4. Setting the Chroma Filter Selection

The chroma information for the encoded video signal may be filtered with a number of filter bandwidths ranging from 650k to 3.0 MHz. The **Chroma Filter** control, selects which chroma filter will be applied.

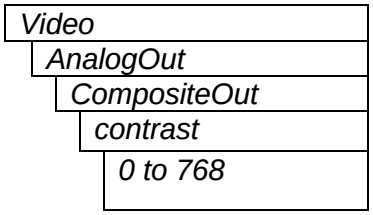
Video
AnalogOut
CompositeOut
chromaFilter
650kHz
1.0MHz
1.3MHz
2.0MHz
3.0MHz

The chroma filter options are listed below:

650kHz: 650k chroma filter applied.
1.0MHz: 1.0 MHz chroma filter applied.
1.3MHz: 1.3 MHz chroma filter applied.
2.0MHz: 2.0 MHz chroma filter applied.
3.0MHz: 3.0 MHz chroma filter applied.

5.1.4.5. Setting the Contrast

The **Contrast** control allows the user to adjust the contrast of the analog video output.

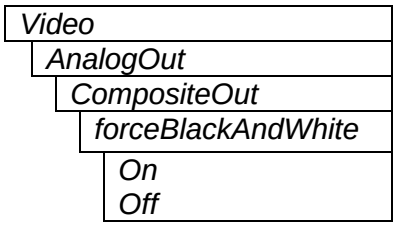


To set the contrast, enter a value between 0 and 768 into the *contrast* field. The default value is 512.

Level 0 corresponds to 0%
Level 512 corresponds to 100%
Level 768 corresponds to150%.

5.1.4.6. Enabling Force Black and White

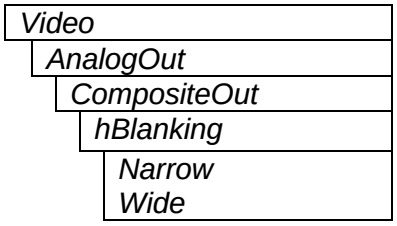
The **Force Black and White** control enables the user to force black and white video to be generated on the analog video output.



Select *on* to make the composite analog video output black and white. Select *off* to enable colour video on the composite output.

5.1.4.7. Setting the H Blanking

The **H Blanking** setting enables the user to set the Horizontal blanking boundaries. To set the H blanking control, select either *narrow* or *wide* from the drop down menu.

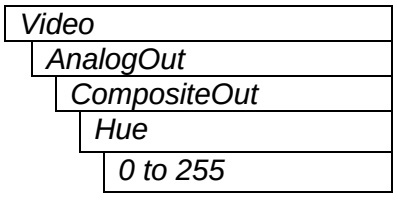


When set to *Narrow*, the H blanking will be 10.7µsec wide.

When set to Wide, the H blanking will be 11.2µsec.

5.1.4.8. Setting the Hue

The **Hue** control allows the user to adjust the Hue of the analog video output in increments of 0.175 degrees.



To set the hue, enter a value between 0 and 255 into the *Hue* field.
Level 0 corresponds to -22.5 degrees Hue shift
Level 128 corresponds to 0 degrees Hue shift
Level 255 corresponds to +22.5 degrees Hue shift.

5.1.4.9. Enabling Line 21 Pedestal

Line 21 closed captioning has been defined to NOT have a 7.5 IRE pedestal, but it is placed on the first active line of video where there may be a pedestal. The upstream closed captioning encoder should not have generated a setup pedestal. When encoding composite video with properly keyed captioning, a pedestal must not be generated. This control, when set to *Off*, will not create the 7.5 IRE pedestal on line 21. When set to *On*, the 7.5 IRE pedestal will be generated on line 21.

- *Video*
  - *AnalogOut*
    - *CompositeOut*
      - *Line21Pedestal*
        - *On*
        - *Off*

ON: Turns the Line 21 Pedestal On.

OFF: Turns the Line 21 Pedestal Off.

5.1.4.10. Setting the Luma Bandwidth

The **Luma Bandwidth** control enables the user to set the luma bandwidth of the analog video output. To set the luma bandwidth, select either *composite* or *wideband* from the drop down menu.

- *Video*
  - *AnalogOut*
    - *CompositeOut*
      - *lumaBandwidth*
        - *Wideband*
        - *composite*

Wideband: Enables the luma bandwidth to be set by Luma Bandwidth Frequency Response control.

Composite: The luma channel will be filtered with a standard composite filter.

5.1.4.11. Setting the Luma Wideband Frequency Response

When the **Luma Bandwidth** control is set to *Wideband*, this selects between a set of frequency response curves with a +/- 4dB range. To set the **Luma Wideband Frequency Response** control, enter a value between -6 to 6.

- *Video*
  - *AnalogOut*
    - *CompositeOut*
      - *lumaWidebandFreq*
        - *-6…6*

-6 – 4.0 dB response curve
-5 – 3.3 dB response curve
-4 – 2.7 dB response curve
-3 – 2.0 dB response curve
-2 – 1.3 dB response curve
-1 – 0.7 dB response curve

0 + 0.0 dB response curve

1 + 0.7 dB response curve
2 + 1.3 dB response curve
3 + 2.0 dB response curve
4 + 2.7 dB response curve
5 + 3.3 dB response curve
6 + 4.0 dB response curve

5.1.4.12. Enabling the NTSC Setup Pedestal

Composite NTSC analog video may have a 7.5 IRE pedestal while 4:2:2 SDI video does not. This control, when set to *On*, will add the pedestal and re-scale the video accordingly. The setup pedestal should not be present on composite video when operating in Japan.

- *Video*
  - *AnalogOut*
    - *CompositeOut*
      - *ntscPedestalSetup*
        - *On*
        - *Off*

ON: Turns the NTSC Setup Pedestal On.
OFF: Turns the NTSC Setup Pedestal Off.

5.1.4.13. Setting the Saturation

The **Saturation** control allows the user to adjust the saturation of the analog video output.

- *Video*
  - *AnalogOut*
    - *CompositeOut*
      - *saturation*
        - *0 to 1023*

To set the saturation, enter a value between 0 and 1023 into the *saturation* field. Setting the saturation Level to 512 (100% gain) is neutral.

Level 0 corresponds to 0% gain.
Level 512 corresponds to 100% gain
Level 1023 corresponds to a 199.8% gain

5.1.4.14. Setting the VBI Processing

The **Vertical Blanking** interval may be passed through to the composite analog video output or may be blanked.

- *Video*
  - *AnalogOut*
    - *CompositeOut*
      - *vbiProcessing*
        - *Pass*
        - *Blank*

When set to *Pass*, VBI lines will be passed to the composite analog video outputs.

When set to *Blank*, VBI lines will be blanked on the composite analog video outputs.

5.1.4.15. Setting the Master Video Level

The **Master CVBS Video Level** control enables the user to set the video level gain for the composite video output.

- *Video*
  - *AnalogOut*
    - *CompositeOut*
      - *videoLevel*
        - *-64….64*

To set the video gain, enter a value between -64 and 64 into the *Master CVBS Video Level Gain* field. Level 0 is neutral.

Level -64 corresponds to -7.5% gain change
Level 0 corresponds to 0% gain change
Level 64 corresponds to 7.5% gain change

5.1.5. Configuring the DVI In Controls

5.1.5.1. DVI IN Configuration

The HD201x series has a DVI input that can be used to accept either 720p or 1080p input video signals. 720p input signals are immediately frame synced and converted to SDI so that the signal can then be routed to any other HD201x processing resource. 1080p input signals are immediately frame synced, interlaced to 1080i and converted to SDI. The format of the DVI input signal must be defined by the **DVI Input** control

Within the HD201X configuration tool, you must specifically configure the DVI input for the signal format that is being applied.

- *Video*
  - *dviInput*
    - *format*
      - *Auto*
      - *1080p5994 > i*
      - *720p5994*
      - *1080p50 > i*
      - *720p50*

At the time of writing this manual, the "AUTO" option is not enabled. You must select 720p or 1080p. Again, note that when a 1080p DVI signal is applied to this input, the signal is immediately interlaced to be a 1080i signal.

5.1.5.2. Configuring the DVI Output Format

The HD201x series has a DVI output that must be specifically configured to match the output video format that will be supplied to it.

- *Video*
  - *dviOutput*
    - *format*
      - *followSource*
      - *525i5994*
      - *720p5994*
      - *1080i5994*
      - *625i50*
      - *720p50*
      - *1080i50*

Select the video format that matches the format being sent to the DVI transmitter by the relevant conversion path.

5.1.6. Configuring the DVI Output Path

The DVI output on the HD201x series can be driven by any one of the available conversion paths. Use the DVI Output control to select which path the DVI output will follow.

- *Video*
  - *dviOutput*
    - *output*
      - *Path 1*
      - *Path 2*
      - *Path 3*
      - *Path 4*

The DVI output can be driven by paths 1, 2, 3, or 4.

5.1.7. Configuring the Internal Multi Image Display Processor

5.1.7.1. Configuring the Internal Multi Image Display Processor

The HD201x series has an optional internal multi image display processor. This multi image display generates a quad split video output that displays the output of PATH1, PATH2, PATH 3 and PATH 4 video processors. Audio levels are displayed using bar graphs. To see the output resolution of the multi image display processor, use the Octoplus Format control.

- *Video*
  - *Octoplus*
    - *format*
      - *1440x900x60*
      - *1680x1050x60*
      - *1920x1080x60*
      - *1920x1200x60*
      - *1440x900x50*
      - *1680x1050x50*
      - *1920x1080x50*
      - *1920x1200x50*

Each window of the multi image display processor may have static UMD (Under Monitor Display) characters superimposed over the video window. Window UMD characters are user programmable.

5.1.7.2. Setting the Reference Format

The ***Reference Format*** control enables the user to select the reference format for the HD201x. The user can select either NTSC or PAL to be set as the reference format. The HD201x supports bi-level reference inputs only.

Video
Octoplus
referenceFormat
Ntsc
pal

Bi-level NTSC reference, composite NTSC, or PAL signals may be applied as a valid reference signal.

5.1.7.3. Setting the Reference Mode

The **Reference Mode** control enables the user to select the reference mode for the HD201x. To set the reference mode, select either *internal* or *external* from the ***Reference Mode*** control. Select *external* when supplying the HD201x an external reference signal. Select *internal* when the HD201x is intended to operate as a self-locking system.

Video
Octoplus
referenceMode
Internal
External

Selecting *Internal* enables the HD201x to operate as a self-locking system. Selecting *External* enables the user to apply and lock to an external bi-level reference.

5.1.8. Configuring the Test Generator

5.1.8.1. Setting the Test Signal Generator Format

The HD201x has an internal video test signal generator on which you can select the video format. You can also overlay user defined text on the test pattern signal to assist with source or truck identification.

Video
Test Gen
format
525i5994
1080i5994
720p5994
625i50
1080i50
720p50

The formats mentioned below are available for selection:

525i5994
1080i5994
720p5994
625i50
1080i50
720p50

5.1.8.2. Setting the Test Signal Generator Output

The user can select on which conversion path output the test signal generator is routed to. Note that there is a single test signal generator in the HD201x. If the test signal is active on a particular path output and it is then subsequently enabled on a different path, the test signal will be automatically disabled on the first path and enabled on the second path. For the sake of brevity, the control for routing to PATH 1 output is shown.

Video
Test Gen
Output
Path 1
Enable
Disable

When set to *enable*, the selected path will be enabled.

When set to *disable*, the selected path will be disabled.

5.1.8.3. Setting the Test Signal Generator Pattern

The **Patten** control selects the pattern for the test signal generator.

Video
Test Gen
Pattern
Select pattern

Turn the rotary encoder to select from the various test generator patterns.

5.1.8.4. Setting the Test Signal Generator Source ID

The **Test Signal Generator** control enables the user to enter a custom source ID name.

Video
Test Gen
Source ID
Enable
Disable

Select *Enable* to turn on the test signal generator source ID text. Select *Disable* to turn off the test signal generator source ID text.

5.1.8.5. Setting the Test Signal Generator Source ID

The **Test Generator Source ID** control enables the user to enter a custom source ID name.

Video
Test Gen
Source ID
Text

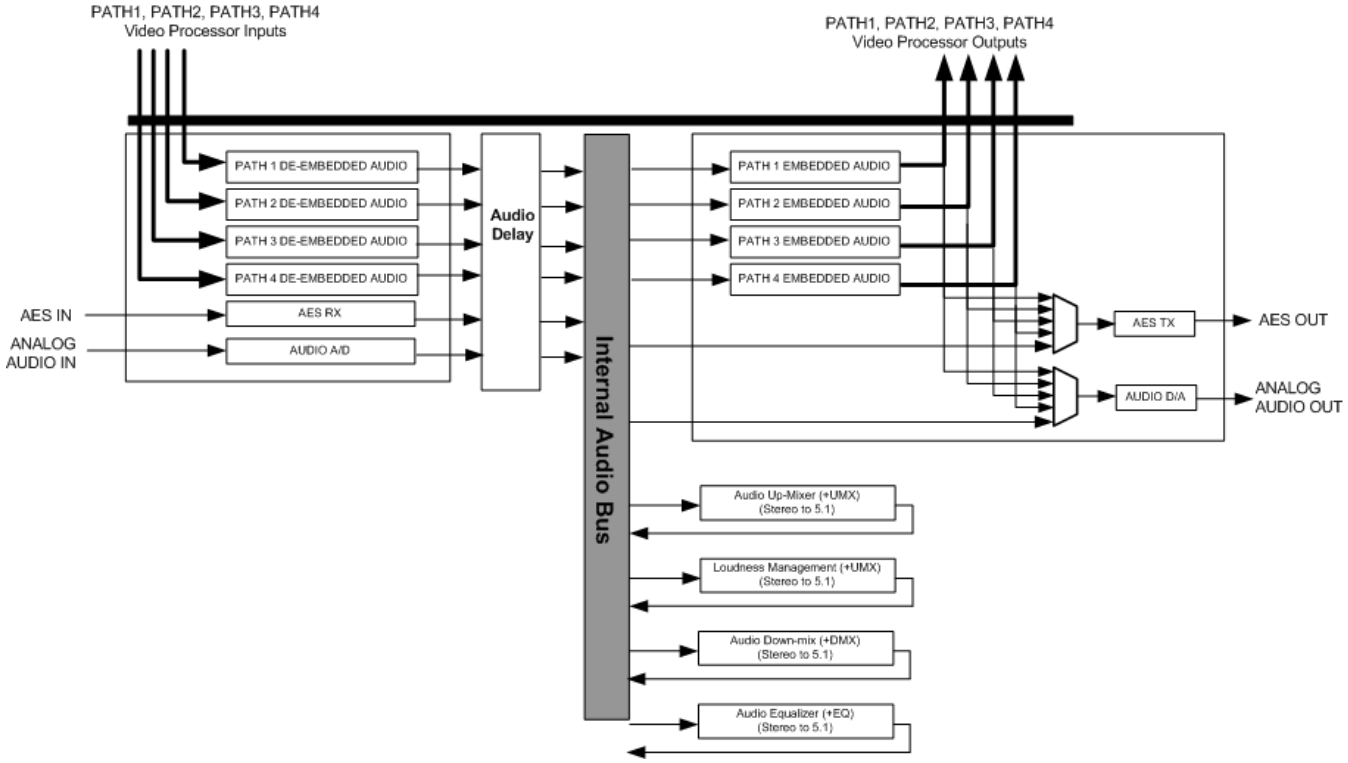
Using the rotary encoder, select the text that you wish to have for the source ID text. Note that the ◄ symbol on the front panel is used to cursor back and delete a character in the text field.

5.2. AUDIO CONFIGURATION MENU ITEMS

The HD2014 audio processor and its internal architecture are shown below. The audio processor acquires its incoming audio from embedded, 8x discrete AES and 4x discrete analog (+AA option) audio inputs. In the HD2014, embedded audio from the video supplied to each of the four internal processing paths is de-embedded (16 channels) and made available for subsequent processing.

In the HD201x, there are 8x AES outputs and 8x mono analog audio outputs. AES outputs and analog audio outputs have their own independent audio channel routing, gain and inversion controls. Embedded audio from the audio processor is fed back up to the output of each video processing path. Embedded audio outputs have their own independent audio routing, gain and inversion controls.

Advanced audio processing functions like IntelliGain audio loudness (+IG), stereo to 5.1 up-mixing (+UMX), 5.1 to stereo down-mixing (+DMX) and audio band equalization (+EQ) are integrated into the system using an audio wrap-around architecture. These processing blocks may acquire their source of video from any other inbound audio channel or any processing block. At the same time, each processing block feeds its output audio back into the system so it can feed any other processing block.



The controls for the audio processor are segmented into seven logical categories as shown below. The following sections will outline in detail the parameters under each of these seven categories.

Deembedder	Sets parameters for the audio de-embedders.
Embedder	Sets parameters for the audio embedder.
AES In	Sets parameters for the AES In audio.
AES Out	Sets parameters for the AES Out audio.
Analog In	Sets parameters for the Analog In audio.
Analog Out	Sets parameters for the Analog Out audio.
Tone Generator	Sets parameters for the Tone Generator.

Table 5-3: Top Level of the Audio Setup Menu

5.2.1. Configuring the Audio Deembedder

5.2.1.1. Configuring the Embedded Audio Per Channels Delays

The HD201x de-embeds 4 groups (16 channels) of audio from the video supplied to each of the HD201x video processing paths. The HD201x supports per channel delay for de-embeddeded audio channels. For the sake of brevity, the audio delay control for de-embedder 1, channel 1 only. Delay controls for all other de-embedders and channels operate in the same way.

NOTE:
Deembedder 1 corresponds to the audio de-embedded from PATH1
Deembedder 2 corresponds to the audio de-embedded from PATH2,
Deembedder 3 corresponds to the audio de-embedded from PATH3
Deembedder 4 corresponds to the audio de-embedded from PATH4.

Audio *deembedder* *Deembedder 1 to 4* *chDelay* *Channel 1 to 16* *0…16383*	Units of measure are audio samples (48 KHz sampling). Select a value from 0 to 16383 audio samples. Each audio sample is 48 KHz and therefore represents a delay of 0.02 ms. Therefore, 0 samples correspond to 0ms of delay and 16383 corresponds to ~ 314 ms of delay.

5.2.1.2. Configuring the Embedded Audio Sample Rate Converters

The HD201x de-embeds 4 groups (16 channels) of audio from each of the video supplied to the input of each processing path. The HD201x supports control over the relevant sample rate converters on a **per channel pair** basis.

For the sake of brevity, the audio sample rate converter control for de-embedder 1, channel pair 1 will only be discussed in this manual. Sample rate converters for all other de-embedders and channels pairs operate in the same way. It is recommended that all audio sample rate converters remain in *auto* mode.

NOTE:
Deembedder 1 corresponds to the audio de-embedded from PATH1
Deembedder 2 corresponds to the audio de-embedded from PATH2,
Deembedder 3 corresponds to the audio de-embedded from PATH3
Deembedder 4 corresponds to the audio de-embedded from PATH4.

- *Audio*
  - *deembedder*
    - *Deembedder 1 to 4*
      - *SRCMode*
        - *ChannelPair 1 to 8*
          - *Auto*
          - *Bypass*
          - *Enable*

For each audio channel pair there is an audio sample rate converter that can be enabled, disabled, or set to auto. It is recommended that all audio sample rate converters remain in *auto* mode.

5.2.2. Displaying the Status of the Channel Pairs

The HD201x de-embeds 4 groups (16 channels) of audio from the video supplied to the input of each processing path. The HD201x monitors the status of internal sample rate converters on a **per channel pair basis**. For the sake of brevity, only the audio sample rate converter status for de-embedder 1, channel pair 1 will be discussed in this manual. Sample rate converters for all other de-embedders and channels pairs are monitored in the same way.

NOTE:
Deembedder 1 corresponds to the audio de-embedded from PATH1
Deembedder 2 corresponds to the audio de-embedded from PATH2
Deembedder 3 corresponds to the audio de-embedded from PATH3
Deembedder 4 corresponds to the audio de-embedded from PATH4.

- *Audio*
  - *Deembedder*
    - *Deembedder 1 to 4*
      - *Status*
        - *ChannelPair 1 to ChannelPair 8*
          - *Pcm, Bypass*

The SRC status will be displayed as Pcm or Bypass,

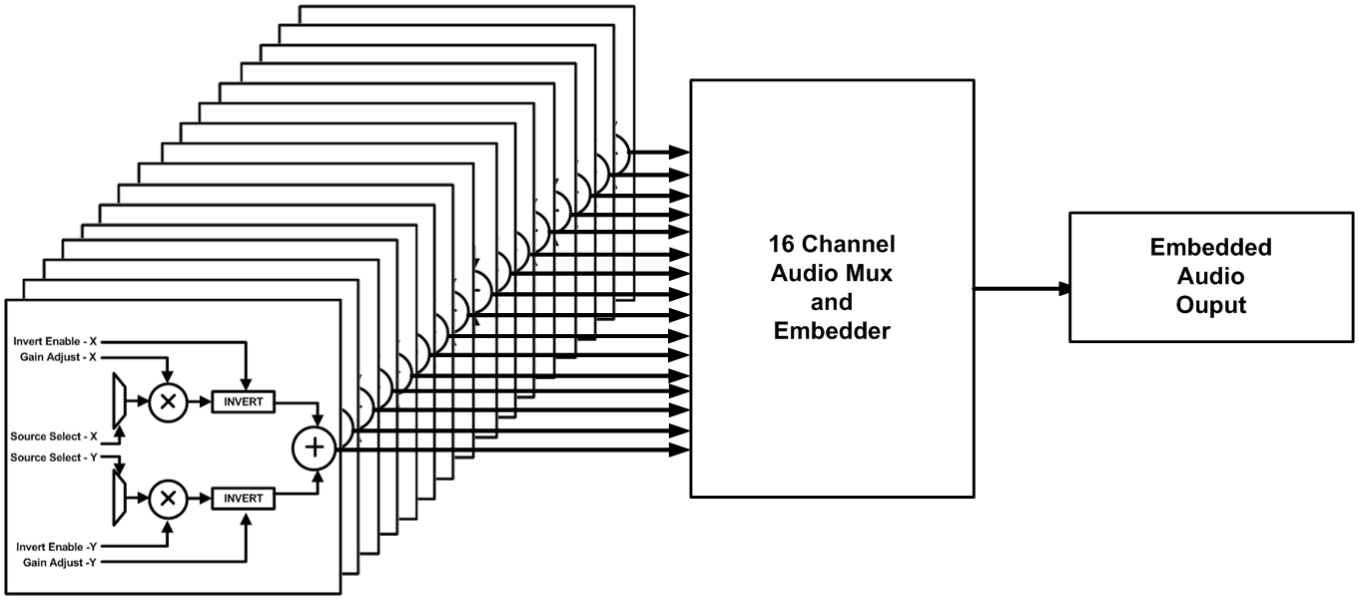
5.2.3. Configuring the Audio Embedders

5.2.3.1. Configuring the Input Channel of the Mixer

The HD201x embeds 4 groups (16 channels) of audio into the output video of each processing path. Within the audio embedder audio routing, audio gain and audio inversion controls are supported on a channel by channel basis. For the sake of brevity, only the controls for embedder 1, channel 1 will be discussed in this manual. Audio embedding for all other embedders and channel pairs operate in the same way.

NOTE:
Deembedder 1 corresponds to the audio de-embedded from PATH1
Deembedder 2 corresponds to the audio de-embedded from PATH2,
Deembedder 3 corresponds to the audio de-embedded from PATH3
Deembedder 4 corresponds to the audio de-embedded from PATH4.

Each embedded audio output contains 16 channel of audio. Each individual output audio channel has an associated output audio mixer. The following block diagram illustrates the architecture of the output audio mixer and the 16 channel processing. Each mixer has both an X input and a Y input with associated gain and inversion controls. These X and Y inputs can be used to generate mono-mixes if desired. For the sake of brevity, only channel selection, gain and inversion controls for the X channel are described in this manual.



The following shows the audio routing control for the X input of Embedder 1, Channel 1:

- *Audio*
  - *Embedder*
    - *Embedder 1*
      - *Mixer*
        - *channel1x*
          - *input channel*
            - *aesCh1…*
            - *aesCh16*
            - *aesMono1…*
            - *aesMono8*
            - *analogCh1…*
            - *analogCh4*
            - *analogMono1…*
            - *analogMono2*
            - *deembedder1Ch1…*
            - *deembedder1Ch16*
            - *deembedder1Mono1…*
            - *deembedder1Mono8*
            - *deembedder2Mono1…*
            - *deembedder2Mono8*
            - *deembedder3Ch1…*
            - *deembedder3Ch16*
            - *deembedder3Mono1…*
            - *deembedder3Mono8*
            - *deembedder4Ch1…*
            - *deembedder4Ch16*
            - *deembedder4Mono1…*
            - *deembedder4Mono8*
            - *toneGenCh1…*
            - *toneGenCh8*
            - *toneGenMono1…*
            - *toneGenMono4*

This control enables the user to select an input channel from the Mixer. The total list of audio channel sources is dependant on the full set of audio options installed on the HD201x.

The following shows the gain control for the X input of Embedder 1, Channel 1.

NOTE:
Level 0 corresponds to mute (-199 dB).
Level 1 corresponds to – 72 dB gain
Level 4096 corresponds to 0 dB gain
Level 65535 corresponds to be + 24 dB gain.

The HD201x front panel performs a real time conversion between these numerical values and its associated dB equivalent.

- *Audio*
  - *Embedder*
    - *Embedder 1*
      - *Mixer*
        - *channel1x*
          - *Gain*
            - *0 to 65535*

Enter an input gain between 0 and 65535.

Level 0 corresponds to mute (-199 dB).
Level 1 corresponds to – 72 dB gain
Level 4096 corresponds to 0 dB gain
Level 65535 corresponds to be + 24 dB gain.

The following shows the inversion control for the X input of Embedder 1, Channel 1:

- *Audio*
  - *Embedder*
    - *Embedder 1 to 4*
      - *Mixer*
        - *channel1x*
          - *inputInvert*
            - *Enable*
            - *Disable*

Select *enable* to invert the selected channel of audio and select *disable* to pass through the selected audio channel.

5.2.3.2. Configuring the C-Bit

Several static configuration bits (Audio C bit and Audio Pro Mode) for the overall 16 channel audio embedder can be set. For the sake of brevity, only the controls for embedder1 are shown below.

- *Audio*
  - *Embedder 1*
    - *cBit*
      - *20 bit*
      - *24 bit*

The Embedder Configuration enables the user to set the C bit resolution (20 or 24 bit).

5.2.3.3. Configuring the Audio Pro Mode

Several static configuration bits (Audio C bit and Audio Pro Mode) for the embedder can be set.
For the sake of brevity, only the controls for embedder1 are shown below.

- *Audio*
  - *Embedder 1 to 4*
    - *forcePro*
      - *Don't force*
      - *Force*

The Embedder Configuration enables the user to set the Audio Pro Mode (*force* or *don't force*).

5.2.4. Configuring AES Input Audio

5.2.4.1. Configuring the AES Audio per Channels Delays

The HD201x accepts 8x inputs and supports per channel audio delay for each AES input channel. For the sake of brevity, the audio delay control for AES input channel 1 will be discussed in this manual. Delay controls for all other channels operate in the same way.

NOTE:
AES Channel 1+2 come from AES IN1
AES Channel 3+4 come from AES IN2
AES Channel 5+6 come from AES IN3
AES Channel 7+8 come from AES IN4
AES Channel 9+10 come from AES IN5
AES Channel 11+12 come from AES IN 6
AES Channel 13+14 come from AES IN 7
AES Channel 15+16 come from AES IN 8

- *Audio*
  - *AES In*
    - *chDelay*
      - *Channel 1 to 16*
        - *0…16383*

Units of measure are audio samples (48 KHz sampling).
Select a value from 0 to 16383 audio samples.
Each audio sample is 48 KHz and therefore represents a delay of 0.02 ms. Therefore, 0 samples correspond to 0ms of delay and 16383 corresponds to ~ 314 ms of delay.

5.2.4.2. Configuring the AES Audio Sample Rate Converters

The HD201x accepts 8x inputs and supports control over the internal sample rate converters on a **per channel pair** basis. For the sake of brevity, the audio sample rate converter control for AES IN 1 will be discussed in this manual. Sample rate converters for all other AES inputs operate in the same way.

- *Audio*
  - *AES In*
    - *SRCMode*
      - *Input 1 to 8*
        - *Auto*
        - *Bypass*
        - *Enable*

For each audio channel pair there is an audio sample rate converter that can be enabled, disabled, or set to auto. It is recommended that all audio sample rate converters remain in *auto* mode.

5.2.4.3. Displaying the Status of the Input

The HD201x supports 8x AES inputs. The HD201x monitors the status of internal AES sample rate converters on a **per channel pair** basis. For the sake of brevity, the audio sample rate converter status for AES IN 1 will be discussed in this manual. Sample rate converters for all other AES inputs are monitored in the same way.

Audio
- *AES In*
  - *Status*
    - *Input 1 to Input 8*
      - *Pcm, bypass*

The SRC status will be displayed as Pcm or Bypass,

5.2.5. Configuring AES Output Audio

The following diagram demonstrates the audio architecture associated with AES outputs.

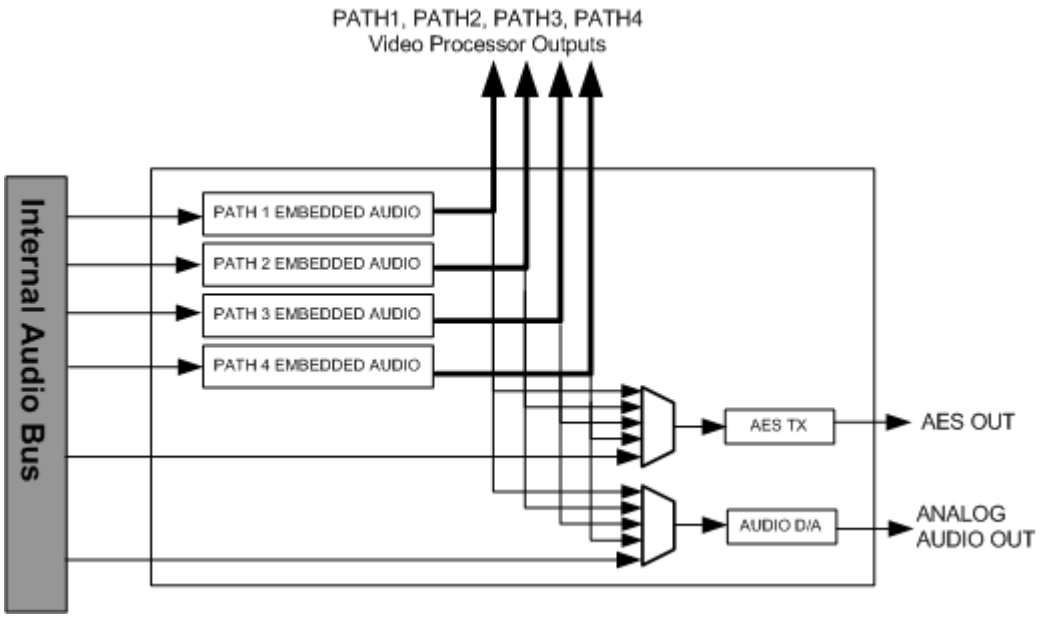


Figure 5-1: Audio Architecture for AES Outputs

5.2.5.1. Setting the AES Output Source

The HD201x AES outputs can operate in several different output modes. The 8x AES outputs (16 channels) can follow output mixers for Embedder 1, Embedder 2, Embedder 3, Embedder 4 or follow the routing programmed by the AES output mixer. The operating mode is chosen using the **Output Source** control.

Audio *AES Out* *OutputSource* *aesMixer* *embedder1* *embedder2* *embedder3* *embedder4*	Select *AES Mixer, Embedder 1, Embedder 2, Embedder 3* or *Embedder 4*.

5.2.5.2. Configuring the Input Channel of the AES Output Mixer

The HD201x supports 8x AES outputs. For the sake of brevity, only the output mixer for AES OUT 1, channel 1 will be discussed in this manual. Controls for all other AES outputs operate in the same way.

Each AES output contains 2 channels of audio. Each output channel has an associated output audio mixer. Figure 5-2 illustrates the architecture for the AES outputs. Each mixer has both an X input and a Y input with associated gain and inversion controls. These X and Y inputs can be used to generate mono-mixes if desired. For the sake of brevity, only channel selection, gain and inversion controls for the X channel are described in this manual.

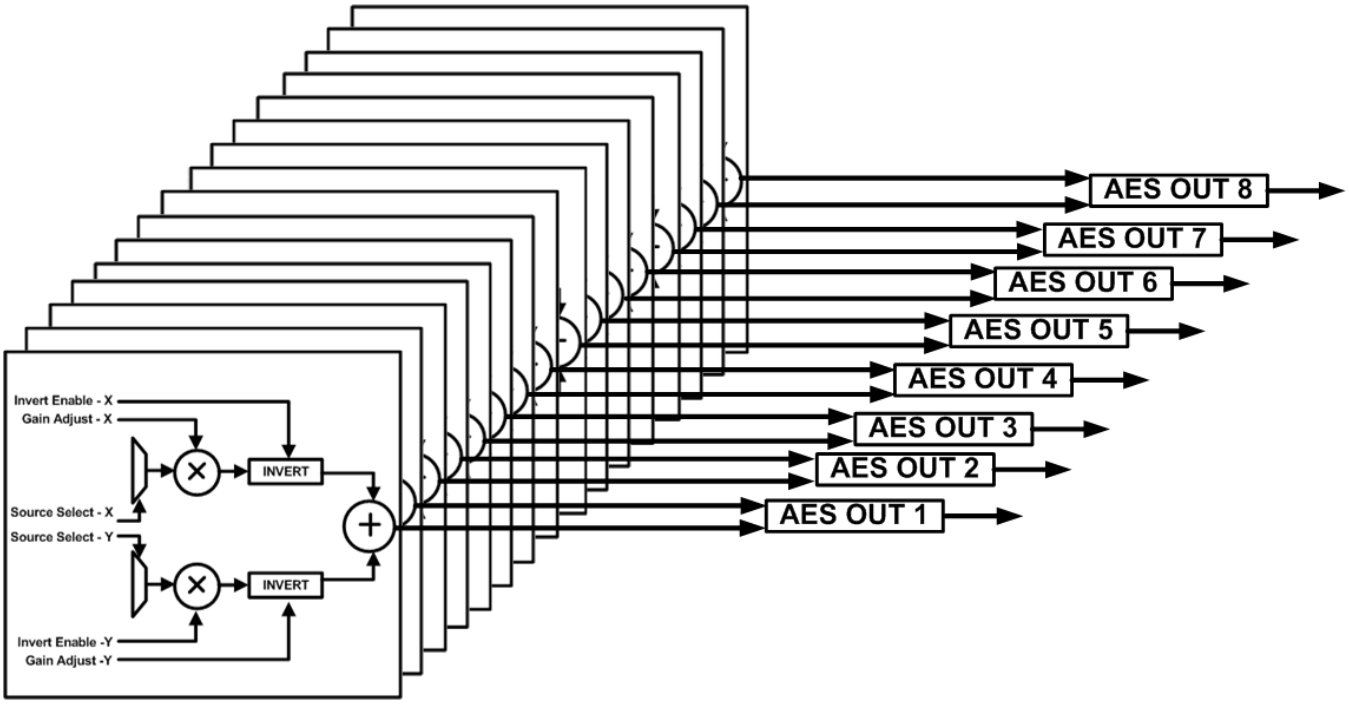


Figure 5-2: Architecture for AES Outputs

- *Audio*
  - *aesOut*
    - *Mixer*
      - *channel1x*
        - *input channel*
          - *aesCh1…*
          - *aesCh16*
          - *aesMono1…*
          - *aesMono8*
          - *analogCh1…*
          - *analogCh4*
          - *analogMono1…*
          - *analogMono2*
          - *deembedder1Ch1…*
          - *deembedder1Ch16*
          - *deembedder1Mono1…*
          - *deembedder1Mono8*
          - *deembedder2Mono1…*
          - *deembedder2Mono8*
          - *deembedder3Ch1…*
          - *deembedder3Ch16*
          - *deembedder3Mono1…*
          - *deembedder3Mono8*
          - *deembedder4Ch1…*
          - *deembedder4Ch16*
          - *deembedder4Mono1…*
          - *deembedder4Mono8*
          - *toneGenCh1…*
          - *toneGenCh8*
          - *toneGenMono1…*
          - *toneGenMono4*

This control enables the user to select an input channel from the Mixer. The total list of audio channel sources is dependant on the full set of audio options installed on the HD201x.

The following shows the gain control for the X input of AES Out 1, Channel 1.

Level 0 corresponds to mute (-199 dB).
Level 1 corresponds to – 72 dB gain
Level 4096 corresponds to 0 dB gain
Level 65535 corresponds to be + 24 dB gain.
Level 0 corresponds to mute (-199 dB).

- *Audio*
  - *aesOut*
    - *Mixer*
      - *channel1x*
        - *input channel*
          - *0 to 65535*

Enter an input gain between 0 and 65535.
Level 0 corresponds to mute (-199 dB).
Level 1 corresponds to – 72 dB gain
Level 4096 corresponds to 0 dB gain
Level 65535 corresponds to be + 24 dB gain.
Level 0 corresponds to mute (-199 dB).

The following shows the inversion control for the X input of AES Out 1, Channel 1:

Audio *aesOut* *Mixer* *channel1x* *inputInvert* *Enable* *disable*	Select enable to invert the selected channel of audio and select disable to pass through the selected audio channel.

5.2.5.3. Configuring the C-Bit for AES Output

Several static configuration bits (Audio C bit and Audio Pro Mode) for the AES outputs can be set.

Audio *aesOut* *cBit* *20 bit* *24 bit*	Select 20 or 24 bit audio mode.

5.2.5.4. Configuring the Audio Pro Mode for AES Output

The **ForcePro** mode control the audio pro mode for the AES output.

Audio *aesOut* *forcePro* *Don't force* *Force*	Select Don't Force or Force.

5.2.6. Configuring Analog Audio Inputs

5.2.6.1. Configuring the Analog Audio Input Levels

The HD201x has 4x analog audio inputs. For each analog audio input you can define the analog audio dynamic range. For the sake of brevity, only the level for analog audio channel 1 will be described in this manual.

Audio *analogIn* *adcInputClipControl* *Channel 1* *25.4.dBu* *19.4 dBu*	Select either 19dBU or 25dBU to match the incoming level for each analog audio channel.

5.2.6.2. Configuring the Analog Audio per Channels Delays

The HD201x has 4x Analog Audio inputs with per channel audio delay control capabilities. For the sake of brevity, only the delay control for channel 1 will be described in this manual.

Audio *analogIn* *chDelay* *Channel 1* *0…16383 samples*	Units of measure are audio samples (48 KHz sampling). Select a value from 0 to 16383 audio samples. Each audio sample is 48 KHz and therefore represents a delay of 0.02 ms. Therefore, 0 samples correspond to 0ms of delay and 16383 corresponds to ~ 314 ms of delay.

5.2.7. Configuring Analog Audio Outputs

5.2.7.1. Configuring the Input Channel of the Analog Output Mixer

The HD201x supports 8x analog audio outputs. Within the analog audio output mixer, audio routing, audio gain and audio inversion controls are supported on a channel by channel basis. For the sake of brevity, the controls for AA OUT 1 will be discussed in this manual. Controls for all other analog audio outputs operate in the same way. Figure 5-3 shows the architecture for the analog audio outputs.

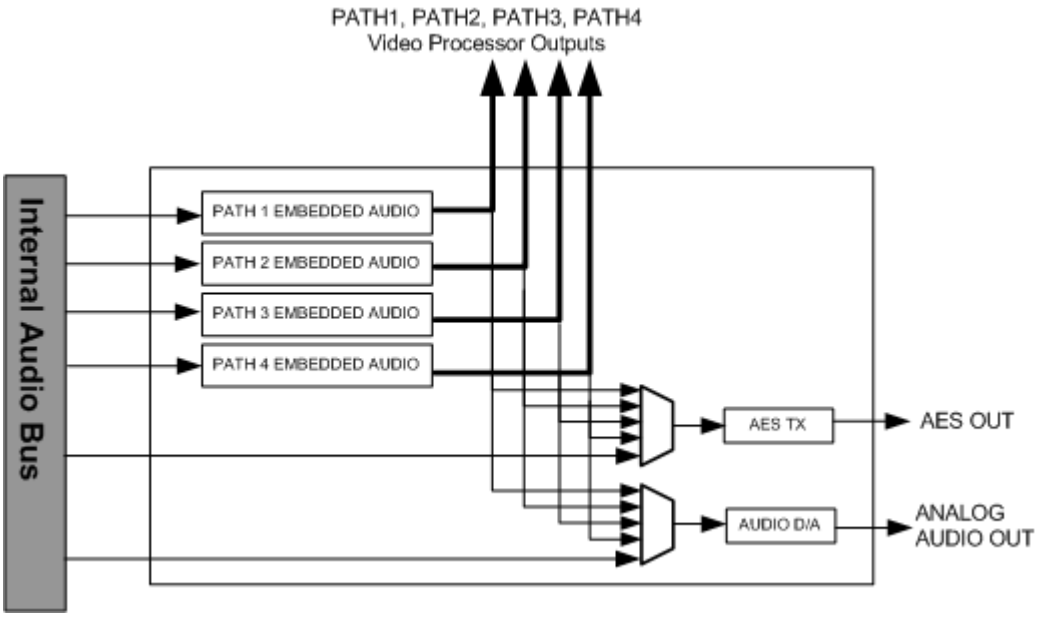


Figure 5-3: Architecture of Analog Audio Outputs

For each output audio Figure 5-4 illustrates the output audio mixer. Each mixer has an X input and Y input with associated gain and inversion controls. These X and Y inputs can be used to generate mono-mixes if desired. For the sake of brevity, only channel selection, gain and inversion controls for the X channel are described in this manual.

The following shows the audio routing control for the X input of Analog Audio out channel 1.

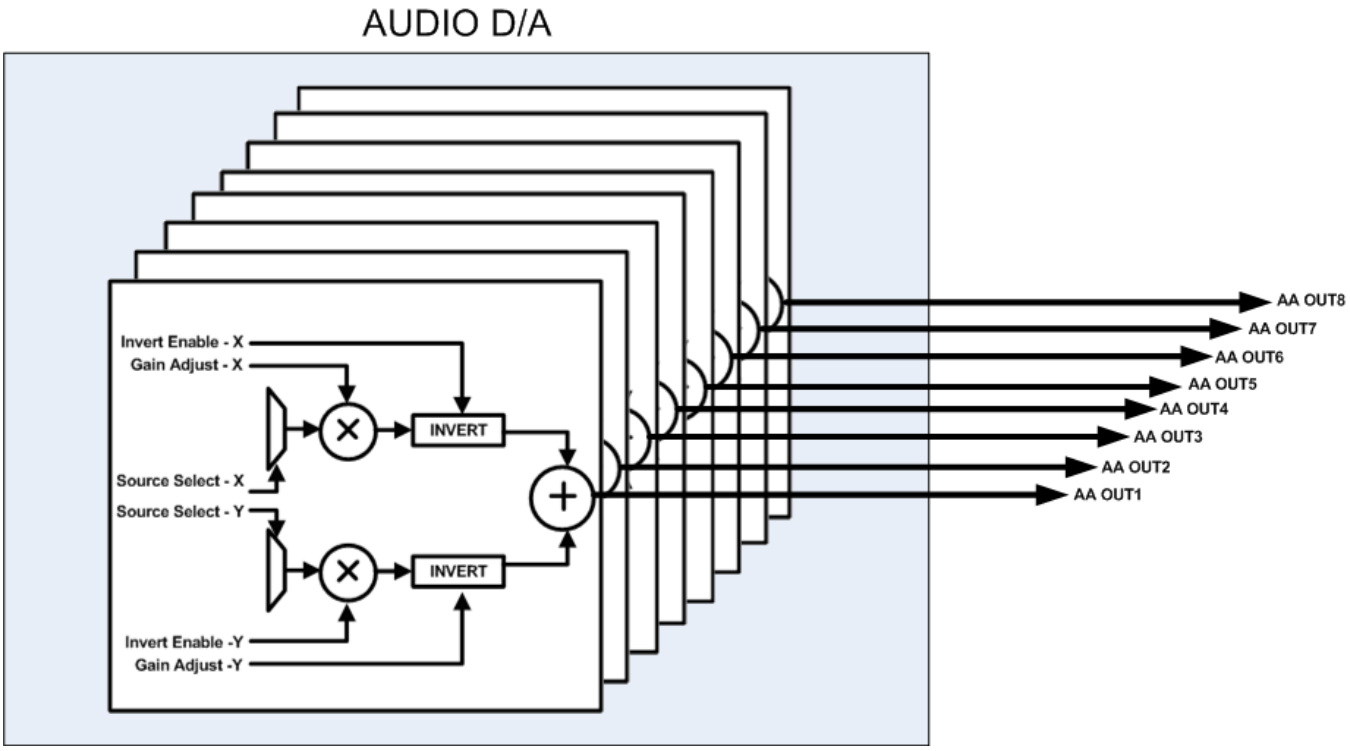


Figure 5-4: Output Audio Mixer

- *Audio*
  - *analogOut*
    - *Mixer*
      - *channel1x*
        - *input channel*
          - *aesCh1…*
          - *aesCh16*
          - *aesMono1…*
          - *aesMono8*
          - *analogCh1…*
          - *analogCh4*
          - *analogMono1…*
          - *analogMono2*
          - *deembedder1Ch1…*
          - *deembedder1Ch16*
          - *deembedder1Mono1…*
          - *deembedder1Mono8*
          - *deembedder2Mono1…*
          - *deembedder2Mono8*
          - *deembedder3Ch1…*
          - *deembedder3Ch16*
          - *deembedder3Mono1…*
          - *deembedder3Mono8*
          - *deembedder4Ch1…*
          - *deembedder4Ch16*
          - *deembedder4Mono1…*
          - *deembedder4Mono8*
          - *toneGenCh1…*
          - *toneGenCh8*
          - *toneGenMono1…*
          - *toneGenMono4*

This control enables the user to select an input channel from the Mixer. The total list of audio channel sources is dependant on the full set of audio options installed on the HD201x

The following shows the gain control for the X input of analog output 1

Level 0 corresponds to mute (-199 dB).
Level 1 corresponds to – 72 dB gain
Level 4096 corresponds to 0 dB gain
Level 65535 corresponds to be + 24 dB gain.
Level 0 corresponds to mute (-199 dB).

- *Audio*
  - *analogOut*
    - *Mixer*
      - *channel1x*
        - *Gain*
          - *0 to 65535*

Enter an input gain between 0 and 65535.
Level 0 corresponds to mute (-199 dB).
Level 1 corresponds to – 72 dB gain
Level 4096 corresponds to 0 dB gain
Level 65535 corresponds to be + 24 dB gain.
Level 0 corresponds to mute (-199 dB).

The following shows the inversion control for the X input of analog audio out 1

Audio
analogOut
Mixer
channel1x
inputInvert
Enable
disable

Select *enable* to invert the selected channel of audio and select *disable* to pass through the selected audio channel.

5.2.7.2. Analog Audio Output Level Configuration

The analog outputs on the HD201x may be individually configured for different audio levels using the **DAC Gain Control** parameter.

Audio
analogOut
dacGainControl
18 dBu
24 dBu

Toggle to the appropriate level and select from one of the options:

18dBu
24dBu

5.2.7.3. Setting Analog Audio Output Soft Mute Control

The **Force Soft Mute** control allows the user to enable or disable a soft mute action for the channel groups.

Audio
analogOut
forceSoftMute
On
Off

When set to *On*, the soft mute will be forced.

When set to *Off*, the soft mute will not be forced.

5.2.7.4. Analog Audio Source Output Configuration

The HD201x analog outputs can operate in several different output modes. The analog outputs can be configured to follow Embedder 1, Embedder 2, Embedder 3, Embedder 4 or follow the routing programmed by the analog audio output mixer. The operating mode is chosen using the **Output Source** control. Since there are only 8x analog outputs and each embedder has 16 channels, there are two selections for each audio embedder. The first selection, allows the 8x analog audio outputs to follow channels 1-8 of the relevant audio embedder. The second selection allows the 8x analog audio outputs to follow channels 9-16 of the relevant audio embedder.

Audio
analogOut
OutputSource
analogMixer
embedder1Ch1to8
embedder1Ch9to16
embedder2Ch1to8
embedder2Ch9to16
embedder3Ch1to8
embedder3Ch9to16
embedder4Ch1to8
embedder4Ch9to16

Select analog mixer to the have the analog audio outputs follow the routing defined by the analog output mixer. Select one of the other options to have the analog audio outputs follow the embedded audio outputs.

5.2.8. Configuring the Audio Tone Generator

5.2.8.1. Configuring the Audio Tone Generator per Channels Delays

The HD201x has an internal 8-channel audio tone generator.
The tone generator produces different 8 different fixed tones with the following assignment

Tone Gen Channel 1 is a fixed 1KHz tone
Tone Gen Channel 2 is a fixed 500 Hz tone
Tone Gen Channel 3 is a fixed 5 kHz tone
Tone Gen Channel 4 is a fixed 2.5 kHz tone
Tone Gen Channel 5 is a fixed 10 kHz tone
Tone Gen Channel 6 is a fixed 7.5k Hz tone
Tone Gen Channel 7 is a fixed 15 kHz tone
Tone Gen Channel 8 is a fixed 12.5 kHz tone

The delay for each of these 8 tones may be programmed individually.

Audio
toneGen
chDelay
Channel 1 to Channel 8
0.0ms

Units of measure are audio samples (48 KHz sampling).
Select a value from 0 to 16383 audio samples.
Each audio sample is 48 KHz and therefore represents a delay of 0.02 ms. Therefore, 0 samples correspond to 0ms of delay and 16383 corresponds to ~ 314 ms of delay.

5.3. MISC MENU

The MISC menu provides three options for configuring your network: IP Address, IP Default Gateway, and IP Netmask.

5.3.1. Setting the IP Address

The **IP Address** control enables the user to configure the IP address of the HD201x.

NOTE: Changes to the HD201x's IP address are made via the front panel engineering menu only. When using HD201x firmware revision HD2010A-20100212-1051.img or earlier changes done to the units IP address DO NOT become active until the unit is power-cycled. In firmware revisions HD2010A-20100212-1051.img or later, changes to the unit's IP address done via the front panel become active immediately.

Misc
network
IP Address
xxx.xxx.xxx.xxx

To set the IP address of the HD201x, use the shaft encoder to toggle and set the desired IP address fields.

5.3.2. Setting the Default Gateway

The **Default Gateway** control enables the user to configure the Default Gateway of the HD2014.

NOTE: Changes to the HD201x's IP address are made via the front panel engineering menu. When using HD201x firmware revision HD2010A-20100212-1051.img or earlier changes done to the units IP address DO NOT become active until the unit is power-cycled. In firmware revisions HD2010A-20100212-1051.img or later, changes to the unit's IP address done via the front panel become active immediately.

Misc
network
ipDefaultGateway
xxx.xxx.xxx.xxx

To set the gateway of the HD201x, use the shaft encoder to toggle and set the desired default gateway address.

5.3.3. Setting the Subnet Mask

The **Subnet Mask** control enables the user to configure the Default Gateway of the HD201x.

NOTE: Changes to the HD201x's IP address are made via the front panel engineering menu. When using HD201x firmware revision HD2010A-20100212-1051.img or earlier changes done to the units IP address DO NOT become active until the unit is power-cycled. In firmware revisions HD2010A-20100212-1051.img or later, changes to the unit's IP address done via the front panel become active immediately.

Misc
network
ipNetmask
xxx.xxx.xxx.xxx

To set the subnet mask of the HD201x, use the shaft encoder to toggle and set the desired default gateway address.

5.4. SYSTEM MENU

The **System** menu enables the user to view version information and perform actions such as restore, delete, factory reset, etc.

5.4.1. Viewing the Product Name

Accessing this menu item will display the entire name of the product.

System *Product Name* *ie. HD2014A+2PS+AA*	The product name will be displayed with all options.

5.4.2. Selecting Configuration Files

The HD201x supports the on board web server and allows the user to define system configuration files. These configuration files are generated using the on-board web-server and saved to the unit for later recall. Navigate the engineering menu **System** -> **Config** -> **Select**. Following this, select the desired file and the configuration file will be loaded. Time to load configuration files depends on the complexity of the system configuration. Typical configuration load times are in the range of 45s-60s.

System *Config* *Select* *Settings…*	When the **Select** menu option is chosen, LIVE files are made active. The LIVE files are the engineering configuration files that get saved to the HD201x, plus any configuration changes that are done via the HD201x front panel. Effectively the LIVE files are the "running memory" of a particular HD201x configuration.

5.4.3. Restoring Configuration Files

These configuration files are generated using the on-board web-server and saved to the unit for later recall. Navigate the engineering menu **System** -> **Config** -> **Select**. Following this, select the desired file and the configuration file will be loaded. Time to load configuration files depends on the complexity of the system configuration. Typical configuration load times are in the range of 45s-60s.

System *Config* *Restore* *Settings…*	When the **Restore** menu option is chosen, the MAIN files are made active. The MAIN files are the engineering files that get saved to the HD201x when a configuration file is first designed and downloaded into the unit.

5.4.4. Factory Reset

The **Factory Reset** menu item allows the user to reinstate the factory settings.

System
Config
factoryReset
Configuring…

Select the *Factory Reset* option if you wish to return the configuration to its factory settings.

5.4.5. Deleting Configuration Files

The **Delete** menu item allows the user to delete configuration files from the HD201x.

System
Config
Delete

5.4.6. Viewing Version Information

The **Version** menu item allows the user to view the current firmware version loaded on the HD201x unit.

System
Version
ie.hd2010a-20100118-1203

The version information will be listed similar to the text shown below:

hd2010*a-20100118-1203*