

HDC6831N HD-SDI Downconverter
/Demultiplexer /Audio and Video Monitor

USER MANUAL



Product Information

Model: HDC6831N HD-SDI Downconverter/Demultiplexer /Audio and Video Monitor
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Company

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Chapter 1 Introduction

1.1 Overview

In the manual, HDC6831N HD-SDI Downconverter / Demultiplexer /Audio and Video Monitor is introduced. The modules can be installed in 6800N series frame.

HDC6831N is a high definition downconverter from HD-SDI to SD-SDI or analog composite, in addition, it also support SD-SDI to analog composite downconversion.

HDC6831N is a multiplexer with 2-pair AES/EBU digital audio outputs and 4-channel analog audio outputs. The module characterizes 8-channel audio meter indication which can be overlapped on CVBS output or SD-SDI output.

The module can display OSD menu, time code and standards of input and output, and can monitor 8-channel audio signal. Furthermore, it supports SNMP control and status indication.

Tab. 1-1 Description of input and output of HDC6831N

Module	Input	Output
HDC6831N	1-channel HD/SD-SDI Video input	<ul style="list-style-type: none"> ✓ 2-channel reclocked HD/SD-SDI loop outputs ✓ 2-channel SD-SDI outputs with audio re-inserting and video processing * ✓ 2-channel CVBS outputs with video processing * ✓ 4-channel analog audio outputs ✓ 2-pair AES/EBU digital audio outputs, balanced or unbalanced

* video processing means users set the parameters in order to add OSD menu, time code, standards of input and output and 8-channel audio meter into video.

1.2 Features

The HDC6831N offers the following features:

- ✓ Auto-detect HD-SDI or SD-SDI input, and convert it into SD-SDI and CVBS outputs with the approximate frequency
- ✓ Support several standard conversion of 1080I, 1080P, 720P, 1035I, 576I, 480I. For more information, please refer to Tab. 1-2
- ✓ 2-channel reclocked HD/SD-SDI loop outputs
- ✓ 2-channel SD-SDI outputs after downconversion (only for HD-SDI input), or 2-channel SD-SDI outputs without downconversion (only for SD-SDI input)

- ✓ 2-channel CVBS outputs
- ✓ Users can add OSD menu, time code, standards of input and output and 8-channel audio meter into video by setting the parameters. For more information, please refer to Fig. 1-1
- ✓ Color space conversion from HD to SD
- ✓ SD-SDI output with audio re-inserting
- ✓ SD-SDI output with EDH re-inserting
- ✓ De-embed 2-pair balanced or unbalanced AES/EBU digital audio outputs and 4-channel analog audio outputs
- ✓ Provide the functions of OSD menu overlapping and SNMP controlling convenient for local and remote controlling.

FCC Caution:

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

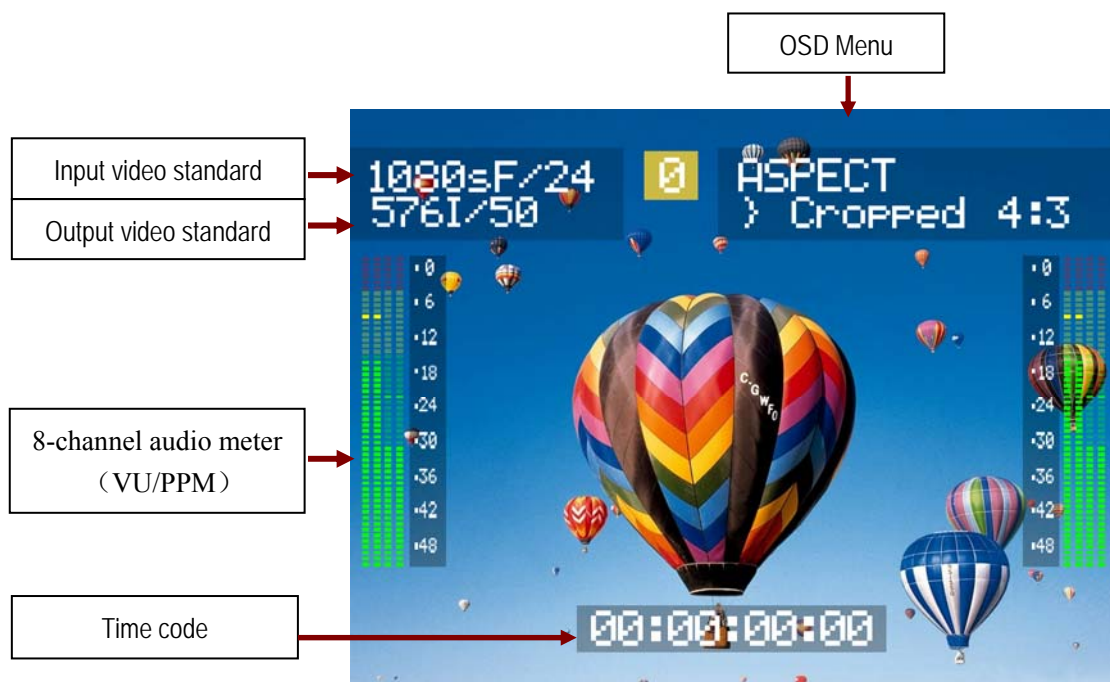


Fig. 1-1 Monitoring Status of HDC6831N

Tab. 1-2 Several Video Standard Conversion fulfilled by HDC6831N

	Input	Output
Video Standard	720P/60, 1080I/60, 1080P/30, 1035I/60, 480I/60, 720P/30, 720P/59.94, 1080I/59.94, 1080P/29.97, 1035I/59.94, 720P/29.97	480I/60
	720P/50, 1080I/50, 1080P/25, 1080P/24, 1080PsF/24, 576I/50, 720P/25, 1080P/23.97, 1080PsF/23.97, 720P/23.97, 720P/24	576I/50

1.3 Module Descriptions

1.3.1 Back Connector



1.3.2 Back Connector of HDC6831N

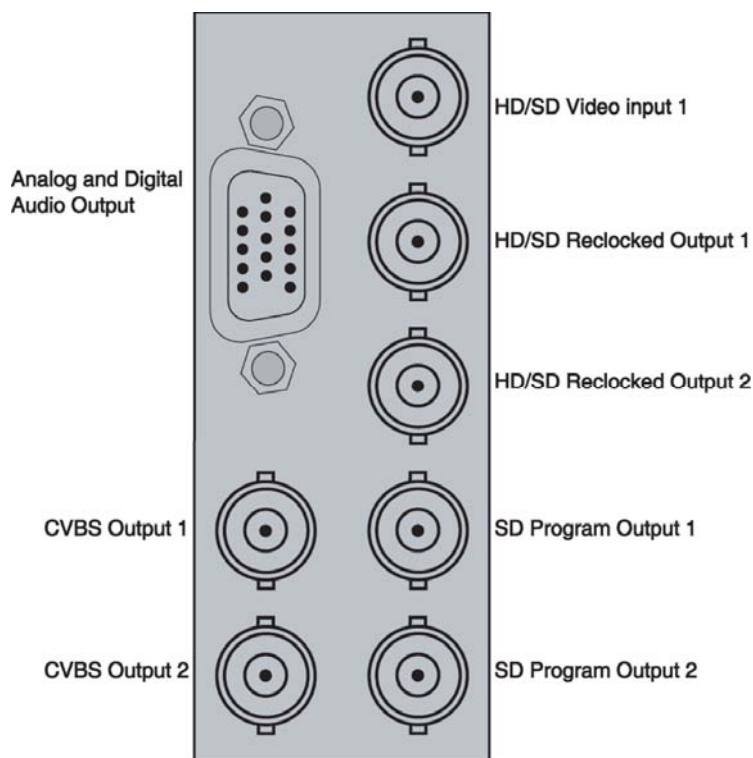


Fig.1-2 Back Connector of HDC6831N

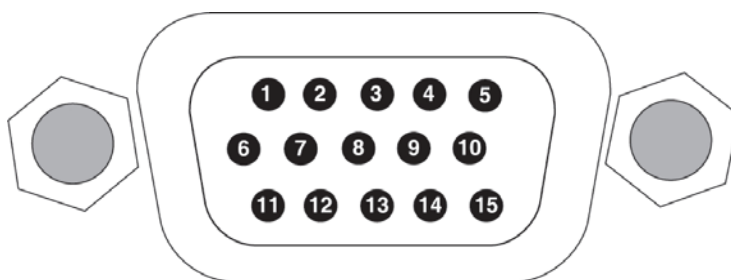


Fig. 1-3 DB15 (female) in the back connector

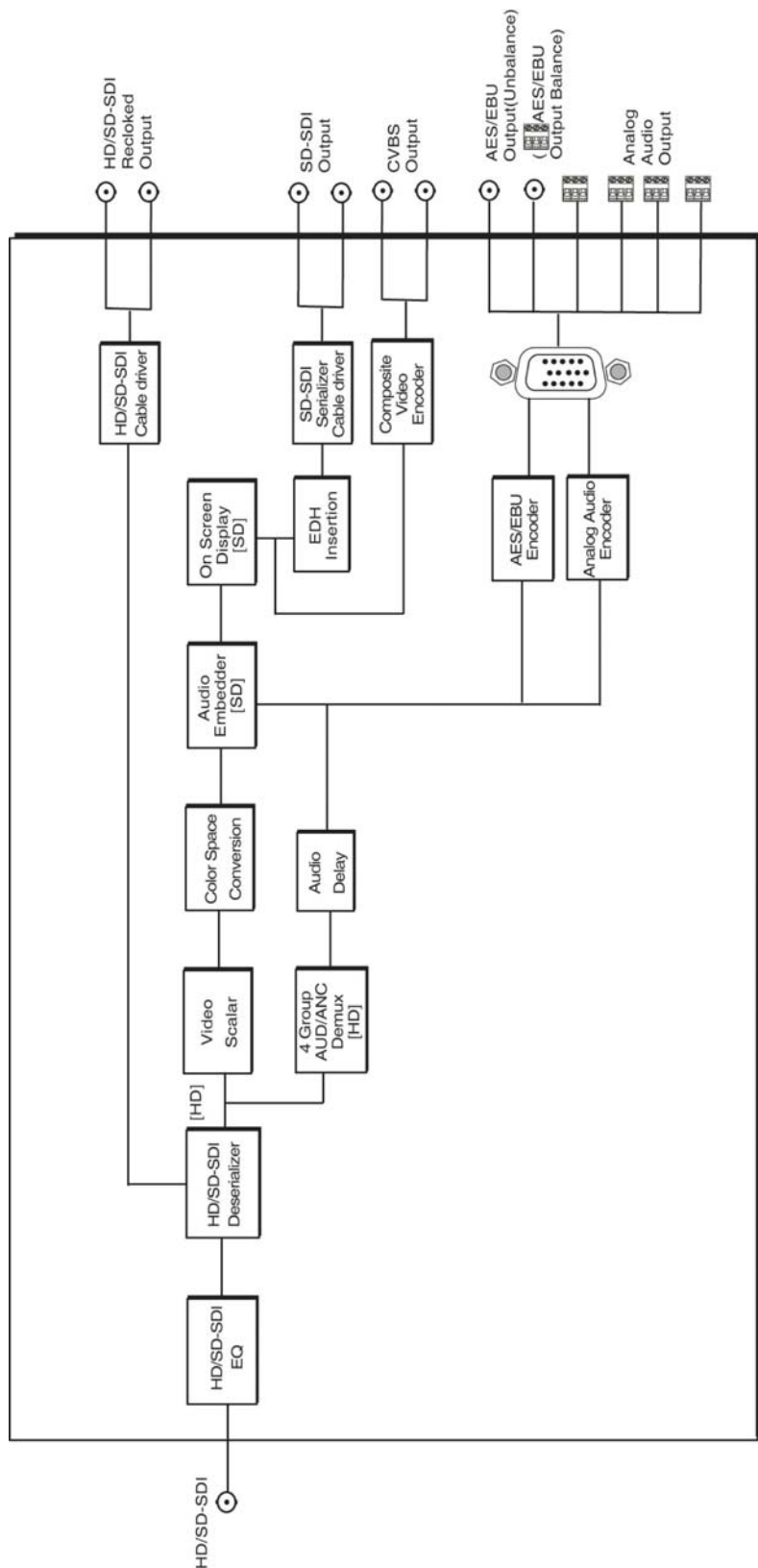
Tab. 1-3 Definition of DB15 (female) in the back connector

Number	Description
①	analog audio 1+
②	analog audio 2+
③	analog audio 3+

Number	Description
④	GND
⑤	AES B1+
⑥	analog audio 1-
⑦	analog audio 2-
⑧	analog audio 3-
⑨	GND
⑩	AES B1-
⑪	analog audio 4+
⑫	analog audio 4-
⑬	GND
⑭	AES B2+
⑮	AES B2-

Note: To AES/EBU digital audio outputs, you must choose AES B1+ and AES B2+ as outputs when setting unbalanced audio, and select the right jumper. For more information, please refer to Tab. 3-5 and 3-6.

1.3.3 Signal Flow



HDC6831N

Fig. 1-4 Signal Flow of HDC6831N

Chapter 2 Installation

2.1 Overview

The power consumption for module and the maximum power ratings that frame can sustain have to be confirmed before installing the module.

In this chapter, the following topics on installation process for HDC6831N are discussed below:

- Unpacking the module
- Installing the module
- Making the connections
- Removing the module

2.2 Maximum Power Ratings for Frame

The maximum power ratings that different types of frames can sustain are listed in the Table 2-1

Tab. 2-1 Maximum Power Consumption

Frame	Maximum Voltage	Redundant Power Supplies	Numbers of Slots
6800N-1U	40W	Yes	4
6800N-2U	60W	Yes	10

2.3 Unpacking the Module

2.3.1 Preparing the Product for Installation

Contact your dealer right now if any items are missing. Please follow the procedures below before installing the module:

- Check the equipment for any invisible damage that may have occurred during transit.
- Confirm all the items listed on the packing list have been received.
- Remove all the packing material including electrostatic-resistant packing.
- Retain these packing for future use.

2.3.2 Check the Packing List

Tab. 2-2 Packed Components

Model Name	Description
HDC6831N	HDC6831N module (1pc); back connector (1pc), and other accessories

2.4 Installing the Module

Caution: Static electricity may cause sensitive semiconductor out of order. Avoid installing or removing the module in the electrostatic-induced environment.

Follow the next steps to install the module:

Step 1



Step2



Step3



Step 4



Step 5



Fig. 2-1 Installation of 2U Frame of 6800N Series

- ✓ Locate the position for back connector and insert the back connector
- ✓ Fasten the screw to fix the back connector.
- ✓ Locate the slot for module.
- ✓ Get the module installed in the slot, push the module slightly along the slot, press module again to confirm that the module is installed firmly and then close swivel handle.
- ✓ Install the front panel.

2.5 Making the Connections

Please connect signals based on Fig. 1-2.

2.6 Removing the Module

Follow the following steps to remove HDC6831N module:

1. Open the front part of frame.
2. Open the swivel handle to the full.



3. First make sure the frame stands firmly, and then pull the module gently along the slot till out of frame.
4. Install the front panel.

Chapter 3 Operation and Control

3.1 Switches

Refer to **Figure 3-1** or **Table 3-1** (Bank 0) or **Table 3-2** (Bank 1) to complete control

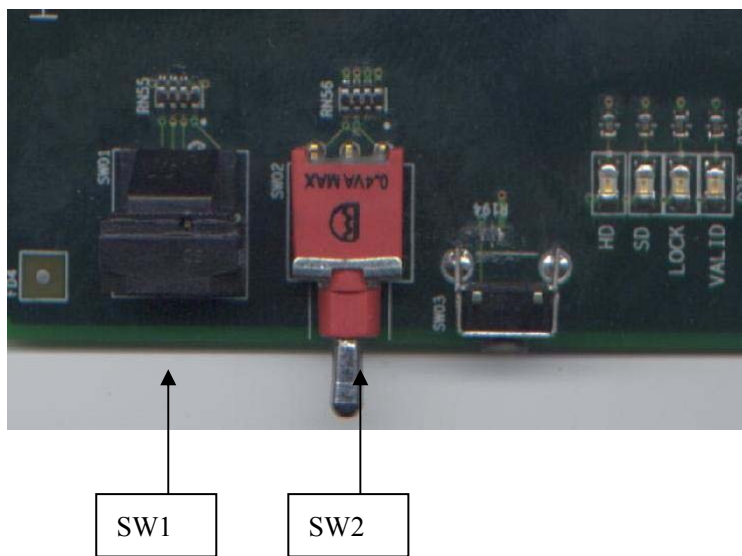


Fig. 3-1 Switches

Rotate SW1 at the position of 0, and select the proper Bank by SW2.

Bank Selection

Rotate the SW1 at the position of “0”. The position of “0” is always used to select Bank. And turn SW2 up or down to select Bank.

1. SW1 Mode Selection

SW1 is a 16-position rotary switch, which is used to select the specific setting.

The selection range is: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F.

2. SW2 Mode Selection

SW2 is a 3-position toggle switch, used to adjust the parameters of the setting made by SW1.

To keep SW2 at the position of “UP” or “DOWN”, the continuous adjustment can be achieved.

3.2 Bank 0 Function Setting

Tab. 3-1 Bank 0 Function Setting

SW1 Position	Function Description	Options	Default
0	Bank Select <i>Used to select Bank</i>	Bank 0 Bank 1 Bank 2	Bank 0
1	ASPECT (READ) <i>Select vertical to horizontal ratio</i>	4:3 16:9 CROPPED 4:3	4:3
2	Over Scan	NORMAL	NORMAL
3	H/V delay select <i>Select H/V delay in order to observe the blanking data</i>	NORMAL, H DELAY, V DELAY, H/V DELAY	NORMAL
4	BLUE/MONO <i>Display a image in pure blue or B&W mode</i>	NORMAL, BLUE ONLY, MONO	NORMAL
5	BRIGHTNESS <i>Adjust the brightness of a image (only for HD)</i>	-128-0~+127	0
6	CONTRAST <i>Adjust the contrast of a image (only for HD)</i>	-128~0~+127	0
7	CHROMA <i>Adjust the chroma of a image (only for HD)</i>	-128~0~+127	0
8	SHARPNESS <i>Adjust the sharpness of a image (only for HD)</i>	0~15	0
9	HUE <i>Adjust the hue of a image (only for HD)</i>	-32~0~+31	0
A	SETUP <i>Setup the standard of NTSC pattern</i>	0 or 7.5IRE	7.5IRE
B	AFD AUTO CTL <i>Automatic checking</i>	ON, OFF	ON
C	AFD PRESET <i>Setup vertical to horizontal ratio</i>	4:3 16:9 CROPPED 4:3	4:3
D~F	RESERVED		
Note: put SW2 up or down to change the option			

3.3 Bank 1 Function Setting

Tab. 3-2 Bank 1 Function Setting

SW1 Position	Function Description	Options	Default
0	BANK SELECT <i>Used to select Bank</i>	Bank 0 Bank 1 Bank 2	Bank 0
1	METER 1 A SRC <i>Select the audio source of METER 1A, users can select one arbitrary channel of 16-channel audio signals from 4 groups for monitoring</i>	CH01-CH16	CH01
2	METER 1 B SRC <i>Select the audio source of METER 1B, users can select one arbitrary channel of 16-channel audio signals from 4 groups for monitoring</i>	CH01-CH16	CH02
3	METER 2 A SRC <i>Select the audio source of METER 2A, users can select one arbitrary channel of 16-channel audio signals from 4 groups for monitoring</i>	CH01-CH16	CH03
4	METER 2 B SRC <i>Select the audio source of METER 2B, users can select one arbitrary channel of 16-channel audio signals from 4 groups for monitoring</i>	CH01-CH16	CH04
5	METER 3 A SRC <i>Select the audio source of METER 3A, users can select one arbitrary channel of 16-channel audio signals from 4 groups for monitoring</i>	CH01-CH16	CH05
6	METER 3B SRC <i>Select the audio source of METER 3B, users can select one arbitrary channel of 16-channel audio signals from 4 groups for monitoring</i>	CH01-CH16	CH06
7	METER 4 A SRC <i>Select the audio source of METER 4A, users can select one arbitrary channel of 16-channel audio signals from 4 groups for monitoring</i>	CH01-CH16	CH07
8	METER 4 B SRC <i>Select the audio source of METER 4B, users can select one arbitrary channel of 16-channel audio signals from 4 groups for monitoring</i>	CH01-CH16	CH08
9	AUD OUT 1 SRC <i>Select 1-pair audio signals as AES 1 and analog audio</i>	METER 01 METER 02	METE R 01

SW1 Position	Function Description	Options	Default
	<p><i>output 1 & 2 from 4-pair audio signals displaying in audio meters.</i></p> <p>Note: AES 1 and analog audio output 1 & 2 have nothing to do with whether the audio meters display on the screen or not. Even if canceling the display of audio meters, Audio signals can output in normal.</p>	METER 03 METER 04	
A	<p>AUD OUT 2 SRC</p> <p><i>Select 1-pair audio signals as AES 2 and analog audio output 3 &4 from 4-pair audio signals displaying in audio meters.</i></p> <p>Note: AES 2 and analog audio output 3 &4 have nothing to do with whether the audio meters display on the screen or not. Even if canceling the display of audio meters, Audio signals can output in normal.</p>	METER 01 METER 02 METER 03 METER 04	METE R 02
B	<p>TEST LEV</p> <p><i>Select the test level for the audio meters</i></p>	-18dB, -20dB	-20dB
C	<p>METER L H POS</p> <p><i>Adjust the horizontal position of left audio meter. In details, adjust the horizontal positions of 1A, 1B, 2A, 2B.</i></p>	4~159	4
D	<p>METER R H POS</p> <p><i>Adjust the horizontal position of left audio meter. In details, adjust the horizontal positions of 3A, 3B, 4A, 4B.</i></p>	4~159	159
E~F	RESERVED		
Note: put SW2 up or down to change the option			

3.4 Bank 2 Function Setting

Tab. 3-3 Bank 2 Function Setting

SW1 Position	Function Description	Options	Default
0	BANK SELECT <i>Used to select Bank</i>	Bank 0 Bank 1 Bank 2	Bank 0
1	COMP OSD EN <i>Select whether overlap OSD into CVBS video. Including overlapping of main menu, time code, standards of input and output and 8-channel audio meter into video.</i>	ON, OFF	ON
2	SDI OSD EN <i>Users can select not to overlap OSD into SDI and can also select FOLLOW COMP to keep the same setting with CVBS</i>	FOLLOW COMP, OFF	FOLLOW COMP,
3	MENU DISPLAY <i>Select the display mode of control menu. When setting at AUTOMATIC, the menu will disappear if users don't operate for 10 seconds. But the menu can re-display if users re-operate the module.</i>	ON, AUTOMATIC	ON
4	STD DISPLAY <i>Select the display mode of input and output</i>	ON, OFF, AUTOMATIC	ON
5	TC DISPLAY <i>Select the display mode of time code</i>	ON, OFF	ON
6	METER DISPLAY <i>Select the display mode of audio meter</i>	ON, OFF	ON
7~E	RESERVED	CH01-CH16	CH07
F	FACTORY CALL <i>Restore the factory default setting</i>	PRESS TO SET	
Note: put SW2 up or down to change the option			

3.5 LED Indicator

Tab. 3-4 LED Indicator Function

Item (color)	Description
HD (green)	On: video input signal is in HD-SDI standard
SD (green)	On: video input signal is in SD-SDI standard
LOCK (green)	On: input signal is locked and can be received in normal
VALID (orange)	On: not support the current video format Off: support the current video format

3.6 Setting Jumper

Tab. 3-5 Setting AES1 at balanced or unbalanced digital audio output

	BLANCE	UNBLANCE
JP02	Closed	Open
JP03	Open	Closed
JP04	Open	closed

Note: please choose AES B1+ as output when setting UNBLANCE

Table 3-6 Setting AES2 at balanced or unbalanced digital audio output

	BLANCE	UNBLANCE
JP05	Closed	Open
JP06	Open	Closed
JP07	Open	closed

Note: please choose AES B2+ as output when setting UNBLANCE

Analog audio outputs are all in balanced mode. With regard to AES/EBU digital audio output, users can select audio signal, balanced or unbalanced.

Please set jumpers at BLANCE when outputting balanced audio referring to Tab. 3-5 and Tab. 3-6, and then connect AES terminal “+”, “-“ and “gnd” of DB15 with 3-pin RCA audio port.

Please set jumpers at UNBLANCE when outputting unbalanced audio referring to Tab. 3-5 and Tab. 3-6, and then connect AES terminal “+” and “gnd” of DB15 with BNC audio port.

Chapter 4 Specifications

In this chapter, the specifications in the following subjects are introduced:

- SD/HD-SDI Video Input
- SD/HD-SDI Reclocked Video Output
- SD-SDI Video Output
- Analog Composite Video Output
- AES/EBU Digital Audio Output
- Analog Audio Output

4.1 SD/HD-SDI Video Input

Tab. 4-1 SD/HD-SDI Video Input Specifications

Item	Parameter
Number	1
Standards	SMPTE 292M HD-SDI or 259M SD-SDI coaxial cable signal
Connector	BNC (IEC169-8)
Impedance	75Ω
Return Loss	HD-SDI mode: >18dB From 5Mhz to 1485MHz SD-SDI mode: >18dB to 270MHz
Equalization	HD-SDI mode: 120m Belden 1694A cable SD-SDI mode: 230m Belden 8281 cable

4.2 SD/HD-SDI Reclocked Video Output

Tab. 4-2 SD/HD-SDI Reclocked Video Output Specifications

Item	Parameter
Number	2
Standards	SMPTE 292M HD-SDI or 259M SD-SDI coaxial cable signal
Connector	BNC
Impedance	75Ω
Return Loss	HD-SDI mode: >18dB From 5Mhz to 1485MHz SD-SDI mode: >18dB to 270MHz
Signal Level	800mV±10%
DC Offset	0V±0.5V
Rise and Fall Time	HD-SDI mode: <270ps SD-SDI mode: 400-1500ps (20%~80% amplitude)
Overshoot	< 10%
Jitter	<0.2UI (740ps) peak to peak

4.3 SD-SDI Video Output

Tab. 4-3 SD-SDI Video Output Specifications

Item	Parameter
Number	2
Standards	259M SD-SDI coaxial cable signal
Connector	BNC
Impedance	75 Ω
Return Loss	SD-SD mode: >18dB to 270MHz
Signal Level	800mV±10%
DC Offset	0V±0.5V
Rise and Fall Time	SD-SD mode: 400-1500ps (20%~80% amplitude)
Overshoot	< 10%
Jitter	<0.2UI (740ps) peak to peak

4.4 Analog Composite Video Output

Tab. 4-4 Analog Composite Video Output Specifications

Item	Parameter
Number	2
Standards	NTSC, PAL
Level	1Vp-p +/-3dB
Connector	BNC (IEC169-8)
Impedance	75Ω
Return Loss	>40dB to 5MHz
DC Offset	0V±0.05 V
Frequency Response	+/-0.5dB to 5MHz
Differential Gain	<1.5%
Differential Phase	1.5 degree
SNR	58dB to 5.75MHz

4.5 Balanced AES Audio Output

Tab. 4-5 Balanced AES Audio Output Specifications

Item	Parameter
Number	2
Standards	AES balanced
Connector	DB9
Impedance	110 Ω , ±20% (0.1 to 6MHz)
Signal Level	2 to 7V peak to peak
Sample Rate	48KHz
Jitter	±20ns
Rise and Fall Time	5 to 30 ns (10% to 90%)
Bits	20

4.6 Unbalanced AES Audio Output

Tab. 4-6 Unbalanced AES Audio Output Specifications

Item	Parameter
Number	2
Standards	AES unbalanced
Connector	DB9
Impedance	75 Ω
Signal Level	1V peak to peak $\pm 10\%$
Sample Rate	48KHz
Jitter	$>25\text{dB}$, 0.1 to 6MHz
Rise and Fall Time	30 to 44 ns (10% to 90%)
Bits	20

4.7 Analog Audio Output

Tab. 4-7 Analog Audio Output Specifications

Item	Parameter
Number	4
Standards	Balanced analog audio
Connector	DB9
Impedance	66 Ω
THD+N	0.004% @ 1 kHz 0 dBFS
SNR	$>107\text{dB}$
Return Loss	$>25\text{dB}$, 0.1 to 6MHz
Frequency Response	20 Hz - 20 kHz: $0 \pm 0.15\text{ dB}$

Note: Specifications are subject to change without notice