

# HA5 HDMI To HD-SDI/SDI Video and Audio Converter

## User Manual



**HDMI**<sup>™</sup>  
HIGH DEFINITION MULTIMEDIA INTERFACE

**AJA**  
VIDEO SYSTEMS

May 13, 2008

## Trademarks

---

AJA®, KONA®, and XENA® are registered trademarks of AJA Video, Inc. Io HD™ and Io™ are trademarks of AJA Video, Inc.

HDMI, the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC. DVI is a registered trademark of DDWG. All other trademarks are the property of their respective holders.

## Notice

---

Copyright © 2008 AJA Video, Inc. All rights reserved. All information in this manual is subject to change without notice. No part of the document may be reproduced or transmitted in any form, or by any means, electronic or mechanical, including photocopying or recording, without the express written permission of AJA Inc.

## FCC Emission Information

---

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. Changes or modifications not expressly approved by AJA Video can effect emission compliance and could void the user's authority to operate this equipment.

## Contacting Support

---

To contact AJA Video for sales or support, use any of the following methods:

443 Crown Point Circle, Grass Valley, CA. 95945 USA

Telephone: 800.251.4224 or 530.274.2048

Fax: 530.274.9442 Web: <http://www.aja.com>

Support Email: [support@aja.com](mailto:support@aja.com)

Sales Email: [sales@aja.com](mailto:sales@aja.com)

When calling for support, have all information at hand prior to calling.

## Limited Warranty

---

AJA Video warrants that this product will be free from defects in materials and workmanship for a period of five years from the date of purchase. If a product proves to be defective during this warranty period, AJA Video, at its option, will either repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, you the Customer, must notify AJA Video of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. The Customer shall be responsible for packaging and shipping the defective product to a designated service center nominated by AJA Video, with shipping charges prepaid. AJA Video shall pay for the return of the product to the Customer if the shipment is to a location within the country in which the AJA Video service center is located. Customer shall be responsible for paying all shipping charges, insurance, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. AJA Video shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than AJA Video representatives to install, repair or service the product, b) to repair damage resulting from improper use or connection to incompatible equipment, c) to repair any damage or malfunction caused by the use of non-AJA Video parts or supplies, or d) to service a product that has been modified or integrated with other products when the effect of such a modification or integration increases the time or difficulty of servicing the product.

THIS WARRANTY IS GIVEN BY AJA VIDEO IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. AJA VIDEO AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. AJA VIDEO'S RESPONSIBILITY TO REPAIR OR REPLACE DEFECTIVE PRODUCTS IS THE WHOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER AJA VIDEO OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

## Introduction

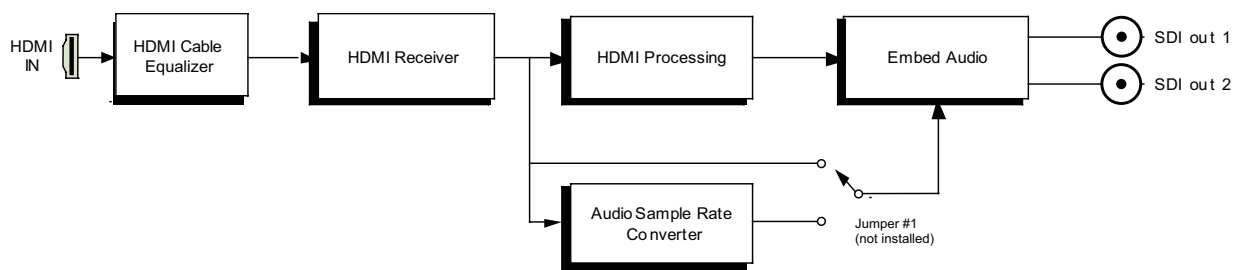
The HA5 converts HDMI to SDI or HD-SDI. Up to eight channels of HDMI audio are embedded into the SDI/HD-SDI output allowing a convenient single cable audio/video connection. The HA5 provides two SDI/HD-SDI outputs and supports long HDMI cables on the input. The HA5 is useful for connecting HDMI cameras and other sources to SDI/HD-SDI capture cards and equipment.

## Features

- HDMI to SDI/HD-SDI
- Full 10-bit Conversion
- Full HDMI support including embedded audio
- Equalized HDMI input supports long HDMI cables up to 40m
- PLL clock filtering for low jitter SDI/HD-SDI outputs
- Lock LED shows type of input source: SD (green) or HD (red)
- HDMI cable supplied
- Uses 5V power (supply sold separately)

**Note:** The HA5 will not pass HDMI video with HDCP copy protection.

## Block Diagram



*HA5 Converter, Simplified Block Diagram*

## Audio

HA5 converter supports 8 audio channels (4 stereo pairs) at 24-bit/48 KHz which it dis-embeds from HDMI and embeds into SDI. For proper embedding, audio must be synchronous to video. However, if audio is not synchronous with video or the sample rate is not 48 KHz, then jumper #1 must be installed. Having jumper #1 installed forces an onboard Sample Rate Converter to convert audio to 24-bit/48 KHz and then synchronize it with input video before embedding. In this scenario only channels 1/2 are embedded—the other 6 channels are muted.

## I/O Connections



*HA5 Converter*

## User Controls

An internal jumper block (J2) with 3 jumpers provides controls for SDI output range and SDI audio. The Color Space is automatically detected to be either YCbCr, which is passed to SDI unmodified, or RGB—which can be a narrow or wide range before output to SDI. Each setting is described in the table below.

### Internal Jumper

Jumper #1	Jumper #2	Jumper #3
Installed (default) = 2 channels (1/2) of audio with Sample Rate Conversion to 48 KHz	Installed (default) = Wide RGB in (0-1023) to YCbCr out (64-940)	Installed (default) = Auxiliary (not used)
Removed = 8 channels of audio at 48 KHz	Removed = Narrow RGB in (64-940) to YCbCr out (64-940)	

To access this jumper, remove the four phillips screws securing the back side of the HA5 case. Once the case cover is removed, locate the jumper block. Jumper positions 1 through 3 are clearly marked on the circuit board.

## Installation

Typically, HA5 installation consists of the following steps:

1. Ensure the HA5 is disconnected from power.
2. Connect equipment to the converter BNCs and HDMI input connector.
3. Apply +5VDC power to the converter (AJA power supply model DWP or DWP-U).

## Specifications

Item	Specification
Input	HDMI with embedded audio
Input Formats	525i, 625i 1080p23.98/24/25/29.97/30 1080i 50/59.94/60 720p 50/59.94/60
Outputs	SMPTE-259/292/296, SDI/HD-SDI, 2 x BNC
HDCP	Content not supported
Size	4.6" x 2.4" x 1" (117 x 61 x 25 MM.)
Power	+5 VDC regulated, 4 watts, Requires Power Supply (AJA power supply model DWP or DWP-U recommended)

