HDP
HD-SDI/SDI To DVI-D and Audio Converter

User Manual

AJA VIDEO SYSTEMS INC

December 14, 2004 P/N 101657

Trademarks

AJA, Io, and Kona are trademarks of AJA Video, Inc. DVI is a registered trademark of DDWG. E-DDC and E-EDID are registered trademarks of VESA. All other trademarks are the property of their respective holders.

Notice

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
Sales Email: sales@aja.com

When calling for support, have all information on the product (serial number etc.) 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 HDP is a miniature HD-SDI/SDI to DVI-D converter for LCD or Plasma monitors. Using a very high quality scaling engine, the HDP will automatically size 4 x 3 or 16 x 9 inputs to most DVI-D monitors. For appropriate monitor configurations, scaling is automatically 1 to 1—for example, displaying 1920 x 1080 video on a WUXGA (1920x1200) monitor. The HDP will also automatically adapt the input frame rate for monitor compatibility. In addition, the HDP provides 2 channel RCA style audio monitoring and 2 looping outputs of the SDI inputs.

Features

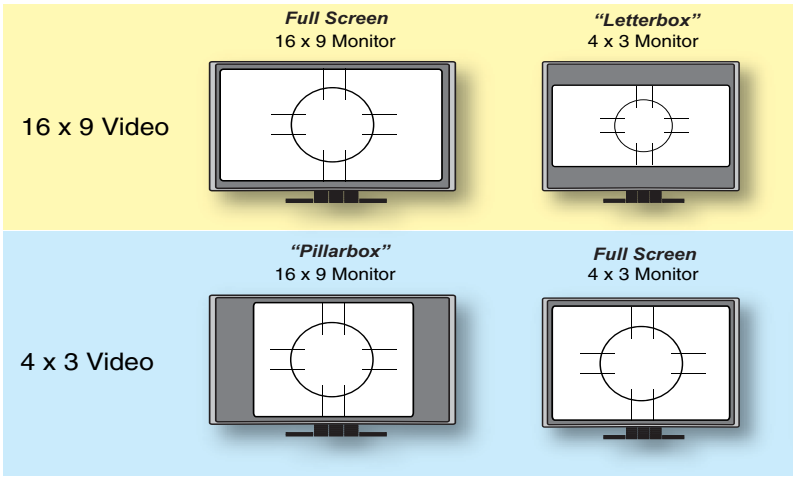
- Converts HD-SDI/SDI to DVI-D for LCD/Plasma monitors
- Automatically adapts to most LCD monitors up to 1920 x 1200
- High quality scaling engine for proper display of 4 x 3 or 16 x 9 content
- Scaling is 1 to 1 for appropriate user-selectable monitor configurations
- 2 channel “RCA-Jack” audio output
- 2 HD-SDI/SDI looping outputs
- Flexible 5-18V power supply
- External Dipswitch Configuration

Monitor Compatibility

The DVI specification supports many different monitor types and raster formats. The HDP uses the EDID communication protocol of the DVI standard to determine the monitor type. Once the monitor type is known, the HDP will scale the input video based on the native resolution of the monitor. If the monitor type is unknown, the HDP will default to a 1024 x 768 60Hz raster.

Video Scaling

As shown in the graphic below, the HDP will scale the input video to the best fit for a given monitor and video input. In cases where the input video and the monitor are already the same or similar, the HDP automatically turns off scaling. For example, a 1920 x1080 video and a 1920 x1200 monitor will not be scaled.



Note: The HDP also properly supports 16:10 and 5:4 monitors.

If the HDP scaling is turned off with user control Dipswitch 1, the input raster will be displayed unscaled. This means that input rasters smaller than the monitor appear as a "floating" image surrounded by black. For example, a 1280 x 720 image on a 1920 x 1200 monitor only fills about 40% of the screen. Standard definition inputs unscaled on a 1920 x 1200 monitor only fill about 20% of the screen. This mode will only work when the input raster is smaller than the monitor resolution.

The Full Screen mode, controlled by Dipswitch 2, causes the scaler to fill the monitor screen when the input and monitor aspect ratios do not match. This is done with a combination of horizontal stretch and zoom (for 4 x 3 video on a 16 x 9 monitor) or a combination of horizontal squeeze and zoom (for 16 x 9 video on a 4 x 3 monitor). Both of these operations crop part of the image and slightly distort the aspect ratio.

The SD Anamorphic mode, controlled by Dipswitch 4, will define SD (standard definition) inputs as 16 x 9. With this mode on, SD inputs display full screen on 16 x 9 monitors, and letterboxed on 4 x 3 monitors.

Vertical Locking

Depending on the input frame rate and the capabilities of the monitor in use, the HDP will provide a vertically locked signal to the monitor. Because most DVI monitors have their own internal scaling, the internal scaler of the monitor may or may not lock vertically to the HDP output. The recommended monitor list shown below lists only monitors which have been tested for proper vertical lock. The HDP works with many LCD and Plasma monitors not shown on the recommended monitor list—however, these monitors may have one of two types of issues associated with not being vertically locked:

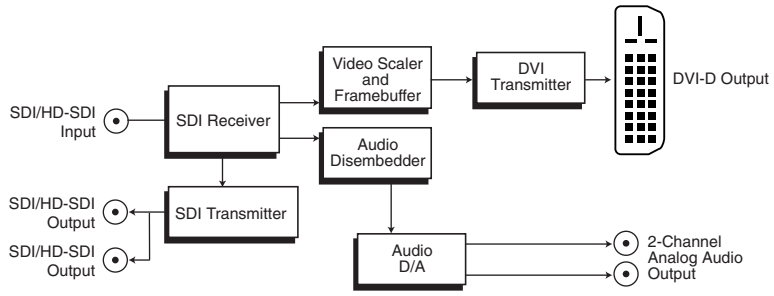
Frame add/drop: The monitor occasionally adds or drops a frame of video which appears as discontinuous motion. For example, a moving object may appear to briefly pause or jump ahead.

Motion tearing: The monitor displays video from 2 different fields or frames on screen. This appears as a horizontal discontinuity in the video during motion. For example, a moving object may appear to be split horizontally with the upper part ahead or behind the lower part.

Recommended Monitor List

- Apple 23” Cinema HD Display (Vlocks @ 60Hz). A 3:2 pulldown is used for 24Hz inputs, and a 6:5 conversion is used for 50Hz inputs
- Sony 23” SDM-P234 (Vlocks @ 60Hz, 50Hz, 48Hz)

Block Diagram



HDP Converter, Simplified Block Diagram

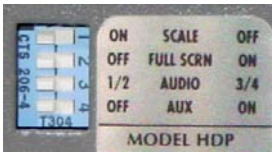
I/O Connections

HDP Converter

User Controls

The user interface for the HDP is a 4-switch DIP accessible through a cut-out in the bottom of the unit. Use the DIP switches to enable/disable and configure scaling modes, and assign which AES audio channels are disembedded.

The exact function of each DIP switch and what it controls is described on the following pages.



HDP DIP Switches

Switch 1 SCALE—Turns Scaling On or Off

ON	OFF
Normal Operation	Turns scaling off; the picture will output 1:1. **Note:** only works when it is possible to display the entire unscaled raster For example, it is not possible to display a 1920 x 1080 input on a 1600 x 1200 monitor. Use a 1920 x 1200 (WUXGA) monitor for optimal performance. 1:1 scaling will then be supported for all input formats.

Switch 2 FULLSCRN—Selects Scaling Mode (when SW1 is ON)

OFF	ON
Normal Operation (aspect ratio preserved)	Scaler always fills screen as described in “Video Scaling”

Switch 3 AUDIO—Selects Two AES Channels for Disembedding

1/2	3/4
Selects AES Channels 1 and 2 for disembedding from the SDI stream.	Selects AES Channels 3 and 4 for disembedding from the SDI stream.

Switch 4 AUX—SD Anamorphic

OFF	ON
Normal Operation	Defines SD inputs as 16 x 9. Scaling must be ON (S1 set to ON).

Installation

Typically, HDP installation consists of the following steps:

1. Ensure the HDP is disconnected from power.
2. Configure the DIP switch for the desired configuration and video scaling.
3. Connect video equipment to the convertor BNCs and DVI connector.
4. Connect audio equipment to RCA connectors (optional)
5. Apply +5 to +18VDC power to the converter (AJA power supply model DWP or DWP-U).

Specifications

Item	Specification
Inputs	SMPTE-259/292/296 SDI/HD-SDI
Input Formats	1080i, 1080p, 720p, 525i, 625i
Video Input	HD-SDI/SDI, SMPTE-259/292/296/274
Outputs	DVI-D (E-DDC and E-EDID compatible) Audio (2 channel RCA-style outputs) @ -10dBV nominal 2 Looping SDI outputs of the SDI inputs

Item	Specification
Supported Output Displays (native resolution) **Note:** for resolutions not listed here, the HDP defaults to 1024 x 768	640 x 480 — VGA 800 x 600 — SVGA 848 x 480 — Plasma 852 x 480 — Plasma 1024 x 600 — WSVGA 1024 x 768 — XGA 1280 x 720 — HDTV 1280 x 768 — WXGA 1280 x 960 — 4:3 SXGA 1280 x 1024 — SXGA 1360 x 768 — Plasma 1366 x 768 — Plasma 1600 x 1024 — WSXGA 1600 x 1200 — UXGA 1680 x 1050 — Apple 20” Cinema HD 1920 x 1200 — WUXGA
Maximum DVI resolution	1920 x 1200 @ 60Hz
Size	5.8” x 2.4” x 1” (131 x 61 x 25mm)
Power (AJA power supply model DWP or DWP-U)	+5 to +18v DC regulated, 5 watts