HDP4
HD-SDI/SDI To DVI-D and Audio Converter 4-Output

User Manual

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Introduction

The HDP4 is similar to the HDP, converting HD-SDI/SDI to DVI-D for LCD or Plasma monitors. Where the HDP outputs 1 DVI-D output with audio, the HDP4 provides 4 sets of DVI-D and audio outputs. Each output is separately reclocked and buffered. Using a very high quality scaling engine, the HDP4 automatically sizes 4:3 or 16:9 inputs to many DVI-D monitors. For appropriate monitor configurations, scaling is automatically 1 to 1—for example, displaying 1920x1080 video on a WUXGA (1920x1200) monitor. The HDP4 will also automatically adapt the input frame rate for monitor compatibility. In addition, the HDP4 provides 2 looping outputs of the HD-SDI/SDI input.

The HDP4 is designed for use as a general monitoring device, perfect for use in applications such as:

- General post-production reference monitoring
- Client monitoring
- Presentation
- Projection
- Corporate displays
- Kiosk applications
- ...and much, much more!

The scaling engine in the HDP4 makes it a simple and effective way to get full-screen images from a myriad of SD and HD sources.

Note: The HDP4 is not intended as a critical viewing device, for applications such as color-correction, etc. We recommend professional/broadcast grade monitors for such critical applications.

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
- 4 sets of stereo audio output
- 4 DVI-D outputs
- 2 channel "RCA-Jack" audio outputs, 1 set per DVI-D output
- 2 HD-SDI/SDI looping outputs
- Universal 100/240 VAC 8 Watt power supply
- External Dipswitch Configuration

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About Monitor Compatibility

The HDP4 is designed to work with most DVI-D monitors. The HDP4 uses the industry standard EDID communication protocol (within the DVI link) to communicate with the monitor, and then adjust the DIP's internal scaling engine to scale the input video to the native resolution of the monitor. However, due to the hundreds of variations of DVI formats currently in use, proper operation with all monitors cannot be guaranteed.

The HDP4 has 2 modes of operation that occur automatically, depending on what monitor it is attached to: Recommended Monitor Mode and VESA Mode.

Recommended Monitor mode

For recommended monitors, there is custom firmware that will provide an accurate frame-locked image for all supported SDI and HD-SDI input formats. The HDP4 automatically determines the monitor it is connected to.

Recommended Monitors:

- Apple 23" HD Cinema, model M9178LL/A (aluminum bezel)
- Sony 23", model SDM-P234
- Viewsonic VP231wb

VESA Mode

For DVI-D monitors not on the recommended list, the HDP4 will use standard VESA timing based on the particular monitors "preferred timing"—as determined by the EDID communication with the monitor. Because VESA timing standards are not based on video formats, the HDP4 cannot frame lock to the input video and will operate like a frame synchronizer - it will frame rate convert by adding or dropping frames as needed. If a particular monitor reports a preferred timing mode that is not supported by the HDP4, the HDP4 will default to standard XGA (1024 x 768 60Hz) timing.

Monitors tested for Compatibility in VESA Mode:

- HP HPL2335
- Samsung 170T
- Samsung 213T
- Samsung 243T
- Samsung 173P

Video Scaling

As shown in the graphic below, the HDP4 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 HDP4 automatically turns off scaling. For example, a 1920 x1080 video and a 1920 x1200 monitor will not be scaled.
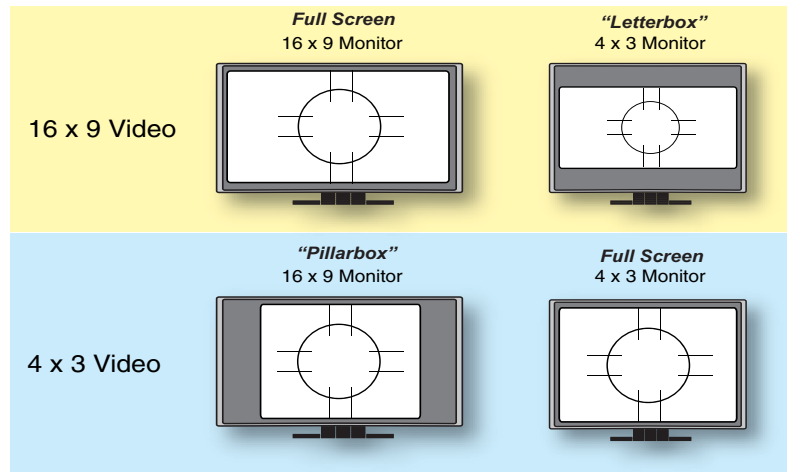
Note: The HDP4 also properly supports 16:10 and 5:4 monitors.

If the HDP4 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.
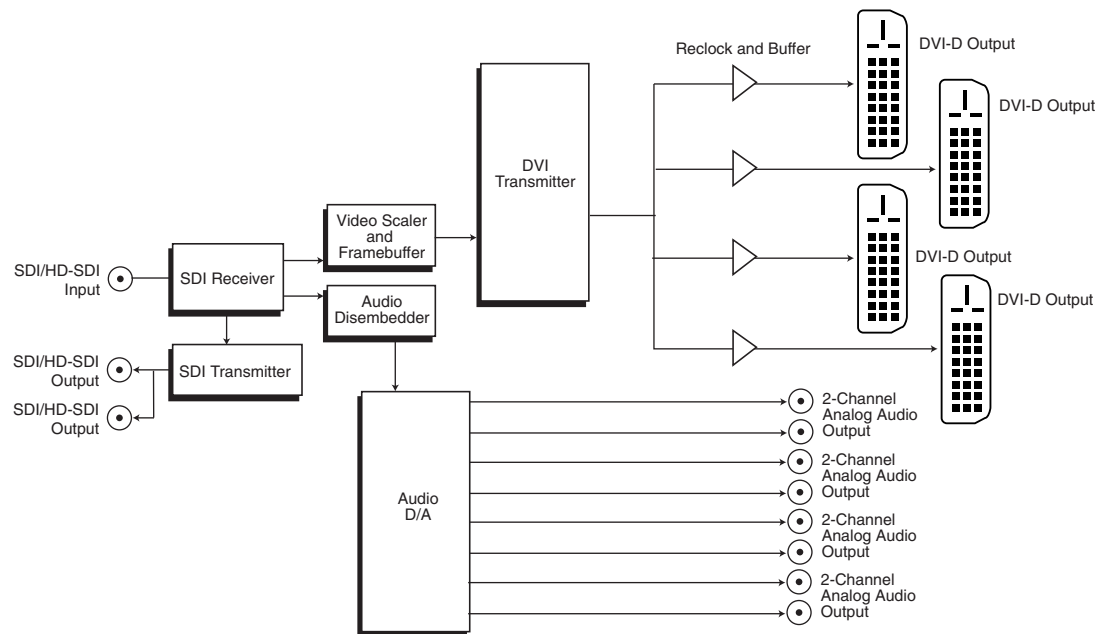
Vertical Locking

Depending on the input frame rate and the capabilities of the monitor in use, the HDP4 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 HDP4 output. The recommended monitor list shown below lists only monitors which have been tested for proper vertical lock. The HDP4 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.
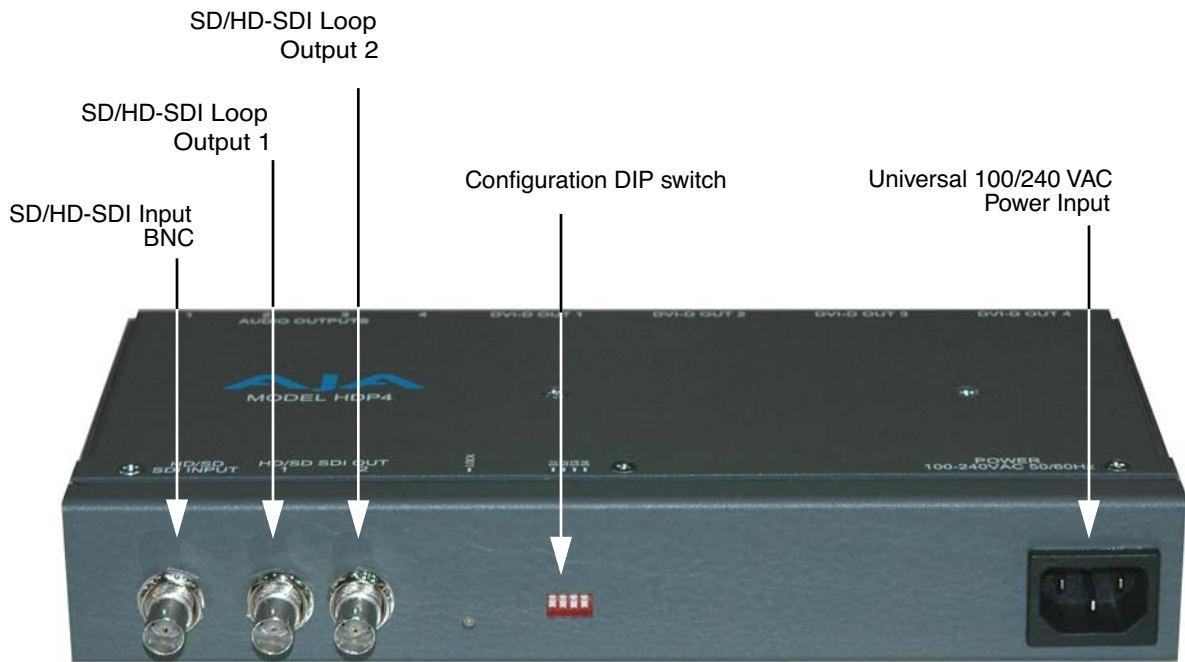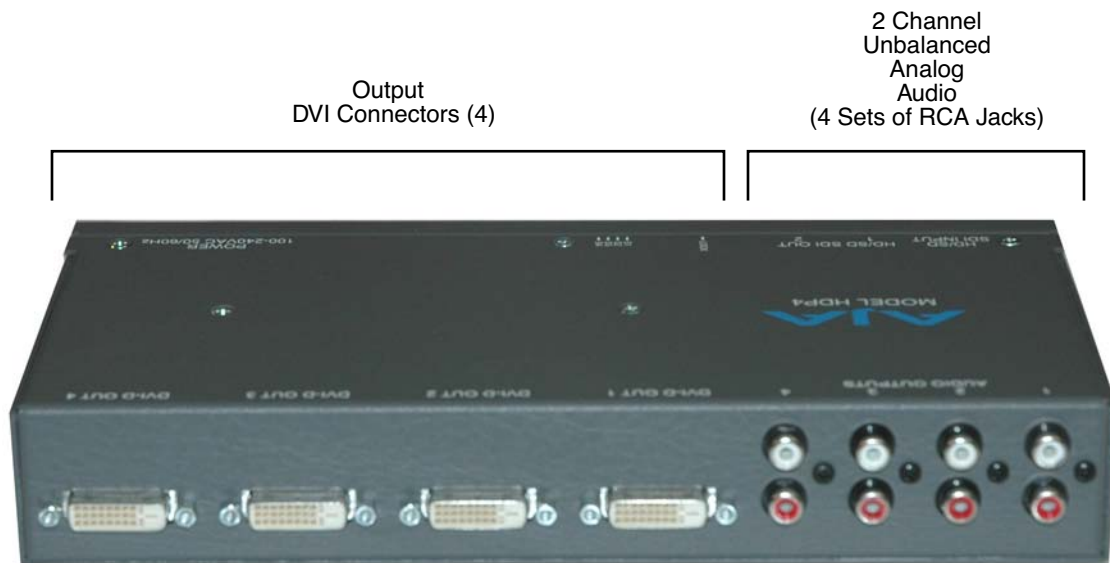
Motion tearing: The monitor displays video from 2 different fields or frames on screen. This appears as a horizontal discontinuity in the video during motion. For example, a moving object may appear to be split horizontally with the upper part ahead or behind the lower part.

Block Diagram

HDP4 Converter, Simplified Block Diagram

I/O Connections

Output
DVI Connectors (4)

2 Channel
Unbalanced
Analog
Audio
(4 Sets of RCA Jacks)

SD/HD-SDI Loop
Output 2

SD/HD-SDI Loop
Output 1

Configuration DIP switch

Universal 100/240 VAC
Power Input

SD/HD-SDI Input
BNC

HDP4 Converter

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User Controls

The user interface for the HDP4 is a 4-switch DIP accessible through a cut-out in the outside of the case (same side as the AC power connector). Use the DIP switches to enable/disable and configure scaling modes, and assign which AES audio channels are disembedded.

HDP4 DIP Switches

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

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—720p60 Output

OFF	ON
Normal Operation	Forces the output to 720p60. Useful for compatibility with most HDTVs.

Installation

Typically, HDP4 installation consists of the following steps:

1. Ensure the HDP4 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 AC power to the converter.

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	4 DVI-D (E-DDC and E-EDID compatible)
	4 Sets of Stereo Audio (RCA-style outputs) @ -10dBV nominal
	2 Looping SDI outputs of the SDI inputs
Supported Output Displays (native resolution) **Note:** for resolutions not listed here, the HDP4 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	5.25" x 10.5" x 1.75" (133 x 266 x 44mm)
Power	100/240 VAC, 8 Watt, power cord provided

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