

HDP2

HD-SDI/SDI to DVI-D Video and Audio Converter

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Installation and Operation Guide

Because it matters.

AJA[®]
VIDEO SYSTEMS

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Contacting Support

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

180 Litton Drive, 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.

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Introduction

The HDP2 is a miniature HD-SDI/SDI to DVI-D converter for digital display devices (graphics and video), such as LED, LCD, DLP and Plasma monitors (and projectors). Using a very high quality scaling engine, the HDP2 will automatically size 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. Where appropriate, the HDP2 can automatically adapt the input frame rate for monitor compatibility. In addition, the HDP2 provides 8 channel embedded audio over HDMI, 2 channel analog audio monitoring, and a looping output of the SDI input.

The HDP2 is designed for general monitoring, perfect for use in applications such as: General post-production reference monitoring, Client monitoring, Presentation, Projection, Corporate displays, Kiosk applications...and much more!

Deep color is supported in RGB and YCbCr. USB connectivity allows for easy PC/Mac setup and field upgrades.

Features

- HD-SDI/SDI to DVI-D
- HDMI 1.3a support (via DVI-D connector), including:
 - Deep Color 30-bit video (24-bit also supported)
 - 2 or 8 channels of embedded audio
- Automatically adapts to popular LED/LCD/DLP/Plasma monitors (and projectors) up to 1920x1200 and 1080p
- High quality scaling engine for proper display of 4:3 or 16:9 content—even better quality than original HDP
- 1 to 1 scaling for appropriate monitor configurations
- 2 channel RCA analog audio output (user-assignable channel pairs)
- HD-SDI/SDI looping output
- Setup via PC/Mac using USB port and supplied USB cable (USB configuration software application supplied on CD)
- 5 year warranty

About Monitor Compatibility

The HDP2 is designed to work with most DVI-D monitors. HDMI monitors are also supported with a standard, inexpensive DVI-to-HDMI cable (user supplied). The HDP2 uses the industry standard EDID communication protocol (within the DVI or HDMI link) to communicate with the monitor, and then adjust the HDP2'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.

To ensure the greatest compatibility with today's available digital display devices, the HDP2 will, by default, provide VESA or CEA standard timing.

Frame Locking

Auto: Use this mode to ensure greatest compatibility with other monitors. The HDP2 will use standardized output timing for most monitors. If the attached monitor (such as an HP DreamColor) is recognized as having enhanced capabilities, then special, frame-locked timing will be used.

Manual: Selecting an output frame rate that matches the input frame rate will provide a vertically locked signal to the monitor, and may yield the best results. Note that not all monitors will be able to accept these signals.

Recommended Monitors

The monitors listed below have been verified to work with one or more of the manual frame rate selections.

- HP 24" LP2480zx DreamColor
- Apple 23" HD Cinema, model M9178LL/A (aluminum bezel)
- Sony 23", model SDM-P234
- Viewsonic VP231wb
- Dell 2405FPW
- Barco LC-42
- Barco LC-47
- Westinghouse LVM-37wl
- Sony Bravia Series
- Sharp Aquos Series

Optimal Performance with HP LP2480zx DreamColor

When using the HDP2 with an HP LP2480zx, the best results are obtained by using the default HDP2 "Auto" selections (no action required—unless you've changed the factory defaults using the Mini Config software supplied).

Automatic 720p or 1080p Support

Monitors that report 1280x720 or 1920x1080 in their "Preferred Timing Mode" section of EDID readback will receive a 1280x720 or 1920x1080p signal, respectively, from the HDP2.

Manual 720p or 1080p Support

The HDP2 can be configured manually for 720p or 1080p. This is discussed under "USB Control and Setup" later in this manual.

Note: For best results when using video display devices, it is recommended that a monitor capable of displaying the "Full 1080p" image be used.

VESA and CEA Timing

By default, the HDP2 will automatically output standardized VESA rate graphics where appropriate when a computer resolution is detected, and standardized CEA rate video when a video device, such as an HDTV is detected. Not all VESA rates are synchronous to SMPTE standard video input rates. However, the HDP2 can be configured manually by selecting an output frame rate that matches the incoming frame rate. By doing so, enhanced timing signals will be generated that will be locked to the incoming video.

Note: Some monitors may not be able to handle some of these enhanced timing modes. For best results, refer to the list of recommended monitors that have been tested to lock at one or more of the user-selectable frame rates.

Motion Adaptive De-interlacing

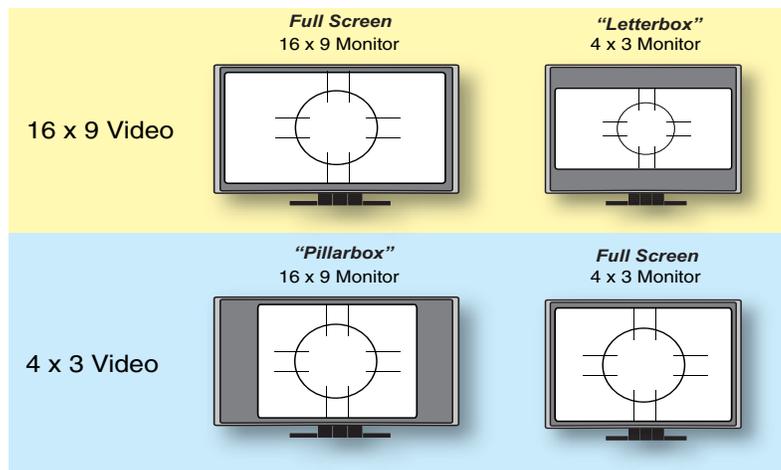
Video displayed on DVI progressive display devices requires de-interlacing technology to properly display the video from its native interlace format. HDP2 uses advanced motion adaptive de-interlacing to predict motion in the video stream and output a quality picture using spatial and temporal comparisons on individual pixels.

10-bit and Deep Color Support

HDP2 supports the HDMI 1.3a specification for Deep Color bit depths. In operation, HDP2 can support Deep Color bit depths up to 30 bits/pixel (1.073 billion colors).

Video Scaling

As shown in the graphic below, the HDP2 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 HDP2 automatically turns off scaling. For example, a 1920 x1080 video and a 1920 x1200 monitor will not be scaled.



Note: The HDP2 also properly supports 16:10 and 5:4 monitors.

If the HDP2 scaling is set to 1:1 via the control panel, 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.

If the HDP2 scaling is set to “Auto,” the HDP2 will scale the image to best fit the screen while preserving the aspect ratio. In some cases, a letterboxed or pillarboxed image can be expected.

Vertical Locking

Depending on the input frame rate and the capabilities of the monitor in use, the HDP2 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 HDP2 output. The recommended monitor list shown earlier lists only monitors which have been tested for proper vertical lock. The HDP2 works with many LED/LCD/DLP/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:

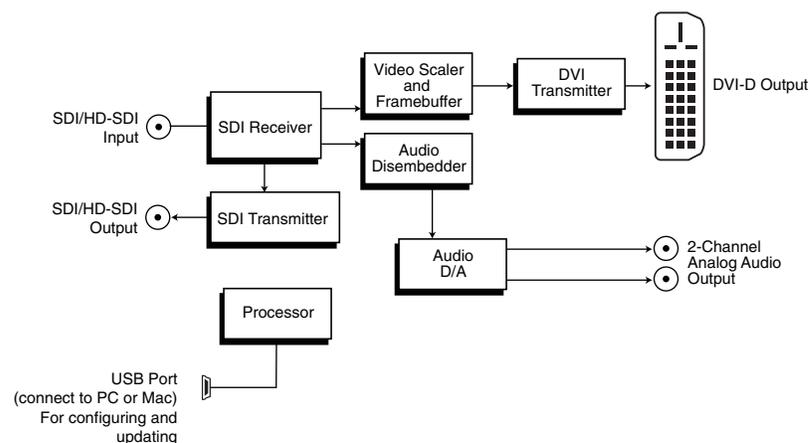
Frame add/drop: The monitor occasionally adds or drops a frame of video which appears as discontinuous motion. For example, a moving object may appear to briefly pause or jump ahead.

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.

Frame Rates

When the HDP2 is manually configured for a particular output frame rate, the output will run in lock-step with the video input. For best results, (without any added or dropped frames), select an output frame rate that matches the incoming video frame rate.

Block Diagram

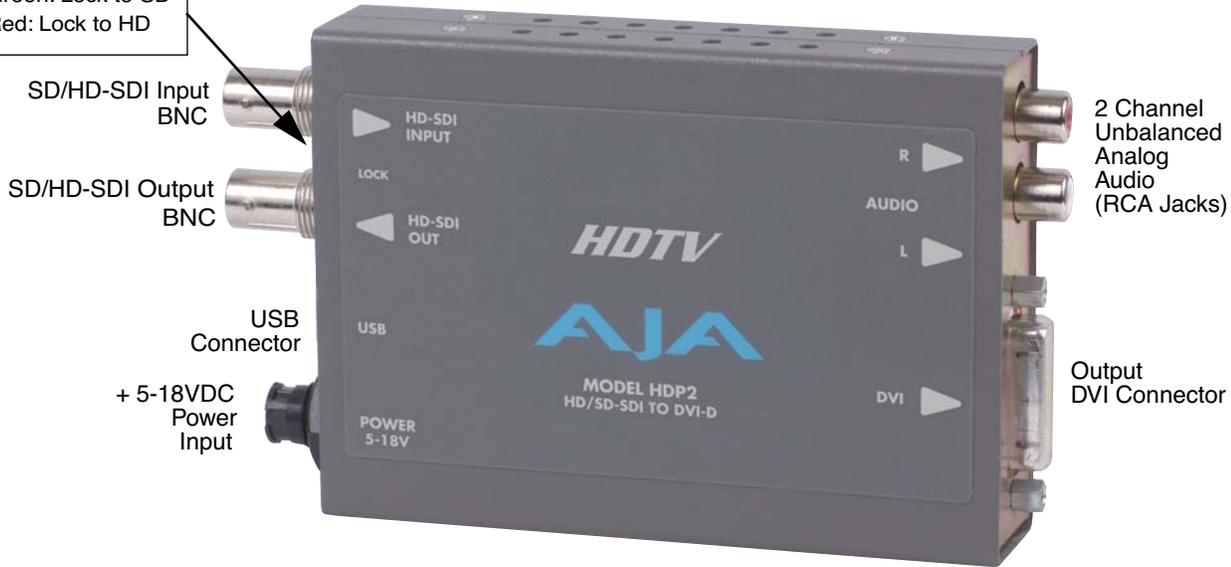


HDP2 Converter, Simplified Block Diagram

I/O Connections

LOCK LED

Green: Lock to SD
Red: Lock to HD



HDP2 Converter

USB Control and Setup—Using AJA Mini Config

The HDP2 can usually be used right out of the box for most applications since it is designed to recognize inputs and perform standard actions automatically by default. However you can also manually configure the HDP2 using a supplied software application for PCs and Macs, named “Mini Config.” This same application can be used to update firmware on the HDP2 in the event newer software is released by AJA.

Installing Mini Config on a Mac

To install the application on a Mac, simply insert the CD supplied with the Mini-Converter into the computer, drag the “AJA Mini Config” application for your platform (Mac or PC) to your desktop or an applications folder.



Note: Macintosh computers must be Intel-based (G5, G4 and earlier models will not work with Mini Config).

AJA MiniConfig

Installing Mini Config on a PC



To install the application on a Windows PC, simply insert the CD supplied with the Mini-Converter into the computer, locate the “MiniInstaller” application, and then double-click it.

A Setup Wizard will guide you through the installation. Just click Next to begin.

Answer all questions in the subsequent dialogues; when you’re done, you will be able to locate the Mini Config application in the AJA folder in the Programs listing.

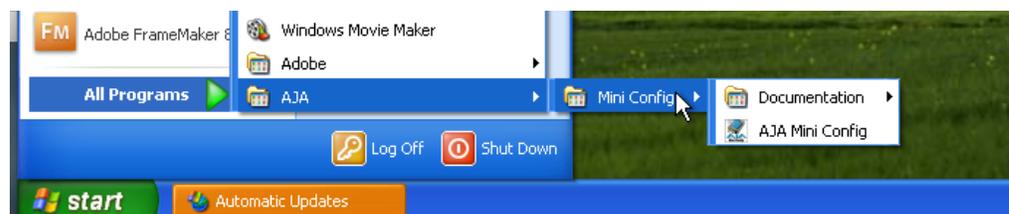
Running Mini Config

Connect a HDP2 Mini-Converter to the PC or Mac via the supplied USB cable. Connect power to the Mini-Converter (DWP or DWP-U recommended).



Note: On a Mac, when the Mini-Converter is connected to the USB port, you may see an alert like that shown following. If you do, press Cancel—this alert can be ignored.

To run Mini Config on a PC, find the AJA Mini Config in the program list and locate the AJA Mini Config application.



To run Mini Config on a Mac, double-click the Applications folder and locate the AJA Mini Config application. Double-click the AJA Mini Config application to launch it.

Once AJA Mini Config is running (PC or Mac), it looks pretty much the same, regardless of the platform.

A *File* menu at the top of the Mini Config application menu bar allows you to *Save* the current state of the Mini-Converter—with all the settings you’ve made—to a file for later recall. This allows you to set up the converter for different applications, storing each (with *Save*) to a unique name for easy recall later—using the *Open* menu item. A *Revert to Factory Settings* menu item similarly allows you to change the settings back to AJA’s factory defaults. An *Edit* menu allows you to cut and paste values to/from fields, just as in other applications.

Operating Mini Config

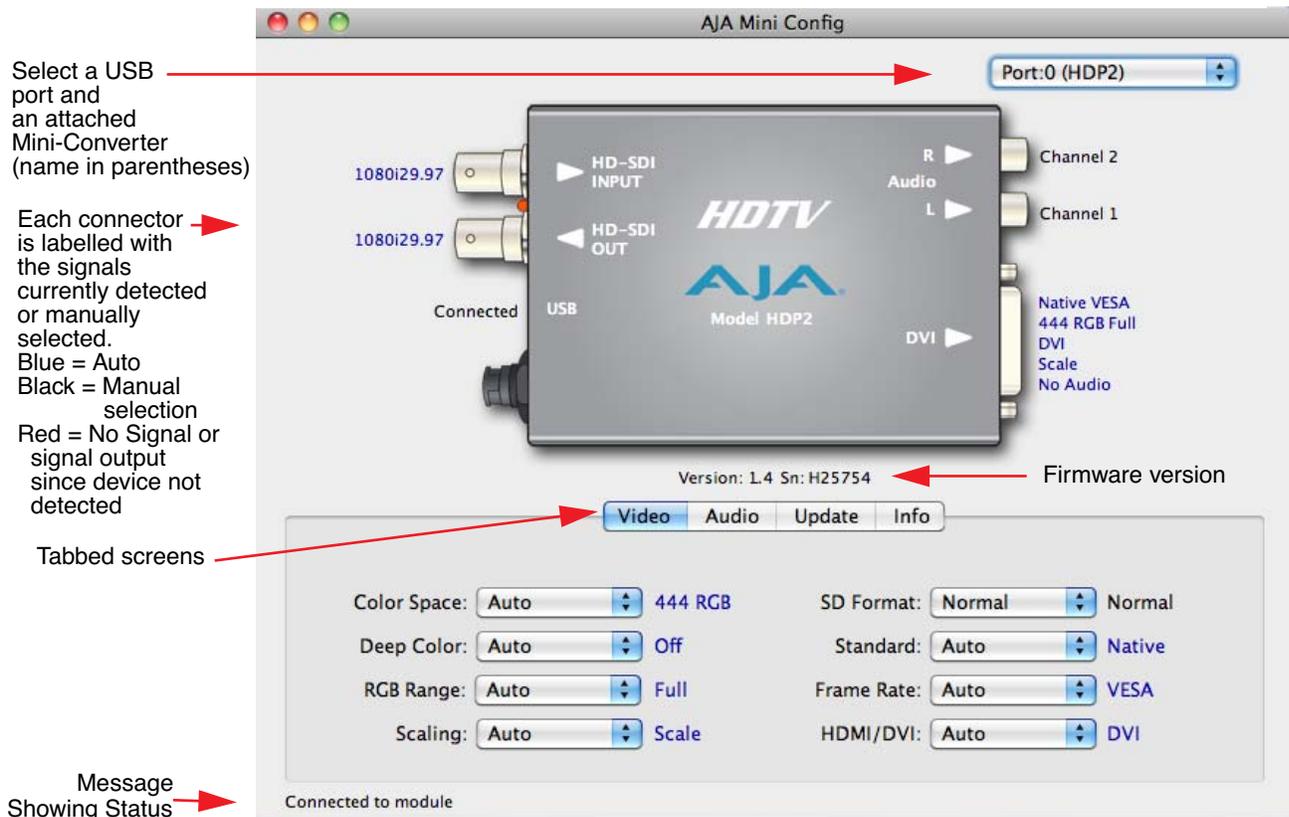
When the application is running, you'll see a simple graphical interface for viewing settings and updating software. This user interface consists of an information area at the top that shows the available Mini-Converters attached to the computer via USB (in this case your HDP2), with a graphical rendering of the selected Mini-Converter showing all the BNCs and connectors and their current state.

Colored text by connectors provides an indication of signal type and what the HDP2 is doing. Text in blue shows the values automatically selected, while text in black shows values that you have manually selected. Text in red shows that HDP2 is not detecting a signal or cannot negotiate with the attached device (even if can't detect an output device, it still shows the signal it is outputting).

Note: configuration settings in red will change based on the attached output device as well as input signals. For improved accuracy and reliability, you should configure the Mini-Converter only when the target output device is attached and input signals are supplied at the inputs.

Screens are virtually the same on both PC and Mac, with subtle differences that reflect the general look of the platform environment.

Mini Config can manage multiple AJA Mini-Converters connected via USB—even when they are of differing types. However it only connects to one at a time. You can choose which Mini-Converter you wish to control using the pulldown menu in the upper right hand corner. If you want to configure and update multiple Mini-Converters in parallel, you can do it by running multiple instances of the Mini Config application and have each control a different Mini-Converter.



Mini Config, Video Screen

The name of each Mini-Converter found can be seen in the menu pulldown at the top right hand side of the screen (in the example above, it shows: Port:0 (HDP2)).

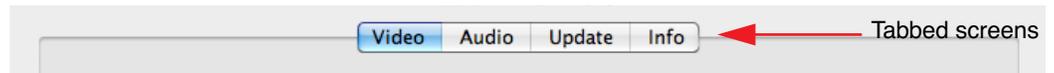
This allows you to select a desired Mini-Converter when there are more than one. Selecting a Mini-Converter with this dropdown menu causes this application to connect to the selected converter. The type of Mini-Converter and serial number will be shown in the graphic and text below it.

A status field at the bottom of the screen shows whether you are connected and communicating with the Mini-Converter shown using Mini-Config.

When configuring the HDP2 Mini-Converter, select it from the top pulldown, view the current settings and change any values. Making a change communicates that new value to the Mini-Converter's non-volatile memory.

Tabbed Screens

The Tabs delineate groups of controls for each type of task to be performed.

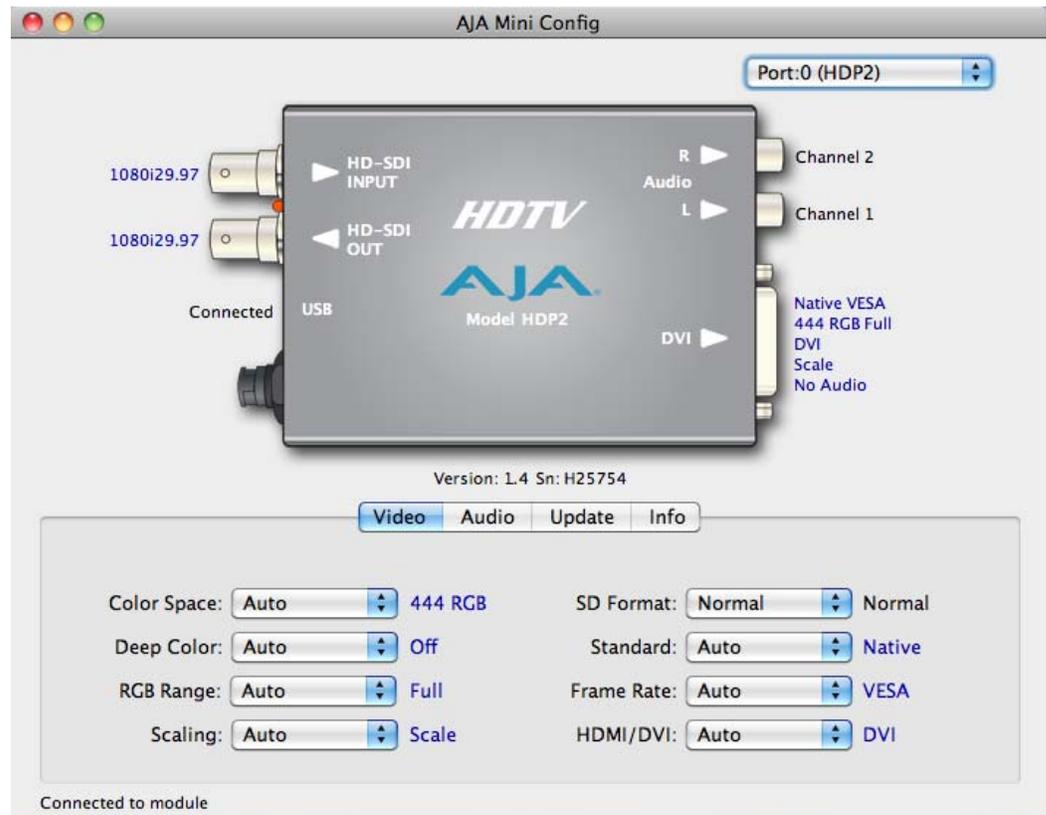


Mini Config, Tabbed Screens

The controls for the actual configuration parameters are specific to each Mini-Converter type. Click on any of the tabbed buttons (Video/Audio/Update/Info) and the screen below will change to match. Each of these screens are described on the following pages.

Video Tab Screen

The selections on this screen configure the output video. In all cases, selecting "Auto" allows the HDP2 to conform the output to best serve the attached monitor. This is handled automatically when the HDP2 reads the capabilities indicated by the attached monitor.

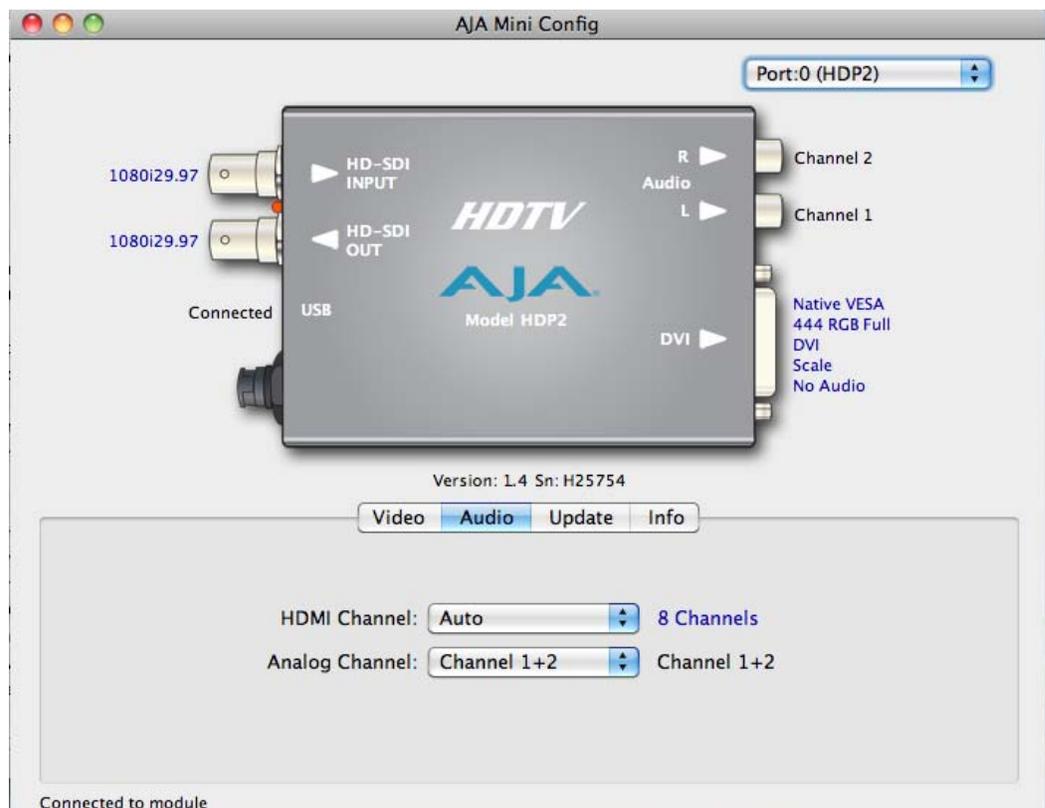


Mini Config, Video Tab Screen

- Color Space**—Selects the Video Format. Choose from Auto, 4:2:2 YCbCr, 4:4:4 RGB or 4:4:4 YCbCr. Choosing “Auto” lets the HDP2 automatically select the format based on the capabilities indicated by the attached monitor.
- Deep Color**—Selects how Deep Color is supported. Choose from Auto, On or Off. Choosing “Auto” lets the HDP2 decide based on input. Choosing On turns on support for Deep Color 30-bit video (24-bit also supported).
- RGB Range**—Selects the Input Video Color Range. Choose Auto to let the HDP2 decide, or choose SMPTE or Full color range.
- Scaling**—Choose Auto to let the HDP2 choose based on the attached output device’s capabilities, 1:1 for no scaling, or Scale, to let the HDP2 scale for the attached monitor. Displaying 1:1 only works properly 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. For optimal performance with 1:1 scaling, use a 1920 x 1200 (WUXGA) monitor.
- SD Format**—Choose Normal (standard picture aspect ratio) or Anamorphic; these control how an SD picture appears on an HD monitor.
- Standard**—Raster choices available are: Auto (let the HDP2 decide based on input), Native, WUXGA, 1080p, 1080i, 720p, 576p, or 480p.
- Frame Rate**—Choices are: Auto (let HDP2 decide), VESA, 24/23.98, 25, 30/29.97, 48/47.95, 50, or 60/59.94.
- HDMI/DVI**—Choose Auto, HDMI, or DVI. Choosing “Auto” lets the HDP2 automatically select the output mode based on the input video and the attached device’s capabilities.

Audio Tab Screen

The selections on this screen configure the output audio.



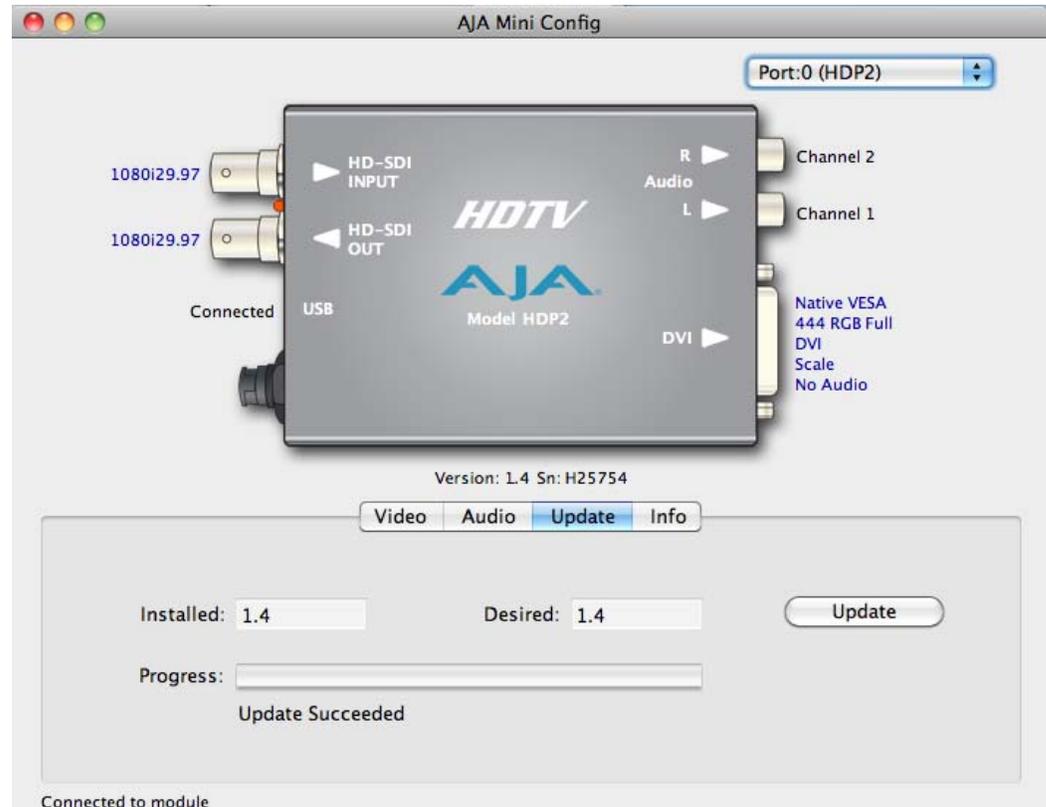
Mini Config, Audio Tab Screen

HDMI Channel—Choose Auto, 2-channel or 8-channel embedded audio. Choosing “Auto” lets the HDP2 automatically select the audio channels based on the attached device's capabilities. **Note:** When in 2-channel mode, the audio pair selected will be the same as described by the “Analog Audio” selection, below.

Analog Channel—Choose which 2 embedded audio channels are routed to the RCA output pair: Ch 1+2, Ch 3+4, Ch 5+6, or Ch 7+8.

Update Tab Screen

Use this Update screen to view the software version currently installed on the HDP2 or install new software.



Mini Config, Update Screen

Note: When discussing Mini-Converters, “Firmware” is software that will be stored in the Mini-Converter’s non-volatile memory and used when it is powered up. This is something different than the Mini Config application software. The version numbers shown in the Update screen refer only to the firmware.

The following fields and control are present in this screen:

Installed—this field shows the version of the firmware currently installed inside the Mini-Converter.

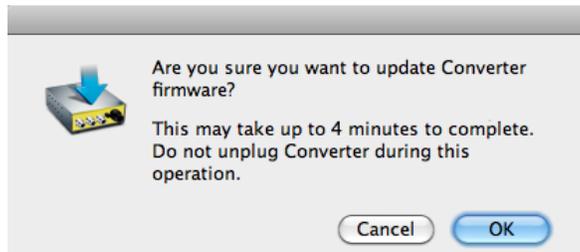
Desired—this field shows the version of firmware embedded in the Mini-Config application which you can install into the Mini-Converter by clicking the *Update* button.

Update —this button initiates a software update operation loading the “Desired” version of firmware into the Mini-Converter’s non-volatile memory.

Progress—this indicator bar shows the progress of software being installed.

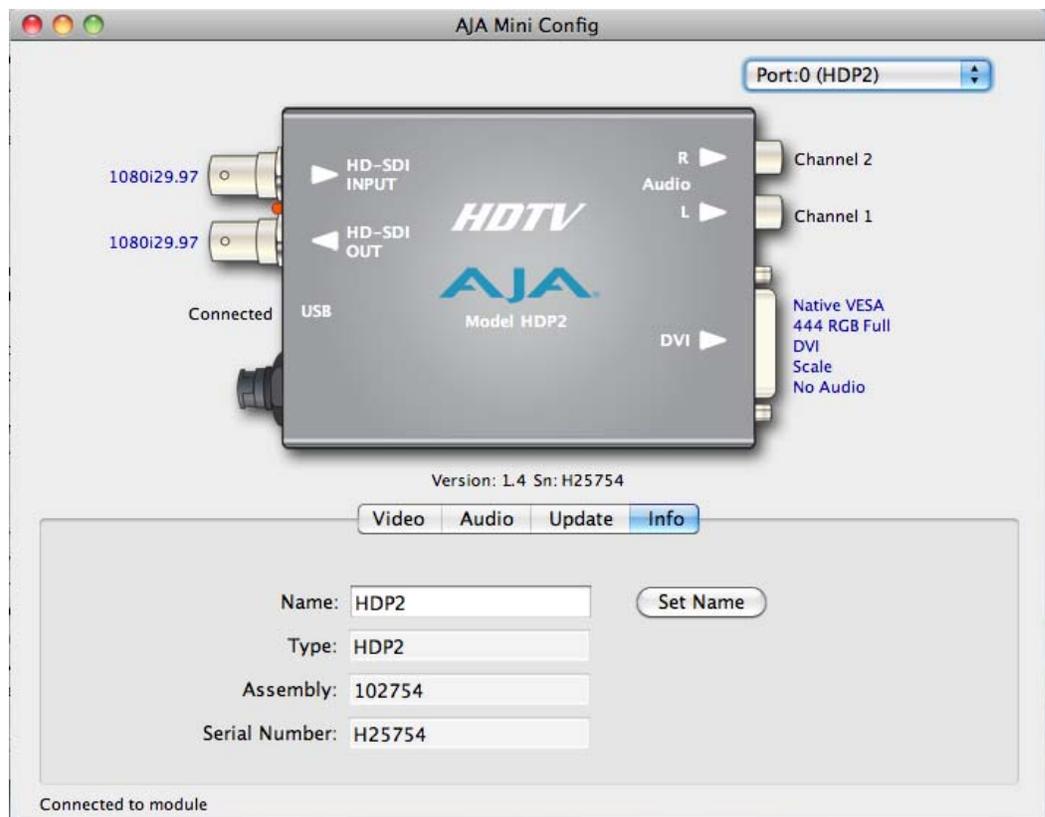
Software Update Procedure

1. Check the AJA website for new Mini-Config software for your Mini-Converter. If new software is found, download it and uncompress the file archive (zip). Here is the URL to use when checking:
<http://www.aja.com/support/converters/converters-mini-rackmount.php>
2. Connect the Mini-Converter to a Mac or PC via a USB port on the computer and run the new Mini-Config software just downloaded.
3. Click on the Update tab screen.
4. Check the Installed version level against the Desired version level. If the Desired is newer, then click the *Update* button to download the new firmware to the Mini-Converter; progress will be shown via the "Progress" thermometer bar. When you click Update, Mini Config will provide a dialog asking you to confirm that you really want to update the firmware (see below).



Info Tab Screen

This screen provides basic information about the Mini-Converter. This information is mostly useful when calling AJA Support for service or technical support.



Mini Config, Info Screen

Name—this field allows you to give your Mini-Converter a name. This may be useful if you have several Mini-Converters attached to a Mac/PC via USB so you can distinguish one of them easily (especially if they're the same model). In the example show previously, the Hi5-3G has been named "HDP2."

Type—this is the factory set model name of the Mini-Converter (HDP2).

Assembly —this is the factory assembly number.

Serial Number—this is the factory set unique serial number of your HDP2. If you ever call AJA Support for service, you may be asked for this number.

Specifications

Item	Specification
Inputs	HD, and SD-SDI (auto-selected), SMPTE-259/274/292/296, BNC connector
Input Formats	525i, 625i, 720p 50/59.94/60, 1080i 50/59.94/60, 1080p 23.98/24/25/29.9/30, 1080psF 23.98/24/25, YCbCr 10-bit
Video Outputs	DVI v1.0 / HDMI v1.3a, 4:2:2 YCbCr, 4:4:4 YCbCr/RGB 24/30-bit, DVI-D standard male connector
Audio Outputs	2 channel RCA-style analog outputs (-10dBV nominal) as user-assignable channel pairs, 2 or 8 channel 24-bit embedded audio (HDMI mode only)
Maximum DVI resolution	1920 x 1200 @ 60Hz
User Controls	USB 2.0 port used with supplied cable and software application to configure device via PC/Mac
Size	5.8" x 3.1" x 1 (147mm x 79mm x 25mm)
Power (AJA power supply model DWP or DWP-U)	+5 to +18v DC regulated, 5 watts