Hi5-3G

3G/Dual-link/HD/SD-SDI to HDMI 1.3a Video and Audio Converter

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 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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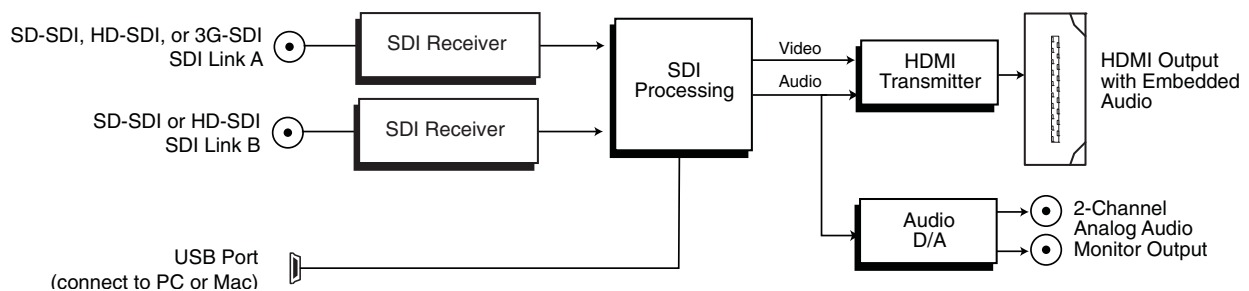
Introduction

The Hi5-3G converts 3G-SDI, dual or single link HD-SDI, or SD-SDI to HDMI v1.3a for driving HDMI monitors. HDMI v1.3a capability at 30 bits per pixel allows full support of the latest 10 bit monitors. Audio is supported in the HDMI output allowing a convenient single cable audio/video connection. The Hi5-3G provides 2 Channel RCA style audio outputs for separate audio monitoring if needed. USB connectivity allows for easy PC/Mac setup and field upgrades.
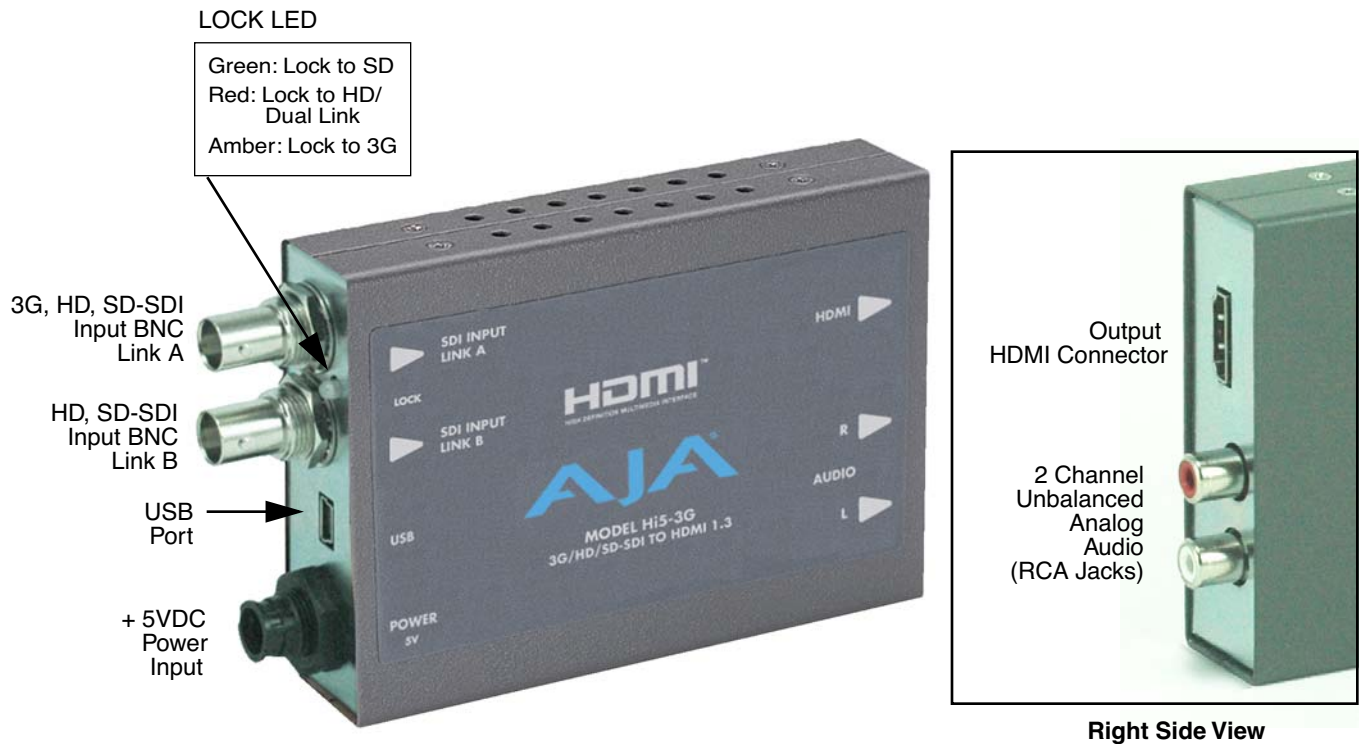
Features

- 3G/HD/SD-SDI to HDMI
- SMPTE425M-AB input
- Full HDMI 1.3a support including:
  - Deep Color 30- and 36-bit video per pixel (24-bit also supported)
  - 2 or 8 channels of embedded audio
- Additional 2 channel RCA analog audio output (User assignable channels)
- Setup via PC/Mac using USB port and supplied USB cable (USB configuration software application supplied on CD)
- HDMI cable supplied
- Uses 5V power (supply sold separately)
- 5 year warranty

Block Diagram

Hi5-3G Converter, Simplified Block Diagram

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I/O Connections

LOCK LED

Green: Lock to SD
Red: Lock to HD/
Dual Link
Amber: Lock to 3G

3G, HD, SD-SDI
Input BNC
Link A

HD, SD-SDI
Input BNC
Link B

USB
Port

+ 5VDC
Power
Input

SDI INPUT
LINK A

LOCK

SDI INPUT
LINK B

USB

POWER
5V

HDMI

HDMI
HIGH DEFINITION MULTIMEDIA INTERFACE

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MODEL Hi5-3G
3G/HD/SD-SDI TO HDMI 1.3

R

AUDIO

L

Output
HDMI Connector

2 Channel
Unbalanced
Analog
Audio
(RCA Jacks)

Right Side View

Hi5-3G Converter

Installation

Typically, Hi5-3G installation consists of the following steps:

1. Ensure the Hi5-3G is disconnected from power.

2. Connect video equipment to the convertor BNCs and HDMI connector.

3. Connect audio equipment to RCA connectors (optional)

4. Apply +5VDC power to the converter (AJA power supply model DWP or DWP-U).

5. The Hi5-3G will now run using the default factory settings. If you wish to alter the factory settings, you'll need to install the AJA Mini Config software (supplied on CD) on a computer, attach the Hi5-3G via USB to the computer, and then make your changes. This process is detailed on the following pages.

USB Control and Setup—Using AJA *Mini Config*

The Hi5-3G 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 Hi5-3G using a supplied software application for PCs and Macs called "Mini Config." This same application can be used to update software on the Hi5-3G 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).
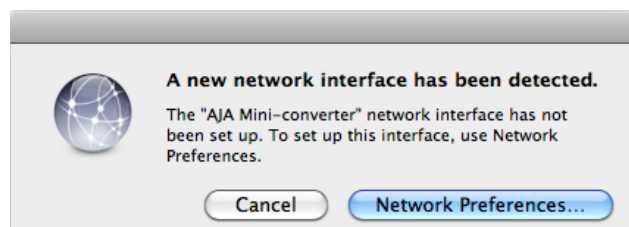
Installing Mini Config on a PC

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.
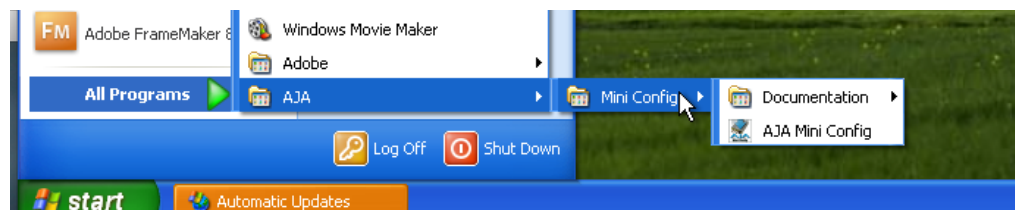
Running Mini Config

Connect a Hi5-3G 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.
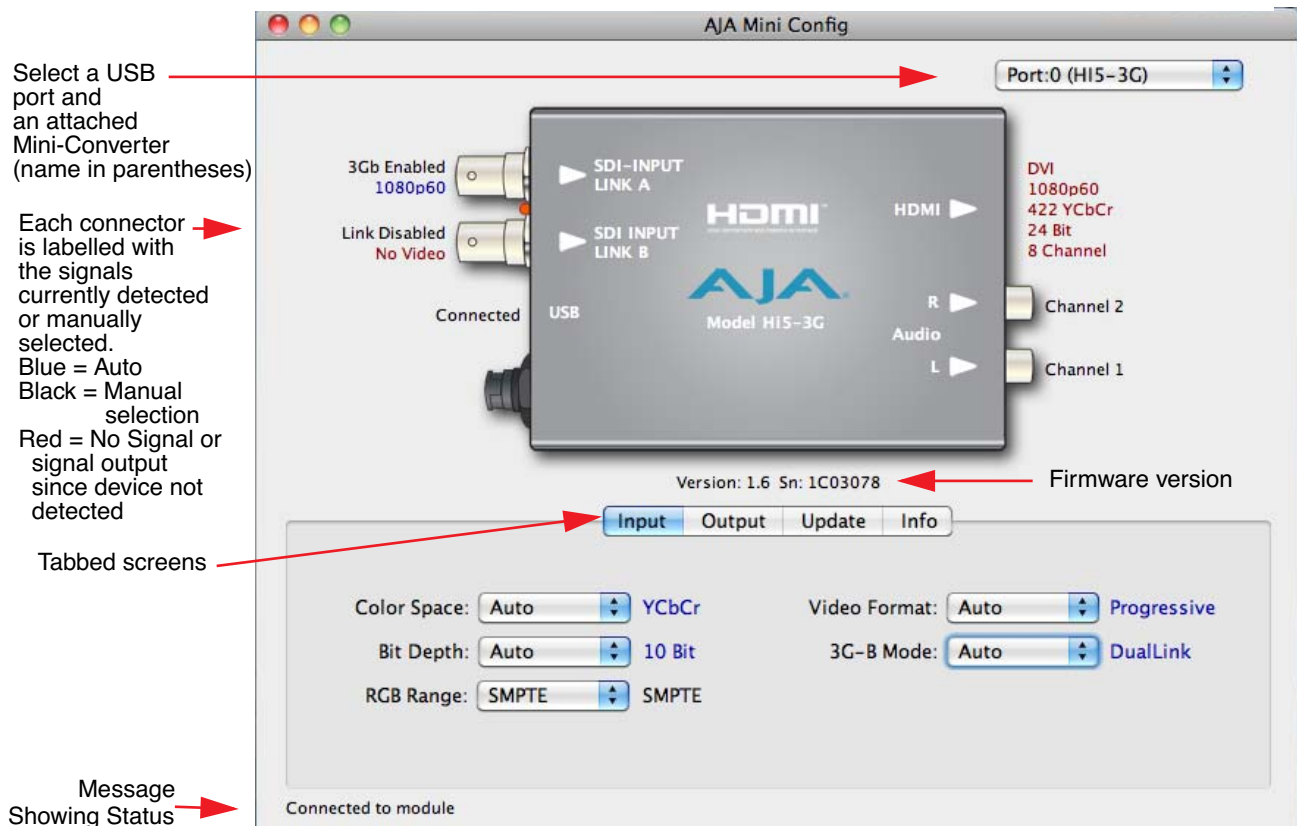
Operating Mini Config

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 Hi5-3G), with a graphical rendering of the selected Mini-Converter showing all the BNCs and connectors and their current state.

Colored text by connectors provides and indication of signal type and what the Hi5-3G 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 Hi5-3G 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.

Select a USB port and an attached Mini-Converter (name in parentheses)

Each connector is labelled with the signals currently detected or manually selected.
Blue = Auto
Black = Manual selection
Red = No Signal or signal output since device not detected

Firmware version

Tabbed screens

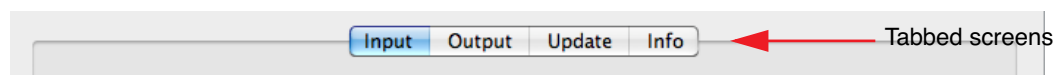Message Showing Status

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 (HI5-3G)". 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 Hi5-3G 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.
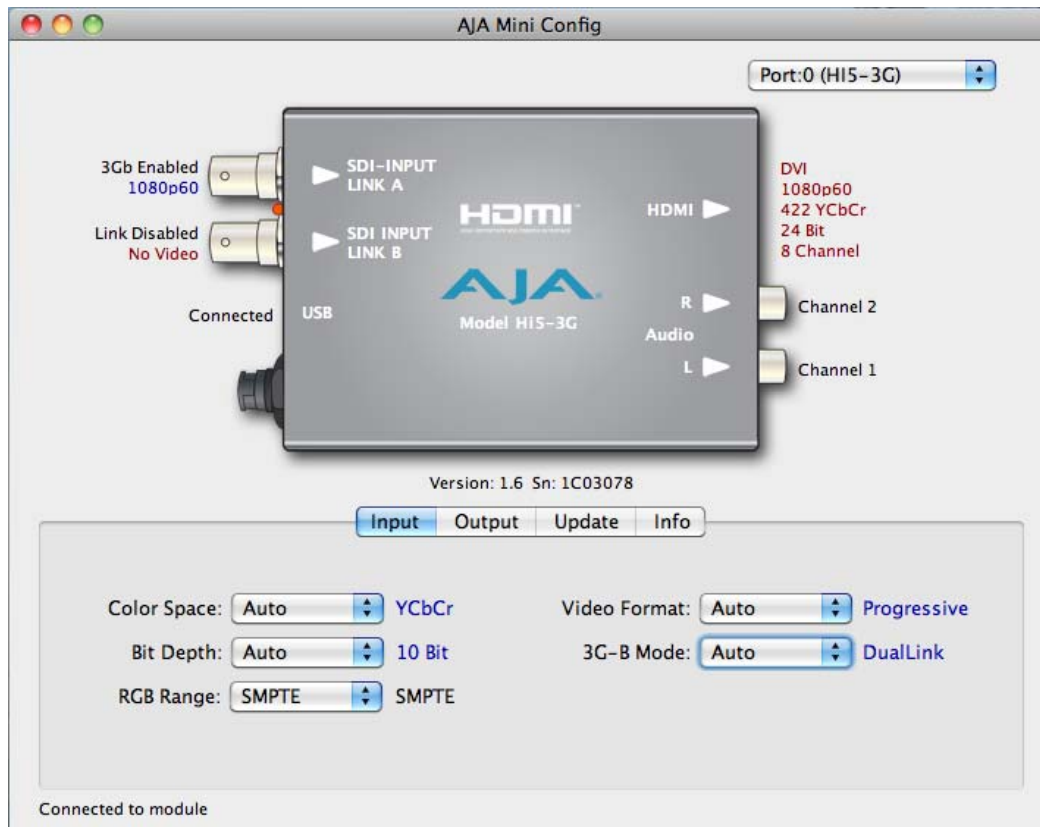

Tabbed screens

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 (Input/Output/Update/Info) and the screen below will change to match. Each of these screens are described on the following pages.

Input Tab Screen

With a HI5-3G connected and selected, you'll click on the Input tab to view and make changes to the Hi5-3G input settings.

Any changes you make will be saved, overwriting previous settings.

Mini Config, Input Tab Screen

Input Video Selections

Color Space—Selects the Input Video Color Space. Choose Auto, YCrCb, RGB, or XYZ. Choosing "Auto" lets the Hi5-3G automatically select color mode based on the input video parameters and the payload ID.
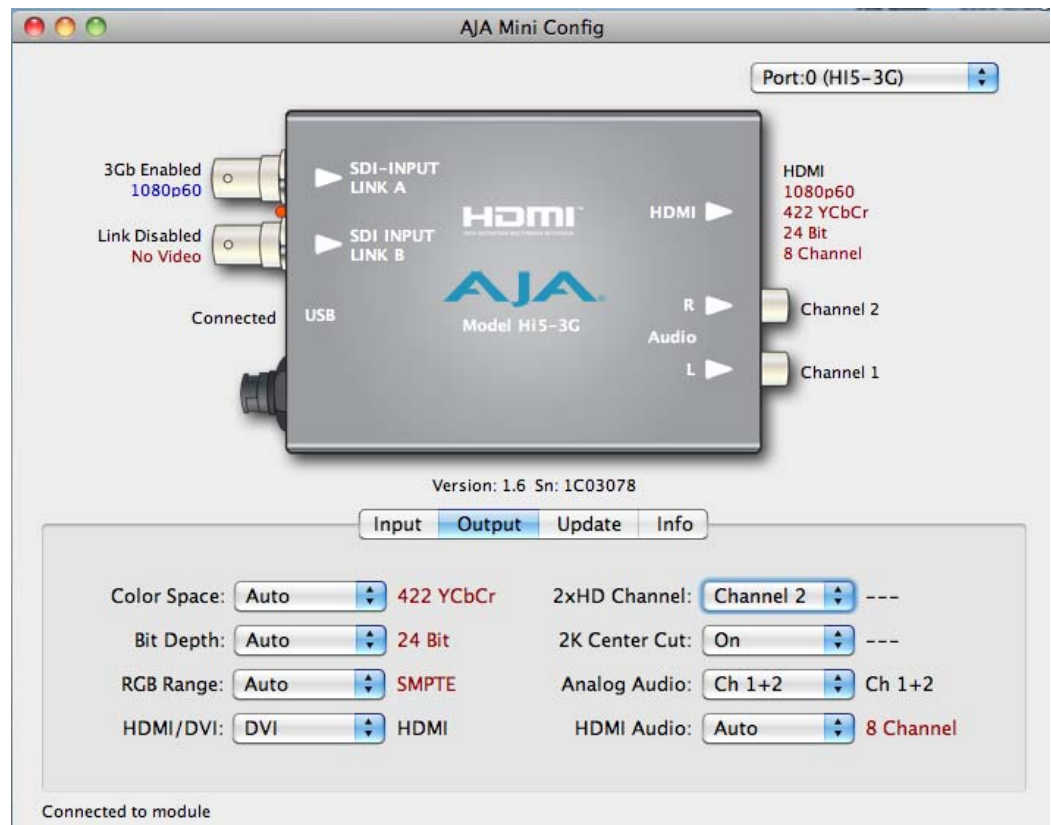
Bit Depth—Selects the input video bit depth. Choose Auto, 10-bit or 12-bit. Choosing "Auto" lets the Hi5-3G automatically select the bit depth based on the input video parameters and the payload ID.

RGB Range—Selects the Input Video Color Range. Choose SMPTE or Full color range.

Video Format—Selects the Input Video Format. Choose from Auto, Progressive (P), Interlaced, or PsF (progressive segmented frame). Choosing "Auto" lets the Hi5-3G automatically select the format based on the input video parameters and the payload ID.

3G-B Mode—Selects the 3G level B Video Mode. Choose Auto, Dual Link, or 2xHD.

Output Tab Screen   Click on the Output tab to view and make changes to the Hi5-3G Output settings.

Mini Config, Output Tab Screen

Color Space—Selects the desired output video format. Choose from Auto, 4:2:2 YCrCb, 4:4:4 RGB, or 4:4:4 YCrCb. Choosing "Auto" lets the Hi5-3G automatically select the video format based on the input video and the attached device's capabilities.

Bit Depth—Choose from Auto, 24-bit, 20/30-bit, or 36-bit. Choosing "Auto" lets the Hi5-3G automatically select the bit depth based on the input video and the attached device's capabilities.

RGB Range—Choose Auto, Limited or Full. Choosing "Auto" causes the Hi5-3G to follow the *input* color range setting.

HDMI/DVI—Choose Auto, HDMI, or DVI. Choosing "Auto" lets the Hi5-3G automatically select the output mode based on the input video and the attached device's capabilities.

2xHD Channel—Provides output channel selection when in 3G level B 2xHD mode. Choose Ch 1 or 2.
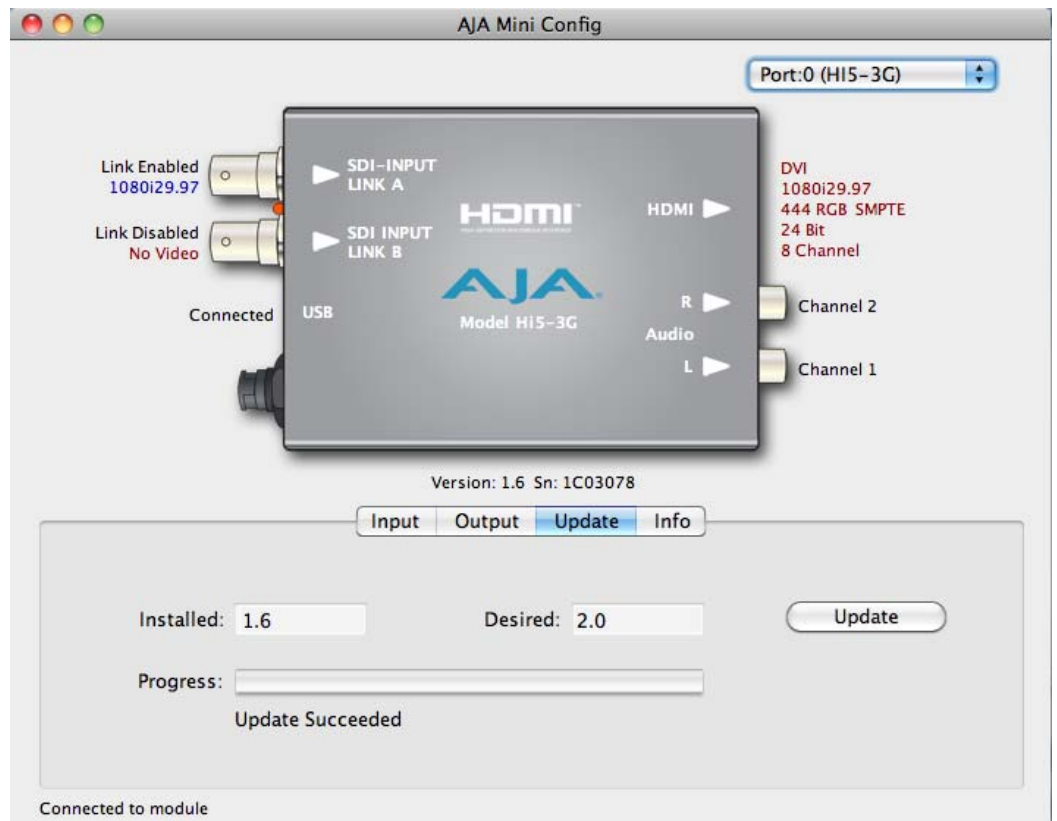
2K Center Cut—Provides the option of center cutting 2Kx1080 video signals to comply with the HDMI standard. Checkbox selects On or Off (not selected).

Analog Audio—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.

HDMI Audio—Choose Auto, 2-channel or 8-channel embedded audio. Choosing "Auto" lets the Hi5-3G automatically select the audio channels based on the attached device's capabilities.

Update Tab Screen Use this Update screen to view the software version currently installed on the Hi5-3G 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.
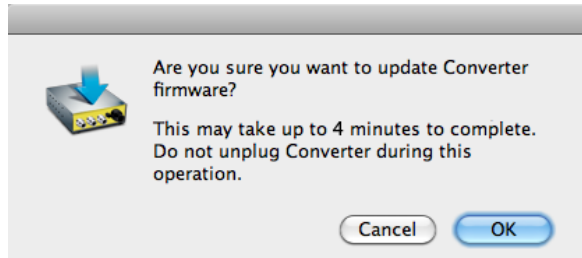
Update —this button initiates a software update operation loading the "Desired" version of firmware into the Mini-Converter's non-volatile memory.

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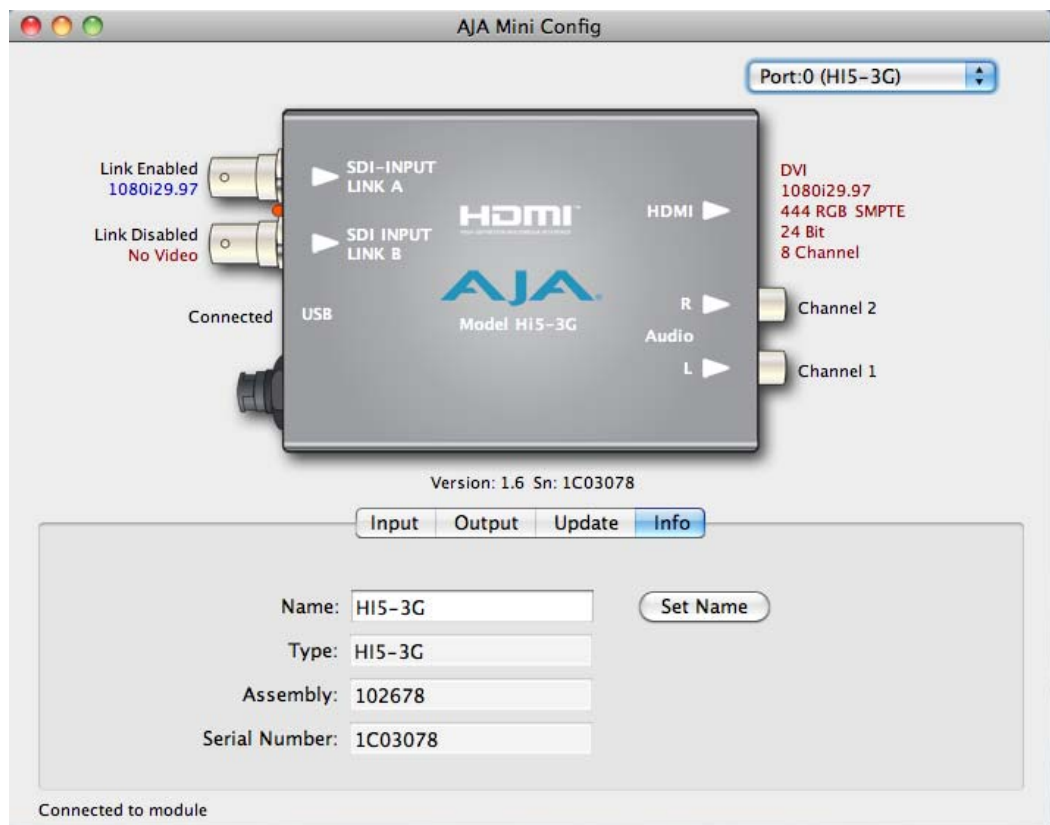
Software Update Procedure

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 "Hi5-3G."

Type—this is the factory set model name of the Mini-Converter (Hi5-3G).

Assembly —this is the factory assembly number.

Serial Number—this is the factory set unique serial number of your Hi5-3G. If you ever call AJA Support for service, you may be asked for this number.

Specifications

Item	Specification
Input Formats	525i, 625i, 720p 50/59.94/60, 1080i 50/59.94/60, 1080p 23.98/24/25/29.97/30/50/59.94/60 1080psF 23.98/24/25/29.97/30 2048x1080 is supported in all the above frame rates YCbCr/RGB/XYZ 10/12-bit
Video Inputs	3G, HD, and SD-SDI (auto-selected), SMPTE-259/274/292/296/372/424/425, 2x BNC
HDMI Output	Standard Type A connector Video: HDMI 1.3a/DVI 1.0 4:2:2 YCbCr and 4:4:4 YCbCr/RGB 24/30/36-bit Audio: 24-bit, with 2 or 8 embedded channels RCA-style analog outputs at -10dBV (User Selectable channels)
HDCP	The Hi5-3G does not encode the HDMI output with HDCP encryption. By definition, SDI/HD-SDI inputs to the Hi5-3G are unencrypted. The HDMI specification requires HDMI monitors to support unencrypted inputs.
User Controls	USB 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	+5 VDC regulated, 5 watts Requires Power Supply (AJA power supply model DWP or DWP-U recommended)