

HD-Connect MI™ Guide and User's Manual



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1 Getting Started

1.1 Welcome

Congratulations on selecting Convergent Design HD-Connect MI™. HD-Connect MI™ is shipped from the factory in the most secure packaging available. Please inspect the content of the package and make sure to email us if you find any shipping damage or missing components.

1.2 FCC Compliance

This professional equipment has been tested and found to comply with the provisions for a Class A digital device under part 15 of the FCC rules. These provisions are designed to provide reasonable protection against radio-frequency emissions by digital devices in a commercial environment. This device may interfere with radio and television reception in residential areas and is required to accept all interference received, including that which may cause undesired operation.

1.3 Shipping Contents

Your HD-Connect MI™ should come packaged with the following:

- 1) HD-Connect MI™
- 2) Power Supply with Changeable Plugs
- 3) Quick Start Guide

2 HD-Connect MI™

2.1 Overview

The Convergent Design HD-Connect MI is an HDMI to HD/SD-SDI converter featuring embedded audio and time-code. This unique product converts the uncompressed (YCbCr 4:2:2 or RGB 4:4:4) video and audio from HDMI devices including Sony/JVC camcorders and decks into the HD/SD-SDI format used in professional video applications. The HD-Connect MI offers two distinct advantages over other HDV converters: DV as well as HDV support and the ability to playback both 1080i and 720p tapes from a single deck (see FAQs for more details). Users can connect the HD/SD-SDI output to their NLE systems

and convert HDV through HDMI to DVCProHD. The unit can also convert DV to uncompressed SD, as well as HDV to uncompressed HD in real-time. Additionally, the HD-Connect MI converts RS-422 deck commands to 1394, so the HDV deck/camcorder can be directly controlled from an editing application. Offline/ Online workflows as well as batch captures are easily supported. Finally, tape dubs from HDV to HDCAM or DigiBeta entail only a single coax connection via the HD/SD-SDI cable which carries video, audio and time-code.

The HD-Connect MI™ is your HDMI connection, bringing HDV and DV to your studio and edit bays as well as supporting over-the-air playout.

2.2 Features

- 1) HDMI→ HD/SD-SDI Conversion (with emedded audio & time code)
- 2) HDV, DV and AVCHD Playback support
- 3) HDMI input formats: 1080i60, 1080i59.94, 1080i50, 1080p30, 1080p29.97, 1080p25, 1080p24, 1080p23.98, 720p60, 720p59.94, 720p50, 486i29.97, 576i25
- 4) DVI support (for formats matching listed HDMI input formats)
- 5) YUV 4:2:2 or RGB 4:4:4 HDMI support.
- 6) HDV Deck Control via RS-422 →1394 translation.
- 7) Cross Conversion and down-scale as provided by the deck. (see compatibility chart available on website).
- 8) Eliminates Long-GOP (HDV) editing (and associated render times) by enabling REAL-TIME conversion of HDV to DNxHD, DVCProHD and other I-Frame Codecs
- 9) 1394-based Firmware Updates.
- 10) 100% digital, no A/D or D/A conversions.
- 11) Compatible with Sony HDCam & DigiBeta Decks
- 12) NOTE: Will *not* convert HDCP encrypted content
- 13) Color Bar Output.
- 14) Extremely low latency (< 100 μ sec)
- 15) Ability to force 1080i, 720p, and SD (486i or 576i) from HDMI devices that would not otherwise support these formats (eg. Sony HDG-HC3).

2.3 Functional Block Diagram

MI™

HD - Connect MI™

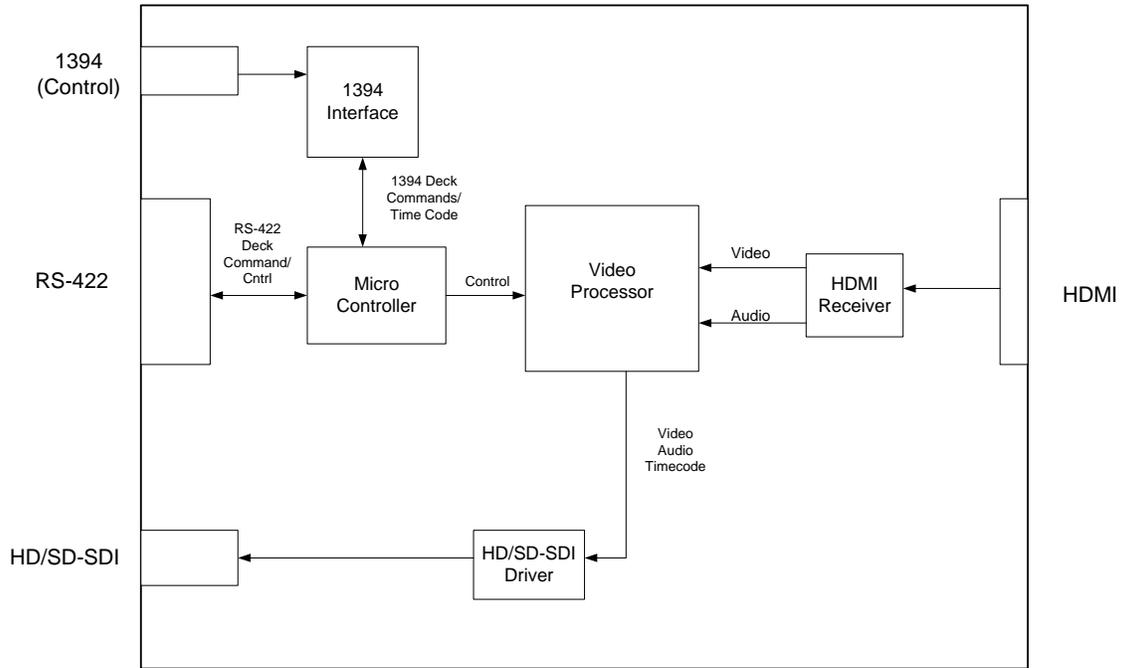


Figure 1 Functional Block Diagram of HD-Connect

3 Installation and Quick Start

3.1 Connections

Refer to Figure 2 and the descriptions below when connecting HD-Connect MI™.

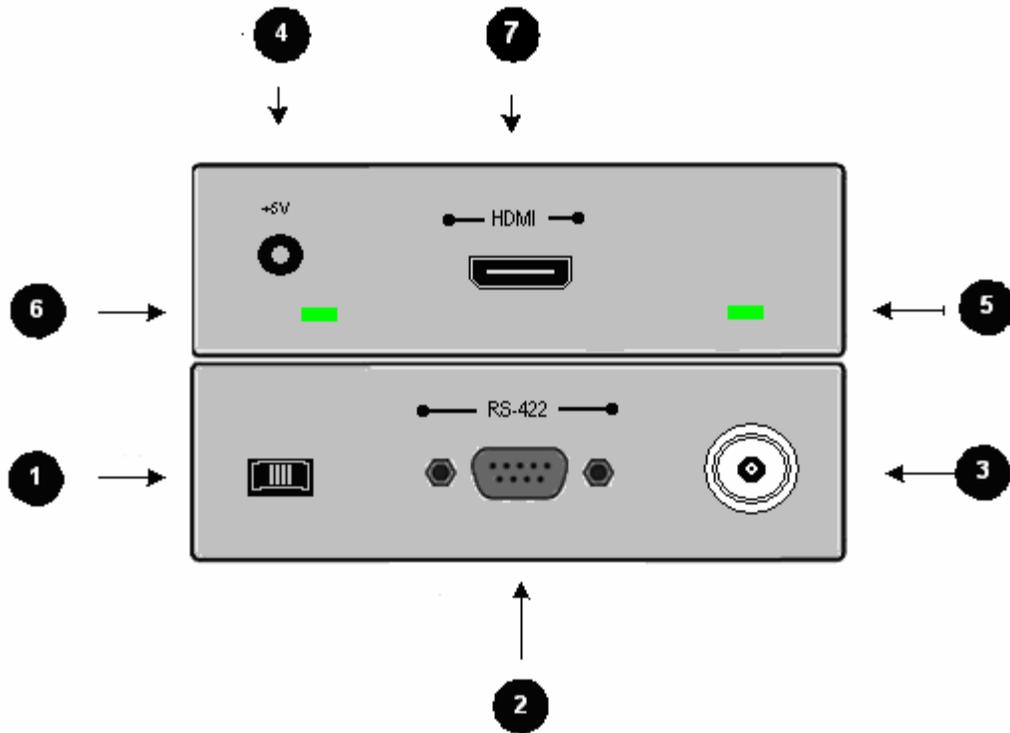


Figure 2 Connectors on the HD-Connect MI™

- 1) **1394 Control:** Connect to your HDV camera/deck for device control.
- 2) **RS-422:** Connect to your SDI based editing system for RS-422 → 1394.
- 3) **HD/SD-SDI Out:** Connect to your monitor, NLE system, or dub target. The HDMI format from your HDMI source determines output format. See **Tips and Troubleshooting** for descriptions of how to select video formats on various devices.
- 4) **DC +5V in:** Connect the supplied DC power supply unit. **Warning: Use only the power supply provided by Convergent Design, Inc. Damage to the unit caused by connection to other power supplies is not covered by warranty.**
- 5) **Status LED:** User interface indicators for operation of the box. LED to the right of the HDMI connector indicates Status.

- 6) **Power LED:** Indicates power connected to the unit.
- 7) **HDMI In:** Connect to your HDMI source (Note: Source video/audio must not be encrypted).

HD-Connect MI Connection Diagram

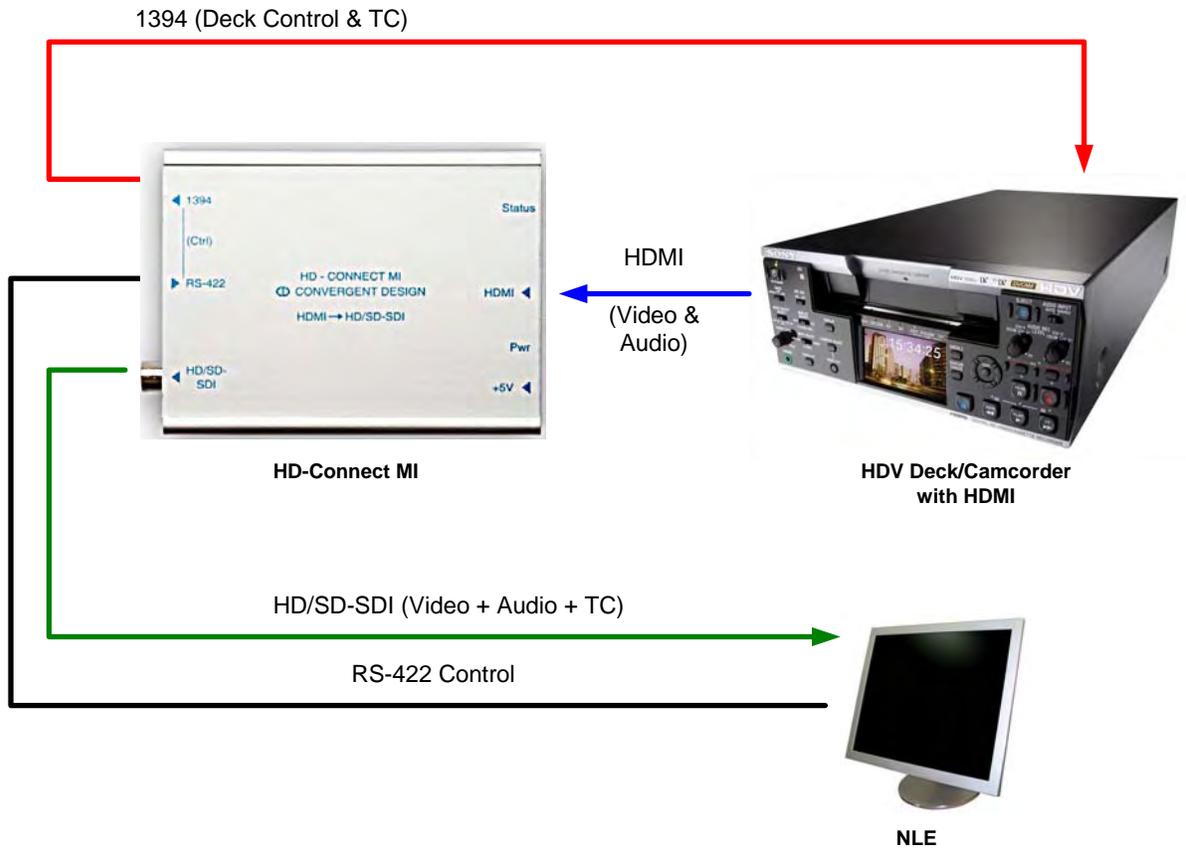


Figure 3 Connection Diagram

3.2 Status LED

The Status LED (Light Emitting Diode) to the right of the HDMI connector (Item 5 above) indicates the status of the HD-Connect MI™. When operating properly, this LED will remain on when video is flowing, and will be off when there is no video flow (e.g., color bars are generated). If the light is flashing, it is for one of two reasons:

- 1) (2 flashes) The incoming HDMI video is HDCP encrypted. HD-Connect MI™ can only stream unencrypted video.
- 2) (3 flashes) The incoming HDMI video is not of a format that the box can handle (see **Features** above for a list of supported formats).

4 Controlling HD-Connect MI™

4.1 Preparation

When selecting options in the Control App, occasionally the HD-Connect MI™ will lose track of the 1394 uplink and may give you alert messages. If so, we recommend unplugging and re-plugging the 1394 connection or power cycling the box.

4.2 Using the Control Application

PC & Mac

- 1) Connect the HD-Connect MI™ to your computer using the 1394 port. You must wait for your computer to recognize the box before the control application will work. This may take up to 30 seconds for either Windows XP or Mac.
- 2) Open and run the control application. Click on the “Open” or “Refresh” button under the “Control” tab. The application will then display the current firmware version. Figure 4 shows a screenshot of the application.

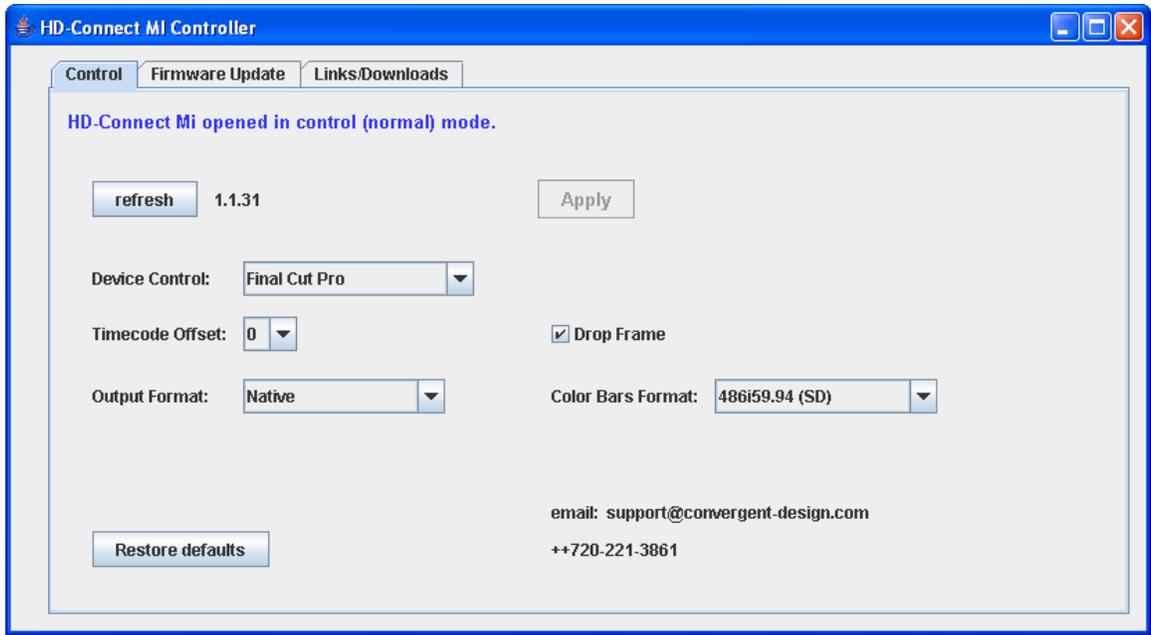


Figure 4 HD-Connect MI™ control application screen.

- 3) Perform the desired control operation as described below.

Control Operations

The operations available in the control application are described below. Following your selection of a list item, checkbox, or radio button, a message should appear confirming that your selection has been successfully loaded into your HD-Connect MI™ box once you select “Apply”. Figures 5-7 show the use of the control app for each operation. The interface for the PC and the Mac are identical in operation.

- 1) *Device Control.* The device-control dropdown list allows selection of a template representing a certain RS-422 controller or a set of controllers. The text box should display the controller currently selected. Click on the arrow to show the list and click on the text identifying the deck control template the HD-Connect MI™ should use. Once selected and applied, the blue text should display a confirmation message. By default, HD-Connect MI™ comes pre-loaded with “Final Cut Pro” selected. Figure 5 illustrates.

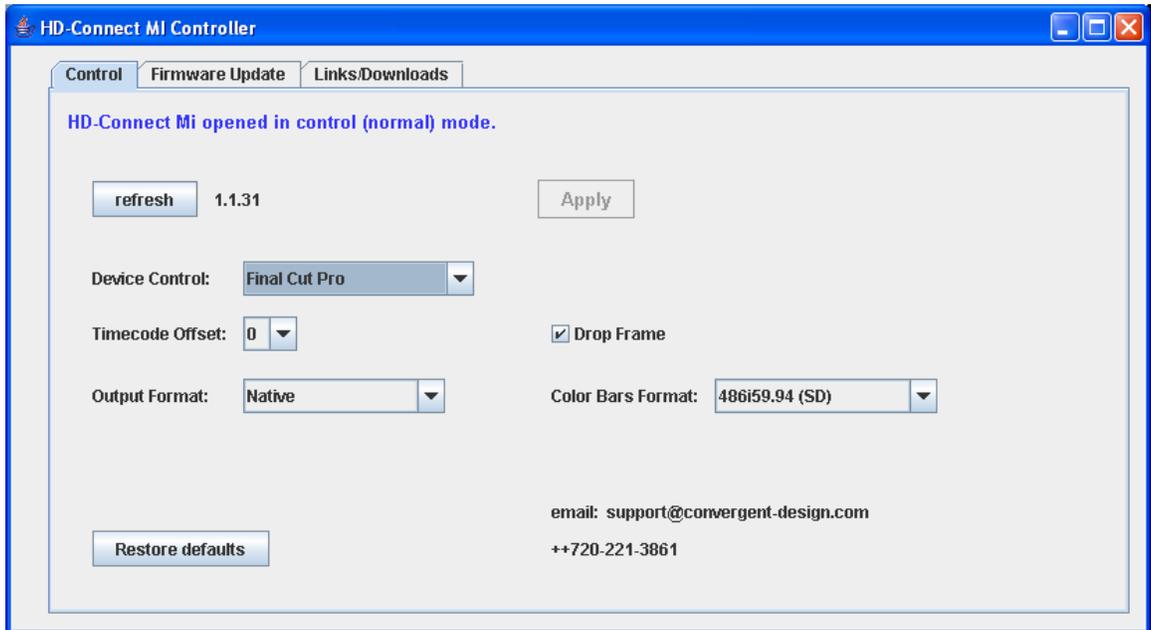
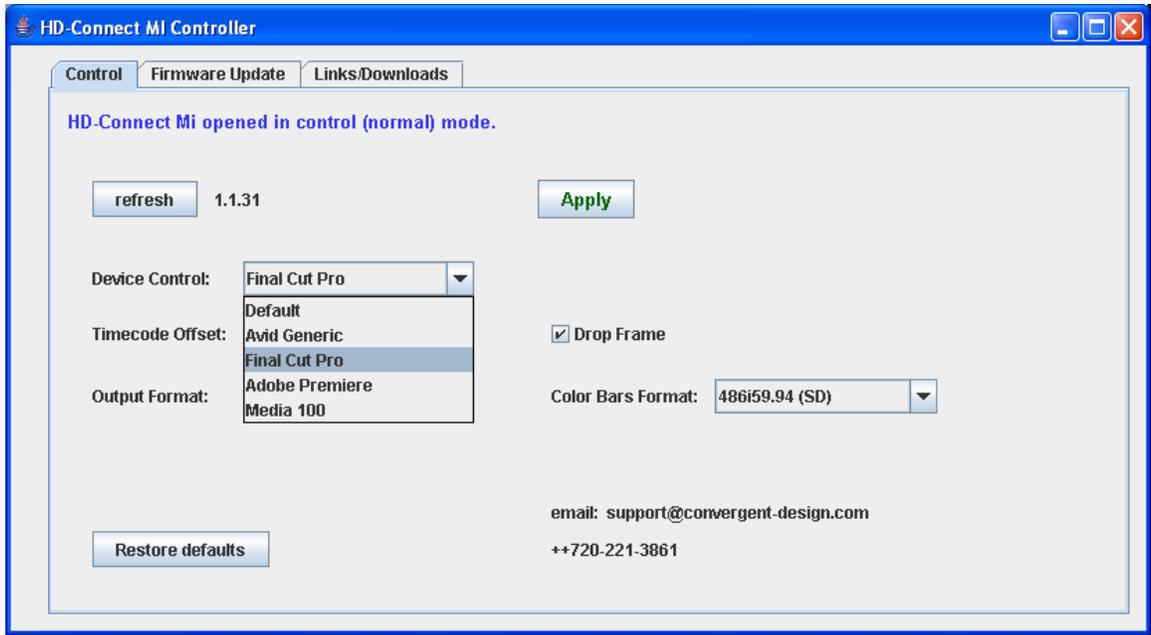


Figure 5 Device Control selection confirmation.

- 2) *Timecode Offset*. This setting allows you to add an offset to the timecode that will be reported to an RS-422 controller. Should you have other pieces of equipment downstream from HD-Connect MI™ that add further frame delays through your setup, you may wish to set an additional offset here.

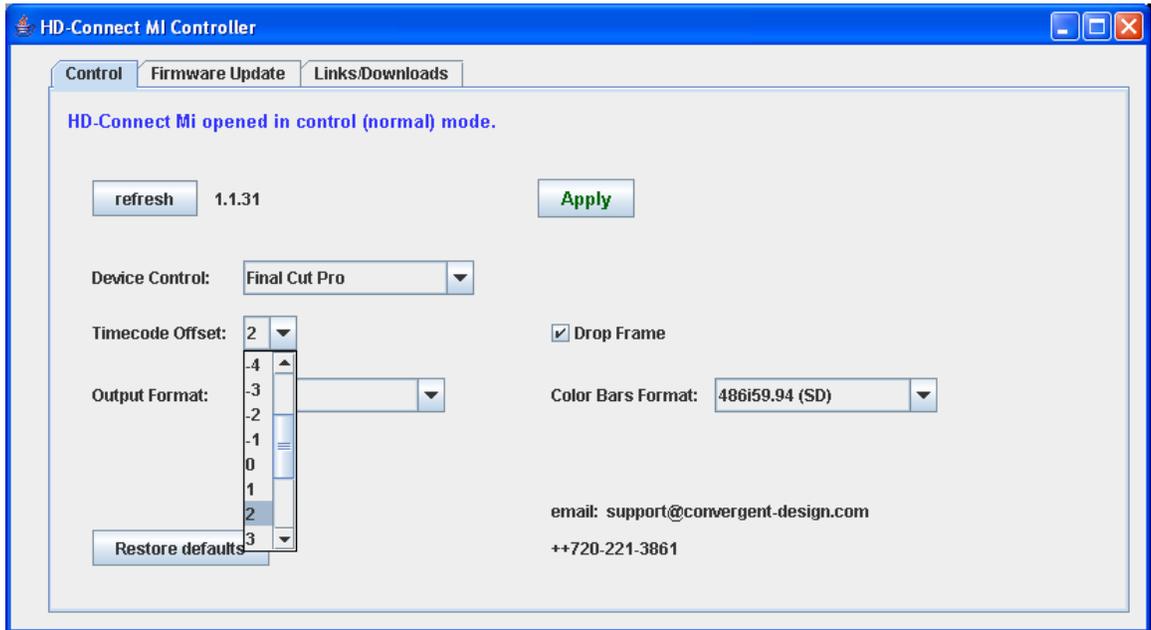


Figure 6 Timecode Offset Selection.

- 3) *Output Format*. This setting allows you to choose the video output format from the following options:

- Native – camera/deck output settings determine format; use this setting if connected to an HDV deck
- 1080i – force 1080i output from camera
- 720p – force 720p output from camera
- 486i – force NTSC SD output from camera
- 576i – force PAL SD output from camera

Options that force output to a particular format work well for devices that do not themselves have a menu selection for output formats. Figure 7 shows selection of “Force SD” as an example.

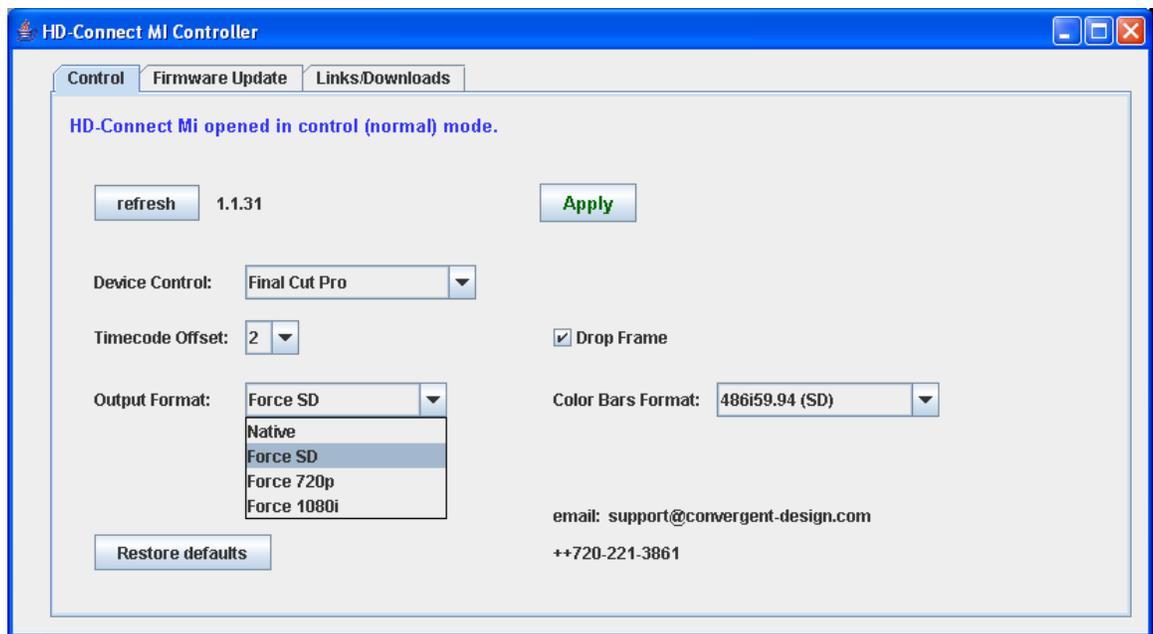


Figure 7 Input Format Selection

- 4) *Color Bars*. This selects the output test pattern when your HDMI source is turned off or the HDMI cable is disconnected. Figure 8 illustrates the various selections.

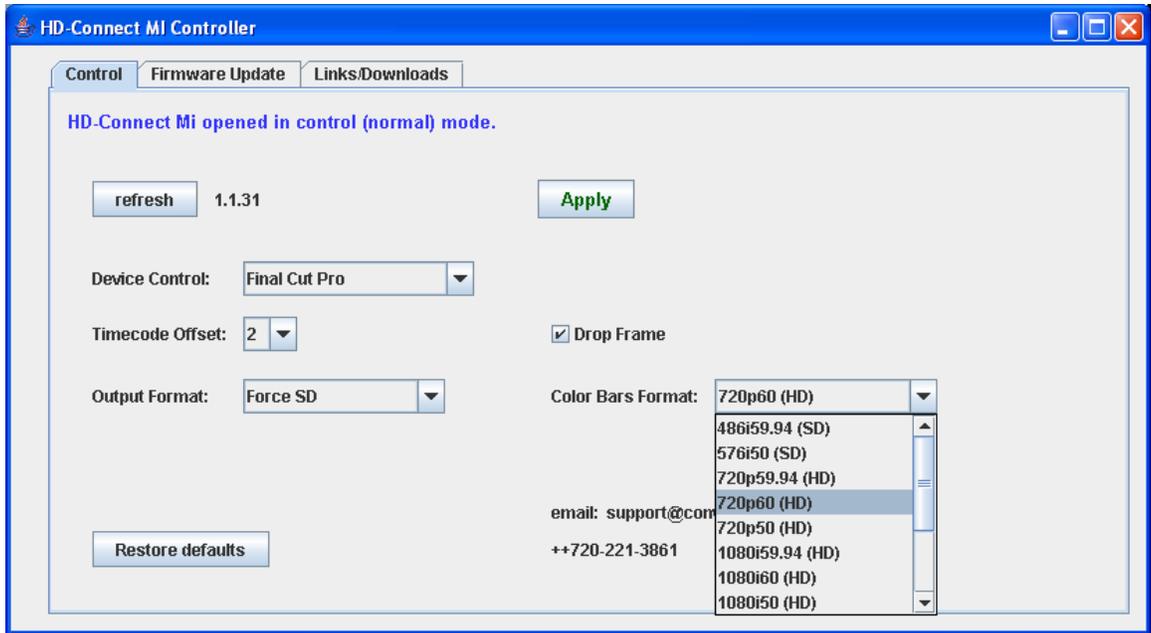


Figure 8 Color Bars Selection

- 5) *Drop Frame*. This setting has no effect in PAL mode. For the sake of NTSC, check the box if you want HD-Connect MI™ to report dropframe timecodes by default or uncheck it if you want HD-Connect MI™ to report non-dropframe timecodes by default. Timecodes will follow the condition of this checkbox on power-up or when you apply a change in the state of the checkbox. Thereafter reported timecodes will follow the selected format only until timecodes queried from a controlled device suggest a change is needed. If HD-Connect MI™ is reporting dropframe timecodes and detects a timecode valid only for non-dropframe material, it will switch to reporting non-dropframe timecodes. Similarly, if HD-Connect MI™ is reporting non-dropframe timecodes and finds a timecode sequence valid only in dropframe material, it will begin reporting dropframe timecodes. Note that HD-Connect MI™ can only detect a change in timecode at the beginning of each minute, except those ending in zero (00, 10, 20, 30, 40, and 50). This means that MI may not immediately detect a change in the dropframe sense at a scene boundary. It may take up to two minutes, though more typically up to one minute, to notice from queried timecodes that the dropframe sense of the timecodes has changed.

5 Updating HD-Connect MI™

5.1 Preparation

To prepare for updating the HD-Connect MI™, complete the following steps:

HD-Connect MI™ Guide and User's Manual.

- 1) Download and install the update and control application from the website. Go to the HD-Connect MI™ downloads page at <http://www.convergent-design.com/MIdownloads.htm> . Here you may download the latest code updates for either PC or Mac.
- 2) In order to run the control application, you will need the Java Runtime Environment 1.4.1 or better. If you need this to be installed on your machine, follow the instructions on the product downloads page where the installation files are located.
- 3) Connect the HD-Connect MI™ to your computer via the 1394 port. It is recommended that the control and update application not be run alongside other applications that use the 1394 port.

5.2 Using the Update Application

Follow the instructions below to complete the update process using either a PC or a Mac.

PC

- 1) Connect the HD-Connect MI™ to your computer using the 1394 port. You must wait for your computer to recognize the box before the update application will work. This may take up to 30 seconds. It is recommended you wait for 30 seconds.
- 2) Install the update and control application by running the installation file. Figure 9 shows the installation process.

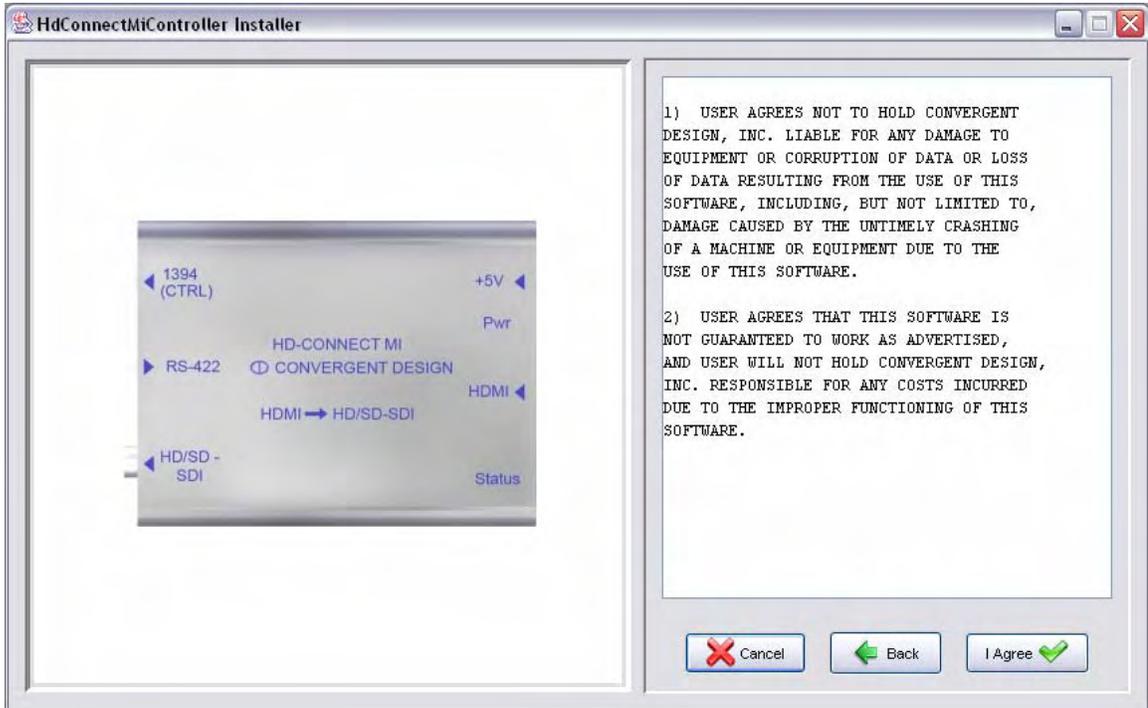


Figure 9 Installing the Control Application the PC & Mac

- 3) From the Start Menu, open the newly installed application “HdConnectMiController”. When the application first starts, it will check online for available updates. You will be prompted to update it upon first use, click ok. When the update is finished, you will need to restart the application. Figure 10 shows the dialog window.

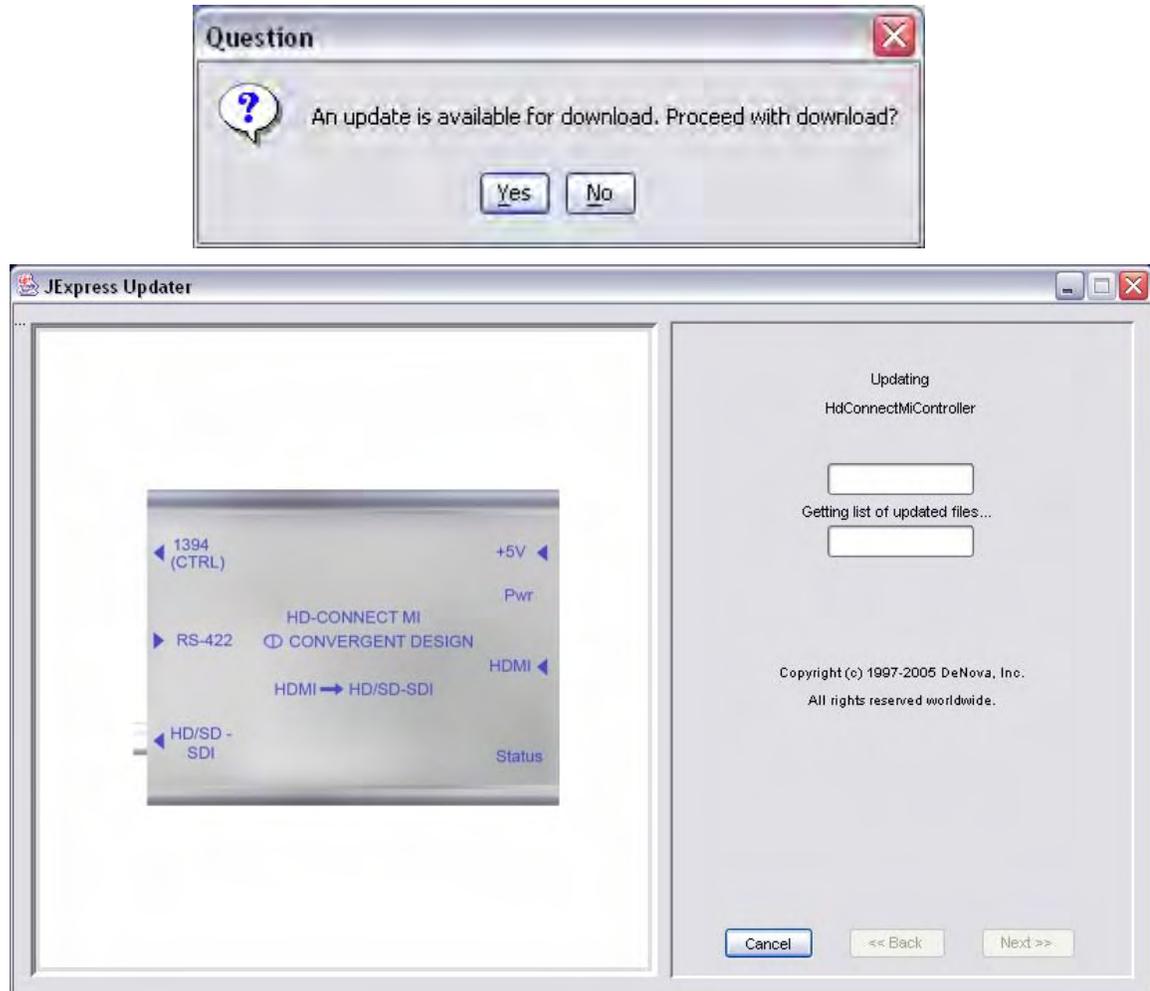


Figure 10 Control Application Asking for Updates

- 4) Open the Control Application again. Click on the “Firmware Update” tab, and click the “Open” or “Refresh” button to check the current software loaded into the HD-Connect MI™, and display the newest version to update to. Figure 11 illustrates.

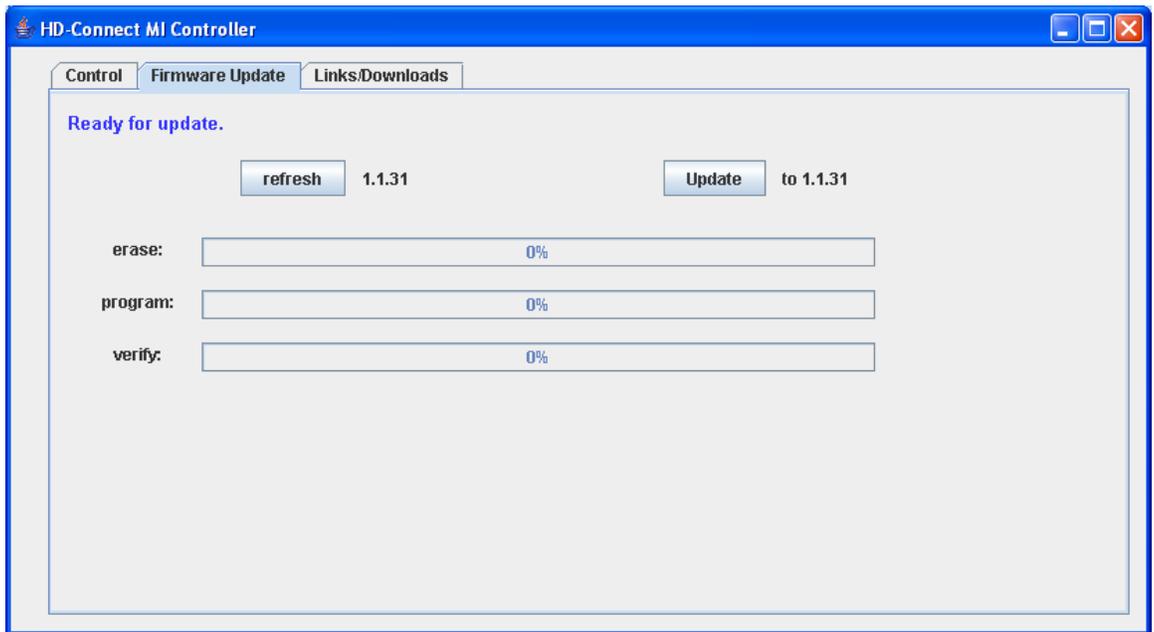
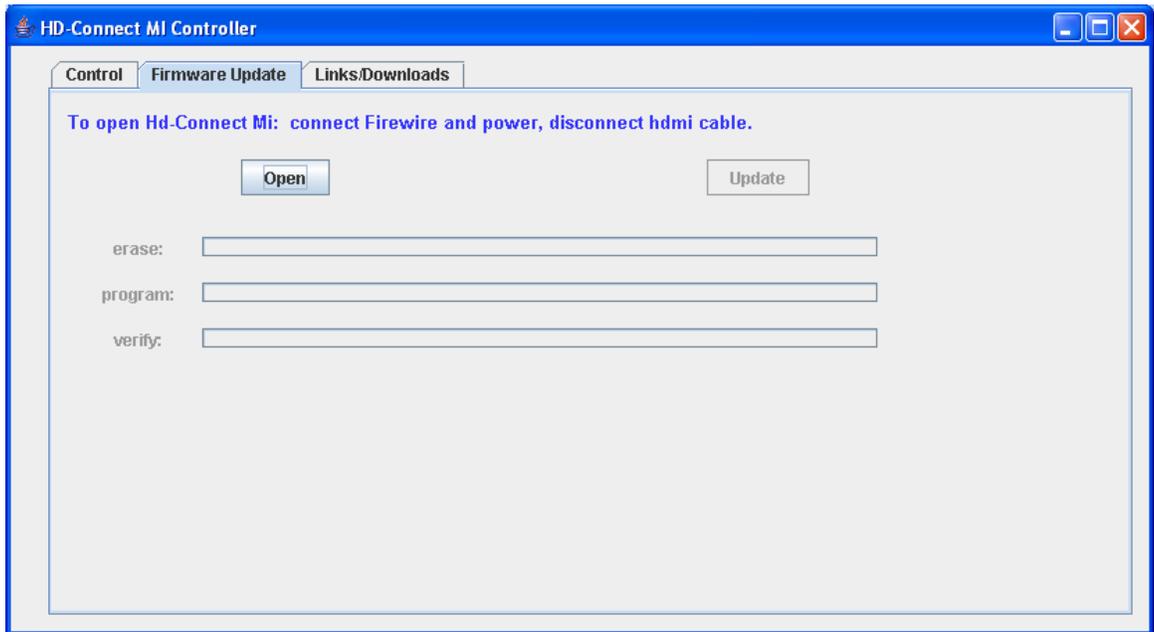


Figure 11 Using the Update Application

- 5) Before updating, be sure that no HDMI cable is plugged into the HDMI input of your unit. Click on the "Update" button to begin the update. It is recommended that you record the current version before updating the box, so that you can roll back to it if the new version does not work. This process takes 3-6 minutes. During that time **DO NOT** unplug the box. A

success window will appear when the update is complete. See Figure 12 for a screenshot of a complete update.

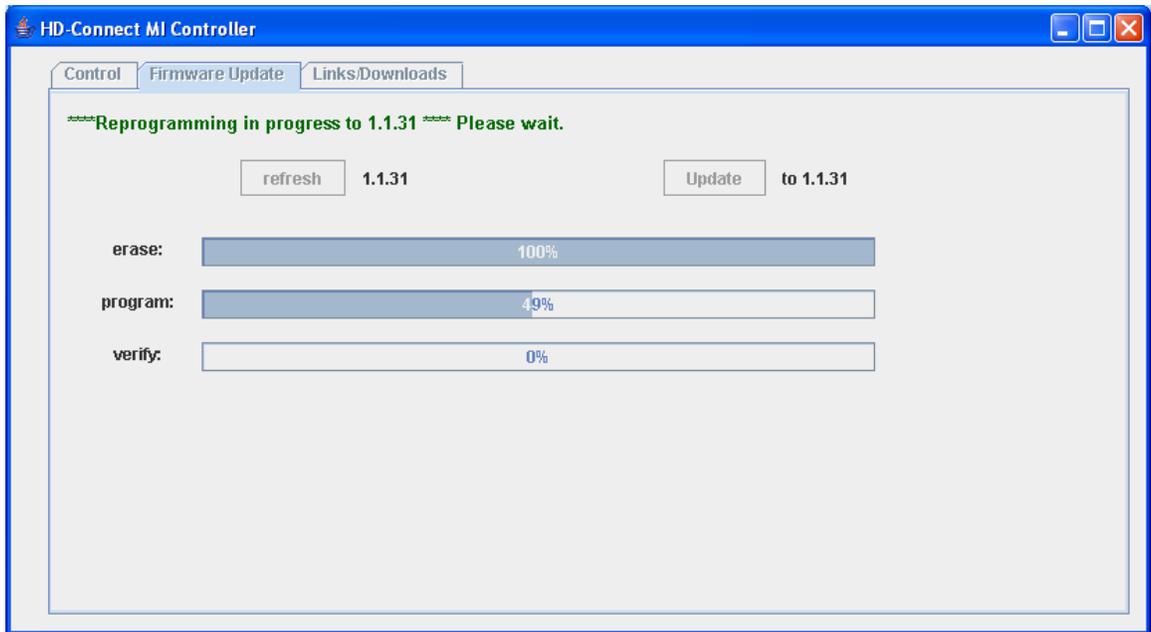


Figure 12 Update Application in Action.

- 6) Once the update is complete, close the application. HD-Connect MI™ will automatically switch between update and normal mode.

Mac

- 1) For the Mac OSX, the procedure for installation is identical to the PC. Follow the instructions as before. Figure 13 shows the Mac installer window.

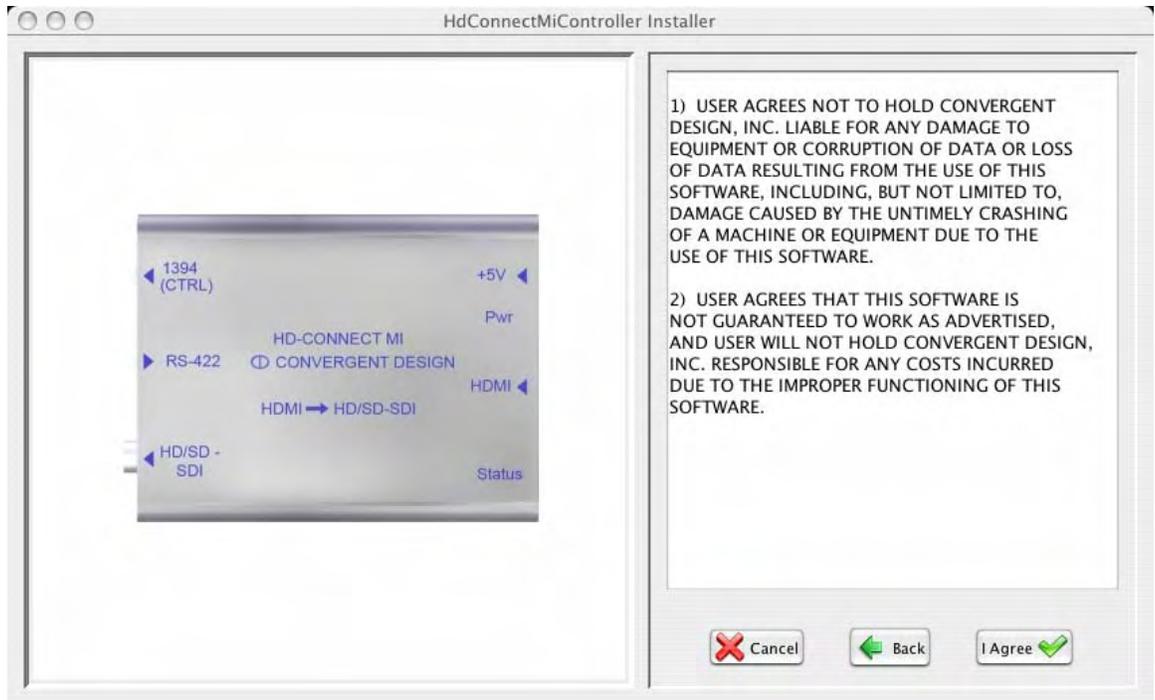


Figure 13 Mac OSX Installer Screen

- 2) Open the HD-Connect MI™ Update Application window itself, using Finder to locate the Applications, and select “HdConnectMiController”. Figure 14 illustrates this.

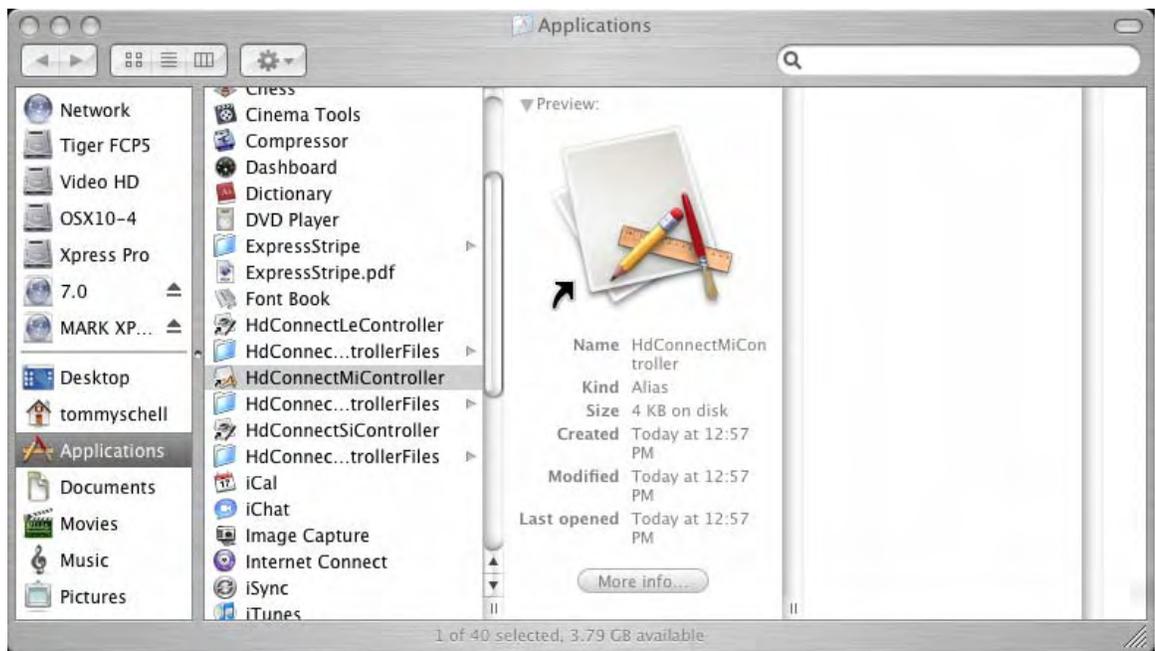


Figure 14 Finder in OSX

- 3) When you open the application, it should appear as in Figure 15. Use the exact same procedure for PC to update the box. Click the “Refresh” button, then click the “Update” button. The update should take around three to five minutes. During that time DO NOT unplug the box.

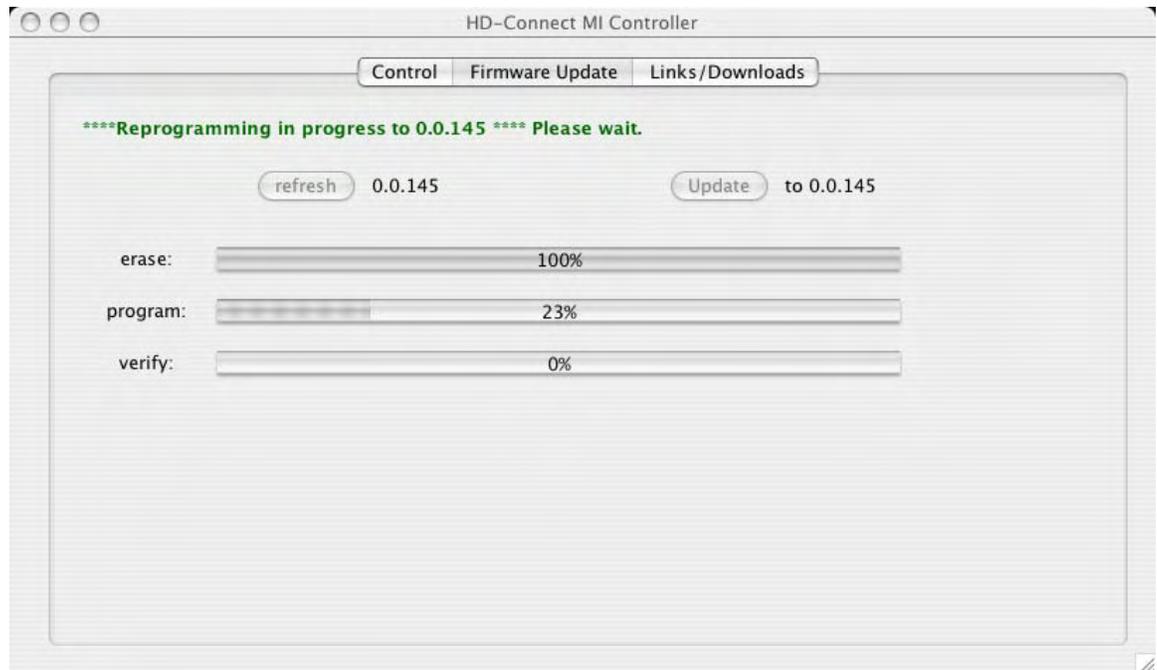


Figure 15 Mac Update Application

5.3 Rollbacks

Firmware updates will appear periodically on the website. If you update your HD-Connect MI™ as described above and find problems with the box in your application, you can roll back to a previous code version using the Control App. To do this, with the box in Update mode, click on the “Links/Downloads” tab. Click on “Refresh List”. Using the drop down menu, select the code you wish to use. This tells the Control App what code to load when it is restarted. Close the Control App, restart it and allow it to download the appropriate code, then proceed with the normal update procedure. Figure 16 below shows the “Links/Downloads” tab.

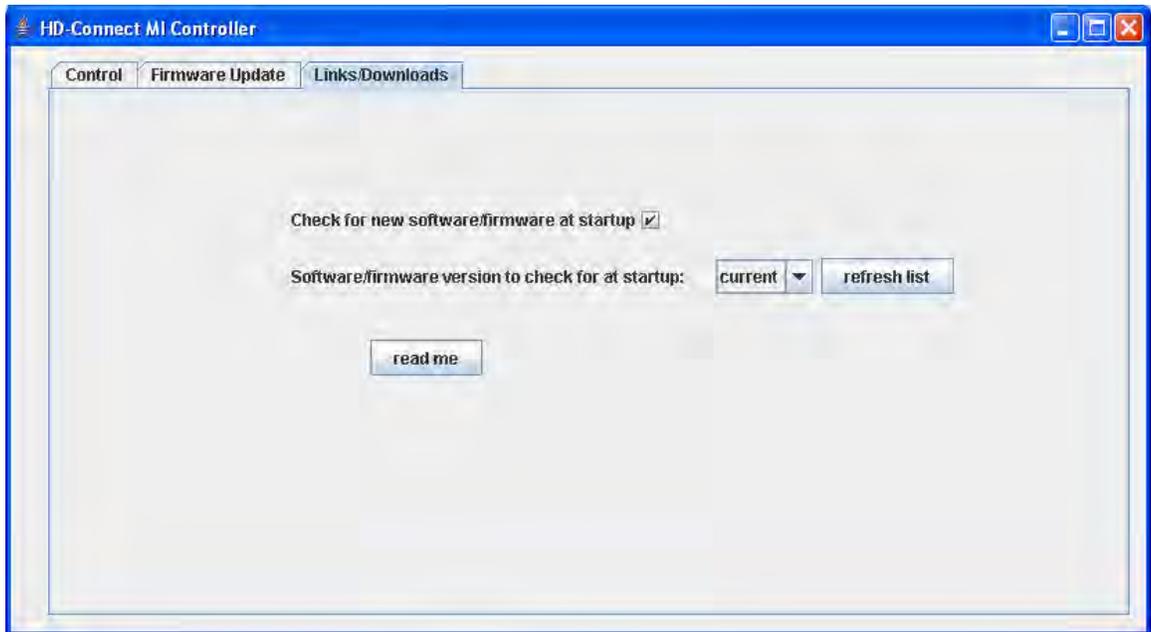


Figure 16 Code Rollback Feature in the Control App

6 Tips and Troubleshooting

6.1 Operating Tips

The follow are recommendations for video-editing workflow and operation of HD-Connect MI™ with other products that may appear in your configuration.

- 1) Equipment Warm-Up Time. Turn on deck/camera and HD-Connect MI™ for at least 5 minutes prior to use. This lets the crystal oscillators inside the camera/deck and HD-Connect MI™ warm up and stabilize in frequency.
- 2) Continuous Timecode and Leaders in Video Capture. For purposes of searching in the course of a batch capture, it is best to have a tape without timecode breaks. A camera in free-run timecode mode will continue to advance its internal timecode while the camera is not recording. This can create significant gaps in timecode from one clip recording to the next and may cause problems in later searches. Even greater problems arise when there are multiple instances of the same timecode on a single tape. For best results, the camera should be set in record-run mode with a desired starting timecode and the timecode not reset until the full tape has been recorded. This should cause the

camera to begin advancing its internal timecode only each time the record button is pushed. It is also recommended that the first scene recorded on a tape have a leader of 30 seconds or more of sacrificial material in order to prevent a reverse search from overrunning the timecodes on the tape. There should also be a leader before each subsequent scene at least as long as the preroll during batch capture. The recommended preroll time for a batch capture is 6 seconds

- 3) Avoiding Multiple IEEE-1394 Devices. On any reset of the 1394 bus (e.g., on power-up or plugging or unplugging a 1394 device), HD-Connect MI™ searches the bus for the first HDV device it can find. Where there is more than one, any beyond the first are ignored. The order in which devices are queried may change from one reset to the next, so it is best never to have more than a single HDV device plugged in at the same time. With more than one device on the bus sending out queries in the wake of a bus reset (e.g., HD-Connect MI™ and a PC or Mac), communications between HD-Connect MI™ and an HDV device may fail. This is known to happen with the Canon XLH1 camera. This seems to result from queries from HD-Connect MI™ and the computer arriving at the HDV device too close to one another. It is best, especially with the Canon camera, to include only HD-Connect MI™ and a single HDV device on the 1394 bus and plug a computer in only to run the controller application for HD-Connect MI™.
- 4) Avoiding Avid Auto-Configure. Rather than use Avid's automatic deck configuration, select Generic Play Deck as a specific device-control template.
- 5) When using the Sony HVR-M25U Deck. The default fast forward and rewind speed of the deck is too fast for HD-Connect MI™ to perform batch captures properly. The deck needs to be set to the "Shuttlemax" speed. To change this setting, go to the main menu on the deck, scroll down to "VTR Set", within that submenu go to "FF/Rew Speed", the default setting is "FF/Rew". Simply select "Shuttlemax", and batch captures should work properly. Under the In/Out Rec Settings, force the deck to HDV mode (not Auto or DV).
- 6) Handling Dropframe/Non-Dropframe Timecodes. Added automatic dropframe/non-dropframe timecode reporting for material that is not PAL SD or HD at 50 fps. Previously HD-Connect MI reported dropframe or non-dropframe timecodes based only on the state of the Drop Frame checkbox in the HD-Connect MI Controller application. It reported an error (one LED flash every five seconds) on encountering timecodes of the opposite sense. In this firmware version, timecodes follow the condition of the Drop Frame checkbox only on power-up or when the user changes that checkbox through the Controller. Thereafter timecodes follow the current format until timecodes queried from the controlled device suggest a change is needed. If MI is reporting dropframe timecodes and detects a timecode valid only for

non-dropframe material, it will switch to reporting non-dropframe timecodes. Similarly, if MI is reporting non-dropframe timecodes and finds a timecode sequence valid only in dropframe material, it will begin reporting dropframe timecodes. Note that MI can only detect a change in format at the beginning of each minute other than those ending in zero (00, 10, 20, 30, 40, and 50). This means that MI will not immediately detect a change in the dropframe sense at a scene boundary. It may take up to two minutes, though more typically up to one minute, to notice from queried timecodes that the dropframe sense of the timecodes has changed.

- 7) Offline/Online Workflow. While HD-Connect MI™ will allow you to use your RS-422 controller to navigate through a tape in an HDV device, it is best to reserve this capability for a rough look at source material rather than for logging in and out points for later batch capture. Due to the GOP (Group Of Pictures) structure of MPEG video and the transport limitations of HDV devices, navigation can be quite choppy compared to navigation through a tape on an RS-422-controlled deck. For ease of clip logging, it may be better to capture an entire tape at a low resolution, decompose the captured material through an editing application into clips that will be a part of the final project, and then capture just those clips again at the desired final resolution.

Two scenarios illustrate this approach. In the first, the DV scenario, material from source tapes is captured directly using a DV editing application and the DV output from an HDV device. In the second, the SDI scenario, source material is captured instead from the SDI output on HD-Connect MI™ connected to an SDI card installed in the editing computer. The discussion below focuses on the advantages and disadvantages of these two scenarios.

The DV scenario supports a simple offline capture and edit process that can be accomplished on a laptop. Since the material is captured in a format (DV) available as a direct output of the camera, the offline stage of the process does not require any equipment beyond the camera and the editing computer. Given minimal equipment and the relatively low DV data rate, material could easily be captured and edited in the field. For Avid users, DV also opens up the possibility of capture and edit on low-cost Xpress Pro systems followed by full-resolution capture and finishing on high-end Avid products. Of course, capturing and editing in DV will mean that editors have no choice but to work with lower-quality standard-definition video. Another problem in the DV scenario is that timecode for the offline capture will be from one device in one mode (the camera in DV mode), while the final online capture will be from a different device in a different mode (HD-Connect MI™ in HD mode). It

may be necessary to set a timecode offset in the capture application to ensure that the logged DV inpoints and outpoints correspond to the correct frames during final online capture through HD-Connect MI™. In addition, some HDV devices will not down-convert to SD and provide a DV output, so this scenario would not be possible with all HDV devices.

While the need for an SDI capture card (HD or SD) in the SDI scenario eliminates the possibility of capturing and editing on a laptop or with Avid Xpress Pro, the SDI offline/online scenario eliminates the difference in timecode source, since clips are captured through HD-Connect MI™ at both offline and online stages. Also, the SDI scenario allows the selection of a number of different codecs for video compression during the offline tape capture. With SD-SDI output from HD-Connect MI™ set in SD mode, a software DV codec could achieve the same savings in disk space as in the DV scenario. For higher-quality material during offline capture and edit, HD-Connect MI™ could be set in HD mode and a DVC-Pro-HD or DNxHD codec used to compress captured video. Recapture of just the final project clips could then be done at the full HD data rate. The SDI scenario is also more universal than the DV scenario, since it covers an HDV source such as the JVC BR-HD50 deck that do not down-convert to DV.

The table below summarizes the advantages and disadvantages of the DV and SDI scenarios.

	DV Offline Capture	SDI Offline Capture
Advantages	<ul style="list-style-type: none"> • Laptop ok • Avid Xpress Pro ok • Minimal equipment • Low data rate 	<ul style="list-style-type: none"> • SD or HD • Choice of SD or HD codecs (DV, DVC Pro HD, etc.) • Ok for HDV device without down-conversion
Disadvantages	<ul style="list-style-type: none"> • Lower offline quality • SD only • DV compression only • May need timecode offset in edit app • Requires HDV 	<ul style="list-style-type: none"> • No laptop • No Xpress Pro

	device that down-converts	
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6.2 Troubleshooting Guide

1) No video output from the box.

- Confirm output from your HDMI source by plugging directly into an HDMI monitor.
- Confirm colorbar output from by unplugging the HDMI cable and plugging its SDI output into an SDI monitor, if you have one available.
- If you are trying to connect to an SDI monitor and is putting out an HD SDI stream, is your monitor HD-capable or is it limited to SD-SDI?
- If you are trying to connect SDI to an NLE system, does the expected format in the NLE capture settings exactly match the format from your HD-Connect MI™? Unplug HDMI and use the Controller application to select appropriate colorbar formats for testing (1080i50, 1080i60, etc.).
- On a Sony HDMI source device, set the **HDV/DV SEL** option under the **In/Out Rec** menu to **HDV**.

2) Box failed to update

- Make sure the computer recognizes the box before updating.
- Roll back to a previous working version.

3) RS-422 Deck control does not work.

- Select a generic play deck as the deck template in the NLE software.
- Ensure that the RS-422 cable is connected from HD-Connect MI™ to the correct serial port on your NLE system.
- Ensure that a 1394 cable is connected from HD-Connect MI™ to your HDMI source device.
- Ensure that 1394 control is enabled on the controlled device and that the device allows remote control and is not set to allow only local control.

4) Batch Capture Problems.

- On a Sony device, set the **FF/Rew Speed** option to **SHUTTLE MAX**.
- Set NLE preroll to 6 seconds.

5) I only see color bars when I turn on the box.

- When there is no HDMI device, the HD-Connect MI™ displays color bars in the selected output mode.

7 Safety and ESD Precautions

- 1) Always connect the box to specified power source: 100 to 240 V AC, 50/60 Hz. DO NOT use any power supply other than the one supplied with the HD-Connect MI™, as this voids the warranty.
- 2) Do not operate the unit in an unprotected outdoor installation or in wet areas. Do not expose this product to rain or snow.
- 3) Keep the operating temperature between 5° C and 40° C (40° F and 104° F). Avoid conditions which would cause moisture condensation on the outside cover.
- 4) There are no user serviceable components inside the box. Only a qualified technician should perform servicing of the unit. Opening the box may void the warranty.
- 5) Do not pour water or any other fluid over the box. Avoid the use of sharp objects near the box as they may scratch the anodized aluminum case or damage the DIP switch and board.
- 6) Clean only with water with a damp cloth.
- 7) CAUTION: Electrostatic Discharge (ESD) can damage components in this product. Although HD-Connect MI™ has countermeasures to this hazard installed inside, it is always best to avoid damage by using extra caution when adjusting the DIP switch settings. Always ground yourself (by touching a grounded metal object) to discharge any static prior to adjusting the DIP switches.
- 8) Do not touch exposed connector pins and do not insert any metal objects in the connectors.
- 9) Ensure that all connections made to the box (including at the “other end of the cable”) are made in ESD safe environments.
- 10) Always transport and store the box in the static protected bag included with the HD-Connect MI™

8 Specifications

8.1 Inputs

HDMI

Formats:

- 1920x1080i, 60Hz
- 1920x1080i, 59.94Hz
- 1920x1080i, 50Hz
- 1920x1080p, 30Hz
- 1920x1080p, 29.97Hz
- 1920x1080p, 25Hz
- 1920x1080p, 24Hz
- 1920x1080p, 23.98Hz
- 1280x720p, 60Hz
- 1280x720p, 59.94Hz
- 1280x720p, 50Hz
- 720x486i, 29.97Hz
- 720x576i, 25Hz
- YUV 4:2:2 or RGB 4:4:4 for all formats
- 8-bit video, 24-bit audio at 48kHz (2 channel support now, 8 channel coming soon)

8.2 Outputs

HD-SDI

Standards:

- Video Format: SMPTE 274M (1080i), 296M (720p)
- SDI Video: 4:2:2 SMPTE 292M
- SMPTE High Def Color Bars RP-219
- 4 Channel Embedded Audio (8 channels added soon)
- Audio: 24-bit, 48Khz, SMPTE 299M

Formats:

- Same as for **Inputs** above.

Connectors: 75 Ω BNC

SD-SDI

Standards:

- Video Format: SMPTE 125M
- SDI Video: 4:2:2 SMPTE 259M-C
- SMPTE Standard Def Color Bars RP-178
- 4 Channel Embedded Audio
- 20-bit, 48Khz, SMPTE 272M-A

Formats:

- 720x480i, 29.97Hz, 4:3
- 720x576i, 25Hz, 4:3

Connectors: 75 Ω BNC

Embedded Time Code

Standards:

- SMPTE RP-188 (HD), VITC (SD)
- SD NTSC Lines: 14, 16, 277, 279
- SD PAL Lines: 14, 16, 327, 329
- HD 1080i Lines: 14, 16, 577, 579

8.3 Physical

Dimensions

- 4" (101 mm) deep X 1.75" (44 mm) high X 6" (152 mm) wide

Weight

- 1 lb. (0.5 kg)

8.4 Power

Range

- AC Power: 100 to 240 V AC (50/60 Hz)
- Unit Input Power: +3.6 to 5.25V, center positive, 2.5mm jack

Maximum Operating

- 3W

8.5 Temperature Ranges

Operating

- 40° F to 104° F (5° C to 40° C)

Storage

- -5°F to 140°F (-20° C to 60° C)

8.6 Humidity

Operating

- Less than 80% (non-condensing)

Storage

- Less than 90% (non-condensing)

9 RMA and Warranty

9.1 Conditions of the Warranty

Convergent Design reserves the right to determine if a repair is subject to the warranty agreement. Damages caused by products being dropped or mishandled is not covered by this warranty. Also damage caused by over-voltage conditions on any of the I/O connectors is not covered by this warranty. Use of any power supply other than the one provided automatically voids the warranty.

There are no user-serviceable parts inside the cabinet. Opening the cabinet voids the warranty. Transit damage caused by inadequate packaging also invalidates the warranty agreement. Please ship the unit in its original packaging, if possible.

All products are shipped prepaid to Convergent Design. For insurance reasons, Convergent Design cannot accept any product that is returned via U.S. Postal Service. Returns will be accepted from Federal Express, UPS, DHL, or other comparable freight carrier. Convergent Design returns the product via a prepaid two-day delivery service within the continental United States, only if the product is under warranty and subsequently found to be faulty. Out-of-warranty repaired products are shipped at customer's expense. Turnaround time for warranty repairs normally will not exceed 48 hours (excluding shipping time), unless extraordinary fault conditions exist. A failure analysis report is returned with each product.

Labor and defects are covered for the warranty period stated on your original invoice from the original date of purchase. Only the original purchaser of the products is covered under this warranty. The warranty is non-transferable. If you discover a defect, please refer to our Return Merchandise Policy below. The warranty covers all Convergent Design hardware defective in material or workmanship. Software is warranted in a separate written statement accompanying the software. During the warranty period, Convergent Design, at its option, will repair or replace product or product components, which in its opinion prove defective. Parts and components used in the repair process may be recycled or repaired, at Convergent Design's discretion. This warranty service will be performed at no charge to the registered owner, provided the product is shipped prepaid to Convergent Design. Convergent Design will return the repaired product via a like carrier, in the continental United States within 48 hours, shipping time excluded. Convergent Design reserves the right to determine whether a needed repair is subject to the warranty as per its provisions sated herein. Transit damage caused by inadequate packing violates the warranty. The warranty will be void if, in the opinion of Convergent Design,

the product has been damaged through accident, misuse, misapplication, or as a result of service or modification performed not authorized in writing by Convergent Design.

WARNING: The following are **not** covered under warranty:

- Damage due to the use of a power supply other than that supplied with HD-Connect MI™.
- Damage caused by improper connections to external 1394 devices supplying power over the 1394 cable.

9.2 Obtaining an RMA

It is our policy that all material and repair returns, whether in warranty or not, are only accepted if an RMA (Return Merchandise Authorization) number has been issued for the products being returned. Any unauthorized shipments will be returned, un-repaired at the customer's expense.

Damaged or defective Convergent Design products that are purchased from Convergent Design may be returned for replacement only. Convergent Design will not accept returns for any other reason. All eligible returns require a Return Merchandise Authorization (RMA) number. E-mail Convergent Design, Inc. at support@convergent-design.com to obtain an RMA number. Items must be returned within 10 days of receiving your RMA number. Returned product must be in its original packaging with all contents included and must have the RMA number clearly marked on the outside of the package.

RMA numbers and return address may be obtained from Technical Support.

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