ImageCue

Model 1.1 User's Guide

Second Release – December 2015

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About this User's Guide

The purpose of this User's Guide is to provide you with detailed information about the operation of the *ImageCue*™ image server. Keeping in mind that no two users think identically, you will find that some information is duplicated within this guide so that the answers to questions can be found under a variety of topics. We will strive to make improvements to this guide as we discover how you, the end user, are using *ImageCue*™. Please do not hesitate to contact us should you feel that this guide is missing important information, or that the information is not found where you think it should be located.

About ImageCue™

ImageCue™ is a compact, easy to use image server that provides control of high definition still images and videos with only twelve channels of DMX512.   Each *ImageCue*™ includes a library of 205 images, 50 videos, and 55 overlays. In addition, users can supply their own images and videos using a USB flash drive or external SSD hard drive to provide access to over 65,000 image and video files.   *ImageCue*™ is fast – images and videos are selected and displayed/played in less than a quarter of a second. You can instantly "bump" from image to image, image to video, video to video, or video to image. Still images can also be crossfaded – with crossfade times of ½ second to 109 minutes in 1/10 second increments. *ImageCue*™ accepts JPEG files for still images, and H264 raw video files. PNG files with transparency can be overlaid onto images and videos. A software utility to transcode and extract H264 format files from user content is available free from ImageCue™ for the following video container types: AVI, DV, FLAC, FLV, M4V, MJPEG, MOV, MP4, M4A, 3GP, 3G2, and many others. *ImageCue*™ gives the user full RGB mixing control of the background, and color mixing can also be used in the foreground to tint images and videos. Full dimming control is provided for the output.

Connections and Controls

Please refer to the drawings below and the corresponding index number for a description of the associated connector or control:
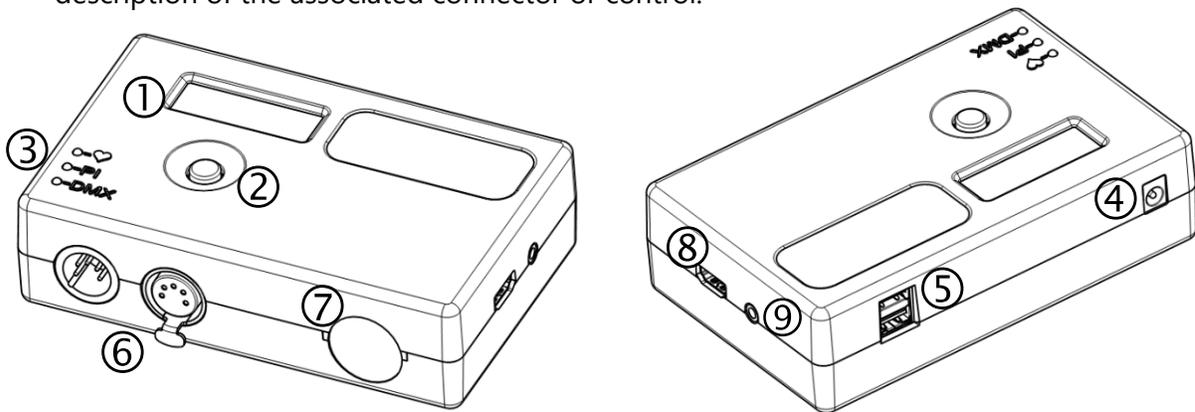
1) <u>LCD DISPLAY</u>   This is a text only, 2 lines of 16 characters each, display associated with the *ImageCue™* menu system.   The display is backlit with a white LED whose intensity can be set through the menu system.   During normal operation the display outputs "IMAGECUE" on the top line and "* * * * * * * * " on the bottom line.   The display also outputs diagnostic messages which are detailed in the Setup section of this guide.

2) <u>NAVIGATION SWITCH</u> This "button" is a 5-way switch used in conjunction with the display for the *ImageCue™* menu system. The switch positions are: UP, DOWN, LEFT, RIGHT, and SELECT. SELECT is a press on the button when it is in the center position. Normal usage in the menu is that UP and DOWN move through the menu, LEFT will decrease a value, RIGHT will increase a value, and SELECT enters the value and returns to the next higher menu level.   The practical use of the navigation switch is further detailed in the Setup section of this guide.

3) <u>LED's</u> There are 3 LED's that are used to indicate proper operation of *ImageCue™*.

♥ is the "heartbeat" LED. It is blue and flashes once per second when *ImageCue™* is operating properly. This LED is driven by the *ImageCue™* circuit board.

PI is the Raspberry Pi LED. It is blue and flashes every time it receives data from the *ImageCue™* circuit board. This will normally correspond to every DMX512 data frame that is received. In Standalone Mode this LED will flash 10 times per second. This LED is driven by the Raspberry Pi.

DMX indicates reception of DMX512 data. It is green and flashes every time a valid DMX512 data frame is received. This LED is disabled when the unit is in Standalone Mode. This LED is driven by the *ImageCue™* circuit board.

4) <u>POWER INLET</u> This is the connection for the *ImageCue™* power supply. We strongly recommend that you use only the power supply that came with your *ImageCue™*. **Any power supply connected to this inlet must be <u>REGULATED</u> <u>5 Volts DC</u> rated at 3 Amps**. **The**

maximum allowable voltage is 5.50v and the minimum is 4.75v. The center post is POSITIVE polarity.   Use of a power supply outside of this specification will permanently damage the *ImageCue™* unit and is not covered by the warranty.

5) <u>DUAL USB PORT</u> Either of the USB 2.0 ports may be used with a <u>single</u> flash drive to provide user images, videos, and overlays for *ImageCue™*. The USB ports are configured only for use with memory devices. Any USB device other than a flash memory will not be recognized and may prevent *ImageCue™* from operating properly.   Any memory device used with *ImageCue™* must be formatted FAT32. This is the normal formatting of USB flash drives when purchased. For more information regarding the file and folder formatting of the USB flash drive for user images, please see the User Media section of this guide.

6) <u>MALE & FEMALE 5 PIN XLR CONNECTORS</u> The DMX512 signal used to control *ImageCue™* is connected here. The connectors are wired as pass-through so that the *ImageCue™* unit does not require power in order for the signal to "loop-through" to other units in the chain. The DMX512 connection is ISOLATED per the ANSI E1.11 – 2008 (R2013) standard. The DMX512 standard specifies that the very end of a DMX512 data cable run should be terminated with a 120 ohm resistor. If an *ImageCue™* unit is the last device on the DMX512 cable run, a user supplied terminator should be plugged into the unused connector to avoid signal reflections on the line. Systems may operate correctly without such termination, but *ImageCue™* recommends the use of termination to avoid hard to diagnose DMX512 problems.

7) <u>SD CARD ACCESS</u> The *ImageCue™* operating system, program, and image libraries are stored on a 16GB micro SD card accessible through this hole covered by a rubber hole plug. DO NOT PUSH ON THE HOLE PLUG LIKE A PUSH BUTTON OR YOU WILL LIKELY DISENGAGE THE SD CARD FROM ITS SOCKET MAKING THE UNIT INOPERABLE. To remove the hole plug, gently pry it up using a fingernail around the edges until it pops out. The micro SD card has a push-in, push-to-release mechanism to lock it into place. When replacing the SD card it is a good idea to push it in /out a couple of times just to make sure it is properly seated. When replacing the rubber hole plug you must use care to ensure that you do not release the SD card. Gently work the plug into the hole using pressure along the circumference of the hole plug – not by pressing in the center. Instructions for making a backup SD card for *ImageCue™* may be found in the SD Card Section of this guide.   **NOTE: Do not attempt to use the *ImageCue™* SD card with a Raspberry Pi without the *ImageCue™* PCB. Likewise you should not attempt to use a SD card with an operating system for a Raspberry Pi in *ImageCue™*. In either case, permanent damage not covered by the warranty may occur to a Raspberry Pi or *ImageCue™*.**

8) <u>HDMI PORT</u> The video output from *ImageCue™* is available on the HDMI port. Since *ImageCue™* does not support audio, there is no audio present on the HDMI connector and it is considered to be in DVI output mode. When using the HDMI to DVI adapter supplied with *ImageCue™* it is strongly recommended that you use the supplied mounting plate and adapter mounting bracket. This will prevent strain on the HDMI connector. The adapter mounting bracket can also be used for strain relief for HDMI

cables without the DVI adapter. More information on attaching and using the mounting plate and bracket may be found in the Setup section of this guide.

9) 3.5mm AUDIO/VIDEO JACK This jack is not used or supported by *ImageCue™*. You should not plug anything into this jack as doing so may damage the device connected or possibly the *ImageCue™* unit.   Damage associated with connection to this jack is not covered by the warranty.

Control Channel Descriptions

ImageCue™ uses 12 channels of a DMX512 universe for its default control configuration (DMX Personality 1). For convenience we have listed the control channels from 1 to 12 and also provided the offset from DMX512 starting channel. The *ImageCue™* fixture profile is available on several consoles which makes the channel assignment transparent to the user through the use of a parameter name rather than channel number.

Channel 1 – offset 0: **DIMMER** This channel operates like a conventional dimmer in a lighting fixture. A value of 0 corresponds to a blackout – no output intensity. Any images, videos, or effects running will continue to do so, only they will not be visible. The DIMMER channel may be "bumped" from blackout to full and vice-versa. Timed fades of the dimmer are possible using a console's timed fade capabilities. The DIMMER channel may be used to dim the intensity of the video output from *ImageCue™* without affecting the other attributes of a composited scene.

Channel 2 – offset +1: **SOURCE** This channel selects the Image Source Folder for the image or video to be displayed.   A value of 000 (zero) selects the stock content stored internally in *ImageCue™*. Values from 001 to 255 select the corresponding folder (/imagecue###) on a USB Flash Drive inserted into one of the *ImageCue™* USB ports.   If the requested folder or the USB Flash Drive is not present, a blank image with the words "no media found" in the lower right-hand corner is displayed. For more details on file formatting see the User Media section of this guide.

Channel 3 – offset +2: **SELECT** This channel selects the jpeg image or h264 video within the folder selected by Channel 2 (SOURCE). Images must be in jpeg format (non-progressive) and no larger than 1920x1080 in size. *ImageCue™* will scale images to the size of the currently selected resolution while maintaining aspect ratio. Videos must be in h264 raw format. Resolutions higher than 1920x1080 are not supported. *ImageCue™* will scale the video to fill the currently selected screen resolution without regards to aspect ratio. For more details on file formatting and content preparation see the User Media section of this guide.

Channel 4 – offset +3 / Channel 5 – offset +4: **TIME** These two channels are combined into a 16 bit value representing crossfade time in 1/10 second intervals. Channel 4 is the "coarse" value where each increment of 1 represents 25.6 seconds. Channel 5 is the "fine" value where each increment of 1 represents 1/10 of a second. On consoles using

the *ImageCue™* fixture profile these channels are combined into the TIME parameter and should appear as a single control to the end user. For more details see the Advanced Topics section of this guide.

Channel 6 – offset +5: **RED** This channel controls the additive color mixing saturation level of the color red. A value of 0 has no saturation (no color added) and a level of 255 (100%) adds full saturation of red to the color mix. Channel 9 (MASTER SATURATION) controls the saturation level for all three colors, red, green, and blue as mixed. Channel 9 must be at a value greater than 0 for any color to be seen.

Channel 7 – offset +6: **GREEN** This channel controls the additive color mixing saturation level of the color green. A value of 0 has no saturation (no color added) and a level of 255 (100%) adds full saturation of green to the color mix. Channel 9 (MASTER SATURATION) controls the saturation level for all three colors, red, green, and blue as mixed. Channel 9 must be at a value greater than 0 for any color to be seen.

Channel 8 – offset +7: **BLUE** This channel controls the additive color mixing saturation level of the color blue. A value of 0 has no saturation (no color added) and a level of 255 (100%) adds full saturation of blue to the color mix. Channel 9 (MASTER SATURATION) controls the saturation level for all three colors, red, green, and blue as mixed. Channel 9 must be at a value greater than 0 for any color to be seen.

Channel 9 – offset +8: **MASTER SATURATION** As described above, this channel controls the overall saturation of the red, green, blue color mix. A value of 0 has no saturation and no color will be visible as the RGB color mixing layer will be transparent. A value of 255 (100%) is full saturation and no images will be visible if the RGB color mixing layer is in front of the image layer as the RGB color mixing layer will be completely opaque. For more information about RGB color mixing and layers see the Advanced section of this guide.

Channel 10 – offset +9: **MODE CONTROL** This channel allows the user to override certain default modes of operation for *ImageCue™*. **Note: The MODE CONTROL channel is also used to display the current version number of the operating software when set to a value of 255 (100%). If the channel is set to a value of 255 (100%), even for a single DMX512 frame, *ImageCue™* latches the setting and outputs the version number to the display. To return to normal operation, select a new image on the SELECT channel (Channel 3) after making sure that the MODE CONTROL is at a value other than 255 (100%). The new SELECT value must be different from the one selected prior to the version number being displayed.** When the MODE CONTROL channel is set to a value of 0, *ImageCue™* operates in its default mode: Video files loop on playback; Color layer is behind the image/video layer. The following values will change these operating modes: 64 (25%) will move the color layer in front of the image/video layer; 128 (50%) will cause the video to stop and go to open frame at the end of the file; and 192 (75%) will move the color to the front AND stop the video at the end of the file. As previously mentioned, a value of 255 (100%) will display the current software version running in *ImageCue™*.   For more

information about the operating modes and version number display see the Advanced section of this guide.

Channel 11 – offset +10: **OVERLAY SELECT** This channel is used to select an overlay PNG file with transparency to be displayed in front of the image/video layer and color layer. A value of 0 selects an "open" overlay – it is completely transparent. The source of the overlay depends on the value set on OVERLAY SELECT. The values 001 through 200 are for user files located on the external USB Flash Drive. These files are in a separate directory on the drive labeled "png". If the file or the USB Flash Drive is not present, a blank overlay with the words "no overlay found" in the lower left-hand corner is displayed. The values 201 through 255 select overlays from the stock content stored internally in *ImageCue*™. The visibility of the overlay is dependent on the setting of the OVERLAY OPACITY (channel 12) channel.   Overlays will not be visible unless this channel is set to a value greater than 0. Please see the User Media section of this guide for more information about user supplied overlay files.

Channel 12 – offset +11: **OVERLAY OPACITY** This channel controls the visibility of the overlay selected by the OVERLAY SELECT channel. A value of 0 results in the overlay being completely transparent – not visible. A value of 255 (100%) displays the overlay with 100% opacity, meaning that any areas of the overlay PNG file that are not transparent in the file will not be visible under the overlay. Overlays may be faded in and out by using the OVERLAY OPACITY channel. For more information about overlays see the User Media section of this guide.

Section 2: Setup

In this Section:

✓ Setting the DMX512 starting address
✓ Selecting the DMX personality
✓ Setting the LCD backlight and LEDs on/off
✓ Changing the HDMI output resolution
✓ Selecting DMX or STANDALONE mode (New!!)
✓ Getting *ImageCue™* device information
✓ Other LCD display messages
✓ Attaching the Mounting Plate and DVI Adapter Bracket

Setting the DMX512 Start Address

The DMX512 start address may be set using *ImageCue™'s* built-in menu system or RDM (Remote Device Management). If you are not familiar with RDM please see the Advanced Topics section of this User Guide.

The *ImageCue™* unit is shipped from the factory with the DMX512 start address set for Channel 1. In most real-world applications it will be necessary to change the start address. Here are the steps used to change the start address using the menu system:

1) Power-up *ImageCue™*. It does not matter whether or not you have an active DMX512 signal present.
2) Press straight down (SELECT) and hold the NAVIGATION SWITCH until the LCD DISPLAY reads "SETUP MENU" / "DMX SETUP".
3) Release the NAVIGATION SWITCH and then press straight down again (SELECT). The display will now read "DMX SETUP" / "Start Chan   ###", where ### is the current starting channel number.
4) Push the NAVIGATION SWITCH - RIGHT to increase the value, and LEFT to decrease the value. The value will roll-over from 501 to 1 and 1 to 501. There is no 0 value as this is not a valid start address. Holding the switch RIGHT or LEFT for more than 1 second will rapidly increase or decrease the value.
5) When the desired DMX512 start address is displayed press the NAVIGATION SWITCH - SELECT to select the value.
6) The display will return to "SETUP MENU" / "DMX SETUP".
7) Push the NAVIGATION SWITCH - DOWN three (3) times until the display reads "SETUP MENU" / "EXIT". Press SELECT to exit the menu system.

Selecting the DMX Personality

The DMX512 Personality may be set using *ImageCue™'s* built-in menu system or RDM (Remote Device Management). If you are not familiar with RDM please see the Advanced Topics section of this User Guide.

The *ImageCue™* unit is shipped from the factory with the DMX512 Personality set to Personality 1. **The initial release of *ImageCue™* has only one DMX Personality. All four Personality settings will select the same Personality**. If there is a future software release that supports more Personality settings, here are the steps used to change the DMX Personality using the menu system:

1) Power-up *ImageCue™*. It does not matter whether or not you have an active DMX512 signal present.
2) Press straight down (SELECT) and hold the NAVIGATION SWITCH until the LCD DISPLAY reads "SETUP MENU" / "DMX SETUP".
3) Release the NAVIGATION SWITCH and then press straight down again (SELECT). The display will now read "DMX SETUP" / "Start Chan   ###".
4) Release the NAVIGATION SWITCH and then move the switch DOWN until the display reads "DMX SETUP" / "Personality   #", where # is the current DMX personality.
5) Move the NAVIGATION SWITCH - RIGHT to increase the value, and LEFT to decrease the value. The value will roll-over from 4 to 1 and 1 to 4. There is no 0 value as this is not a valid Personality. You must RELEASE the switch for each increment or decrement of the value.
6) When the desired Personality is displayed press the NAVIGATION SWITCH - SELECT to select the value.
7) The display will return to "SETUP MENU" / "DMX SETUP".
8) Push the NAVIGATION SWITCH - DOWN three (3) times until the display reads "SETUP MENU" / "EXIT".
9) Press the NAVIGATION SWITCH – SELECT to exit the menu system and return to normal operation of *ImageCue™*.

Setting the LCD display backlight level and disabling the LEDs

The LCD backlight level may be set using *ImageCue™'s* built-in menu system or RDM (Remote Device Management). If you are not familiar with RDM please see the Advanced Topics section of this User Guide.

The *ImageCue™* unit is shipped from the factory with the LCD backlight intensity set to a level of 75% and the LED's on. Here are the steps used to change the settings using the menu system:

1) Power-up *ImageCue™*. It does not matter whether or not you have an active DMX512 signal present.

2) Press straight down (SELECT) and hold the NAVIGATION SWITCH until the LCD DISPLAY reads "SETUP MENU" / "DMX SETUP".

3) Release the NAVIGATION SWITCH and then move the switch DOWN until the display reads "SETUP MENU" / "DISPLAY".

4) Release the NAVIGATION SWITCH and then press straight down (SELECT). The display will now read "DISPLAY" / "Backlight   ##", where ## is the current backlight intensity level.

5) Move the NAVIGATION SWITCH - RIGHT to increase the value, and LEFT to decrease the value. The value will roll-over from 100 to 0 and 0 to 100. 0 will be no backlight and 100 is full backlight. Holding the switch RIGHT or LEFT for more than one second will rapidly increase or decrease the value. The backlight will change intensity while you increment or decrement the value.

6) Press the NAVIGATION SWITCH – SELECT when the desired intensity is displayed. The display will return to "SETUP MENU" / "DISPLAY". If you do not want to change the LED mode just use move the NAVIGATION SWITCH – DOWN until the display reads "SETUP MENU" / "EXIT" and then SELECT.

7) To change the LED mode, while the display reads "SETUP MENU" / "DISPLAY", press the NAVIGATION SWITCH to SELECT, then use DOWN to arrive at the "DISPLAY" / "Leds   (on/off)" display.

8) The NAVIGATION SWITCH – LEFT and RIGHT actions will toggle the mode between "on" and "off". Note: The LED's will not change mode until AFTER the menu system is exited. The "Pi" LED will not change mode until a valid DMX512 frame is received.

9) Press the NAVIGATION SWITCH to SELECT the desired Led mode.

10) The menu will return to "SETUP MENU" / "DISPLAY". Use the DOWN action to move to "SETUP MENU" / "EXIT" and use SELECT to exit the menu system. After a brief moment the LEDs will change to the selected mode.

Changing the HDMI/DVI output resolution

The *ImageCue*™ is shipped from the factory with the output resolution set at 1920x1080p 30Hz. This mode will work with most HDTV supported displays. Many displays designed for use as computer monitors do not fully support the HDTV standard and will only accept video with a vertical sync rate of 50 or 60 Hz. The High Definition output resolution for these displays from *ImageCue*™ will be the 1280x720p 60Hz setting. Should it be necessary for you to change the output resolution of the *ImageCue*™ unit it can be done using the menu system as follows:

1) Power-up *ImageCue*™. It does not matter whether or not you have an active DMX512 signal present.

2) Press straight down (SELECT) and hold the NAVIGATION SWITCH until the LCD DISPLAY reads "SETUP MENU" / "DMX SETUP".

3) Release the NAVIGATION SWITCH and then move the switch DOWN until the display reads "SETUP MENU" / "DISPLAY".

4) Release the NAVIGATION SWITCH and then press straight down (SELECT). The display will now read "DISPLAY" / "Backlight   ##".
5) Move the NAVIGATION SWITCH – DOWN until "HDMI RESOLUTION" and the current resolution are displayed.
6) Move the NAVIGATION SWITCH - LEFT and RIGHT until the new desired resolution is displayed. The possible settings are: "1920x1080p 30Hz", "1280x720p 60Hz", "1280x800p 60Hz", "12080x1024p 60Hz", "800x600p 60Hz", "OPT 1", "OPT 2", and "1920x1080p 24Hz" (formerly "OPT 3").
7) With the desired resolution displayed, press SELECT. The display will return to "SETUP MENU" / "DISPLAY".
8) Move the NAVIGATION SWITCH – DOWN until "SETUP MENU" / "EXIT" is displayed. SELECT to exit the menu system. **The new resolution setting will not take effect until you cycle the power on *ImageCue*™.** Remove power from the unit, wait 5-10 seconds and re-apply power. *ImageCue*™ will take 3-5 seconds longer to boot, but the new output resolution will be as set.

Selecting DMX or STANDALONE mode

ImageCue™ units with firmware version 1.0.1.3 and higher include a Playback mode. The playback mode may be either "DMX" or "Standalone". In standalone mode ImageCue™ does not require a DMX512 signal and will begin to playback a pre-programmed "scene" when power is applied. More details about standalone mode are provided in the Advanced Topics section of this guide.

The steps to change the Playback mode are as follows:

1) Power-up *ImageCue*™. It does not matter whether or not you have an active DMX512 signal present.
2) Press straight down (SELECT) and hold the NAVIGATION SWITCH until the LCD DISPLAY reads "SETUP MENU" / "DMX SETUP".
3) Release the NAVIGATION SWITCH and then move the switch DOWN until the display reads "SETUP MENU" / "PLAYBACK".
4) Release the NAVIGATION SWITCH and then press straight down (SELECT). The display will now read "PLAYBACK" / "Mode: xxxxxxxxx".
5) Move the NAVIGATION SWITCH - LEFT or RIGHT and the display will toggle between "DMX" and "STANDALONE".
6) With the desired mode displayed, press SELECT. The display will return to "SETUP MENU" / "PLAYBACK".
7) Use the NAVIGATION SWITCH – DOWN until "EXIT" is displayed and SELECT.

Getting information about your ImageCue™ device

The *ImageCue*™ menu system can provide the following information about the unit: Serial Number, EEPROM Serial Number, Raspberry Pi Serial Number, and Firmware Version. The Serial Number is a unique number for all *ImageCue*™ model 1.1 units. The

EEPROM Serial Number indicates a manufacturing batch and is not unique. The Raspberry Pi Serial Number is unique, and is associated with the *ImageCue*™ Serial Number at manufacture. The Firmware Version relates only to the firmware within the *ImageCue*™ circuit board. It has no relationship to the software running in the Raspberry Pi. The steps to retrieve this information are as follows:

1) Power-up *ImageCue*™. It does not matter whether or not you have an active DMX512 signal present.
2) Press straight down (SELECT) and hold the NAVIGATION SWITCH until the LCD DISPLAY reads "SETUP MENU" / "DMX SETUP".
3) Release the NAVIGATION SWITCH and then move the switch DOWN until the display reads "SETUP MENU" / "INFO".
4) Release the NAVIGATION SWITCH and then press straight down (SELECT). The display will now read "Serial Number:" / "9311######", where the # represents the unique portion of the serial number.
5) Use DOWN and UP movements on the NAVIGATION SWITCH to scroll through the information displays.
6) To exit, use SELECT when the display reads "INFO" / "Done", then DOWN until the display reads "SETUP MENU" / "EXIT". SELECT will exit the menu system.

Other LCD Display Messages

The LCD Display will display messages to help the user diagnose problems and current operating status. Not including the menu system, here are the possible messages and their meaning:

"ImageCue" / "* * * * * * * *" -- This message indicates normal operation after a successful boot of the Raspberry Pi in DMX mode.

"ImageCue" / "** STANDALONE **" -- This message indicates normal operation after a successful boot of the Raspberry Pi in Standalone mode.

"RESTORING" / "PARAMETERS" -- This is the first message during the boot process. It indicates that *ImageCue*™ is reading the stored setup information from the EEPROM.

"V1.0.1.x" / "Waiting for Pi!" -- This is the second message during the boot process. The top line provides the current FIRMWARE version and indicates that the *ImageCue*™ circuit board is waiting for the Raspberry Pi to boot up and start the application.

"DMX Reception" / "Lost" -- If the DMX512 data stream is lost for a period over 1 second, this message is displayed. It is possible for this message to be displayed during RDM exchanges.

"DMX FRAME ERROR" / "Frame too short" -- This indicates that the DMX512 data frame received by *ImageCue*™ was too short and did not contain any or all of the data required

for the current DMX512 start address. Some controllers have a setting for the length of the DMX512 data stream they send. This is a controller issue, not an *ImageCue*™ issue.

"IMAGECUE" / "Base channel ###" -- This is a message you should only see during some RDM communication. It is not displayed during normal operation.

"RDM Message" / "Received" -- This message will be displayed momentarily during RDM communication. It will be cleared when a normal DMX512 data frame is received.

"RDM FOUND ME" / "* * * * * * * *" -- This is displayed when RDM has selected the unit and requested that it show itself. If the unit is connected to a display it will also be showing a white screen, overriding the previous data.

The following messages indicate a serious error condition that will require the *ImageCue*™ unit to be returned to your dealer for repair:

"Fetching Pi" / "Serial Number" and/or "FETCH" / "FAILED".

Attaching the Mounting Plate and DVI Adapter Bracket
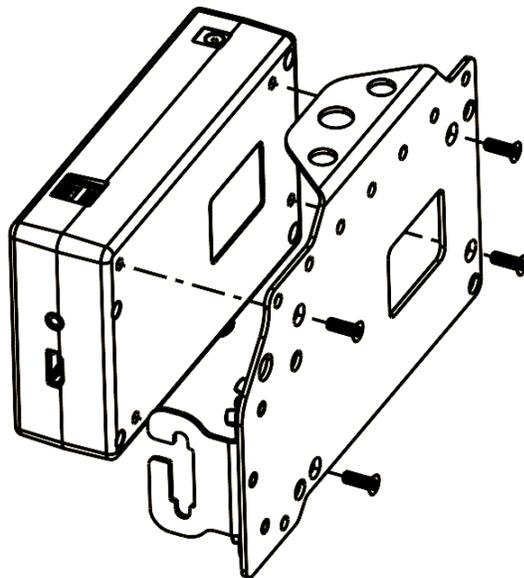
The Mounting Plate and DVI Adapter Bracket assembly kit is supplied with every *ImageCue*™ unit. The kit includes the mounting plate with the adapter support bracket already attached; an HDMI male to DVI female adapter; and 4 – M4x12 flat head machine screws.

Before attaching the mounting plate assembly to *ImageCue*™ please note: If you intend to attach a hanging clamp to the plate using hardware longer than ¾" (18mm) you must put the longer hardware through the hole in the mounting plate BEFORE attaching the plate to the *ImageCue*™ unit.

The plate is attached to the *ImageCue*™ unit using the four supplied M4x12 flat head machine screws as shown in the drawing above. **These are METRIC screws. Use of non-metric screws will damage the internal threads of the *ImageCue*™ unit. Screws longer than 12 millimeters will damage the circuit boards inside the *ImageCue*™ unit.**

The DVI Adapter Bracket may also be used as a strain relief for HDMI cables inserted directly into the HDMI socket on *ImageCue*™. Loosen the two wingnuts enough to be able to slide the bracket under them (with the washers on the top side of the bracket). Insert your HDMI cable and slide the bracket towards the *ImageCue*™ unit to secure the cable. Tighten the wingnuts.

Note: The M4 Nut with nylon insert is not meant to be fully tightened. It is set at the factory to allow easy movement of the DVI Adapter Bracket but will prevent it from coming off of the Mounting Plate while the wingnuts are in place. The wingnuts must be removed in order to remove the DVI Adapter Bracket from the assembly. The nut does not need to be removed.

To install the HDMI to DVI adapter, slide the DVI Adapter Bracket away from the *ImageCue*™ unit and insert the adapter. Slide the Adapter Bracket back making sure that you capture the adapter fully in the bracket. You must loosen the wingnuts enough to allow the Adapter Bracket to slide underneath them, with the washers on the top side of the Adapter Bracket. Tighten the wingnuts securely.

The Mounting Plate can also be used to mount *ImageCue*™ directly to the rear of many flat panel displays. The mounting plate has several holes with dimensions that fit displays according to the VESA mounting standard. **Hardware for mounting the plate to your display is not included. You should only use hardware designed for your display to avoid damage to the display.**

The Mounting Plate has several holes that can and should be used with an approved safety cable to secure *ImageCue*™ when it is mounted.

Section 3: User Media

In this Section:

✓ Setting up the USB Flash Drive
✓ JPEG Images
✓ H264 Videos
✓ Using the *ImageCue*™ Utilities (New!!)
✓ PNG Overlays
✓ Copyrights

Setting up the USB Flash Drive

User content is stored on an external USB flash drive. The flash drive can be of any size large enough to hold the content. There is no limitation to the size of the drive (there are now 512GB and 1TB flash drives available). The flash drive must be formatted FAT32, which is the formatting normally found on the drives when purchased. *ImageCue*™ requires that user content be placed into a very specific file folder structure. A down-loadable zip file template with an empty folder structure is available on the *ImageCue*™ website: http://imagecue.lighting/support/downloads. Once you have downloaded the template zip file, unzip it to the root of your USB flash drive. All of the folders for *ImageCue*™ will be created on the drive. The "root" of the drive means that the file structure cannot be placed within a folder on the drive. Once you have completed the unzip process you should see a file structure like this:
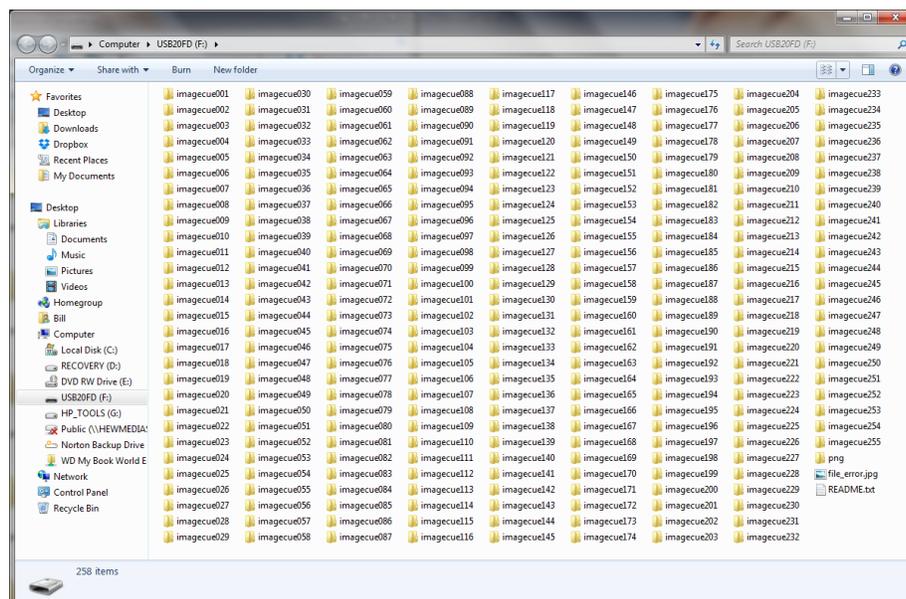
The images, videos, and overlays you want to use with *ImageCue™* will be placed inside these folders. The "README.txt" file can be opened by any text editor and has details about file naming requirements. It is alright to have other folders on the USB drive other than the *ImageCue™* structure as long as they do not have the same name. **NOTE: File names used by *ImageCue™* must not have any spaces in them. *ImageCue™* uses a Linux based operating system and it does not like spaces in file names. Files with spaces in the name will most likely NOT be found by *ImageCue™* and result in the "Media not found" message displayed. We suggest using the "_" (underscore) character in the place of any spaces in your file names.**

You are now ready to start putting your content on the flash drive. Images (jpeg files) and videos (h264 files) are put into the "imagecue###" folders depending on the SOURCE value you want to use for playback. Image files and video files may be intermixed within a folder. The only constraints being: 1) Every file within a folder must have a unique numeric 3 character prefix from 001 to 255; and 2) every file must have a suffix indicating the file type as either ".j", ".jpg", ".jpeg", ".J", ".JPG", ".JPEG" for image files, and ".h", ".h264", ".H", ".H264" for video files. Obviously, the actual file content must match the file type suffix. Overlay PNG files must be placed in the "png" folder and have a numeric prefix from 001 to 200. The overlay files must have a suffix of ".p", ".png", ".P", or ".PNG".

Occasionally, when swapping the USB flash drive from *ImageCue™* to a Windows PC you may get a warning window to scan the drive. You may choose to scan the drive for errors or skip the scan. This occurs because *ImageCue™* does not require you to take special steps to shut it down and the USB drive is not officially unmounted before a shutdown.

The USB drive should be installed in the *ImageCue™* USB port <u>BEFORE</u> powering up *ImageCue™*. If you have selected an image/video from the USB drive before you power up *ImageCue™* the boot sequence will take about 3 seconds longer in order to mount the drive completely and display the selected image/video. If you insert the USB drive into the *ImageCue™* USB port after power up, it may take up to 10 seconds for the drive to be recognized and mounted. If you have selected an image/video from the USB drive prior to it being recognized and mounted you may have to deselect that image and reselect it in order for it to appear. Removing and replacing the USB drive while *ImageCue™* is powered up is not recommended and may result in unpredictable behavior.

JPEG Images

Still images used in *ImageCue™* must be in standard JPEG format. Progressive jpegs cannot be processed and may not be used. There is a free image viewing utility called Irfanview that can tell you if a jpeg is progressive or standard. Load the jpeg into Irfanview, and then select "Image" on the top menu, and then "Information" from the drop down menu. The window that opens has a line showing "Compression". If the jpeg is progressive it will be indicated on this line. Irfanview is also a utility that can be used

to batch resize jpegs. There are some applications available that can convert progressive jpegs to standard, including Imagemagick.

For best performance, jpegs used with *ImageCue™* should be in the same resolution as the output resolution of *ImageCue™*. Normally this is 1920 x 1080 pixels**. Jpegs should never be larger than 1920 x 1080 pixels.** Jpegs at a higher resolution than 1920 x 1080 pixels should be resized using a resizing utility such as Irfanview or Fotosizer before putting them on the USB flash drive. Both of these utilities allow for batch resizing of files.

Scaling and aspect ratio: *ImageCue™* resizes jpeg images up or down to fit the closest screen dimension while maintaining the aspect ratio of the original image. Some examples: If the *ImageCue™* resolution is set to 1920 x 1080 and the jpeg image is 1280 x 720, the image will be scaled up to 1920 x 1080. However, if the jpeg image is 720 x 720, the image will be scaled up to 1080 x 1080 and centered on the screen. On either side of the image the background (color layer if it is behind the image) will show through. Extreme scaling up of images will result in poor image quality and is not recommended. As a rule of thumb it is always better to match the current resolution or scale down rather than scale up. When scaling down, *ImageCue™* maintains the aspect ratio and scales to the closest full screen dimension.

H264 Videos

ImageCue™ only accepts video files in H264 RAW format. In nearly all cases it will be necessary to extract the H264 RAW video stream from a multimedia container file. **SIMPLY RENAMING THE CONTAINER FILE WITH THE FILE TYPE ".h264" WILL <u>NOT</u> WORK.** Video files that have not been created with the H264 codec will need to be transcoded to H264 before extraction.

Video resolution, bit rate, and frame rate: For optimal performance of *ImageCue™* there are some considerations that should be made in the selection and/or the creation of video content. As with jpegs, video content should be in the same resolution as the selected output resolution of *ImageCue™*. With 1920 x 1080 content *ImageCue™* is capable of decoding video smoothly with bit rates up to 40Mbps. We recommend bit rates in the range of 10Mbps to 30Mbps at 1920 x 1080 for best performance.   Video content that is highly compressed with extremely low bit rates may be slower to load and exit than content with less compression and higher bit rates. The frame rate (FPS) of content can also affect performance. *ImageCue™* will decode and play videos with frame rates from 24FPS up to 60FPS. For optimal performance the frame rate should be 30FPS.

Video scaling and aspect ratio: *ImageCue™* was designed and optimized for HD format video, 1920 x 1080 or 1280 x 720. Using content in these formats with a matching output resolution of *ImageCue™* will achieve the best performance. *ImageCue™* scales all video content up or down to fit the screen resolution being used while maintaining aspect ratio. Some examples: A source video with a resolution of 1280 x 1080 will stay

at 1280 x 1080 with transparent areas on either side if the output resolution is set for 1920 x 1080. A standard definition (SD) video with a resolution of 720 x 480 will be stretched equally in both directions to 1620 x 1080 if the output resolution is set for 1920 x 1080, again with transparent areas on either side. The video will fill the screen however it will lack the sharpness of a true 1920 x 1080 HD video. The resizing of video content by *ImageCue*™ is very processor intensive and should be avoided if at all possible to achieve the best performance.

Interlacing: *ImageCue*™ does not support interlaced video. The utility, VLC, can also determine if your video is interlaced. Many of the same tools used to re-encode video to H264 can also de-interlace video.

To make the process of transcoding and extraction of user video content easier, ImageCue™ has created our own utility programs. You can download a single zip file containing these utility programs from the ImageCue™ website: http://imagecue.lighting.

The ImageCue™ utilities are:

> ImageCueVideoInfo.exe – this utility examines your video file and lists useful information such as the codec used for encoding, resolution, frame rate, and bitrate.

> ImageCueH264Utility.exe – this utility will transcode and/or extract an H264 raw video stream from a single file into a file with all spaces replaced with the underscore character and the ".h264" suffix added.

> ImageCueBatchUtility.exe – this utility will transcode and/or extract the H264 raw video stream for all video files in a given directory. It will replace all space characters with the underscore character and add the ".h264" suffix.

Using the ImageCue Video Utilities

ImageCueVideoInfo.exe: This utility is designed to provide useful information about your video files that can guide you in the transcoding and extraction process. When the utility is started the following window will open:
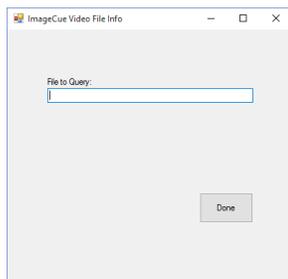
Click in the "File to Query" box and navigate to the desired file using the window that opens. As soon as you select the file it will be analyzed and an information window will open:
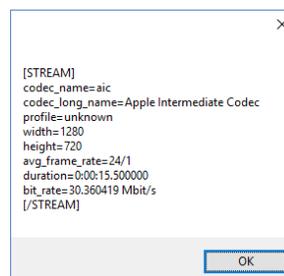
The top line describes the codec used to encode the video. If it does not say "h264" the video must be transcoded in order to be used. The example above shows that the codec used is "aic". The video must be transcoded to h264 in order to work with *ImageCue™*.
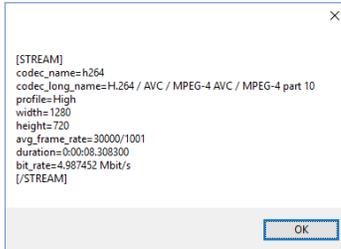
This example shows that the video has been encoded using the h264 codec. To determine whether or not we can simply extract the h264 stream we need to look at the bit_rate value. If this value is less than 5 Mbit/s, or greater than 40 Mbit/s the video will need to be transcoded. This example shows a bit rate just under 5Mbit/s. We would recommend transcoding this video to be safe.

Other information about the video is provided such as the width and height. For satisfactory performance of *ImageCue™* we strongly recommend that the size of your videos match the output resolution setting of *ImageCue™*. If you are having problems playing a video on *ImageCue™*, it is advisable to provide all of the information in the dialog box about the video to the support technician.

You may repeat the process for many files – just click "OK" in the information window and click in the "File to Query:" box to select the next file. When you are finished using the utility, click "Done" to exit.

ImageCueH264Utility.exe: This utility will process a single video file at a time. It can perform a simple extraction of the H264 video stream or a more complex transcoding followed by extraction. The utility will process many types of encoding schemes and container types and convert the video to be used with *ImageCue™*.

When the utility is started the following window will open:
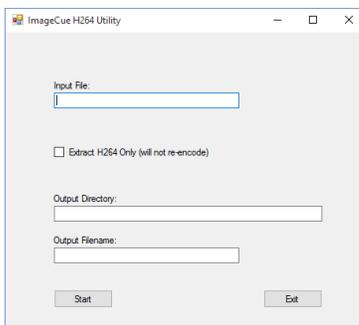
Click in the "Input File:" box and select the input video file.

Click and tick the "Extract H264 Only" box if desired.

Click in the "Output Directory:" box and select location.

The "Output Filename:" box will be a copy of the input file name with all spaces replaced with "_" and the file type ".h264". You may edit this file name if you wish.

Click on "Start" to begin the process. If the "Extract H264 Only" box is ticked the process can be extremely fast. You should only tick the box if you are absolutely sure your video is H264 encoded AND it meets the bit rate specification as previously described. When transcoding, you will see the processing happen within a new "command" window that is running the FFMPEG program:
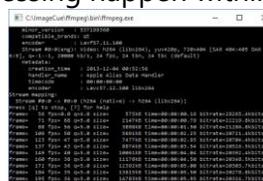
When processing is complete the following dialog window will appear:
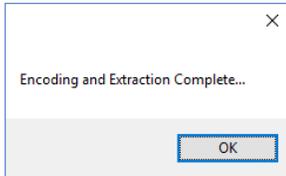
Click on "OK" to close the dialog and return to the utility. At this point you can either repeat the process with another video file or "Exit" to quit the utility.

ImageCueBatchUtility.exe: This utility is very similar in operation to the single file utility however it can process all of the files within a single folder without user intervention. If you have more than just a few videos to transcode or extract, this utility can be a big time-saver. When the utility is started the following window will open:
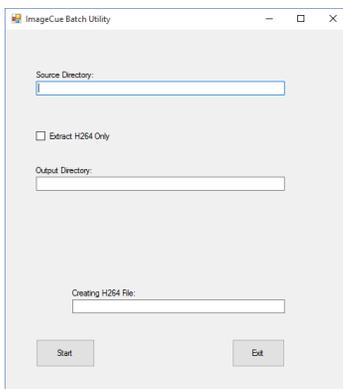
Click in the "Source Directory:" box and select the desired folder containing your video files. If ALL of the files are H264 encoded and within the required bit rate, tick the box to "Extract H264 Only". Otherwise leave it un-ticked.

Click in the "Output Directory:" box to navigate to the desired output folder. You can create a new folder if you wish.

Click on "Start" to begin the batch process.

As each file is processed the "Creating H264 File:" box will show the name of the output file being created. It will be the same as the source file with all space characters replaced with "_" and the ".h264" file type suffix. A "command" window running FFMPEG will open and close as each input file is processed. Depending on the number of files being processed, the "command" windows may start to obscure the utility window. When all of the files have been processed, the following dialog will be displayed:
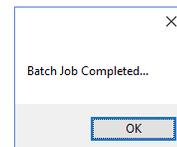
Click "OK" to close the dialog. You can run another batch by repeating the same steps, or quit the utility by clicking "Exit".

PNG Overlays

PNG images are similar to JPEGs except that they can contain a transparency attribute. This can be extremely useful as a way to overlay text, graphics, and effects on another image or video without having to modify the image or video content. *ImageCue*™ does not scale PNG images. In order to make the PNG Overlay process as fast and efficient as possible, *ImageCue*™ has some strict constraints on the attributes of PNG files for use as Overlays.

Resolution and size: The *ImageCue™* Overlay function supports only one image size and resolution depending on the current output resolution being used. If the output resolution is set to 1920 x 1080 the PNG Overlay must be 1920 x 1080 in size/resolution. For all other output resolutions the PNG Overlay must be 1280 x 720 in size/resolution. Images that do not conform to this specification will result in the "Overlay not found" message being displayed.

Color: *ImageCue™* only supports PNG overlay files that are 24 bit color and 24 bit color + transparency (32 bits total). 8 bit color and monochrome (Black & White) files will produce unpredictable results. Even if you are using black and white, save your PNG image as 24 bit color or 24 bit color + transparency. Technically, this is color types 2 or 6 with a bit depth of 8.

Interlacing: *ImageCue™* does not support interlaced PNG Overlay files.

Providing that your PNG file meets these constraints, all you need to do is rename the file with a 3 digit numeric prefix from 001 to 200, remove all spaces, and place it in the "png" folder of the USB flash drive. Selection of the PNG Overlay is through the OVERLAY SELECT parameter (channel 11). The OVERLAY OPACITY parameter (channel 12) controls the visibility of the Overlay. The Overlay will not be visible if the OVERLAY OPACITY value is 0 or very low.

Copyrights

It is the end user's responsibility to observe all copyrights for any and all material they use in conjunction with *ImageCue™*. *ImageCue™* accepts no liability for the infringement of third party copyrights by end users of *ImageCue™*.

Section 4: SD Card

In this Section:

- ✓ About the SD Card
- ✓ Backing up the SD Card
- ✓ Downloading an *ImageCue*™ SD Card Image
- ✓ Restoring a backup or downloaded image to a SD Card
- ✓ Updating *ImageCue*™ Software

About the SD Card

ImageCue™ uses a Raspberry Pi 2 as its video processing engine. The custom Linux kernel (Operating System), the *ImageCue*™ program, and the stock media library are stored on a 16GB microSD card. The SD card has two partitions: "BOOT" and "rootfs". The "BOOT" partition is formatted as FAT32 and will be visible on Windows and Mac. The "rootfs" partition is formatted as Linux EXT4 and is not visible on Windows and Mac without special software. The "BOOT" partition contains the files required for the Raspberry Pi to start up. It also contains the *ImageCue*™ program as a binary file. **The *ImageCue*™ binary file will not work without the *ImageCue*™ custom Linux kernel and specific hardware. Use of the binary file in other systems will MOST LIKELY result in damage to the hardware. *ImageCue*™ accepts no liability for the use of the binary file or kernel in non-*ImageCue*™ systems.**

To remove the hole plug and gain access to the microSD card, gently pry it up using a fingernail around the edges until it pops out. The microSD card has a push-in, push-to-release mechanism to lock it into place. When replacing the SD card it is a good idea to push it in /out a couple of times just to make sure it is properly seated. When replacing the rubber hole plug you must use care to ensure that you do not release the SD card. Gently work the plug into the hole using pressure along the circumference of the hole plug – not by pressing in the center.

SD Cards for use with *ImageCue*™ must be at least 16GB in size. A larger capacity card does not gain you anything as the user does not have any access to the storage on the SD Card. The SD Card must be Class 10 or better (48MB/second). *ImageCue*™ has tested and recommends the Samsung EVO series and the SanDisk Ultra or Pixtor series microSD cards.

Backing up the SD Card

We strongly suggest that you create a backup of the *ImageCue*™ SD card. You can also purchase *ImageCue*™ SD cards for use as a backup. Contact your dealer for more information.

The SD Card cannot be backed up by doing a file copy process. An "image" of the entire card must be created. The image will contain both partitions and all data needed by *ImageCue*™. There are a few free programs available that can save SD card images. We recommend HDD Raw Copy Tool. A link to download this application can be found on the *ImageCue*™ website. Once you have successfully downloaded HDD Raw Copy Tool here are the steps to make a backup copy of your *ImageCue*™ microSD card:

1) Put the *ImageCue*™ microSD card into a full size SD card adapter. SD card adapters are available from most retailers that sell SD cards.
2) Insert the adapter with the microSD card into the SD card slot on your computer or a SD Card to USB adapter.
3) Wait for the SD card to be recognized. If you receive a message to scan the card for errors, choose the "skip" option.
4) Locate the SD Card using Windows Explorer or other file manager. It will show up as "SD" or "BOOT". Note the drive letter that has been assigned.
5) Start HDD Raw Copy Tool.
6) A window similar to this will open:
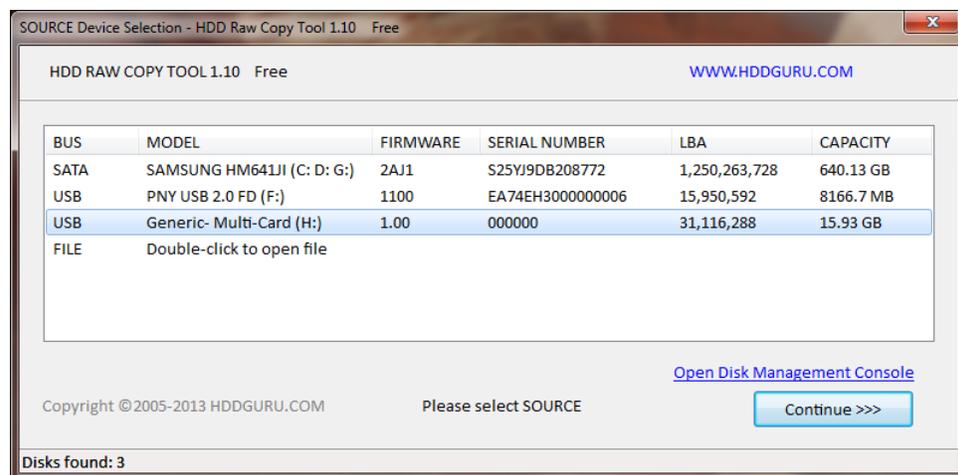
7) Select the SD Card (in this case H:) as the SOURCE. Make sure you are selecting the SD Card!! The computer's hard drive is also listed, and in this instance, so is a USB flash drive. The *ImageCue*™ SD Card will have a capacity of 15 to 16 GB.
8) Click "Continue >>>>".
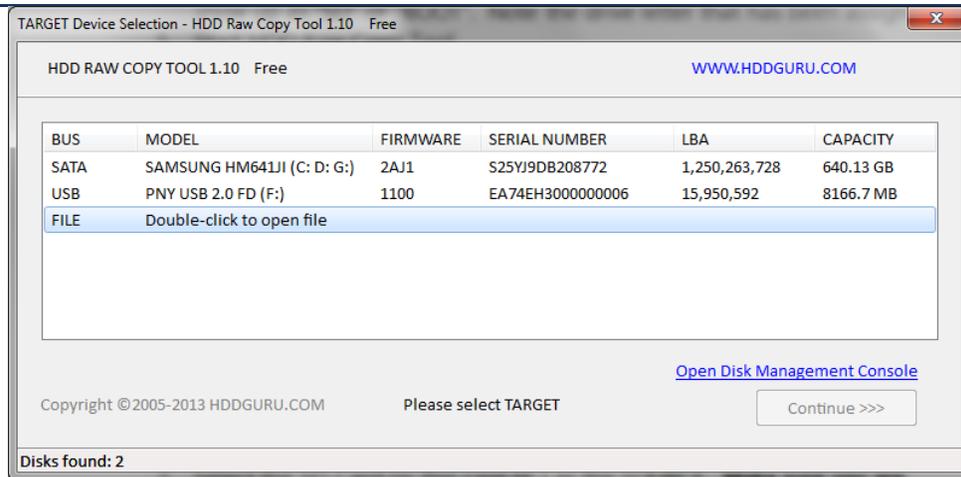
9) Double-click on the line "Double-click to open file".
10) Browse to the desired destination directory and name the file (leave the extension set as ".img").
11) Click "Continue >>>>".
12) Verify that the SOURCE is the SD Card and the TARGET is your destination file.
13) Click "START".   A progress bar and data will be shown. The process will take approximately 15 to 30 minutes to complete depending on your computer.
14) When the process is complete the screen will look like:
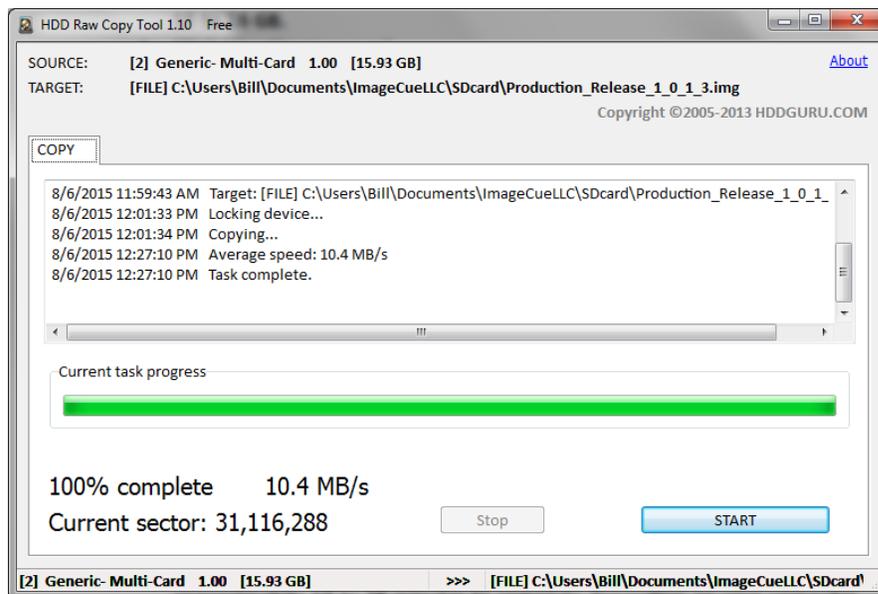
15) IMPORTANT: Do NOT click "START" again when the process is 100% complete!
16) Quit HDD Raw Copy Tool by clicking on the red X "Close" square.
17) Verify that the file has been written to the desired location. It will have the suffix ".img". Your operating system may associate this file type with a zip file utility. The file cannot be opened with a zip utility. See the instructions below for restoring the image file back to your SD Card.

Downloading an *ImageCue*™ SD Card Image

For security purposes, downloading of the *ImageCue*™ SD Card image is limited to owners of *ImageCue*™ units. You must supply the serial number and linked Raspberry Pi serial number (See Section 2 – Setup) in order to download the SD Card image. Please contact your distributor's technical support services department for more information.

Restoring a Backup or Downloaded Image to a SD Card

In the unlikely event that your *ImageCue*™ SD Card gets corrupted or damaged you can restore your backup image (or an image obtained from *ImageCue*™ or your distributor) by using the HDD Raw Copy Tool and following these instructions:

1) Put the *ImageCue*™ microSD card into a full size SD card adapter. SD card adapters are available from most retailers that sell SD cards.
2) Insert the adapter with the microSD card into the SD card slot on your computer or a SD Card to USB adapter.
3) Wait for the SD card to be recognized. If you receive a message to scan the card for errors, choose the "skip" option.
4) Locate the SD Card using Windows Explorer or other file manager. It will show up as "SD" or "BOOT". Note the drive letter that has been assigned.
5) Start HDD Raw Copy Tool.
6) A window similar to this will open:
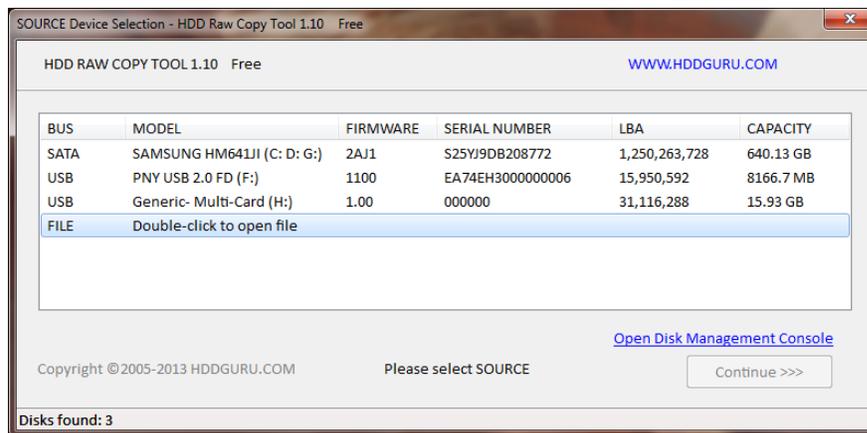
7) Double-click on the line "Double-click to open file".
8) Browse to the location of the image file (.img) and click "Open".
9) The file you selected will be displayed next to "FILE". This is your SOURCE. Click "Continue >>>".
10) A window similar to this will open:
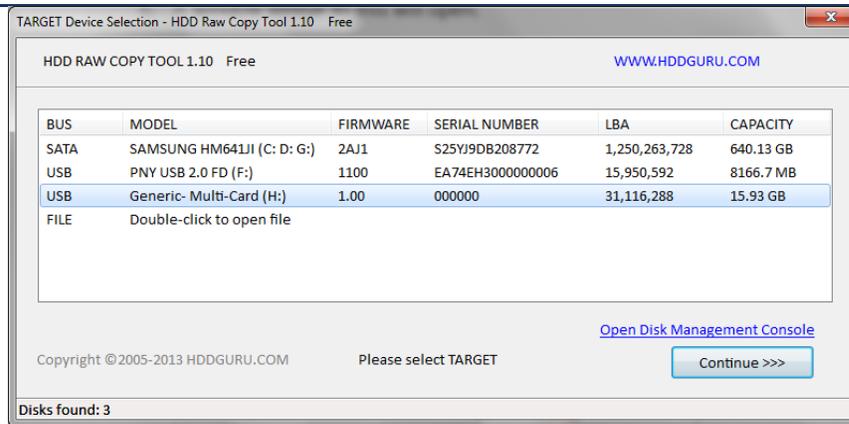
11) Select the SD Card as the TARGET. WARNING!!! The hard disk drive of your computer will be listed here. Selecting it will result in the hard disk being over-written and all of your data including the operating system will be GONE.
12) Making absolutely sure that you have selected the SD Card as the TARGET, click on "Continue >>>".
13) The HDD Raw Copy Tool will give you one more warning that the TARGET device will be IRREVERSIBLY OVERWRITTEN. Once more, verify that the SOURCE and TARGET are correct at the top of the window. Click "START" to begin the copy process. You will get yet another warning to make sure you really want to copy to the TARGET device. If you are sure, click "Yes". The process will take between 15 and 30 minutes depending on your computer.
14) When the process is complete the screen will look like:
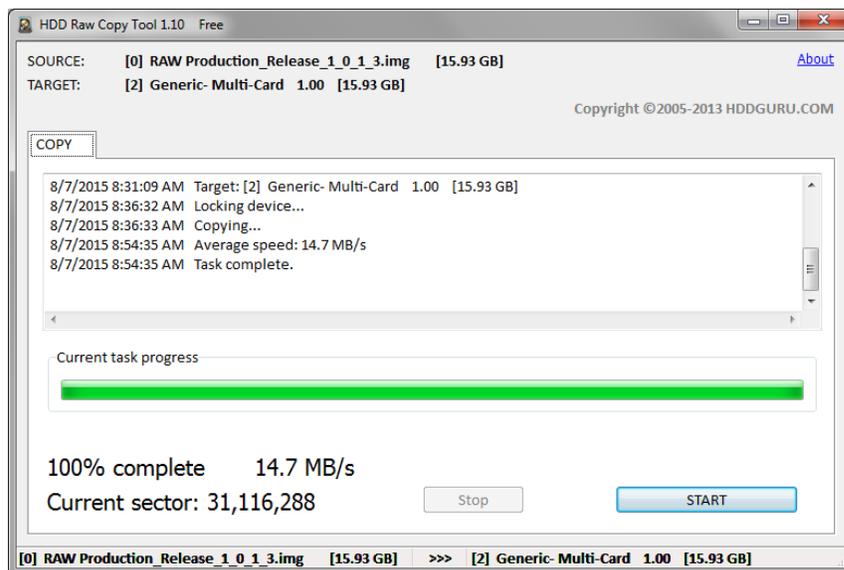
15) IMPORTANT: Do NOT click "START" again when the process is 100% complete!
16) Quit HDD Raw Copy Tool by clicking on the red X "Close" square.
17) You may now "eject" the SD Card and put it into your *ImageCue*™ unit.

Updating *ImageCue™* Software

From time to time *ImageCue™* may release software updates to provide additional features and/or to fix software bugs. The most current software release will always be available on the *ImageCue™* website, or from your distributor. To update the software on your SD Card (this must be a working *ImageCue™* SD Card) please follow these steps:

1) Download the software update zip file to the desktop of your computer.
2) Put the *ImageCue™* microSD card into a full size SD card adapter. SD card adapters are available from most retailers that sell SD cards.
3) Insert the adapter with the microSD card into the SD card slot on your computer or a SD Card to USB adapter.
4) Wait for the SD card to be recognized. If you receive a message to scan the card for errors, choose the "skip" option.
5) Locate the SD Card using Windows Explorer or other file manager. It will show up as "SD" or "BOOT". Note the drive letter that has been assigned.
6) Open the zip file and select the option to "Unzip entire file".
7) Select "Unzip to a selected folder"
8) Choose "BOOT" (the SD Card) as the selected folder (drive).
9) Unzip the file.
10) You will receive a warning about files being overwritten. Click on "Yes to All".
11) Close the zip utility and "eject" the SD Card. Your software is updated.

Section 5: Advanced Topics

In this Section:

- ✔ Controlling color and layers
- ✔ Using TIME for crossfades
- ✔ Displaying the current software version
- ✔ Using "Standalone" Mode (new!!)
- ✔ RDM support

Controlling Color and Layers

When we speak about layers in *ImageCue™* we are referring to the visual components that can be combined to create a final output image. This differs from the definition of a layer in most media servers.
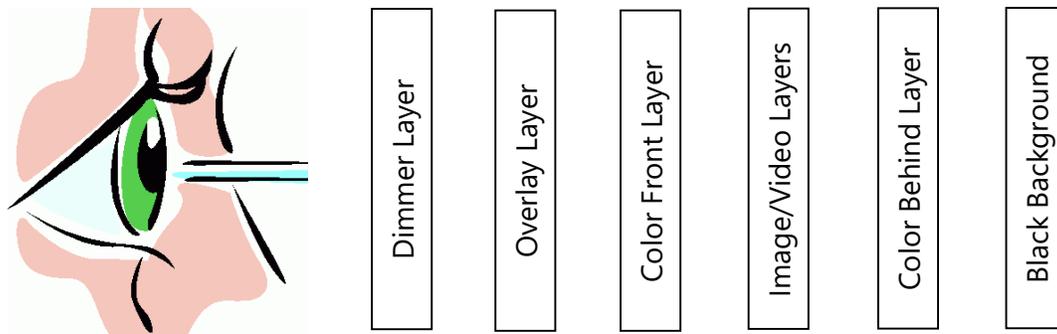
The above illustration shows where each layer is in relationship to the viewer and each other. The outermost layer is the Dimmer which is basically a full screen black image that is opaque when the DIMMER (channel 1) value is 0 (blackout) and completely transparent when its value is 255 (100%). The DIMMER does not affect any of the layers below it. If a video or color effect sequence is running it will continue to do so behind the DIMMER layer if it dimmed or blacked out. The DIMMER response time is very fast and can be used for stroboscopic effects limited by the DMX512 frame and video refresh times.

The next layer is the Overlay (PNG file) Layer. The OVERLAY OPACITY parameter (channel 12) controls the degree of visibility of the Overlay. A value of 0 is transparent, as if the layer wasn't there at all. A value of 255 (100%) is completely opaque and blocks

the visibility of all the layers below it except in the areas where the PNG image is transparent. The OVERLAY OPACITY response time is very fast and can be used for stroboscopic effects limited by the DMX512 frame and video refresh times.

Depending on the value set on the MODE CONTROL (channel 10) the RGB color mixing layer will be in FRONT or BEHIND the Image/Video layers. If the MODE CONTROL has a setting of 64 (25%) or 192 (75%) the RGB color mixing layer will be in FRONT of the Image/Video layers. With the color mixing layer in FRONT, the MASTER SATURATION (channel 9) parameter takes on more of an opacity control characteristic. With the MASTER SATURATION control set at a value of 0 the RGB mixing layer is completely transparent and any image or video selected will be completely visible. As the value of MASTER SATURATION is increased, any image or video will begin to be "tinted" with the color mixed with the Red, Green, and Blue color channels (channels 6, 7, 8). If all the color mixing channels are at 0, the resulting color is black. If all of the color mixing channels are at 255 (100%) the resulting color is white. When the MASTER SATURATION value reaches 255 (100%) the Color Layer is completely opaque and nothing behind it will be visible. However, the Overlay Layer is in front of the Color Layer and it will be visible if the OVERLAY OPACITY has a high enough value. The MASTER SATURATION response time is very fast and can be used for stroboscopic effects limited by the DMX512 frame and video refresh times.

The image (JPEG) and video (H264) layers are next. The crossfading of images and crossfading of images to and from videos is accomplished by putting them on different layers and changing the opacity of the layers. This is done internally by *ImageCue™* and the user has no direct control over the layering or opacity other than through the TIME parameter. Using the TIME parameter is explained further in the next segment.

The default position of the RGB color mixing layer is BEHIND the image/video layers. Unless the MODE CONTROL parameter is set to a value of 64 (25%) or 192 (75%) this is the location of the color mix layer. If the value of the MASTER SATURATION is high enough to see the color, it becomes the background visible when there is no image or video selected (SELECT @ 0) or when an image is smaller in one dimension than the full screen resolution. Because the image/video layer is opaque, full size images and all videos will obscure the color mixing layer when it is in the BEHIND layer.

Using TIME for Crossfades

The TIME parameter (channels 4 & 5) is a 16 bit value representing time as the number of 1/10 second intervals. Many consoles will convert the value directly into seconds and tenths of seconds. On more basic consoles you may have to use channel 4 as a "coarse" setting where a value of 1 equals 25.6 seconds, and channel 5 as a "fine" setting where a value of 1 equals 0.1 second. The maximum TIME setting is (255 x 25.6) + (255 x .1) = 6,553.5 seconds (109 minutes, 13.5 seconds).

TIME can be used to crossfade from no image to image, no image to video, image to image, image to video, video to image, image to no image, and video to no image. Video to video crossfades are not possible and the TIME parameter is ignored.

TIME may be updated during a crossfade at any time and *ImageCue*™ recalculates the transition time to complete based upon the new value from the original starting point. This can be useful to speed up, or slow down transitions. Changing the TIME value to 0 will result in the immediate completion of the crossfade.

If another image or video (in the case of image to video or video to image transitions) is selected before the TIME has completed, the first transition will halt where it is and the new image will commence a new crossfade using the TIME setting. In the case of image to image transitions it is possible to have up to 3 images displayed simultaneously if a crossfade transition is not allowed to complete and a second crossfade is started. If a third crossfade is started before the second crossfade is completed, the very first image will drop out to allow the new image crossfade to start. If several crossfades are started very quickly with a relatively slow TIME setting be aware that the output image will progressively transition to black as each image has less and less opacity as it begins to fade in and is halted by the next transition.

It is possible to set crossfade times at values less than ½ second, however the quality of the crossfade may be questionable especially with video content.

Displaying the Current Software Version

The LCD Display on *ImageCue*™ displays the FIRMWARE version currently running on the *ImageCue*™ circuit board. It does not display the SOFTWARE version. The current SOFTWARE version can be displayed as an image by setting the MODE CONTROL (channel 10) to a value of 255 (100%). **When MODE CONTROL is set to a value of 255 (100%), even for a single DMX512 frame, *ImageCue*™ latches the setting and outputs the version number to the display. To return to normal operation, select a new image on the SELECT channel (Channel 3) after making sure that the MODE CONTROL is at a value other than 255 (100%). The new SELECT value must be different from the one selected prior to the version number being displayed.**

The SOFTWARE version number can also be determined by viewing the file "VersionNumber.jpg" that is located on the microSD card in the "BOOT" partition.

Using "Standalone" Mode

Beginning with units having serial numbers greater than 11000160 the *ImageCue*™ firmware supports two playback modes: DMX and Standalone. The playback mode is selected using the Menu System. See Section 2 – Setup for more information on selecting the playback mode.

There are two ways to set up your *ImageCue*™ for Standalone operation:

1) "Capture" the current DMX values supplied to the *ImageCue*™ or;
2) "Edit" the values of the 12 control channels using the Menu System.

To set the Standalone scene using "Capture", use the following steps:

1) Make sure the Playback mode is "DMX".
2) Use your controller to set the *ImageCue*™ control channels as desired.
3) Press straight down (SELECT) and hold the NAVIGATION SWITCH until the LCD DISPLAY reads "SETUP MENU" / "DMX SETUP".
4) Release the NAVIGATION SWITCH and then move the switch DOWN until the display reads "SETUP MENU" / "PLAYBACK".
5) Release the NAVIGATION SWITCH and then press straight down (SELECT). The display will now read "PLAYBACK" / "Mode: xxxxxxxxx".
6) Move the switch DOWN until the display reads "PLAYBACK" / "CAPTURE DMX VALS".
7) Press straight down (SELECT). The DMX values are copied into the Standalone Mode scene. Note: Any changes made to the DMX values after entering the menu system will NOT be captured. The DMX values present when entering the menu system are the values recorded.
8) The menu will return to "SETUP MENU" / "PLAYBACK".
9) Press straight down (SELECT) again. The display will read "PLAYBACK" / "Mode: DMX".
10) Move the NAVIGATION SWITCH - LEFT or RIGHT and the display will toggle between "DMX" and "STANDALONE".
11) With "STANDALONE" mode displayed, press SELECT. The display will return to "SETUP MENU" / "PLAYBACK".
12) Use the NAVIGATION SWITCH – DOWN until "EXIT" is displayed and SELECT.

To set the Standalone scene using "Edit", use the following steps:

1) Press straight down (SELECT) and hold the NAVIGATION SWITCH until the LCD DISPLAY reads "SETUP MENU" / "DMX SETUP".
2) Release the NAVIGATION SWITCH and then move the switch DOWN until the display reads "SETUP MENU" / "PLAYBACK".
3) Release the NAVIGATION SWITCH and then press straight down (SELECT). The display will now read "PLAYBACK" / "Mode: xxxxxxxxx".
4) Move the switch DOWN until the display reads "PLAYBACK" / "EDIT VALUES".

5) Press straight down (SELECT) to enter the Edit Mode. The display will read "PLAYBACK" / "Dimmer   ###", with the stored value shown.
6) Move the NAVIGATION SWITCH – LEFT or RIGHT to change the value. Holding the switch for more than 1 second will rapidly increase or decrease the value. When the desired value is displayed, press straight down (SELECT) to store the value. Note: You must press SELECT in order to store the new value. If you move to another channel without pressing SELECT the value is NOT recorded.
7) After pressing "SELECT" the display will automatically move to the next channel and display the currently stored value. You can use UP and DOWN to move through channels that do not require changing.
8) Please note that some channel settings do not make sense in Standalone Mode. For example: Setting the Dimmer channel to zero.   Setting the Time channels will only affect the initial fade-in after power-up. Setting the Control channel for play-once will play a video after power-up, but then go to a blank screen until power is cycled.
9) When all of the channels are set to the desired values, use the NAVIGATION SWITCH – UP or DOWN until the display reads "PLAYBACK" / "Done". Press SELECT to exit Edit Mode.
10) The menu will return to "SETUP MENU" / "PLAYBACK".
11) Press straight down (SELECT) again. The display will read "PLAYBACK" / "Mode: DMX".
12) Move the NAVIGATION SWITCH - LEFT or RIGHT and the display will toggle between "DMX" and "STANDALONE".
13) With "STANDALONE" mode displayed, press SELECT. The display will return to "SETUP MENU" / "PLAYBACK".
14) Use the NAVIGATION SWITCH – DOWN until "EXIT" is displayed and SELECT.

RDM Support

ImageCue™ provides support for the RDM (Remote Device Management) protocol over DMX512 per ANSI Standard E1.20-2010. RDM can be a useful tool for setting the DMX512 start address, DMX Personality, and other functions remotely without using the menu system on *ImageCue™*. Many control consoles support RDM. There are several third party devices that can be connected to the DMX512 universe to provide RDM support.

The RDM unique ID for each *ImageCue™* unit is formed from the manufacturer's ID 0x0308 and the 8 digit unit serial number that starts with "11" converted into an 8 digit hexadecimal value. For example, if the serial number is "11000123", the RDM unique ID for the unit would be 0308:00A7093B. The RDM discovery process will find the unit without knowing this information, but you can speed discovery by providing RDM with the manufacturer ID prior to discovery.

The following RDM commands are supported by *ImageCue™*:

DISCOVERY
COMMS_STATUS   get only
SUPPORTED_PARAMETERS   get only
DEVICE_INFO   get only
DEVICE_MODEL_DESCRIPTION   get only
MANUFACTURER_LABEL   get only
SOFTWARE_VERSION_LABEL   get only – this is the FIRMWARE version
DMX_PERSONALITY   get and set
DMX_PERSONALITY_DESCRIPTION   get only
DMX_START_ADDRESS   get and set
DISPLAY_LEVEL   get and set
IDENTIFY_DEVICE   get and set
SERIAL_NUMBER   get only

The IDENTIFY_DEVICE command allows you to set a flag that will cause the selected *ImageCue™* unit to display "RDM FOUND ME" / "* * * * * * * * " on its LCD display, and if the unit is connected to an active HDMI display, it will go to an all-white image at full intensity. This can be useful to determine which *ImageCue™* is which in a system.

You can find out more about RDM at: http://www.rdmprotocol.org

Section 6: Legal

In this Section:

- ✓ End User Licensing Agreement
- ✓ Open Source Licensing Agreements
- ✓ Image, Video, and Overlay Library Copyright Notice

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3.6. You may not print the Software.

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4.2. The SOFTWARE is provided "as-is" and "as-available", without warranties of any kind.

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Article 6 Export Control

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In the event that you fail to comply with any of the terms and conditions contained herein, ImageCue shall have the right to immediately terminate this Agreement without any notification to you. Upon termination of this Agreement, you shall cease all use of the Software and destroy all copies, in whole and/or in part.

Article 8 Governing Law

This EULA is governed by the laws of California, United States of America, without references to the conflict of laws principles. Any and all disputes arising hereunder shall be resolved

exclusively by the courts of California, and you hereby consent to the exclusive jurisdiction of such court.

Article 9 Severability
If any provision of this EULA shall be held to be invalid, illegal or unenforceable, the validity, legality and enforceability of the remaining provisions hereof shall not in any way be affected or impaired.

The software pre-installed in the ImageCue Model 1.1 consists of multiple, independent software components. Each software component is copyrighted by ImageCue or a third party.

The ImageCue Model 1.1 uses software components that are distributed as freeware under a third-party end-user license agreement or copyright notice (hereinafter referred to as a "EULA"). Some EULAs require that the source code of the applicable component be disclosed as the condition for distributing the software component in executable format.

Open Source Licensing Agreements

The chart below lists all of the Programs and Libraries with Open Source Licensing Agreements used in *ImageCue*™:

PACKAGE	VERSION	LICENSE	SOURCE SITE
buildroot	2015.02-rc2-00013-g74aca65-dirty	GPLv2+	Not applicable
cmake	3.0.2	BSD-3c	http://www.cmake.org/files/v3.0
fakeroot	1.18.4	GPLv3+	http://snapshot.debian.org/archive/debian/20141023T043132Z/pool/main/f/fakeroot
kmod	19	LGPLv2.1+	https://www.kernel.org/pub/linux/utils/kernel/kmod
lzop	1.03	GPLv2+	http://www.lzop.org/download
pkgconf	0.8.9	pkgconf license	http://rabbit.dereferenced.org/~nenolod/distfiles
rpi-firmware	70b05985...a78dd	BSD-3c	https://github.com/raspberrypi/firmware/archive/70b05985cf2b2b893bc6e55b12794f32857a78dd
autoconf	2.69	GPLv3+ with exceptions	http://ftp.gnu.org/pub/gnu/autoconf
automake	1.15	GPLv2+	http://ftp.gnu.org/pub/gnu/automake
libtool	2.4.5	GPLv2+	http://ftp.gnu.org/pub/gnu/libtool
lzo	2.08	GPLv2+	http://www.oberhumer.com/opensource/lzo/download
busybox	1.23.1	GPLv2	http://www.busybox.net/downloads
libpng	1.6.16	libpng license	http://downloads.sourceforge.net/project/libpng/libpng16/1.6.16
rpi-firmware	70b05985...a78dd	BSD-3c	https://github.com/raspberrypi/firmware/archive/70b05985cf2b2b893bc6e55b12794f32857a78dd
rpi-userland	d4aa617d...52179	BSD-3c	https://github.com/raspberrypi/userland/archive/d4aa617de3b196399bb8e2ce32e181768cb52179
zlib	1.2.8	zlib license	http://downloads.sourceforge.net/project/libpng/zlib/1.2.8
linux	7d54f175...eed06	GPLv2	git://github.com/raspberrypi/linux.git

For more information about the Open Source programs used in *ImageCue*™ please send an email to: info@imagecue.lighting.

Image, Video, and Overlay Library Copyright Notice

All JPEG Images, H264 Videos, and PNG Overlays contained on the microSD Card used in the *ImageCue*™ are ©2015 Breckinridge Design LLC. This content is licensed to ImageCue LLC under an exclusive licensing agreement. The end user may use this content royalty free in conjunction with the *ImageCue*™ unit. It is strictly forbidden to copy and use this content in or with any other device without written permission from Breckinridge Design LLC.

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EC Declaration of Conformity

In accordance with EN ISO 17050-1:2004

We   ImageCue LLC (a California Limited Liability Company)

of   PO Box 3585, Running Springs, CA 92382 USA

in accordance with the following Directives:

2006/95/EC	**The Low Voltage Directive**
2004/108/EEC	**The Electromagnetic Compatibility Directive**

hereby declare that:

Equipment:	**ImageCue theatrical media server**
Model Number:	**ImageCue Model 1.1**

is in conformity with the applicable requirements of the following documents:

Ref. No.	Title
EN 55022	**Radio Disturbance Characteristics**
EN 55024	**Radio Disturbance Characteristics**
EN 61000-3-2	**Electromagnetic Compatibility (EMC)**
EN 61000-3-3	**Electromagnetic Compatibility (EMC)**
EN 60065	**Audio, video and similar electronic apparatus. Safety requirements.**

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications. The unit complies with all applicable Essential Requirements of the Directives

Signed by: _____
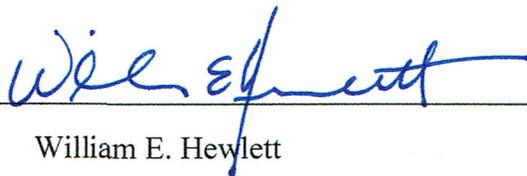
Name:	William E. Hewlett
Position:	Owner / Managing Member
Done at	Running Springs, California, USA
On	July 15, 2015