Technical Reference

020-101449-03

Mirage 4K Serial API Commands

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Content

Mirage 4K Serial API

The Mirage 4K25 and Mirage 4K35 serial API commands can be used to modify projector settings.

Documentation conventions

Convention	Description
Command Sequence Comment	Comment to provide sequence descriptions
(Command/subcode)	Command/subcode sent to the projector
(Response)	Response from the projector
<required arguments>	Mandatory argument for a serial command
[option arguments]	Optional argument for a serial command

ADR–Projector Address

Sets the projector address to target commands to a specific projector when communicating using the Christie Serial Protocol. This command also helps to identify where a response or asynchronous message originates from.

Generally, this command is used for projectors that are daisy-chained together using the RS232 style communication.

Commands

Command	Description	Values
ADR <value>	Sets the projector address to <value>. (Saved value)	0 to 999 65535 = Reserved broadcast address

Examples

Set all devices to address 0.

(65535 ADR 0)

Set first device at address 0 to address to 5.

(0 ADR 5)

Query address for all devices and return results to address 1001.

(65535 1001ADR?)

(01001 00005ADR!005)

ALC–Ambient Light Correction

Adjusts the image to help compensate for brighter or darker ambient light conditions.

Commands

Command	Description	Values
ALC <value>	Adjusts the image to help compensate for ambient light conditions. This command is only available if the video electronics are on. (Save value)	0 = No correction 1 to 100 = Adjusts the image for darker environments -1 to -100 = Adjusts the image for brighter environments

APW–Auto Power Up

Automatically powers up the projector to the On state if the projector was on when the AC power was lost.

For more information about the different power states, see the *PWR–Power* on page 38.

Commands

Command	Description	Values
APW <0 | 1>	Automatically powers up the projector to the on state. (Saved value)	0 = Disables auto power up 1 = Enables auto power up

ASU–Auto Setup

Automatically readjusts various video controls for the active video source to produce an optimal image on screen.

Commands

Command	Description	Values
ASU	Automatically readjusts various video controls for the active video source to produce an optimal image on the screen. This command is only available if the active display has a signal.	-

Examples

Perform auto setup on the active video source.

(ASU)

BDR–Baud Rate

Sets the baud rate for any of the three serial ports on the projector.

Commands

Command	Description	Values
BDR+PRTA <value>	Sets the baud rate for the RS232-IN port. This command requires service level access. (Saved value)	1 = 2400 2 = 9600 3 = 19200 4 = 38400 5 = 57600 6 = 115200(Default baud rate on each port)
BDR+PRTB <value>	Sets the baud rate for the RS232-OUT port. This command requires service level access. (Saved value)	
BDR+PRTC <value>	Sets the baud rate for the RS422 port. This command requires service level access. (Saved value)	

Examples

Set baud rate on port A to 115200 bits per second.

(BDR+PRTA 6)

Verify that RS232-IN is set to 115200bps.

(BDR+PRTA?)

(BDR+PRTA!006 "115200")

BGC–Base Gamma Curve

Applies a predefined gamma transfer function to the image.

Commands

Command	Description	Values
BGC <value>	Applies a predefined gamma transfer function to the image. This command is only available if the video electronics are on. (Saved value)	0 = sRGB (Default) 2 = Power Law Function 3 = M-Series (Standard) 4 = ITU-R BT.709

Examples

Select the sRGB gamma transfer function

(BGC 0)

Select a Power Law Function with a 2.6 Exponent.

(BGC 2)

(GAM 2600)

BST–Built-in Self Test

Performs a number of self-checks in the projector that can be safely executed either in standby, on, or cool down mode. Do not execute this command while the projector is warming up.

Commands

Command	Description	Values
BST?L	Returns a list of available test suites. (Read-only)	-
BST <suite>	Executes the test suite specified.	0 = All Tests 1 = Image processor board tests 2 = Formatter tests 3 = Active backplane tests 4 = Video path tests
BST+TEST?L	Returns a list of available tests. (Read-only)	-
BST+TEST <index>	Executes the specified test.	0 = Video path: CRC check 1 = Video path: CRC check between option cards and input FPGA 2 = ABP/C4BP: Check FPGA voltages 3 = HIP: Check FPGA voltages 4 = HIP: Verify undefined pins 5 = HIP: Memory test 6 = CFB: Check FPGA voltages 7 = CFB138: Memory test 8 = CFB138: EEPROM test 9 = ABP: Test side channel to HIP 10 = HIP: Test side channels

Examples

Retrieve list of test suites/tests as of v1.1.0 software.

(BST?L)

```
(BST!L001 001 00000 "All Tests")
(BST!L001 001 00001 "Image Processor Board Tests")
(BST!L001 001 00002 "Formatter Tests")
(BST!L001 001 00003 "Active Backplane Tests")
(BST!L001 001 00004 "Video Path Tests")
(BST!L111 "--END--")
```

(BST+TEST?L)

```
...
(BST+TEST!L001 001 00000 "ABP: Check FPGA voltages")
(BST+TEST!L001 001 00001 "HIP: Check FPGA voltages")
...
(BST+TEST!L111 "--END--")
```

Run all tests successfully.

(BST 0)

```
(BST!000 "--OK--")
```

Example of failed tests within the All Tests test suite:

(BST 0)

```
(BST!001 "Fail" "no response on pin 1")
(BST!002 "Fail" "no additional details")
(BST!000 "Fail")
```

Example of failing test 1:

(BST+TEST 1)

```
(BST+TEST!001 "Fail" "no response on pin 1")
```

CCA–Color Adjustment

Configures the color adjustments for the projector. Use this command to also set the native colors for the projector.

Commands

Command	Description	Values
CCA+SLCT <value>	Sets the color table. This command is only available if the video electronics are on. (Saved value)	0 = Max Drives Turns off all color adjustments, projector runs at maximum brightness 1 = Color Temperature Selects color adjustments based on a color temperature 2 = HD Video (ITU-R BT.709) 3 = Custom settings
CCA+CTMP <value>	Sets the color temperature of the projector. This command is only available if the video electronics are on, the projector is configured to use Color Temperature for its color table, and Color Temperature is selected. (Saved value)	3200 to 9300
CCA+RDCX <x coordinate for red> CCA+RDCY <y coordinate for red> CCA+GNCX <x coordinate for green> CCA+GNCY <y coordinate for green> CCA+BLCX <x coordinate for blue> CCA+BLCY <y coordinate for blue> CCA+WHCX <x coordinate for white> CCA+WHCY <y coordinate for white>	Defines a custom color table using x,y coordinates, scaled by a factor of 10,000. For example, an x value of 3350 corresponds to x=0.3350 in the CIE 1931 chromaticity scale. This command is only available if the video electronics are on and Custom is selected. (Saved value)	The valid range for each value depends on which of the Red/Green/Blue point is being adjusted.
CCA+GOFR <green of red saturation value> CCA+BOFR <blue of red saturation value> CCA+ROFG <red of green saturation value> CCA+BOFG <blue of green saturation value> CCA+ROFB <red of blue saturation value> CCA+GOFB <green of blue saturation value>	Defines a custom color table using saturation values. Each control represents a percentage of each native RGB component needed to produce a target RGB space. This command is only available if the video electronics are on and Custom is selected. (Saved value)	-1000 to 1000, where 1000 = 100% A negative value reduces the influence of the component by scaling up the other two components.

Command	Description	Values
CCA+ROFR <red of red saturation value> CCA+GOFG <green of green saturation value> CCA+BOFB <blue of blue saturation value>	Defines a custom color table using saturation values. Each control represents a percentage of each native RGB component needed to produce a target RGB space. • Red of red is equivalent to red of white. • Green of green is equivalent to green of white. • Blue of blue is equivalent to blue of white. This command is only available if the video electronics are on and Custom is selected. (Saved value)	0 to 1000, where 1000 = 100%
CCA+ROFW <red of white saturation value> CCA+GOFW <green of white saturation value> CCA+BOFW <blue of white saturation value>	Defines a custom color table using saturation values. Each control represents a percentage of each native RGB component needed to produce a target RGB space. This command is only available if the video electronics are on and Custom is selected. (Saved value)	0 to 1000, where 1000 = 100%
CCA+RDPX <x coordinate for red> CCA+RDPY <y coordinate for red> CCA+GNPX <x coordinate for green> CCA+GNPY <y coordinate for green> CCA+BLPX <x coordinate for blue> CCA+BLPY <y coordinate for blue> CCA+WHPX <x coordinate for white> CCA+WHPY <y coordinate for white>	Sets the native color primaries for the projector using the x,y coordinate form, scaled by a factor of 10,000. For example, an x value of 3350 corresponds to x=0.3350 in the CIE 1931 chromaticity scale. This command is only available if the video electronics are on and Max Drives is selected. It is only available to a service user.	The valid range for each value depends on which of the Red/Green/Blue/White point is being adjusted.
CCA+COPY <value>	Copies the values from one of the other pre-defined color tables into the custom color table. This command is only available if video electronics are on.	0 = Max Drives 1 = Color Temperature 2 = HD Video (ITU-RBT.709)

Command	Description	Values
CCA+SAVE	Saves the current primary settings (for example, CCA+RDPX, and so on) as the new default color primary settings. Save these settings after calibrating the color primaries (such as measuring the primary x,y coordinates using a spectroradiometer or similar equipment). This command is only available if video electronics are on. It is only available to a service user.	
CCA+RSET	Resets the native color primary settings to their defaults. If primary settings have not been saved (CCA+SAVE), this resets the primary settings to hard-coded defaults. This command is only available if video electronics are on. It is only available to a service user.	-

Examples

Use a custom color table.

(CCA+SLCT 3)

Reset values to "HD Video (ITU-R BT.709)".

(CCA+COPY 2)

Change the x-coordinate of the custom color table to 0.6753.

(CCA+RDCX 6753)

Save the current color primary settings as the new calibrated defaults.

(CCA+SAVE)

Reset the color primary settings to the saved calibrated defaults.

(CCA+RSET)

CHA–Channel

Changes the current channel.

Commands

Command	Description	Values
CHA?L	Returns a list of available channels.	-
CHA <channel>	Selects a specified channel. This command is only available if video electronics are on. (Saved value)	1 = Four-Port (slot 1,2) 2 = Four-Port (slot 3,4) 3 = Four-Port (slot 1,2,3,4) 11 = Two-Port (slot 1,2) 12 = Two-Port (slot 3,4) 21 = One-Port (slot 1) 22 = One-Port (slot 2) 23 = One-Port (slot 3) 24 = One-Port (slot 4)

Examples

Retrieve the list of available channels.

(CHA?l)

```
(CHA!L001 001 00001 "Four-Port (slot 1,2)")
(CHA!L001 001 00002 "Four-Port (slot 3,4)")
(CHA!L001 001 00003 "Four-Port (slot 1,2,3,4) (120Hz)")
...
(CHA!L111 "--END--")
```

CLE–Color Enable

Enables specific colors in the video path.

Commands

Command	Description	Values
CLE <color>	Enables specific colors in the video path. This command is only available if video electronics are on.	0 = White 1 = Red 2 = Green 3 = Blue 4 = Yellow 5 = Cyan 6 = Magenta

CSP–Color Space Selection

Changes the color space of the active signal on the screen.

This applies to all inputs.

Commands

Command	Description	Values
CSP <color space>	Changes the color space of the active signal on the screen. This command is only available if video electronics are on. (Saved value)	0 = Auto Detect—Uses the detected colorspace in the active signal. (Default) 1 = RGB (full range) 2 = RGB (limited range) 3 = YCbCr HDTV (ITU-R BT.709) 4 = YCbCr HDTV (explanded range)

Examples

Set the color space to RGB irrespective of which channel is selected.

(CSP 1)

Set the projector to always automatically detect the color space.

(CSP 0)

DEF–Factory Defaults

Resets the projector to its factory default values.

Note the following about the command:

- Only available while the projector is in standby or cooling down.
- The current lamp record is archived and a lamp change must be performed to enter the correct type, serial number, and pre-hours.
- Does **not** delete any existing lamp records.
- The projector must be AC cycled for this command to take effect.

Commands

Command	Description	Values
DEF 111	Performs the factory default command.	111—Must be entered exactly as is

Examples

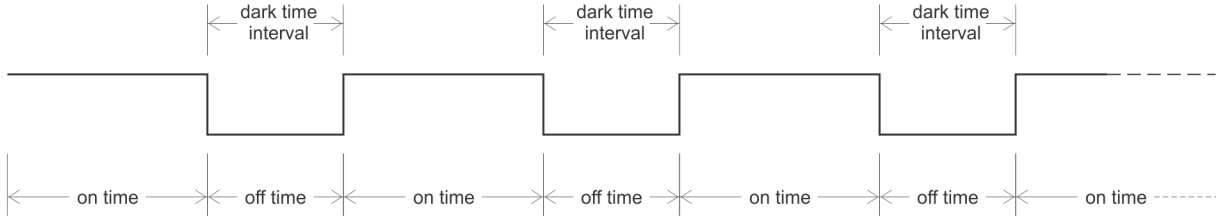
Reset the projector to factory defaults.

(DEF 111)

(65535 00000 FYI00919 “All settings have been restored to their factory defaults. Reboot is required to take effect.”)

DRK–3D Dark Interval

Configures how much time the DMDs stay off between frames, in µs.



Commands

Command	Description	Values
DRK <value>	Configures how much time the DMDs stay off between frames.	200µs to 3000µs 700µs (Deafult)

Examples

Set the dark time interval to 2300µs.

(DRK 2300)

DTL–Sharpness

Adjusts the sharpness of scaled video to alter the amount of visible detail. This command does not affect unscaled video.

Commands

Command	Description	Values
DTL <value>	Adjusts the sharpness of scaled video to alter the amount of visible detail. This command is only available if video electronics are on. (Saved value)	0 to 100 Lower values = Soften the image 50 = Applies a moderate amount of filtering to the image (Default) Higher values = Sharpen the image

EBB–Black Level Blending

Selects the black level blend to use on the projector.

By default, black level blends are not on the projector. Use Twist (or Autocal) to add edge blends to the projector.

Commands

Command	Description	Values
EBB+SLCT?L	Retrieves a list of available black level blends.	-
EBB+SLCT <value>	Selects the black level blend to use on the projector. This command is only available if video electronics are on. (Saved value)	0 = Turns off black level blending (Default) 1 to 4 = Selects one of the four black level blends, if available

EBL–Edge Blending Selection

Selects the edge blend to use on the projector.

By default, edge blends are not on the projector. Use Twist (or Autocal) to add edge blends to the projector.

Commands

Command	Description	Values
EBL+SLCT?L	Retrieves a list of available edge blends.	-
EBL+SLCT <value>	Selects the edge blend to use on the projector. This command is only available if video electronics are on. (Saved value)	0 = Turns off edge blending 1 to 4 = Selects one of the four edge blends, if available

EDO–EDID Override

Configures which EDID is presented using inputs that support EDIDs (such as DisplayPort, HDMI, DVI, and so on).

Use this command to configure what the projector advertises regarding the type of signals it accepts.

This command does not need to be set to accept a particular type of signal.

Commands

Command	Description	Values
EDO <rate>	Defines the expected frame rate regardless of the active window size of the signal. This command is only available if video electronics are on. (Saved value)	24 25 30 48 50 60 (Default) 120
EDO+COLM <value>	Defines the expected active window size of the incoming signal. This command is only available if video electronics are on. (Saved value)	0 = Standard (quadrants) (2048x1080 / 1920x1080) 1 = Two Column (2048x2160 / 1920x2160) 2 = Four Column (1024x2160 / 960x2160)

EME–Enable Asynchronous Serial Messages

Enables or disables the asynchronous serial messages that the projector occasionally transmits.

Commands

Command	Description	Values
EME <0 | 1>	Enables or disables asynchronous serial messages. (Saved value)	0 = Disables all asynchronous FYI/ERR serial messages 1 = Enables asynchronous FYI/ERR serial messages (Default)

ETP–Engine Test Pattern

Enables or disables the engine diagnostic test patterns.

Commands

Command	Description	Values
ETP <index>	Enables the engine diagnostic test patterns, indicated by the <index> parameter. This command is only available if video electronics are on.	0 = Flat Black 1 = Green 2 = Red 3 = Blue 4 = White 5 = 8x8 Green Checker 6 = 8x8 Red Checker 7 = 8x8 Blue Checker 8 = 8x8 White Checker 9 = Convergence Border & Cross (Green) 10 = Convergence Border & Cross (Red) 11 = Convergence Border & Cross (Blue) 12 = Convergence Border & Cross (White) 13 = Convergence Border & Cross (Multi-color) 14 = Convergence Border & Square (Green) 15 = Convergence Border & Square (Red) 16 = Convergence Border & Square (Blue) 17 = Top Blue, Bottom Black 18 = Left Blue, Right Black 19 = Top Green, Bottom Black 20 = Left Green, Right Black 21 = Top Red, Bottom Black 22 = Left Red, Right Black 29 = Convergence Border & Cross (Multi-color2) (green/red colors are swapped) 45 = Convergence Border & Cross (Multi-color3) (green/blue colors are swapped) 235 = Moving Circles (Green) 236 = Moving Circles (Red) 237 = Moving Circles (Blue) 238 = Color Bars 239 = Edge Blend Grid (Green) 240 = Edge Blend Grid (Red) 241 = Edge Blend Grid (Blue) 242 = Edge Blend Grid (White) 243 = 17 Point

Command	Description	Values
		244 = Magenta 245 = Cyan 246 = Yellow 247 = Diagonal Lines 248 = Dark Segmented Ramp 249 = Bright Segmented Ramp 255 = Off

EVT–Event Manager

Retrieves a list of significant log messages for the current AC cycle from the projector.

Commands

Command	Description	Values
EVT	Returns all events starting from the most recent event on the projector back to AC start. (Read-only)	-
EVT <max>	Returns at most <max> events starting from the most recent event on the projector back to AC start. (Read-only)	max = Maximum number of events to return
EVT <start timestamp>	Returns all events from <start timestamp> back to current time. The timestamp has a format of yyyy-mm-dd hh:mm:ss. (Read-only)	start timestamp = String in the following format: yyyy=mm-dd hh:mm:ss
EVT <start timestamp> <end timestamp>	Returns all events from <end timestamp> back to <start timestamp>. The timestamps have a format of yyyy-mm-dd hh:mm:ss. (Read-only)	start timestamp = String in the following format: yyyy=mm-dd hh:mm:ss end timestamp = String in the following format: yyyy=mm-dd hh:mm:ss

Examples

Retrieve all events since last AC start.

(EVT)

```
(EVT!000 "2013-03-17 04:47:18.340" "OK" "Setting Time to 06:47:17")
(EVT!001 "2013-03-17 04:01:13.860" "Error" "(SST+TEMP?003) Lamp
     Exhaust Temperature (Temp 3) = Communication fault (shutdown)")
(EVT!002 "2013-03-17 04:01:13.855" "Error" "(SST+TEMP?002) Air
     Intake Temperature (Temp 2) = Communication fault (shutdown)")
(EVT!003 "2013-03-17 04:01:13.824" "Error" "(SST+TEMP?000) Integrator
     Rod Temperature (Temp 1) = Communication fault (shutdown)")
(EVT!004 "2013-03-17 04:01:12.663" "Error" "(SST+VERS?017) Lamp Power
     Supply Version = Detection fault")
(EVT!"--END--")
```

Retrieve two most recent events.

(EVT 2)

```
(EVT!000 "2013-03-17 04:47:18.340" "OK" "Setting Time to 06:47:17")
(EVT!001 "2013-03-17 04:01:13.860" "Error" "(SST+TEMP?003) Lamp
     Exhaust Temperature (Temp 3) = Communication fault (shutdown)")
(EVT!"--END--")
```

Retrieve all events from a specific point in time until now.

```
(EVT "2013-03-17 04:01:13")
(EVT!000 "2013-03-17 04:47:18.340" "OK" "Setting Time to 06:47:17")
(EVT!001 "2013-03-17 04:01:13.860" "Error" "(SST+TEMP?003) Lamp
     Exhaust Temperature (Temp 3) = Communication fault (shutdown)")
(EVT!002 "2013-03-17 04:01:13.855" "Error" "(SST+TEMP?002) Air
     Intake Temperature (Temp 2) = Communication fault (shutdown)")
(EVT!003 "2013-03-17 04:01:13.824" "Error" "(SST+TEMP?000) Integrator
     Rod Temperature (Temp 1) = Communication fault (shutdown)")
(EVT!"--END--")
```

Retrieve all events between two specific points in time.

```
(EVT "2013-03-17 04:01:08" "2013-03-17 04:01:12")
(EVT!004 "2013-03-17 04:01:12.663" "Error" "(SST+VERS?017) Lamp Power
     Supply Version = Detection fault")
(EVT!"--END--")
```

FCS–Lens Focus Position Adjustment

Sets the lens focus to an absolute position. This command is only enabled when the projector is on.

Commands

Command	Description	Values
FCS <position>	Adjusts the lens focus to the specified position. The position is persistent across AC cycles.	position = A numerical value that is subject to the range returned in FCS?m
FCS?m	Returns the minimum/maximum range of the zoom axis based on the last lens calibration performed. The returned range is persistent across AC cycles.	-

Examples

Move lens focus to position 500.

```
(FCS 500)
```

FRD–Frame Delay

Sets the delay between the input sync timing and the output sync timing, measured in 1/1000^{ths} of a frame (based on the input frame rate). The actual delay can vary based on the amount of processing applied to the image.

Commands

Command	Description	Values
FRD <delay>	Sets the frame delay, measured in 1/1000^{ths} of a frame. This command is only available if video electronics are on. (Saved value)	1000 to 3000 2000 = 2 frames (Default)
FRD+STAT?	Returns the actual frame delay in 1/1000^{ths} of a frame. This value may be higher than the required delay as the minimum allowed delay differs for each of the various channel configurations. (Read-only)	-
FRD+TIME?	Returns a string representation of the actual frame delay, in milliseconds. If 3D processing is used, the left and right eye delay may be different from each other and each delay is reported individually. (Read-only) **Note:** This representation in milliseconds is approximate and is for reference only.	-

Examples

Set the frame delay to 2.25 frames.

(FRD 2250)

Set the frame delay to 1.1 frames.

(FRD 1100)

Query the actual frame delay.

(FRD+STAT?)

(FRD+STAT!1250)

Query the actual frame delay, in ms.

(FRD+TIME?)

(FRD+TIME!"33.33")

Query the actual frame delay for a Dual-Input 3D configuration, in ms.

(FRD+TIME?)

(FRD+TIME!"33.33 (L), 41.67 (R)")

FRZ–Image Freeze

Freezes the active video or test pattern.

Commands

Command	Description	Values
FRZ <0 | 1>	Freezes the active video or test pattern. This command is only available if video electronics are on.	0 = Disable freezing of current video (Default) 1 = Freeze the current video

GAM–Gamma Power Value

Defines the exponent used in a standard Power Law Function. This command is only available if the base gamma curve is set to Power Law Function (see *BGC–Base Gamma Curve* on page 7).

Commands

Command	Description	Values
GAM <exponent>	Sets the exponent for the power law function used for the gamma transfer function. This command is only available if video electronics are on. (Saved value)	1000 to 3000 2200 (Default)
GAM+SLOP <value>	Defines the slope of the linear section at the bottom of the curve.	1 to 100 1 (Default)
GAM+BLKA <value>	Adjusts the contrast ratio of the ITU-R BT.1886 gamma curve. The contrast ratio value is approximate. This command is only available if video electronics are on. (Saved value)	1000 to 5000 2000 (Default)

Examples

Set the base gamma curve function to 2.6

(GAM 2600)

Set the base gamma curve function to 1.0

(GAM 1000)

HIS–Lamp History

Retrieves a history of lamps installed in the projector, including the currently installed lamp. Each entry indicates lamp identification as well as various usage statistics collected while the lamp was installed.

The list is in reverse chronological order—meaning the first entry describes the current lamp, followed by the next most recent lamp, and so on, up to a maximum of 50 total entries.

Commands

Command	Description	Values
HIS?	Returns a list of entries in the lamp history.	Each entry has the following format: *<entry number> <install date> <serial #> <lamp type> <strikes> <failed strikes> <failed re-strikes> <unexpected lamp offs> <pre-installation hours> <total lamp hours>* Entry Number—Unique number identifying the entry Install Date—Date that the lamp entry was created Serial #—Serial number of the lamp (an arbitrary string) Lamp Type—Type of lamp used Strikes—Number of lamp strikes performed for this entry Failed Strikes—Number of failed strikes that occurred for this entry Failed Re-strikes—Number of times the lamp failed a re-strike for this entry Unexpected Lamp Offs—Number of times the lamp unexpectedly turned off for this entry Pre-installation Hours—Number of hours that this lamp has been on, prior to being installed in the projector Total Lamp Hours—Total number of hours (including the pre-installation hours) that the lamp has been on

Examples

(HIS?)

```
(HIS!00000 "8/10/2012 5:22:28 PM" "ymoj2694" "CDXL-30SD" 00078 00001 00000 00000 00304)
(HIS!00001 "7/23/2012 7:58:10 PM" "ydpd3284" "CDXL-20" 00010 00000 00000 00000 00032)
(HIS!00002 "6/9/2012 7:00:50 PM" "yepa2626" "CDXL-30" 00009 00001 00000 00000 00107)
```

ITP–Internal Test Pattern

Enables or disables test patterns.

Commands

Command	Description	Values
ITP <index>	Enables or disables test patterns. This command is only available if video electronics are on.	0 = Off 1 = Grid 2 = Grey Scale 16 3 = Flat White 4 = Flat Grey 5 = Flat Black 6 = Checker 7 = 17 Point 8 = Edge Blend 9 = Color Bars 10 = Multi Color 11 = RGBW Ramp 12 = Horizontal Ramp 13 = Vertical Ramp 14 = Diagonal Ramp 15 = Square Grid 16 = Diagonal Grid 17 = Prism/Convergence 18 = Maximum Activity 19 = FLIR 20 = Focus Fidelity
ITP+FREQ <value>	Sets the frequency at which the internal test patterns are displayed. This command is only available if video electronics are on.	24 to 60 (Default)
ITP+GREY <grey level>	Defines the shade of grey for the Flat Grey test pattern. This command is only available if video electronics are on.	0 to 4095 2048 (Default)
ITP+RMPM <speed>	Defines the motion speed used for the Horizontal Ramp, Vertical Ramp, and Diagonal Ramp test patterns. This command is only available if video electronics are on.	0 (Default) to 100
ITP+RMPS <slope>	Defines the slope used for the Horizontal Ramp, Vertical Ramp, and Diagonal Ramp test patterns. This command is only available if video electronics are on.	1 (Default) to 5
ITP+RMPL <grey level>	Defines the starting (top/left) grey-level used for the Horizontal Ramp, Vertical Ramp, and Diagonal Ramp test patterns. This setting has no effect when the ramp is moving (such as ITP+RMPM is non-zero). This command is only available if video electronics are on.	0 (Default) to 4095

Command	Description	Values
ITP+GRDP <pitch>	Defines the spacing between lines used for the Square Grid and Diagonal Grid test patterns. This command is only available if video electronics are on.	2 to 127 32 (Default)
ITP+GRDC <0 | 1>	Enables multi-color or white-on-black grids for the Square Grid or Diagonal Grid test patterns. This command is only available if video electronics are on.	0 = White-on-black 1 = Multi-color (Default)
ITP+GRDM <0 | 1>	Enables moving or static grid for the Square Grid or Diagonal Grid test patterns. This command is only available if video electronics are on.	0 = Static (Default) 1 = Moving

LCB–Lens Motor Calibration

Calibrates all of the lens motors. This command is only enabled when the projector is on.

Commands

Command	Description	Values
LCB 1	Runs calibration on all lens motors.	-
LCB+HOME	Moves all lens motors back to the center flag for each axis and sets their respective positions to 0.	-

Examples

Start calibration:

(LCB 1)

Move the lens back to the home position:

(LCB+HOME)

LHO–Lens Horizontal Position Adjustment

Sets the lens horizontal location to an absolute position. This command is only available when the projector is on.

Commands

Command	Description	Values
LHO <position>	Adjusts the horizontal location of the lens to the specified position. The position is persistent across AC cycles.	position = Numerical value subject to the range returned in LHO?m
LHO?m	Returns the minimum/maximum range of the zoom axis based on the last lens calibration performed. The returned range is persistent across AC cycles. (Read-only)	-

Examples

Move the lens to position 500 on the horizontal axis.

(LHO 500)

LLM–LampLOC™ Module

Adjusts the lamp position relative to the reflector dish and integrator rod by automatically finding the optimal position for the lamp to achieve maximum brightness. This is referred to as LampLOC™.

LampLOC™ performs lamp motor calibration first and then starts moving the X, Y, and Z motors to find the optimal position for the lamp. If canceled, the lamp is placed in its original position before LampLOC™ was started.

Commands

Command	Description	Values
LLM+AUTO <start>	Starts or stops the LampLOC™. Resets to 0 when finished.	0 = Cancels and restores the previous position 1 = Starts LampLOC™; resets to 0 when finished
LLM+CALI 1	Starts calibration of the LampLOC™ motors.	-
LLM+LGHT?	Returns the current value of the light sensor. The higher the value the brighter the light is. (Read-only)	-
LLM+MOVX <value> LLM+MOVY <value> LLM+MOVZ <value>	Moves the LampLOC™ motors. The motor does not move beyond its maximum range.	-1 = Moves the motor towards the negative end 0 = Stops the motor 1 = Moves the motor towards the positive end of its range
LLM+MTRX <value> LLM+MTRY <value> LLM+MTRZ <value>	Moves the selected motor to the specified position. An out-of-value range leaves the motor at its far end.	X and Y axis maximum range = -250 to +250. Z-axis maximum range = -175 to +175
LLM+RELX <steps> LLM+RELY <steps> LLM+RELZ <steps>	Moves the selected motor by the specified steps relative to its current location. The motor does not move beyond its valid range.	steps = Either a negative or positive value The maximum absolute value is dictated by the motor's current location and the range of the axis (see LLM+MTR commands).
LLM+STAT?	Returns the progress of the automatic LampLOC™ process in terms of percentage complete. A value of 100 indicates that the automatic LampLOC™ process is finished. (Read-only)	-

Examples

Move the motor X to position 100.

(LLM+MTRX 100)

Start LampLOC™.

(LLM+AUTO 1)

Cancel LampLOC™.

(LLM+AUTO 0)

Return 1 if LampLOC™ was started; 0 if LampLOC™ was aborted, reset, or never started.

(LLM+AUTO?)

Return how much LampLOC™ has been completed as a percentage value (0-100).

(LLM+STAT?)

LMV–Lens Move

Adjusts all aspects of the lens position using a single command. It can also be used to move the lens to a relative position or to start and stop the motors arbitrarily. This command is only enabled when the projector is on.

Commands

Command	Description	Values
LMV <horizontal> <vertical> <zoom> <focus>	Moves the lens to an absolute position as specified by each of the four arguments.	Minimum/maximum of each axis = Dependent on the projector and the installed lens See projector mechanical specifications for details.
LMV+HSTP <relative steps>	Moves the horizontal motor a relative number of steps.	negative steps = Moves the display down positive steps = Moves the display up
LMV+VSTP <relative steps>	Moves the vertical motor a relative number of steps.	negative steps = Moves the display down positive steps = Moves the display up
LMV+FSTP <relative steps>	Moves the focus motor a relative number of steps.	negative steps = Focuses inward positive steps = Focuses outward
LMV+ZSTP <relative steps>	Moves the zoom motor a relative number of steps.	negative steps = Makes the display larger positive steps = Makes the display smaller
LMV+HRUN <-1 | 0 | 1>	Starts and stops the horizontal motor.	-1 = Moves the display left 0 = Stops the motor 1 = Moves the display right
LMV+VRUN <-1 | 0 | 1>	Starts and stops the vertical motor.	-1 = Moves the display down 0 = Stops the motor 1 = Moves the display up
LMV+FRUN <-1 | 0 | 1>	Starts and stops the focus motor.	-1 = Moves the display inward 0 = Stops the motor 1 = Moves the display outward
LMV+ZRUN <-1 | 0 | 1>	Starts and stops the zoom motor.	-1 = Makes the display larger 0 = Stops the motor 1 = Makes the display smaller

Examples

Set the lens to H:1000, V:1500, Z:500, F:500.

(LMV 1000 1500 500 500)

Start to move horizontal motor toward positive max position.

(LMV+HRUN 1)

Stop the vertical motor.

(LMV+VRUN 0)

Start moving the zoom motor towards the negative max position.

(LMV+ZRUN -1)

Move the horizontal motor 45 steps in the positive direction.

(LMV+HSTP 45)

LOE–Video Loop Out Enable

Enables or disables video loop out on the following cards: THIC, 3GIC, and TDPIC.

Commands

Command	Description	Values
LOE <0 | 1>	Enables or disables video loop out. This command is only available if video electronics are on and it only applies to option cards that have loopout. (Saved value)	0 = Disables video loop out 1 = Enables video loop out (Default)

LPC–Lamp Change

Informs the projector of a change in lamp including the ID, serial number, and the pre-used hours on the lamp.

Commands

Command	Description	Values
LPC <lamp type> <serial#> [# of hours]	Informs the projector of a change in lamp.	lamp type = Valid index number of a lamp type (see LPC+TYPE?L) serial# = Any valid string # of hours = Number of hours the lamp has been on (optional)
LPC+TYPE?L	Returns a list of supported lamp types. (Read-only)	-

Examples

Add a new lamp record with CDXL-30 as the lamp type, 12345 as the serial number.

(LPC 2 "12345")

Retrieve the list of supported lamps:

(LPC+TYPE?L)

```
(LPC+TYPE!L000 000 00255 "(Select type)")
(LPC+TYPE!L001 001 00001 "CDXL-20")
(LPC+TYPE!L001 001 00002 "CDXL-30")
...
(LPC+TYPE!L111 "--END--")
```

LPL–Lamp Life

Sets the expected lamp life in hours. If the lamp run time exceeds this value, a warning is displayed in the status system.

The lamp run time is equal to the lamp's original lamp hours plus the amount of time it has been on while installed in the projector.

Commands

Command	Description	Values
LPL <hours>	Sets the number of hours before a warning is displayed in the status system about the lamp needing to be replaced. (Saved value)	Positive number 0 = Disables the lamp end-of-life check (Default)

Examples

Set the lamp end of life indicator to 1000 hours.

(LPL 1000)

Disable the lamp life monitoring.

(LPL 0)

LPM–Lamp Mode

Switches between using the lamp in Constant Power mode or Constant Intensity mode (LiteLOC™).

Commands

Command	Description	Values
LPM <0 | 1>	Switches between using the lamp in Constant Power mode or Constant Intensity mode (LiteLOC™). (Saved value)	0 = Enables Constant Power mode (Default) 1 = Enables Constant Intensity mode

Examples

Use Constant Power mode.

(LPM 0)

Lock the current light output level by switching to Constant Intensity mode.

(LPM 1)

LPP–Lamp Power

Sets the amount of power going to the lamp while in Constant Power mode. The minimum and maximum lamp power allowed is governed by the type of lamp currently selected.

Only set this command when the projector is in Constant Power mode. While the projector is in Constant Intensity mode, this command returns the lamp power setting being used.

Commands

Command	Description	Values
LPP <power>	Sets the power going to the lamp in watts. (Saved value)	power = Number of watts to run the lamp at This is dependent on the type of lamp being used.
LPP?m	Returns the minimum and maximum power allowed for the current lamp. (Read-only)	-

Examples

Set the power to 2000W.

(LPP 2000)

LVO–Lens Vertical Position Adjustment

Sets the lens vertical location to an absolute position. This command is only enabled when the projector is on.

Commands

Command	Description	Values
LVO <position>	Adjusts the vertical location of the lens to the specified position. This position is persistent across AC cycles. (Saved value)	postion = A numerical value that is subject to the range returned in LVO?m
LVO?m	Returns the minimum/maximum range of the vertical axis based on the last lens calibration performed. The returned range is persistent across AC cycles. (Read-only)	-

Examples

Move the lens to position 500 on the vertical axis.

(LVO 500)

NET–Network Setup

Changes the network configuration for the Ethernet port. By default, DHCP support is turned on.

Commands

Command	Description	Values
NET <ip> <subnet> [gateway]	Sets the projector network settings as specified. (Saved value)	All three arguments are strings and the gateway is optional.
NET+DGRP <group>	Sets the device group name for the projector. (Saved value) This can help simplify broadcast searching by organizing projectors into groups, particularly if a large number of projectors are on the same local network.	-
NET+DHCP 1	Enables DHCP. To turn off DHCP support, switch to a static IP by using the base command. (Saved value)	-
NET+ETH0?	Returns the projector IP address. (Read-only)	-
NET+GATE?	Returns the projector gateway address. (Read-only)	-
NET+HOST <name>	Sets the name for the projector. With this set, devices on the same network subnet as the projector can connect to it using the name: <name>.local. (Saved value)	-
NET+MAC0?	Returns the MAC address of the Ethernet port. (Read-only)	-
NET+PORT?	Returns the TCP port used for the Christie Serial Protocol over Ethernet. (Read-only)	1024 to 49151 (with some exceptions) 3003 = Reserved on the projector and cannot be used for the Christie Serial Protocol
NET+SUB0?	Returns the projector netmask. (Read-only)	-

Examples

Set the static IP address to 192.168.1.100, with a netmask of 255.255.255.0, and no gateway:

(NET "192.168.1.100" "255.255.255.0")

Turn on DHCP support:

(NET+DHCP 1)

NTR–Network Routing

Enables or disables routing of Christie Protocol messages between the RS232, RS422, and Ethernet

ports.

RS232-IN and RS232-OUT are always joined, regardless of the NTR setting.

Commands

Command	Description	Values
NTR <value>	Enables or disables routing of Christie Protocol messages. (Saved value)	0 = Separate (Default) 1 = RS232 and RS422 joined 2 = RS232 and Ethernet joined 3 = All joined (includes USB)

Examples

Route messages between the RS232 ports to/from the RS422 port.

(NTR 1)

PNG–Ping

Returns basic projector information to the user, including the type of device and main software version.

Commands

Command	Description	Values
PNG?	Returns basic projector information (Read-only): <type> <major> <minor> <build> where Type = type of projector Major, Minor, Build = Software version	type valid values: 54 = D4K-60, Mirage 4K 55 = Boxer 4K30

Examples

Send a ping to a D4K-60 or Mirage 4K projector with v1.1.0 software.
(PNG?)

(PNG!054 001 001 000)

PRO–Profile

Allows selection of a local profile on the projector.

Commands

Command	Description	Values
PRO?L	Returns the list of available local profiles. (Read-only)	-
PRO x	Selects local profile *x* and applies the profile to the projector. Selecting an empty profile does not do anything.	0 = Default 1 = <custom 1> 2 = <custom 2> 3 = <custom 3> 4 = <custom 4>

PWR–Power

Turns the projector power on and off.

Commands

Command	Description	Values
PWR <0 | 1>	Turns the projector on or off.	0 = Turns the projector off 1 = Turns the projector on
PWR+ELEC <0 | 1>	Keep video electronics on in standby, regardless of lamp state.	0 = Disables electronics override 1 = Enables electronics override
PWR?	Returns the current power state of the projector (Read-only): 000 = Standby 011 = Warming up 001 = On 010 = Cooling down	-

Examples

Turn on the projector.

(PWR 1)

Turn off the projector.

(PWR 0)

Return current state of the power to the projector.

(PWR?)

(PWR!000 "Power Off")

RAL–Remote Access Level

Sets the default remote serial protocol access level for any of the serial ports.

Commands

Command	Description	Values
RAL+PRTA <value>	Sets the access level for the RS232-IN port. (Saved value)	0 = No Access—Disables the port 1 = Login Required—Sets read-only access until a separate login is performed 2 = Free Access—Executes commands at the operator level unless a separate login is performed (Default)
RAL+PRTB <value>	Sets the access level for the RS232-OUT port. (Saved value)	
RAL+PRTC <value>	Sets the access level for the RS422 port. (Saved value)	
RAL+PUSB <value>	Sets the access level for the USB port. (Saved value)	

Examples

Set port to Login Required.

(RAL+PRTC 1)

SHU–Shutter

Opens and closes the shutter. It can also be used check if the shutter is currently opened or closed.

This command may return an incorrect result if the shutter was manually opened or closed.

Commands

Command	Description	Values
SHU <0 | 1>	Opens or closes the shutter.	0 = Opens the shutter 1 = Closes the shutter (Default)

Examples

Open the shutter.

(SHU 0)

Close the shutter.

(SHU 1)

Get the state of the shutter (0 for open, 1 for closed).

(SHU?)

SNM–SNMP Configuration

Configures SNMP support for the projector.

Commands

Command	Description	Values
SNM+TIP1 <ip address> SNM+TIP2 <ip address> SNM+TIP3 <ip address>	Sets up to three IP addresses for traps to be sent. (Saved value)	ip address = String value 0.0.0.0 disables notifications (Default)
SNM+READ <password>	Sets the password for SNMP notifications. (Saved value)	password = String value Default password = private
SNM+LAMP <0 | 1>	Enables or disables Lamp State SNMP traps. (Saved value)	0 = Disables Lamp State SNMP traps 1 = Enables Lamp State SNMP traps
SNM+LIFE <0 | 1>	Enables or disables Lamp End-Of-Life SNMP traps. (Saved value)	0 = Disables Lamp End-Of-Life SNMP traps 1 = Enables Lamp End-Of-Life SNMP traps
SNM+POWR <0 | 1>	Enables or disables Power On/Off SNMP traps. (Saved value)	0 = Disables Power On/Off SNMP traps 1 = Enables Power On/Off SNMP traps
SNM+STAL <0 | 1>	Enables or disables Fan Stall SNMP traps. (Saved value)	0 = Disables Fan Stall SNMP traps 1 = Enables Fan Stall SNMP traps
SNM+THRM <0 | 1>	Enables or disables Thermal warning/error SNMP traps. (Saved value)	0 = Disables Thermal warning/error SNMP traps 1 = Enables Thermal warning/error SNMP traps

SOR–Screen Orientation

Changes the orientation of the displayed image.

Commands

Command	Description	Values
SOR <value>	Changes the orientation of the displayed image. This command is only available if video electronics are on. (Saved value)	0 = Front Projection (Default) 1 = Rear Projection 2 = Front Projection Inverted 3 = Rear Projection Inverted

SST–Status

Returns status information about the projector in read-only mode. See the Status System documentation for a list of items and their possible values.

Each item is listed in the following format:

(SST+<group>!<index> <state> "<value>" "<description>")

where:

- <group> is the four letter identifier of the status system group the item belongs to.

- <index> is the index value of the status item within the group.
- <state> is the condition of the status item:

  000 = OK

  001 = Warning

  002 = Error
- <value> is the value of the status item.
- <description> is the descriptive name of the status item.

Commands

Command	Description	Values
SST?	Returns all status items.	-
SST+<group>?	Returns all status items within the specified four-letter group identifier.	-
SST+<group>?<index>	Returns a specific status item within the specified four-letter group identifier.	-

Examples

The following example was reduced for brevity.

(SST+TEMP?)

```
...
(SST+TEMP!000 000 "21 °C" "Integrator Rod Temperature (Temp 1)")
(SST+TEMP!002 000 "21 °C" "Air Intake Temperature (Temp 2)")
(SST+TEMP!003 000 "21 °C" "Lamp Exhaust Temperature (Temp 3)")
(SST+TEMP!020 000 "28 °C" "Environmental Board Temperature")
...
```

Return item 20 of the temperature group.

(SST+TEMP?20)

```
(SST+TEMP!020 000 "28 °C" "Environmental Board Temperature")
```

SZP–Size and Position

Changes the aspect ratio of the display.

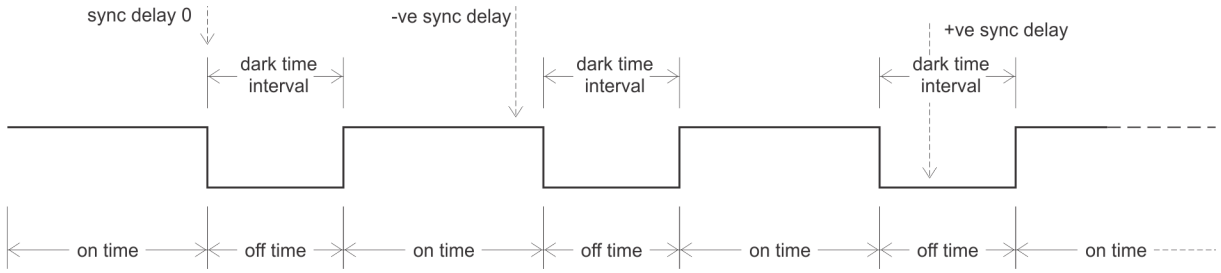
By default, the projector scales all video to the full screen with the exception of 16:9 content. 16:9 content is scaled to 3840x2160 with black pillar boxes on either side.

Commands

Command	Description	Values
SZP <value>	Changes the aspect ratio of the display. This command is only available if video electronics are on. (Saved value)	0 = Allows the projector to determine when to scale video (Default) 1 = None 2 = Full size (stretch horizontally and verticallY) 3 = Full width (stretch horizontally) 4 = Full height (stretch vertically)

TDD–3D Sync Delay

Configures where the sync pulse occurs in relation to the transition from on time to off time in the DMDs, in µs.



Commands

Command	Description	Values
TDD <value>	Configures where the sync pulse occurs.	0 = Lines up the sync pulse with the transition (Default) Negative value = Configures the sync pulse to be slightly before the transition Positive value = Configures the sync pulse to be slightly after the transition

TDM–3D Mode

Controls when input signals are processed as 3D or not.

Commands

Command	Description	Values
TDM <1 | 2>	Controls when input signals are processed as 3D or not.	1 = Automatically determines whether to enable 3D processing or not. When input signals are 60Hz or less, no frame doubling or tripling occurs unless a Dual Input 3D channel is selected. (Default) 2 = Configures the projector to enable 3D processing where possible. Frame doubling occurs when input signals are 60Hz. Frame tripling occurs when input signals are 48-50Hz.

TDN–Invert 3D Input

Inverts the left and right eye frames.

Commands

Command	Description	Values
TDN <0 | 1>	Inverts left and right eye frames.	0 = Leaves the left and right eye frames in their default order (Default) 1 = Reverses the order of the left and right eye frames

TDO–3D Sync Out

Configures the 3D Sync OUT port for either an emitter or for another downstream projector.

Commands

Command	Description	Values
TDO <0 | 1>	Configures the 3D Sync OUT port.	0 = Configures the 3D Sync OUT port to be fed directly to a 3D emitter, including any 3D sync delay (see *TDD–3D Sync Delay* on page 44) and/or sync inversion (see *TDN–Invert 3D Input* on page 45) (Default) 1 = Configures the 3D Sync OUT port to be fed to another downstream projector, without including any 3D sync delay or inversion

TDT–3D Test Pattern

Enables or disables the 3D test pattern.

Commands

Command	Description	Values
TDT <0 | 1>	Enables or disables the 3D test pattern.	0 = Disables the 3D test pattern 1 = Enables the 3D test pattern

TMD–Time and Date

Sets the date and time in the real-time clock.

Commands

Command	Description	Values
TMD+TIME <time>	Sets the time for the clock.	time = String in the following format: hh:mm:ss
TMD+DATE <date>	Sets the date for the clock.	date = String in the following format: YYYY/MM/DD

Examples

Set the time to 3pm.

(TMD+TIME "15:00:00")

Set the date to September 17th, 2014.

(TMD+DATE "2014/09/17")

Get the local time.

(TMD+TIME?)

The following results are displayed:

```
Index   IP                Serial       Time
@m 0    192.168.228.45    0x0024e999   17:50:45
```

UID–User ID

Changes the access level of the currently connected session.

Commands

Command	Description	Values
UID <username> <password>	Logs in using the specified user name and password.	-

Examples

Login as service using the default password.

```
(UID "service" "service")
```

WRP–Warp Selection

Selects the warp map to use on the projector.

By default, warp maps are not on the projector. Use Twist (or Autocal) to add warp maps to the projector.

Commands

Command	Description	Values
WRP+SLCT?	Retrieves a list of available warp maps. (Read-only)	-
WRP+SLCT <value>	Changes the warp map to use on the projector. This command is only available if video electronics are on. (Saved value)	0 = Turns off warping 1-4 = Selects one of four warp maps, if available

ZOM–Lens Zoom Position Adjustment

Sets the lens zoom to an absolute position. This requires a zoom motor on the lens for it to work. This command is only available when the projector is on.

Commands

Command	Description	Values
ZOM <position>	Adjusts the lens zoom to the specified position. The position is persistent across AC cycles.	position = A numerical value that is subject to the range returned in ZOM?m
ZOM?m	Returns the current minimum and maximum values for the zoom position based on the last lens calibration performed. The returned range is persistent across AC cycles.	-

Examples

Get the current minimum/maximum values for the zoom axis.

(ZOM?m)

(ZOM!M-2400 900)

Move the lens to position 500 for the zoom motor.

(ZOM 500)

Asynchronous messages

The projector can generate some asynchronous messages. The following lists examples of each message, including why and when they are generated.

Bolded and underlined text indicates a fixed part of the message.

Type	Message	Description
Card Detected	(**65535 00000 FYI01901 "Card** x **detected**")	Triggered when a new card is detected in slot X while the video electronics are already on.
Card Removed	(**65535 00000 FYI01901 "Card** x **removed**")	Triggered when a card is removed from slot X while the video electronics are on.
Date/Time	(**65535 00000 FYI00916** "Setting Date to 2014/06/20")	Generated when the date or time are changed, respectively.
	(**65535 00000 FYI00916** "Setting Time to 00:00:00")	
Factory defaults	(**65535 00000 FYI00919** "All settings have been restored to their factory defaults. Reboot is required to take effect.")	Generated when a factory default has been performed on the projector.

Type	Message	Description
Networking	(**65535 00000 FYI00915** "Configured network: IP:192.168.228.6 Mask:255.255.252.0 Gateway:192.168.228.1")	Generated when the network settings have changed. Network settings can change due to a number of specific events such as: • Operator changes the network settings (through any of the standard interfaces). • DHCP lease is renewed. • The network cable has been unplugged or plugged in.
Status	(**65535 00000 FYI00000 "(SST**+LAMP?001) Lamp Hours = 00:00 (h:m)")	Generated when a status item changes from an error or warning state to an OK state.
	(**65535 00000 ERR00000 "System Warning: (SST**+LAMP?001) Lamp Hours = N/A")	Generated when a status item changes from an OK or error state to a warning state.
	(65535 00000 ERR00000 "System Error: (SST+VERS?003) Image Processor HW Version = Detection Fault")	Generated when a status item changes from an OK or warning state to an error state.

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